DISCUSSION OF A REGIONAL AGREEMENT FOR SMALL CETACEAN CONSERVATION IN THE INDIAN OCEAN

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ABSTRACT

Multiple and cumulative anthropogenic threats are having an increasing impact on cetacea around the world. While the International Whaling Commission actively manages the twelve great whales, there are few small cetacean-specific regimes. The complexity of threats and the geopolitical ranges these animals inhabit makes an all-encompassing international regime difficult to consider at this stage. Regional agreements under frameworks such as the Convention on the Conservation of Migratory Species of Wild Animals offer a viable alternative. This article explores the efficacy of a regional agreement over the Indian Ocean and associated seas to protect small cetacea from the full range of anthropogenic threats they face. It also advances the proposition that such an agreement would be a valuable step towards global cetacean conservation, through a network of interconnected regional agreements, but also through greater regional cooperation and domestic capacity for marine management.

I. INTRODUCTION

As progress is made on the sustainable management of biological diversity, the importance of linkages with ecological and economic issues also increases . . . Cetacean conservation is also a field that requires cooperative arrangements and management, mainly due to the important migratory patterns of these marine mammals and the international trade that affects them . . . In order to render these synergies more efficient, it would be advisable to include measures on cetacean conservation in the early negotiations stages of international agreements and conventions.[1]

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1. Klaus Topfer, Executive Director, United Nations Environment Programme (UNEP), *Editorial,* ACCOBAMS BULLETIN 3 (2000).

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The rise in anthropogenic threats in the last four decades has placed an increased stress on cetacean populations around the world. Surviving wild populations of at least four species are now highly threatened. Numbers of the baiji *Lipotes vexillifer*, vaquita *Phocoena sinus,* northern right whale *Eubalaena glacialis* and Indus River dolphin *Platanista minor* remain in the low to mid hundreds.[2] The populations of the baiji[3] and vaquita[4] are known to be in a critical condition. Many other species, such as the Dall's porpoise *Phocoedoides dalli*, striped dolphin *Stenella coeruleoalba* and beluga *Delphinapterus leucas* continue to be subjected to large-scale bycatch or hunting without adequate knowledge of population size, ability for population recovery, or satisfactory management considerations.

In the face of the often-cumulative threats, it remains incongruous that cetacea are also revered in many areas of the world. Some societies regard cetacea as sacred,[5] whereas others attribute them a special status that expresses itself as a strong public sentiment for their conservation and ultimate protection.[6] Many regard cetacea as holding a significant intrinsic value. At the most basic level, they are high order predators, whose health reflects the ecosystem in which they live.[7]

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2. RANDALL REEVES & STEPHEN LEATHERWOOD, DOLPHINS, PORPOISES AND WHALES: 1994-1998 ACTION PLAN FOR THE CONSERVATION OF CETACEANS 39 (Int'l Union for the Conservation of Nature and Natural Resources, Gland, Switzerland 1994).

3. Zhour Kaiya & Li Yuemin, *Status and Aspects of the Ecology and Behaviour of the Baiji,* Lipotes vexillifer, *in the Lower Yangtze River, in* BIOLOGY AND CONSERVATION OF THE RIVER DOLPHINS, OCCASIONAL PAPERS OF THE IUCN SPECIES SURVIVAL COMMISSION, NO. 3 86-91 (William F. Perrin et al. eds., The World Conservation Union, 1989).

4. REEVES & LEATHERWOOD, *supra* note 2, at 35.

5. In ancient Greece, dolphins were held in such high regard that killing them was tantamount to killing a person. Both crimes were punishable by the death penalty. Dolphins appear frequently in classical Greek mythology linked with the gods. Many ancient cultures such as Aborigines, Maoris, Polynesians and American Indians traditionally regarded dolphins as sprits, messengers from the gods or even human beings living in the sea. MARK CARWARDINE, THE BOOK OF DOLPHINS 96-97 (1996). *See generally* DAVID LAVIGNE ET AL., THE EVOLUTION OF NORTH AMERICAN ATTITUDES TOWARDS MARINE MAMMALS (John Twiss Jr. & Randall Reeves, eds., 1999); JOHN TWISS JR. & RANDALL REEVES, CONSERVATION AND MANAGEMENT OF MARINE MAMMALS 10-48 (1999); Hal Whitehead et al., *Science and the Conservation, Protection, and Management of Wild Cetaceans, in* CETACEAN SOCIETIES: FIELD STUDIES OF DOLPHINS AND WHALES 331-32 (Janet Mann et al., eds., 2000).

6. Kellert's study found that less than one fifth of Americans support the killing of presumably abundant species of whales for commercial purposes. There were similar results for dolphins. STEPHEN R. KELLERT, AMERICAN PERCEPTIONS OF MARINE MAMMALS AND THEIR MANAGEMENT 9-19 (1999). *See also* Joint Standing Committee on Treaties, The Parliament of the Commonwealth of Australia, AMENDMENTS PROPOSED TO THE INT'L WHALING COMMISSION, REPORT 23 (1999) ("We re-affirm the previous Committee's view that continuation of whaling, in any form and by any nation or group, is repugnant to many Australians.").

7. Hugo Nijkamp & Andre Nollkaemper, *The Protection of Small Cetaceans in the Face of Uncertainty: An Analysis of the ASCOBANS Agreements,* 9 GEO. INT'L ENVTL. L. REV. 281, 301(1997); Hugo P. Castello, *An Introduction to the Dolphins and Whales, in* THE CONSERVATION OF WHALES AND DOLPHINS 1, 10 (Mark P. Simmonds & Judith D. Hutchinson eds., 1996).

The synergistic effects of threats on cetacea remain difficult to manage with current environment protection arrangements. Their survival is affected by fisheries competition and bycatch, habitat degradation, pollution, climate change, ozone depletion and directed hunts. Conservation instruments available to address these threats are often discrete and often not well applied nationally or internationally. The geographical range of many cetacean populations and the overlay of State and international jurisdictions they inhabit further complicate management.[8] Few international mechanisms both address these threats and provide high levels of protection to small cetaceans.

One of the few cetacean-specific regimes that exists, the *International Whaling Commission* (IWC), formally manages the twelve great whales.[9] There is a strong legal case that the IWC's responsibility and competency extends to all cetacea,[10] but political debate continues as to whether the IWC has "competence" to manage remaining species of so-called "small cetacea."[11] In reality, while there is a global moratorium on directed kills of the great whales (with exemptions made for indigenous hunts), there is no such moratorium on small cetacea.[12] Of the approximate thirty-three species of cetacea resident in the Indian Ocean region, the majority is small cetacea.

Building on the first IWC Scientific Committee's *State of the Cetacean Environment Report,*[13] this article reviews the documented threats and explores a proposal for a regional agreement over the Indian Ocean and associated seas to protect small cetacea from the full range of anthropogenic threats—*An Agreement for the Conservation of [Small] Cetaceans of the Indian Ocean and Associated Seas.*

In 2000, the IWC and *Convention on the Conservation of Migratory Species of Wild Animals* (CMS) signed a Memorandum of Understanding that articulated a desire for closer cooperation with the IWC, signaling a move towards acceptance of the CMS' role in cetacean management.[14] CMS

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8. For reference to more general natural resource management regimes, *see generally* ORAN R. YOUNG, INTERNATIONAL GOVERNANCE: PROTECTING THE ENVIRONMENT IN A STATELESS SOCIETY 73 (1994).

9. For a full outline of the International Convention for the Regulation of Whaling (ICRW) nomenclature and the discrepancies of inclusion and exclusion of species from nomenclature listing *see* Alexander Gillespie, *Small Cetaceans, Int'l Law and the Int'l Whaling Comm'n*, MELB. J. INT'L L. 2 (2001).

10. *See* Patricia W. Birnie, *Cetaceans and the Int'l Whaling Comm'n,* 10 GEO. INT'L ENVTL. L. REV. 1, 23-25 (1997); Alexander Gillespie, *Small Cetaceans, Int'l Law and the Int'l Whaling Comm'n*, 2 MELB. J. INT'L L. 258, 267-92 (2001).

11. IWC DOC. IWC/51/20, IWC'S COMPETENCE TO MANAGE SMALL CETACEANS, AGENDA 19 (1999); James Cameron, *Legal Opinion: Analysis of the Competence to Conserve Small Cetaceans in EEZ and Territorial Waters, in* THE WAR AGAINST SMALL CETACEANS (Envtl. Investigation Agency 2d Report, 1992).

12. INT'L WHALING COMMISSION, CHAIRMAN'S REPORT OF THE 42ND ANNUAL MEETING 10 (1990).

13. Mark Simmonds et al., *Prototype State of the Cetacean Environment Report* (SOCER), Paper Submitted to the Int'l Whaling Commission Scientific Committee, IWC Doc. SC/52/E29 (2000).

14. *Memorandum of Understanding Between the Secretariat of the IWC and the Secre-*

has been building its complementary competency in the area of cetacean conservation since 1985, when it listed five great whales and proposed Indus River dolphin for listing on Appendix I, while recognizing the need to include a number of other small cetacea species on the Appendixes.[15] The meeting established a working group on small cetacea that was required to work with appropriate national and international organizations, with a clear inference to the IWC, and the listing of cetacea on CMS Appendix has continued at a steady pace with forty-one populations listed as of 2001.

Addressing the argument that CMS and IWC cannot coexist as complementary tools for management, the Second Meeting of the CMS Parties stated that:

> the coverage of any given species in another convention was not, per se, an argument against the coverage in the [CMS] convention. The International Whaling Convention, for example, was mainly concerned with matters such as catch levels rather than habitat protection.[16]

The Agreement proposed by this article seeks to extend the work already in progress by CMS and as such would function under the CMS as one of a growing network of regional agreements for the conservation of cetacea. The urgent need to find viable management options for small cetacea increases as each year passes. For many species there is little time left. The status of many more remains unknown to us and environmental threats grow greater each year.

I. ENVIRONMENTAL THREATS EXPERIENCED BY CETACEA IN THE INDIAN OCEAN

Like many of our environmental problems, the forces working against cetacean survival originate primarily from human activities. This has been recognised by both the Scientific Committee of the IWC and the Cetacean Specialist Group within the International Union for the Conservation of Nature and Natural Resources (IUCN) Species Survival Commission. IUCN's recent emphasis has been on river dolphins and coastal cetacea, recognising that with the exception of northern right whales this group encompasses "the most critically endangered [cetacean] species whose exceptional vulnerability is often tied to a geographically restricted range, a relatively narrow ecological niche, and a dependence on resources that are also used by humans."[17]

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tariat of the CMS, in ANNUAL REPORT OF THE INTERNATIONAL WHALING COMMISSION (IWC, 2000).

15. CMS, PROCEEDINGS OF THE FIRST MEETING OF THE PARTIES, 2, 23 (1987).
16. CMS, PROCEEDINGS OF THE SECOND MEETING OF THE PARTIES (1988).
17. REEVES & LEATHERWOOD, *supra* note 2, at vii.

Further, in 1993 the IWC requested that the Scientific Committee "give priority to research on the effects of environmental changes on cetaceans in order to provide the best scientific advice for the Commission to determine appropriate response strategies to the new challenge."[18]

The IWC Standing Working Group on Environmental Concerns agreed to report on a number of key areas:

1. Climate/environmental change including Ozone and UV-B radiation,
2. Habitat degradation,
3. Chemical pollution,
4. Impact of noise,
5. Direct and indirect effects of fisheries,
6. Disease and mortality events, and
7. Arctic issues (given the specific regional nature this is not addressed in this discussion).

Implicit in their ongoing study is the synergistic and cumulative effects of all of these factors.[19] During the 52nd Annual Scientific Committee Meeting of the IWC, Simmonds and others reported with the first *State of the Cetacean Environment Report*.[20] However, beyond this simple reporting mechanism, and while its Scientific Committee remains the pre-eminent body for cetacean research and the management of issues associated with the species of great whales, the IWC has shown limited capacity to address wider cetacean conservation beyond the passing of resolutions.[21] By way of example, the symposium and workshop looking at the impact of gillnets on cetacea concluded that bycatch represents one of the most serious threats facing cetacea, but having studied the problem for a number of years, the IWC working group found that it could offer no solutions.[22] The IWC as a body lacks the management capacity to extend its management beyond directed

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It should be noted that this particular emphasis is based on current knowledge of what constitutes species. However, cetacean species and populations are far from fully characterized and taxonomy for many—particularly following the application of modern genetic techniques—is in a state of flux. Further study may reveal far higher levels of species in danger than is presently understood.

Letter from Mark Simmonds, Visiting Research Fellow in Wildlife Conservation at the University of Greenwich to Margi Prideaux (Jan. 2002) (on file with author).

18. *See* Peter J. H. Reijnders et al., *Report of the workshop on chemical pollution and cetaceans*, 1 J. CETACEAN RES. MGMT. (SPECIAL ISSUE) 1, 1 (1999).

19. *Id.*

20. Simmonds et al., *supra,* note 13.

21. For a list of fourteen resolutions between 1990 and 1996 *see* Birnie, *supra* note 10, at 24 n.98.

22. *Gillnets and Cetaceans, Incorporating the Proceedings of the Symposium and Workshop on the Mortality of Cetaceans in Passive Fishing Nets and Traps*, REPORT OF THE INT'L WHALING COMMISSION, SPECIAL ISSUE 15 (1994).

rected hunts into the more difficult area of environmental threats and ecosystem management.[23]

The following section focuses on the Indian Ocean region and builds on the information from the first *IWC State of the Cetacean Environment Report* by further highlighting the environmental threats of this particular region, building the case for management need of threats beyond directed takes.

A. Climate/Environmental Change Including Ozone and UV-B Radiation

The global climate change predictions translate to potential habitat and food loss for many coastal and polar dwelling animals. As sea level and temperature rises, coastal ecosystems may dramatically change, potentially reducing breeding habitat for many fish species. This impact may translate up the food chain to the higher order predators. In addition, the habitat range of inner coastal species of cetacea may also be lost. Humans and cetacea will find themselves in competition for these areas and potentially dwindling fish stocks.

There is little doubt that current climatic changes will have wide ranging implications for the Southern Ocean marine environment. The ecological links between the Southern and Indian Oceans are clear— cetacea being one of many species groups that engage in annual migrations between the two.

At a global scale the impacts of climate change are likely to be focused on changes in polar sea ice (and the association with a major cetacean food source—krill), changes in upwelling patterns across the oceans, and sea level rise.[24] In localised areas there will also be changes in upwelling and nearshore circulation, storm frequency and severity, increased cloudiness, changing patterns of solar radiation penetration on critical coastal ecosystems, and changes in precipitation and run-off.[25]

Studies of the El Niño Southern Oscillation patterns indicate that even small shifts in meteorological and oceanographic patterns can have significant impact on marine productivity and food web stability.[26] These concerns can likely be translated to other oscillation patterns.

While climate variability in the Indian Ocean is probably independent of the El Niño/Southern Oscillation, research does indicate that there is a con-

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23. *See* Birnie, *supra* note 10 at 25; Gillespie, *supra* note 10, at 2.

24. William C.G. Burns, *From the Harpoon to the Heat: Climate Change and the Int'l Whaling Comm'n in the 21st Century, in* OCCASIONAL PAPER OF THE PACIFIC INSTITUTE FOR STUDIES IN DEVELOPMENT, ENVIRONMENT, AND SECURITY 12-15 (2000).

25. Robert T. Lester, *The Potential Effects of Global Climatic Disruption on Coral Reef Ecosystems in* COASTAL ZONE '98, PROCEEDINGS OF THE 6TH SYMPOSIUM ON COASTAL AND OCEAN MANAGEMENT 3045, 3047-49 (1989).

26. Dominique Limberger, *El Niño's Effect on South American Pinniped Species, in* GLOBAL ECOLOGICAL CONSEQUENCES OF THE 1982-83 EL NIÑO OSCILLATION 417, 428 (P.W. Glynn ed., 1990).

sistent temperature rise in this region[27] that may have contributed to several coral bleaching episodes over the past two years. Water temperatures between three and five percent above normal were recorded in 1998.[28] However, our ability to assess impacts at a regional level remains limited.[29]

For species that have evolved to find food in a highly patchy environment—such as mysticetes seeking krill—shifts in food sources through the change in upwelling patterns and prey aggregation may create difficulties in securing food. The combined effect of the net decrease in plankton (and therefore krill supply) and the changes in food distribution should be considered a potential threat to animals that migrate vast distances and have high metabolic requirements.[30]

Coastal and low lying populations will be most directly affected by climate change impacts in terms of land area loss, but their marine environment may further deteriorate through increased coastal erosion and habitat loss from rising sea levels—particularly mangrove, seagrass, and coral reef die off. As the wider impacts of climate change take effect, the practices of coral reef mining, construction of harbor jetties and breakwaters, and inadequate disposal of sewage and toxic chemicals[31] will leave human communities, coastal cetacean populations, and marine biodiversity more vulnerable to climate stress.

In addition to the potential large-scale changes to ocean systems, more localised effects of the warming of tropical seas should also be considered. Warming tropical waters has been shown to increase the incidence and rate of transmission of pathogens, making cetacea who breed and rear young in the tropics vulnerable to disease and immunological stress.[32]

Coral reefs are of major importance for wider marine ecosystem-based management. Their function as a barrier to coastal erosion, as an important source of local food supply and nursery habitat, and as a nature-based tourism source are especially important given their location in the developing tropics around the world.[33] In his 1984 report, Rodney V. Salm offered several guidelines for coral reef reserves that remain relevant for mitigation

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27. Peter J. Webster et al., *Coupled Ocean-Atmosphere Dynamics in the Indian Ocean During 1997-98*, NATURE, Sept. 23, 1999, at 356.

28. Clive Wilkinson et al., *Ecological and Socioeconomic Impact of 1998 Coral Mortality in the Indian Ocean: an ESNO Impact and Warning of Future Change?* 28(2) AMBIO 188, 188 (1999).

29. Burns, *supra* note 24, at 10.

30. Tundi Agardy, *Prospective Climate Change Impacts on Cetaceans and its Implications for the Conservation of Whales and Dolphins*, Paper Submitted to the Int'l Whaling Commission Scientific Committee, IWC Doc. SC/48/CC33 (1996).

31. *See* WILLIAM C.G. BURNS, *The Possible Impacts of Climate Change on Pacific Island States Ecosystems, in* OCCASIONAL PAPER OF THE PACIFIC INSTITUTE FOR STUDIES IN DEVELOPMENT, ENVIRONMENT AND SECURITY 8 (2000); *and* S. Graffin, HIGH WATER BLUES: IMPACTS OF SEA LEVEL RISE ON SELECTED COASTS AND ISLANDS 16 (1997).

32. Agardy, *supra* note 30.

33. Lester, *supra* note 25, at 3046.

against climate change disruption and maintaining critical cetacean coastal and offshore habitat:

1. Incorporate a variety of different microclimates to maintain a constant and diverse supply of larvae.
2. Include neighbouring habitats that are functionally related.
3. Include watersheds in management regimes.[34]

For critical habitat of importance to cetacea, these three themes could be translated as:

1. Ensure primary food source spawning and breeding grounds are incorporated
2. Include neighbouring habitats that are functionally related
3. Including offshore upwelling regions in this formal Agreement would greatly benefit cetacean and fisheries conservation.

Salm's points reinforce the notion that protecting the ecosystem is likely to be more effective than management aimed at the protecting the coral alone.

The silent and unseen impact of ozone depletion must also be considered. Ozone depletion and climate change are linked and may create a self-perpetuating cycle. In 1998, the largest and longest ozone hole phenomena occurred over Antarctica continuously for more than one hundred days. During this time it covered an area greater than ten million square kilometres and for twenty-five days of this period the hole exceeded twenty-five million square kilometres—three times the land mass of Australia.[35] The destruction of the ozone layer and resulting increase in UV-B radiation hitting the planet has the potential to cause ecological havoc. Studies in Antarctica under the ozone hole have shown a reduction in primary productivity (predominantly phytoplankton) by up to twenty-three percent because of elevated UV-B radiation levels.[36] Loss of phytoplankton could lead to a disruption of the food chain,[37] potentially reducing stocks of krill that feed on the plankton.

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34. Rodney V. Salm, *Ecological Boundaries for Coral Reef Reserves: Principles and Guidelines*, 11(3) ENVTL. CONSERVATION 209, 212-13 (1984).

35. *See* Clare Perry, STORM WARNING: THE ENVIRONMENTAL THREATS TO WHALES, DOLPHINS AND PORPOISES 7-8 (1999), *available at* http://www.eia-international.org/Campaigns/cetaceans/Rports/StormWarning/iwc/recomm.html; SCIENTIFIC ASSESSMENT OF OZONE DEPLETION: 1998—EXECUTIVE SUMMARY (World Meteorological Organization, Report No. 44, 1998).

36. C. Susan Weiler & P. A. Penhale, *Ultraviolet Radiation in Antarctica: Measurements and Biological Effects*, *in* ANTARCTIC RESEARCH SERIES 62 (1994) *cited in* Perry, *supra* note 35, at *9.

37. Gustaaf M. Hallegraeff, *Marine Phytoplankton Communities in the Australian Region: Current Status and Future Trends*, *in* STATE OF THE MARINE ENVIRONMENT REPORT FOR AUSTRALIA: THE MARINE ENVIRONMENT—TECHNICAL ANNEX: 1 at 85 (LEON P. Zann ed., 1995), *available at* http://www.ea.gov.au/coasts/information/reports/somer/annex1/phytoplankton.html.

There are also concerns about an increase of skin cancer rate through exposure to UV-A and UV-B radiation of animals that spend considerable time in areas of acute ozone layer thinning, causing radiation-related diseases or a reduction of natural immunity to other threats such as pollutants and viruses.[38]

B. Habitat Degradation

Habitat loss is especially critical for cetacea with limited range, such as river dolphins. In South Asia, this habitat loss is primarily in riverine systems caused by dams and withdrawal of water for human use, both fragmenting populations and reducing amount of habitat available for resident dolphins. In some areas, these threats are more critical than direct and incidental kills,[39] such as for the river dolphins of Central and South Asia.

Water management, flood control and major river modification, including the removal of surface water, has led to the decline of a number of dolphin populations.[40] Dams prevent the migration of dolphins across their natural range, create barriers which fragment populations into genetically isolated sub-populations, reduce the prey species available to the animals by also disrupting the sustainability of fisheries, and greatly increase sedimentation, nutrient over-enrichment, and salinity, which in turn causes eutrophication.[41] Chemical pollution of riverine systems is also a significant factor in the long-term survival of river dolphins. The catchment to deep-sea relationship is poorly studied in this region. Researchers in the area have already indicated that a significant policy focus is urgently needed for riverine habitat conservation.[42]

In recent years there has been a considerable debate surrounding interactions between cetacea and other high-order predators and fisheries. This debate is largely political, but has been given baseless merit as global commercial fish stocks decline, while fishers attempt to refute claims that they are affecting the ecology of the natural system. It should be recognised that, through fishing activities, humans remove large quantities of organisms from marine ecosystems, which are finely balanced to the millennia of predator prey relationship already established. In so doing humans actually compete

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38. Clare Perry et al., SWIMMING AGAINST THE TIDE: ENVIRONMENTAL THREATS TO THE WORLD'S WHALES AND DOLPHINS (2001); *Report of the Workshop on Climate Change and Cetaceans, 1995*, REPORT OF THE INT'L WHALING COMMISSION (1997); Agardy, *supra* note 32.

39. Alison Smith, *The River Dolphins: The Road to Extinction in* THE CONSERVATION OF WHALES AND DOLPHINS: SCIENCE AND PRACTICE 356, 377-81 (Mark P. Simmonds & Judith D. Hutchinson eds., 1996).

40. William F. Perrin, *Status of the Gangetic River Dolphin*, TENTH MEETING OF THE CMS SCIENTIFIC COUNCIL, CMS/ScC.10/Doc.6 (Edinburgh, May 2-4, 2001) (on file with author).

41. Smith, *supra* note 39, at 359-64.

42. William F. Perrin et al., *Biology and Conservation of the River Dolphins, in* OCCASIONAL PAPERS OF THE IUCN SPECIES SURVIVAL COMMISSION 3 (1989).

with other predators for food resources but our access to powerful technology has a far greater potential impact.[43] A majority of scientists and policy makers within this debate agree that fisheries need to be managed to avoid harm to natural systems, rather than the other way around.

C. Chemical Pollution

Limited information specific to Indian Ocean chemical pollution has been collected, but world trends are likely representative of the regional situation. Drawing on more general information, we know that, as high order predators, odontocetes accumulate high concentrations of toxic compounds including PCBs, pesticides and other chemical pollutants.[44] Research indicates that many of these pollutants—particularly PCBs, mercury, lead and cadmium—lead to cancer, damage the nervous system, harm the immune system and can cause reproductive and developmental disorders in mammals.[45] Research also indicates that, worldwide, many cetacean populations are carrying heavy contaminant burdens.[46]

Approximately seventy percent of the marine environment pollution comes from land-based sources.[47] The main sources of coastal pollution come from industrial and domestic waste, burial of hard waste near water tables, urban storm water, and dumping or run-off of agricultural biocides, herbicides and nutrients from land use.[48] Many rivers, estuaries and coastal waters near large population centres show signs of eutrophication and heavy

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43. Peter Yodzis, *Must Top Predators be Culled for the Sake of Fisheries?* 16(2) TRENDS IN ECOLOGY AND EVOLUTION 78, 79 (2001); Jock W. Young, *Do Large Whales Have an Impact on Commercial Fishing in the South Pacific Ocean?* 3(3) J. WILDLIFE L. & POL'Y 1, 31(2000).

44. Peter J.H. Reijnders, *Organohalogen and Heavy Metal Contamination in Cetaceans: Observed Effects, Potential Impact and Future Prospects, in* THE CONSERVATION OF WHALES AND DOLPHINS: SCIENCE AND PRACTICE 205, 212-13 (Mark P. Simmonds & Judith D. Hutchinson eds., 1996). For evidence of these contaminants being present in comparatively clean environments *see* Catherine M. Kemper et al., *A Review of Heavy Metal and Organochlorine Levels in Marine Mammals in Australia,* 154 SCI. OF THE TOTAL ENV'T 129 (1994); Mark Simmonds et al., *Toxic equivalency and cetaceans: A Note on the Threat Posed by Environmental Pollutants*, Paper Submitted to the Int'l Whaling Commission Scientific Committee, IWC Doc. IWC/52/E13 (2000).

45. *See generally* Joseph E. Cummins, *Extinction: The PCB Threat to Marine Mammals,* 18(6) THE ECOLOGIST 193, 194 (1988); Reijnders, *supra* note 44, at 212-13.

46. *See* Simmonds et al., *supra* note 44.

47. *See* Douglas E. Fisher, *Land-Sourced Pollution of the Marine Environment,* 12(3) ENVTL. & PLAN. L.J. 116, 116 (1995).

48. *See* Leon Zann, *Our Sea, Our Future, in* MAJOR FINDINGS OF THE STATE OF THE MARINE ENV'T REPORT FOR AUSTRALIA 55 (1995), *available at* http://www.ea.gov.au/coasts/information/reports/somer/. *See also* Jon Brodie, *The Problems of Nutrients and Eutrophication in the Australian Marine Environment, in* STATE OF THE MARINE ENV'T REPORT FOR AUSTRALIA: POLLUTION—TECHNICAL ANNEX 2 (Leon P. Zann & David Sutton ed., 1995), *available at* http://www.ea.gov.au/coasts/information/reports/somer/annex2/brodie.html.

metal contamination.[49] Toxic algal blooms are increasingly common around estuaries and bays.[50]

The density of population and the industrial activity in the Ganges Basin concentrate pollutants into the riverine systems. Tanneries, textile, wood, and jute mills, and discharge from an oil refinery, directly pollute the Ganges. In addition, effluent from sugar mills, distilleries, pulp and paper factories, synthetic rubber industries, fly ash from coal washeries, and DDT factories pollute the streams associated with the Ganges.[51]

In the Western Indian Ocean, disposal of urban and industrial wastes into the coastal waters is the most significant factor that causes pollution in the region. The majority of Indian Ocean coastal States lacks the basic sewage treatment facilities and routinely discharges the nutrient-rich sewage directly into the coastal waters.[52]

Dredging development in coastal regions to make way for shipping, to create boat harbours or to maintain ports can re-release toxic substances from sediments and mud back into the water column, increasing the contamination of the ecosystem. Often these are critical habitats for dolphins and porpoises but are also nursery grounds for the fish they eat.

A significant and widespread pollution event (ten million square kilometres) was recently reported in the Indian Ocean caused by high concentrations of aerosol pollutant particles. The aerosols reached as far south as the Intertropical Convergence Zone.[53]

D. Noise Pollution

Similar to chemical pollution, limited information specific to noise pollution levels of the Indian Ocean exists. Therefore, world trends must be relied upon as indicators.

All cetacea are dependent on their auditory capacity for communication and geographic identification. Scientists believe it is their primary sense. Interference with this ability threatens their survival. Loud persistent sounds under water—characteristic of military sonar or the detonations used in seismic testing—can have an impact range greater than 100km.[54] At the

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49. Graeme E. Batley, *Heavy metals and tributyltin in Australian coastal and estuarine waters, in* STATE OF THE MARINE ENV'T REPORT FOR AUSTRALIA: TECHNICAL ANNEX 2 at 63 (Leon P. Zann & David Sutton eds., 1995).

50. Zann, *supra* note 48, at 15.

51. R.S. Lal Mohan, *Conservation and Management of the Ganges River Dolphin,* Platanista gangetica, *in India, in* BIOLOGY AND CONSERVATION OF THE RIVER DOLPHINS 64, 67 (Occasional Papers of the IUCN Species Survival Commission, No. 3, William F. Perrin, et al. eds., 1989).

52. International Ocean Institute, *The Coastal & Inshore Marine Environment of the Western Indian Ocean Region at the Dawn of the 21st Century* (2001), *available at* http://www.ioinst.org/index.html.

53. Simmonds et al., *supra* note 13.

54. Jonathan C.D. Gordon & Anna Moscrop, *Underwater Noise Pollution and its Sig-*

source, blast intensities of 240dB (at a frequency of approximately 110Hz), can cause significant stress to local or itinerant populations.[55]

Long-term consequences of chronic exposure to loud sound could affect accessibility to prey species as well as causing shifts in hearing thresholds and auditory damage. For some sensitive species, this damage could occur at moderate ranges. Seismic blasts produce both high and low frequency components and are therefore likely to be perceived by odontocetes as well as mysticetes.[56] Behavioural responses including fright, avoidance, and changes in behaviour and vocalisations have been observed in both mysticetes and odontocetes hundreds of kilometres from the point source.[57] Significant reactions have also been documented in some fish and invertebrates.[58]

Oil and gas drill platforms and large ships that emit low frequency "thumps" around 200dB also create significant noise pollution.[59] This noise range lies within the bandwidth of maximum sensitivity for mysticetes.

There are indications that "stranding" incidences may be linked to low frequency military, seismic, and industrial noise.[60] Research also indicates that industrial noise may be responsible for considerable displacement from habitat.[61]

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nificance for Whales and Dolphins, in THE CONSERVATION OF WHALES AND DOLPHINS: SCIENCE AND PRACTICE 281, 291 (Mark P. Simmonds & Judith D. Hutchinson, eds., 1996).

55. *See* Robert D. McCauley, *Environmental Implications of Offshore Oil and Gas Development in Australia—Seismic Surveys in* ENVTL. IMPLICATIONS OF OFFSHORE OIL AND GAS DEV. IN AUSTRALIA: THE FINDINGS OF AN INDEPENDENT SCIENTIFIC REVIEW 40-42 (John M. Swan et al., eds., 1994). McCauley's research, measured at this source, indicated that levels decrease to 170-180dB within 1km and further to 150dB within 10km, depending on sound propagation characteristics of the area. *Id. See also Investigation 3D Marine Seismic Survey, VIC/P43: Environment Plan* (Report by Joint Venture Partners Woodside Energy, Boral Energy and CalEnergy, November 1999).

56. John C. Goold & Peter J. Fish, *Broadband Spectrum of Seismic Survey Air-Gun Emissions with Reference to Dolphin Auditory Thresholds* in 103(4) J. ACOUSTICAL SOC'Y OF AM. 2177 (1998).

57. *See* John C. Goold, *Acoustic assessment of populations of common dolphins (*Delphinus delphis*) in conjunction with seismic surveying*, 76 J. MARINE BIOL. ASS'N 811, 818-20 (1996); Jonathan C.D. Gordon et al., *The effects of seismic surveys on marine mammals,* SEISMIC AND MARINE MAMMAL WORKSHOP 6 (London June 23-25, 1998). *See generally* Michael Jasny, SOUNDING THE DEPTHS: SUPERTANKERS, SONAR, AND THE RISE OF UNDERSEA NOISE (1995).

58. McCauley, *supra* note 55, at 39-40.

59. Jasny, *supra* note 57, at 30.

60. Alexandros Frantzis, *Does Acoustic Testing Strand Whales?,* NATURE, March 5, 1998, at 29.

61. *See generally* W. JOHN RICHARDSON ET AL., EFFECTS OF NOISE ON MARINE MAMMALS (MMS Study, LGL Ecological Res. Assoc. Inc., 1991); W. John Richardson et al., *Reactions of Bowhead Whales,* Belaena mysticetus, *to Drilling and Dredging Noise in the Canadian Beaufort Sea*, 29 MARINE ENVTL. RES. 135 (1990). *See also* C. I. Malme et al., *Investigations of the Potential Effects of Underwater Noise from Petroleum Activities on Migrating Gray Whale Behaviour, in* U.S. DEPT. OF INTERIOR MINERALS MGMT. SERVICE FINAL REPORT FOR THE PERIOD OF 7 JUNE 1982-31 JULY 1983, REPORT NO. 5366, 9-1 – 9-9 (Nov. 1983); Mark Simmonds & Susan Mayer, *An Evaluation of Environmental and Other Factors in Some Recent Marine Mammals Mortalities in Europe: Implications for Conservation and Manage-*

The offshore impacts are particularly worrying when considering beaked and sperm whales, whose deep diving habits, low frequency hearing, and susceptibility to stranding make them vulnerable when diving to zones where noise may be concentrated but their physiology may limit their options for response.[62] Industry proponents claim there is limited ability to measure *significant* response and therefore the impact on marine mammals or their environment can be assumed minimal. Countering this claim, the IWC *Standing Working Group on Environment Concerns* stated, in the 1998 report, that "it may not always be accurate to assume no impact is occurring even in the absence of a measured response."[63]

Simmonds and Dolman have reviewed potential impacts including hearing sensitivity shifts and/or permanent loss, and bubble growth in tissue causing the "bends."[64] The impact for non-migrating cetacea that are relatively sedentary, or animals engaged in a more localised activity, such as calving or feeding, is probably more acute. Continual displacement from these areas by sustained noise pollution could have a much more profound and serious effect on individuals. Cetacea resting or with small calves could be weak and vulnerable to predation and exhaustion.[65]

The impact from seismic testing and oil platforms in the Indian Ocean is largely unknown, and availability of information on the location of platforms is scant. However, it is almost certain that significant activity is taking place and further investigation into this form of pollution should be conducted. Shipping, however, appears to be a significant source of noise pollution originating from traffic from the Middle East along the Western coast of the Indian Ocean.[66]

E. Direct and Indirect Effects of Fisheries

Despite the increased attention, development and implementation of regulations on bycatch of marine mammals around the world has been politically controversial and slow.[67]

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ment, 5 ENVTL. REV. 89, 98 (1997).

62. *See* Mark Simmonds & Sarah Dolman, *A Note on the Vulnerability of Cetacean to Acoustic Disturbance*, Paper Submitted to the Int'l Whaling Commission Scientific Committee, IWC Doc. SC/51/E15 (1999) (Deep diving animals leave the surface with enough oxygen in their organs and blood to sustain the dive, but may not have reserves to swim away from intense and unexpected noise.).

63. Standing Working Group on Environmental Concerns, *Report of the Standing Working Group on Envtl. Concerns,* in J. CETACEAN RES. & MGMT., 1 Suppl. (1999).

64. Simmonds & Dolman , *supra* note 62.

65. *Id. See also* Robert D. McCauley et al., *The Response of Humpback Whales (*Megaptera novaeangliae*) to Offshore Seismic Survey Noise: Preliminary Results of Observations About a Working Seismic Vessel and Experimental Exposures,* APPEA JOURNAL 692, 705 (1998).

66. GLOBAL ENVIRONMENT FACILITY, GUARDING AGAINST OIL SPILLS IN THE INDIAN OCEAN, New Release # 99/2050/AFR (1998).

67. Whitehead et al., *supra* note 5, at 326-27.

With "too many boats, and too few fish," heavily subsidised distant water fleets are embracing larger and more destructive technology to keep pace with growth.[68] The Food and Agricultural Organization of the United Nations (FAO) estimates that over half of the world fisheries are heading towards collapse.[69] The FAO recognises these impacts, although little is being done to constrain the growth of the global fishing industry in the face of this bycatch and biomass decline.[70]

An estimated fifteen million square kilometres of seabed is trawled annually by the world fleet,[71] which discards between eighteen and forty million tonnes per annum of by-catch.[72] Over-exploitation of fish stocks reduces prey for other species and in many parts of the world small whales and dolphins may come under pressure from reduced food supply,[73] increasing the potential for competition for resources between marine mammals and fisheries.

Many of the fishing techniques themselves can be highly destructive. Cetacea become entangled in many gear types, including long-line, drift nets, trap lines, and mid-water trawls, but gill nets and drift nets remain the largest problem.[74]

It must be acknowledged that the incidence of all types of fisheries entanglement varies considerably by areas and species. Coastal species are often more vulnerable as they live in areas with high fishing effort.[75] Small cetacea are likely to become entangled and drown *in situ*, lacking the body mass or strength to free themselves, whereas the larger whales may be capable of dragging the gear great distances, but may still die through a diminished ability to feed, leading to their eventual starvation.

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68. WWF, THE FOOTPRINT OF DISTANT WATERS FLEETS ON WORLD FISHERIES (1998).

69. FAO, REVIEW OF THE STATE OF THE WORLDS FISHERY RESOURCES: MARINE FISHERIES (FAO Fisheries Circular No. 884, Rome, 1995).

70. WWF, *supra* note 68, at 3.

71. *See* Les Watling & Elliott A. Norse, *Disturbance of the Seabed by Mobile Fishing Gear: A Comparison to Forest Clearcutting*, 12(6) CONSERVATION BIOLOGY, 1180, 1190 (1998). Watling and Norse indicate benthic trawl cover areas equivalent to half the world continental shelf annually, or 150 times the land area that is clear-cut annually. *Id.* at 1191.

72. WWF/IUCN, CREATING A SEA CHANGE: THE WWF/IUCN MARINE POLICY 21 (World Wide Fund for Nature and The World Conservation Union, Gland, Switzerland 1998).

73. Clare Perry & Steve Trent, STORM WARNING: THE ENVIRONMENTAL THREATS TO WHALES, DOLPHINS AND PORPOISES *14 (1999), *available at* http://www.eia-international.org/Campaigns/cetaceans/Rports/StormWarning/iwc/recomm.html. "In its heyday the eastern Pacific Ocean tuna fleet killed 400,000 dolphins annually. American boycotts and stronger regulations have reduced this to under 5,000, but the catch remains alarmingly high." *Id.* at *15.

74. Phillip J. Clapham et al., *Baleen Whales: Conservation Issues and the Status of the Most Endangered Populations*, 29(1) MAMMAL REVIEW 35, 35 (1999), *available at* http://www.cttmar.univali.br/~aberreto/Necton/clapham1999.pdf; Y. Morizur et al., *Incidental Catches of Marine Mammals in Pelagic Trawl Fisheries of the Northeast Atlantic*, 41 FISHERIES RESEARCH 297, 298 (1999).

75. *Id.*

Large-scale drift nets have been responsible for catching everything from migrating humpbacks and calves to whole pods of dolphins. Despite a U.N. General Assembly Resolution, establishing an indefinite global moratorium on the use of large-scale driftnets outside Exclusive Economic Zones (EEZ),[76] these nets are still widely and illegally used. Many operations have moved within State EEZs to escape the ban.

Large purse seine and drift nets catch and kill thousands of dolphins and whales each year.[77] Set nets, gill nets, tangle nets, and trammels nets used in the world's coastal fisheries also catch high numbers of coastal porpoises and dolphins.[78]

Entanglement in static aquaculture structures remains poorly investigated, although there is evidence of high marine mammal mortality rates in large ranching operations.[79] Considering the increased industry investment in aquaculture in many developing areas of the world, the environmental and marine mammal impacts of this industry need to be addressed.

Along the Indian coast, mortality rates through gillnet entanglement are between 1000 and 1500 animals each year.[80] The introduction of synthetic nets has greatly increased mortality. The southwest coast accounts for ninety percent of the mortalities. Spinner dolphins *Stenella longirostris*, common dolphins *Delphinus delphis* and bottlenose dolphins *Tursiops truncatus* are the main species caught.[81]

In 1994, Lal Mohan reported that 286 Ganges River dolphins *Platanista gangetica* had been counted as killed in gill nets in a 600km stretch of River Brahmaputra over the course of his study. While the total population estimates are around only 400, about 50 are killed annually in river gillnets.[82]

The Sri Lankan National Aquatic Resource Agency estimates that approximately 13,000 small cetacea are annually caught in coastal gill nets.[83] Indirect and direct kills are commonly used for human consumption and bait in other fisheries.

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76. United Nations General Assembly Resolution, 46/215, *Large-Scale Pelagic Drift-Net Fishing and its Impact on the Living Marine Resources of the World's Oceans and Seas* (1991).

77. Perry & Trent, *supra* note 73, at *16.

78. Morten Vinther, *Bycatches of Harbour Porpoise (*Phocoena phocoena *L.) in Danish Set-Net Fisheries*, 1(2) J. CETACEAN RES. & MGMT. 123, 134 (1999).

79. Catherine M. Kemper & Susan E. Gibbs, A STUDY OF THE LIFE HISTORY PARAMETERS OF DOLPHINS AND SEALS ENTANGLED IN TUNA FARMS NEAR PROT LINCOLN, AND COMPARISONS WITH INFORMATION FROM OTHER SOUTH AUSTRALIAN CARCASSES: REPORT TO ENVIRONMENT AUSTRALIA 6 (1997).

80. R. S. Lal Mohan, *Review of Gillnet Fisheries and Cetacean Bycatches in the Northeastern Indian Ocean, in* Report of the Int'l Whaling Commission Special Issue 15, 329-43 (1994).

81. *Id.*

82. *Id.*

83. *Id.*

Data available for Bangladesh and Burma (now Myanmar) is still too fragmented to provide conclusive information,[84] however, Irrawaddy dolphins *Orcaella brevirostris* are likely killed in significant numbers in the coastal and estuarine fisheries.[85] Finless porpoise *Neophocaena phocaenoides* are also caught in significant numbers in Pakistan artisanal fisheries.[86]

In many of the coastal African states, killing cetacea and possession of their remains is illegal. Although bycatch is known to be high, fishers discard rather than be caught with the evidence.[87]

Generally, coast set, drift, and gill net fisheries in the Southern African Atlantic and Indian Ocean regions are artisanal and often operate at subsistence level, but there are indications that humpback whales (*Megaptera nonaengliae*) and bottlenose dolphins are subject to heavy depletion off South Africa and Mozambique from these activities.[88]

Salm's documentation of bycatch in Oman's coastal waters indicate that artisanal gillnet fisheries, abandoned gear, and distant water fleets are all contributing to a high rate of mortality of common, spinner, and bottlenose dolphins. Specific gill net entanglements of humpback whales and minke whales (*Balaenoptera acutorstrata*) have also been documented.[89]

Large-scale pelagic shark, tuna, and seerfish fisheries off the coast of Pakistan take Indo-pacific humpback dolphin (*Sousa chinensis*), spinner, and bottlenose dolphins.[90]

In Sri Lanka, where artisanal fishers have made significant by-catches, attention has now turned to targeting of small cetacea in deliberate takes[91] for possible sale in the Southeast Asian market.

International studies indicate there will soon be a shift in fishing effort by distant waters fleets from other oceans into the Indian and Southern Ocean region, especially with a growing consumer acceptance of shark meat in south-east Asia.[92] Anecdotal evidence suggests there is growing conflict

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84. *Id.*

85. DAVID BOWLES ET AL., THE GLOBAL WAR AGAINST SMALL CETACEANS, 2d REPORT 55 (David Currey et al., eds., 1996).

86. *Id.*

87. Vic Cockroft & R. Krohn, *Passive Gear Fisheries of Southwestern Indian and Southeastern Atlantic Oceans: An Assessment of Their Possible Impact on Cetaceans, in* REPORT OF THE INTERNAL WHALING COMMISSION Special Issue 15, 317-29 (1994).

88. *Id.*

89. Rodney V. Salm, *Fishery-Related Mortality of Cetaceans in Oman, in* 7 THE PILOT 12-13 (1992).

90. J RYLE & ALAN THORNTON, THE CONTINUING GLOBAL WAR AGAINST SMALL CETACEANS (1996).

91. This is also evident in Peru and the Philippines. *See* REEVES & LEATHERWOOD, *supra* note 2, at viii.

92. *See* MARTIN TSAMENYI & FELICITY WODHILL, SUSTAINABLE USE OF LARGE MIGRATORY FISH IN THE SOUTHERN AND INDIAN OCEANS: GAPS IN THE INTERNATIONAL LEGAL FRAMEWORK (TRAFFIC Oceania/WWF, Sydney, 1999), *available at* http://www.traffic.org/migratoryfish/sustainableyse.html.

between distant water tuna fleets and cetacea with a combination of by-catch and long-line predation. Increased unregulated effort will only increase by-catch and targeting of cetacea.

F. Disease and Mortality Events

As the cumulative pressures on cetacea increase, so too will their susceptibility to disease. Algal bloom outbreaks increase the potential toll of weakened populations by reducing their food supply as fish die. Outbreaks of morbilliviruses are being attributed to cetacean disease epidemics around the world. Not found before 1987, at this stage the morbilli virus impacts have remained concentrated in the Mediterranean, the Atlantic coast of North America, the Gulf of Mexico, around Northern Ireland, and the Netherlands.[93] Bacterial disease is also another major cause of death in cetacea. However, many infections are secondary conditions.[94] Viral and bacterial episodes are more likely to impact immunologically weak populations that are suffering other trauma.[95]

In addition, there is likely to be a strong relationship between environmental stressors, in particular immunosuppressive compounds, such as organochlorins, and disease epidemics in cetacea and other marine mammals.[96] There is a significant difficultly in assessing mortalities of cetacea from these causes—especially when considering the offshore populations.

Other viruses have been detected in cetacea. Specifically, enterovirus has been noted in grey whales *Eschrichtius robustus* and adenoviruses in *Balaentoptera borealis* and bowhead whales *Blaena mysticetus*. The calicivirus has been found in fin *Balaenoptera physalus*, grey, bowhead, and sperm *Physeter catodon* whales.[97] It is therefore likely that offshore populations are equally effected, but their mortality "at sea" results in no studies being completed.

Other mass mortality events are being associated with military activity and Surveillance Towed Array Sensor System Low Frequency Active sonar (SURTASS LFAS). The most recent incidence occurred in March 2000 when at least seventeen whales (including mainly beaked whales) in apparent good health stranded in the Bahamian Islands on the same day, during a time when the U.S. Navy were conducting military activities in the area. "Both the large number of coincident strandings and the fact that they in-

93. *See* Seamus Kennedy, *Infectious diseases of Cetacean Populations in* THE CONSERVATION OF WHALES AND DOLPHINS: SCIENCE AND PRACTICE 333, 333-37 (Mark P. Simmonds & Judith D. Hutchinson eds., 1996).

94. *Id.*

95. *See* Peter J. H. Reijnders et al., *Report of the Workshop on Chemical Pollution and Cetaceans*, 1 J. CETACEAN RES. MGMT. (SPECIAL ISSUE) 1, 12 (1999).

96. *See* Sue Mayer & Mark Simmonds, *Science and Precaution in Cetacean Conservation, in* THE CONSERVATION OF WHALES AND DOLPHINS: SCIENCE AND PRACTICE (Mark P. Simmonds & Judith D. Hutchinson eds., 1996).

97. Kennedy, *supra* note 93, at 341.

volved at least four species in three families of two suborders of cetaceans can be considered highly unusual and probably related in some way." [98]

Previous stranding rates were between one and two individuals per year. The scientists involved in the rescue attempt commented that blood in the eyes and in the brains, and damage to the lungs in the animals that died, all point to some explosive or high-intensity source.[99]

G. Known/Documented Threats to Small Cetacea in the Indian Ocean Region

The table below represents known and documented threats only. The data clearly indicates that there is a significant deficiency in the known impact data in the Indian Ocean region. Although not included here, anecdotal evidence suggests that chemical pollution is also a likely threat to many coastal species, and fisheries competition and food scarcity is likely increasing.

98. Ken Balcomb Ken & Diane Claridge, *Bahamas Whale Strandings* (List message to MARMAM Editors <marmamed@UVic.CA> on 03/23/2000 07:13:53 pm, From: Ken Balcomb & Diane Claridge, Bahamas Marine Mammal Survey, Abaco, Bahamas Subject: Bahamas whale strandings) (on file with author).

99. *Id.*

Common name	*Scientific name*	Incidental catch in fisheries	Fisheries comp/ food scarcity	Habitat loss and degradation	Chemical pollution	Noise pollution	UV-B radiation	Impacts of global warming	Effects of tourism	Directed kills
Andrews' beaked whale	*Mesoplodon bowdoini*					X	X	X		
Amoux's beaked whale	*Berardius amuxii*					X	X	X		
Baiji	*Lipotes vexillifer*	XX	XX	XX	XX	X	X	X		
Blainville's beaked whale	*Mesoplodon densirostris*		XX			X	X	X		XX
Bottlenose dolphin	*Tursiops truncatus*	XX				X	X	X		
Common dolphin	*Delphinus delphis*	XX				X	X	X	XX	
Cuvier's beaked whale	*Ziphius cavirostris*	XX				X	X	X		XX
Dwarf sperm whale	*Kogia simus*	XX				X	X	X		XX
False killer whale	*Pseudorca crassidens*	XX				X	X	X		
Finless porpoise	*Neophocaena phocaenoides*	**XXX**		**XXX**		X	X	X	XX	XX
Fraser's dolphin	*Lagenodelphis hosei*	XX				X	X	X		XX
Ganges river dolphin	*Platanista gangetica*	**XXX**	XX	**XXX**	XX	X	X	X		**XXX**
Ginkgo-toothed beaked whale	*Mesoplodon ginkgodens*					X	X	X		
Gray's beaked whale	*Mesoplodon grayi*					X	X	X		
Hector's beaked whale	*Mesoplodon hectori*					X	X	X		
Hourglass dolphin	*Lagenorhynchus cruciger*									
Indo-Pacific hump-backed dolphin	*Sousa chinensis*	**XXX**	XX	**XXX**		X	X	X		XX
Indus river dolphin	*Platanista minor*	**XXX**	XX	**XXX**	XX	X	X	X		XX
Irrawaddy dolphin	*Orcaella brevirostris*	**XXX**	XX	XX	XX	X	X	X		XX
Killer whale	*Orcinus orca*					X	X	X		
Long-finned pilot whale	*Globicephala melas*					X	X	X		
Longman's beaked whale	*Mesoplodon pacificus*					X	X	X		
Melon-headed whale	*Peponocephala electra*	XX				X	X	X		
Pantropical spotted dolphin	*Stenella attenuata*	XX				X	X	X		XX
Pygmy killer whale	*Feresa attenuata*	XX				X	X	X		
Pygmy right whale	*Caperea marginata*	XX				X	X	X		
Pygmy sperm whale	*Kogia breviceps*	XX				X	X	X		XX
Risso's dolphin	*Grampus griseus*	XX				X	X	X		XX
Rough-toothed dolphin	*Steno bredanensis*	XX				X	X	X	XX	XX
Shepherd's beaked whale	*Tasmacetus shepherdi*	XX				X	X	X		
Short-finned pilot whale	*Globicephala macrorhynchus*					X	X	X		
Southern bottlenose whale	*Hyperoodon planifrons*		XX			X	X	X		
Southern right whale dolphin	*Lissodelphis peronii*					X	X	X		
Spectacled porpoise	*Australophocaena dioptrica*	XX				X	X	X		
Spinner dolphin	*Stenella longirostris*	XX	XX			X	X	X		XX
Strap-toothed whale	*Mesoplodon layardii*					X	X	X		
Striped dolphin	*Stenella coeruleoalba*	XX				X	X	X		
True's beaked whale	*Mesoplodon mirus*					X	X	X		

Table data compiled from data presented in thesis dissertation, Prideaux Margi in prep, 2002

Key:
- XXX — documented threat of serious concern across all or part of range
- XX — known/documented impact across all or part of range
- X — potential impact/threat extrapolated from more general information

III. EXISTING RELATED REGIMES

A number of international conventions exist that are partially applicable to cetacean conservation—specifically the *United Nations Convention on the Law of the Sea*[100] (UNCLOS), and the *Convention on Biological Diversity*[101] (CBD). In the last decade, the *Convention on the Conservation of Migratory Species of Wild Animals*[102] (CMS) has specifically utilized for cetacean conservation through two specific regional regimes.

CMS acknowledges the importance of migratory species being conserved and of Range States agreeing to act to this end whenever possible and appropriate. The convention pays special attention to migratory species, the conservation status of which is unfavourable, and seeks to avoid migratory species becoming endangered.

> In particular, the Parties:
>
> a) should promote, co-operate in and support research relating to migratory species;
>
> b) shall endeavour to provide immediate protection for migratory species included in Appendix I; and
>
> c) shall endeavour to conclude AGREEMENTS covering the conservation and management of migratory species included in Appendix II.[103]

Appendix I lists migratory species that are known to be endangered.[104] Appendix II lists migratory species that have "an unfavourable conservation status and which require international agreements for their conservation and management, as well as those which have a conservation status which would significantly benefit from the international cooperation that could be achieved by an international agreement."[105]

Migratory is defined under CMS as: "the entire population or any geographically separate part of the population of any species or lower taxon of wild animals, a significant proportion of whose members cyclically and predictably cross one or more national jurisdictional boundaries"[106]

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100. United Nations Convention on the Law of the Sea, Dec. 10, 1982, art. 65, 120, I.L.M. 1261 [hereinafter UNCLOS].

101. Convention on Biological Diversity, U.N. Doc. DPI/130/7, June 2, 1992, *reprinted in* 31 I.L.M. 818 (1992).

102. Bonn Convention on the Conservation of Migratory Species of Wild Animals, 23 June, 1979, I.L.M. 11 [hereinafter CMS 1979].

103. *See* CMS 1979, art. II.

104. *See* CMS 1979, art. III.

105. *See* CMS 1979, art. IV.

106. *See* CMS 1979, art I (1)(a).

The application of any Convention to cetacean management must now conform to the framework convention of UNCLOS. Articles 65 and 120 of UNCLOS relate specifically to marine mammals, making a clear distinction between this group and other living resources.[107] UNCLOS also provides strict guidelines as to jurisdictional matters—setting out the nine maritime zones now recognised in international law.[108] States control all activities within their internal waters, territorial seas and archipelagic waters and are allocated sovereign rights for the purposes of exploring, exploiting, conserving, and managing living resources in their Exclusive Economic Zones. However, Article 61 requires that the States cooperate "as appropriate" with the relevant "competent" international organisations.[109]

When considering UNCLOS and its power as a framework convention, it is important to note that Article 65 does not specify which international organization holds competence for cetacea—although it has widely come to be recognised as the *International Whaling Commission* (IWC). However, it is equally plausible and appropriate that regional agreements under legitimate international conventions such as CMS should be recognised for their equal and sometimes greater competence in certain areas relating to their mandate, especially where issues of ecosystem management are concerned. This potential is recognised in UNCLOS Article 197, which requires that States cooperate on a global and regional basis through competent international organisations for the "protection and preservation of the marine environment, taking into account characteristic regional features."[110]

Only the International Convention for the Regulation of Whaling (ICRW) and its commission, the IWC, exists as a global instrument with a cetacean focus. Debate has continued for some years as to the competence of the IWC to manage all cetacea. Proponents wishing to limit wider cetacean management argue that the nomenclature annexed to the Final Act in 1946 when the ICRW was concluded limits the competence to the listed whales only. However, the IWC Scientific Committee has had a small cetacean subcommittee since the mid 1970s and Parties have passed resolutions on subjects relating to small cetacea for many years.[111] There is a solid argument that the IWC does have competency for all cetacea but lacks the political will to exercise this competence.

If cetacea are to be managed and protected beyond a concern for catch limits and hunting, their ecosystems must also be part of the management

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107. UNCLOS, *supra* note 100, art. 65.

108. These include internal waters, territorial seas, contiguous zones, the continental shelf, exclusive economic (or fishing) zones (EEZ), archipelagic waters, the high seas and the Area (or seabed beyond national jurisdiction). *See* UNCLOS, *supra* note 100, Part II, V, VI, VII.

109. *See* UNCLOS, art. 61.

110. *See* UNCLOS, art. 197, Part XII section 2.

111. *See* Birnie, *supra* note 10, at 24.

framework. As previously stated, CMS has recognised this need.[112] The International Whaling Commission does seek to perform this role through the declaration of sanctuaries, but small cetacea are not presently included in this model, and a wider range of threats than hunting alone affects their survival.

The designation of the Indian Ocean Whale Sanctuary and the Southern Ocean Sanctuary have both put focus on the issue of cetacean conservation for their region. However, neither generates direct work-programs for on-the-ground conservation initiatives and therefore do not satisfy an ecosystem management aim.

Recently, the Convention on Biological Diversity (CBD) and CMS have commenced the negotiation of a proposal on how migratory species could be integrated into the work program of the CBD. CMS could play a role in implementing the Convention on Biological Diversity, particularly the areas relating to the Global Taxonomy Initiative, "the ecosystem approach, indicators, assessments and monitoring, protected areas, public education and awareness, and sustainable use, including tourism."[113]

The present focus of IWC limits its influence to catch levels and, therefore, CMS, in coordination with CBD, is a more natural place to consider a broader ecosystem related cetacean conservation agenda.

A. A Global Convention Versus Regional Agreements

Regionalism typically has three dimensions. Countries within defined geographical areas have historical experience in common. A developed, socio-cultural, political, or economic linkage distinguishes them from the rest of the global community. Typically, such relations have developed organisations to manage crucial aspects of their collective affairs. These three dimensions are interrelated. While the core countries may be easily identifiable, the actual boundaries of the region are often fluid and debatable.[114] These three dimensions could also be seen as solid conditions on which to develop a regime.

Collective affairs, such as the marine environment, emerge as areas well suited to this level of management. Most of the threats and impacts facing small cetacea cross national boundaries and equally exist in international waters. Cetacea are often highly migratory, crossing multiple jurisdictional boundaries. No single nation can manage this range of issues in isolation. In addition, the impacts differ significantly from region to region. Applying a global regime might not focus appropriately on specific regional issues and

112. CMS, PROCEEDINGS OF THE SECOND MEETING OF THE PARTIES (1988).

113. Convention on Biological Diversity, 5th Conference of the Parties 4, Resolution UNEP/CBD/COP/5/INF/28 (2000).

114. Richard Stubbs & Geoffrey R.D. Underhill, *Introduction: Global Trends, Regional Patterns, in* POLITICAL ECONOMY OF THE CHANGING GLOBAL ORDER 331-32 (2d ed., Richard Stubbs & Geoffrey R.D. Underhill eds., 2000).

concerns. Nor is it possible to contemplate environmental issues in isolation from politics. Far too often globally agreed conventions disregard the capacity of less developed regions to comply with regulations and sometimes even the basic elements of the text. In their analysis of compliance with international regulatory agreements, Chayes and Chayes[115] identify three circumstances that frequently lie at the heart of treaty infractions:

1. Ambiguity and indeterminacy of treaty language
2. Limitation in the capacity of parties to carry out their undertakings
3. The temporal dimensions of the social, economic and political changes contemplated by regulatory treaties[116]

Recent conventions have started to address these issues, and this should be considered a positive step. In the words of Duruigbo: "the concepts of global partnership, international cooperation, and symbiosis in international relations catering to the interests of every side of the world divide must be promoted, as opposed to a system that is partitioned into winners and losers."[117]

The development and potential restructuring of ocean governance at the regional level can be critical to creating a synthesis between coastal communities and national governance and between global communities and global "issue" governance.[118]

Conditions are worsening in the Indian Ocean each year. Conservation laws exist in many countries around the Indian Ocean rim but enforcement is poor. Local scientific research is limited, making the assessment of threats difficult to manage. The increase of aid to the region has increased fishing effort,[119] and has also opened the potential to develop cetacean target fisheries, making it difficult to deal with mitigation in the area.[120]

There are also clear socio-economic issues to be considered when addressing these threats. Strong precedents from elsewhere in the developing world show that range States are committed to strong regional management and that local communities benefit from cetacean conservation measures.[121]

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115. ABRAM CHAYES & ANTONIA HANDLER CHAYES, THE NEW SOVEREIGNTY: COMPLIANCE WITH INTERNATIONAL REGULATORY AGREEMENTS 10 (1995).

116. *Id.*

117. Emeka Duruigbo, *Int'l Relations, Economics and Compliance with Int'l Law: Harnessing Common Resources to Protect the Environment and Solve Global Problems*, 21 CAL. W. INT'L L.J. 2 (2001).

118. ELIZABETH MANN BORGESE, OCEAN GOVERNANCE AND THE UNITED NATIONS 164 (1995).

119. *See* Cockroft & Krohn, *supra* note 87, at 317-29.

120. *See* Lal Mohan, *supra* note 80, at 329-43.

121. *See generally* ERICH HOYT, THE WORLDWIDE VALUE AND EXTENT OF WHALE WATCHING: 1995 (1995); Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean, Honolulu, Sept. 2000; *Resolution 1: Establishing a Preparatory Conference for the Establishment of the Comm'n for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pa-*

Whale watching is a growth industry benefiting many small economies.[122] It is especially important to acknowledge that increased protection of the marine environment should also provide local communities with assistance to economically value the ecology of their coastal and offshore areas.[123]

High-order predators, or keystone species such as cetacea, reflect their ecosystems' health and provide useful focus for development of a species protection regime that coincidentally also protects ecosystem integrity and functioning. This should certainly be considered an important tool for the Indian Ocean. The *IUCN/SSC 1994-1998 Action Plan for the Conservation of Cetaceans*[124] outlined a number of specific areas of necessary focus to ensure the better management of cetacea around the world. This included greater population assessments, incorporation of cetacea into laws and strategies and, most importantly regional cooperation.

IV. THE CMS MODEL AND SMALL CETACEA

In 1996, seventeen nations adopted by consensus the *Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean and Contiguous Atlantic Areas* (ACCOBAMS).[125] The agreement, which operates within CMS, was drafted in response to the serious environmental threats faced by cetacea in the region. "Recognising that cetaceans are an integral part of the marine environment, which must be conserved for the benefit of present and future generations" the parties pledged themselves to "achieve and maintain a favourable conservation status for cetaceans."[126]

ACCOBAMS came into force June 1, 2001 and the first meeting of the Parties took place in Monaco in February 2002.[127]

Under the Agreement, Parties have agreed to prohibit the deliberate taking of cetacea, but also agree to adopt and enforce national legislation, assess and manage all human-cetacean interactions, protect cetacean habitat, instigate a system of marine protected areas for these animals, and in all cases, apply the precautionary principle. Importantly, ACCOBAMS makes special

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cific Ocean, Multilateral High Level Conference on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean, Fifth Session (Honolulu, Sept. 1999).

122. *See* HOYT, *supra* note 121, at 2.

123. REPORT ON THE WORKSHOP ON THE SOCIOECONOMIC ASPECTS OF WHALE WATCHING, DECEMBER 1997, KAIKOURA, NEW ZEALAND (Int'l Fund for Animal Welfare, MA, 1999).

124. REEVES & LEATHERWOOD, *supra*, note 2.

125. William C. G. Burns, *The Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS): A Regional Response to the Threats Facing Cetaceans*, 1(1) J. INT'L WILDLIFE & POL'Y 113, 113 (1998) [hereinafter ACCOBAMS 1998].

126. 36 I.L.M. 777, pmbl. & art. II(1) (1997).

127. Villa Girasole, *ACCOBAMS Gains Momentum: Entry Into Force June 2001*, 13 CMS BULL. 13 (2001), *available at* http://www.wcmc.org.uk/cms/pdf/Bulletin_13.pdf.

reference to the reduction of pollution, signalling a regional willingness to tackle a difficult problem for the benefit of non-humans.[128]

The Agreement is also novel in that it binds countries of two subregions to work together on a subject of common concern, and opens membership to non-coastal states whose vessels are engaged in activities that affect cetacea. ACCOBAMS also allows non-signatories of CMS to sign the agreement.

ACCOBAMS seeks synergy with relevant instruments for the region and is closely related to the Barcelona Protocol concerning Specially Protected Areas and Biological Diversity in the Mediterranean.[129]

This agreement was preceded by the *Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas 1991* (ASCOBANS),[130] also within CMS, which requires parties to undertake habitat conservation and management, to prohibit intentional killing, to reduce moralities through bycatch in fisheries, to reduce pollution, to reduce disturbance (*i.e.*, seismic surveys), and to establish protected areas. Like ACCOBAMS, this Agreement also allows for non-range state accession. There has been some historical criticism of ASCOBANS' voluntary nature and inertia in the absence of full scientific certainty. However, these shortcomings have been overcome and the Agreement is growing in strength.

Recently, a CMS International *Agreement for Albatross and Petrels* (ACAP) has been concluded (not yet in force) in South Africa.[131] The Agreement commits signatories to a program of habitat protection, fisheries bycatch mitigation, research, information sharing, and capacity building. Initially it was intended to be a regional agreement contained to the Southern Hemisphere. During the negotiations, references to the Southern Hemisphere were removed to enable three species of albatross from the Northern Hemisphere to be brought into the Agreement in the future.[132]

Both ACCOBAMS and ASCOBANS are area-specific Agreements, whereas ACAP is species-specific. CMS-style Agreements, which can also operate as stand-alone international law, are solid foundations on which to develop a set of worldwide interlocking regional agreements for the conservation of cetaceans.[133] ACCOBAMS, in particular, provides a model based on an 'ecosystem approach' to management, rather than the traditional 'single issues' focus. Although as yet untested, ACAP involves distant water

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128. *See* ACCOBAMS 1998, *supra* note 125.

129. *Proceedings of the Fifth Meeting of the Conference of the Parties*, 1997 CONVENTION ON THE CONSERVATION OF MIGRATORY SPECIES OF WILD ANIMALS, point 113, *available at* http://www.wcmc.org.uk/cms/cop5_prc.htm.

130. *See* ACCOBAMS 1998, *supra* note 125.

128. *See* Bonn Convention on the Conservation of Migratory Species of Wild Animals, Int'l Agreement for Albatross and Petrels, Cape Town, South Africa, art. XI (2001); *and* Colin Galbraith, *Albatross and Petrels*, 13 CMS Bulletin 2 (2001), *available at* http://www.wcmc.org.uk/cms/pdf/Bulletin_13.pdf.

132. Letter from Nicola Beynon, Wildlife and Habitats Program Manager, Humane Society International, to Margi Prideaux (Jan. 2002) (on file with author).

133. *See* Nijkamp & Nollkaemper, *supra* note 7, at 297; Castello, *supra* note 7, at 19.

fleets and range states alike in an ambitious program of bycatch mitigation, which will require significant behavioural change on the part of wealthy and influential distant water fleets. A synthesis of these agreements can be considered as a template for wider cetacean conservation regime development.

Part of the strategy for a regional Agreement under CMS must be to list relevant species from the region on Appendix I and II. At this stage, listed Appendix I cetacea are:

- Blue whale *Balaenoptera musculus*
- Bowhead whale *Balaena mysticetus*
- Franciscana *Pontoporia blainvillei*
- Humpback whale *Megaptera novaeangliae*
- Northern right whale *Eubalaena glacialis*
- Southern right whale *Balaena glacialis australis*

The current listed Appendix II cetacea are:

- Atlantic hump-backed dolphin *Sousa teuszii*
- Atlantic white-sided dolphin *Lagenorhynchus acutus* (only North and Baltic Sea populations)
- Baird's beaked whale *Berardius bairdii*
- Black dolphin *Cephalorhynchus eutropia*
- Boto *Inia geoffrensis*
- Bottlenose dolphin *Tursiops aduncus* (Arafura/Timor Sea populations)
- Bottlenose dolphin *Tursiops truncatus* (only North and Baltic Sea populations)
- Burmeister's porpoise *Phocoena spinipinnis*
- Commerson's dolphin *Cephalorhynchus commersonii* (South American population)
- Common dolphin *Delphinus delphis* (only North and Baltic Sea and eastern
- Dall's porpoise *Phocoenoides dalli*
- Dusky dolphin *Lagenorhynchus obscurus*
- Finless porpoise *Neophocaena phocaenoides*
- Franciscana *Pontoporia blainvillei*
- Fraser's dolphin *Lagenodelphis hosei* (Southeast Asian populations)
- Ganges River dolphin *gangetica gangetica*
- Harbour porpoise *Phocoena phocoena* (only North and Baltic Sea populations)
- Heaviside's dolphin *Cephalorhynchus heavisidii*
- Indo-Pacific hump-backed dolphin *Sousa chinensis*
- Irrawaddy dolphin *Orcaella brevirostris*
- Long-finned pilot whale *Globicephala melaena* (only North and Baltic Sea populations)

- Long-finned pilot whale *Globicephala melas* (only North and Baltic Sea populations)
- Narwhal *Monodon monoceros*
- Northern bottlenose whale *Hyperoodon ampullatus*
- Orca *Orcinus orca* (eastern North Atlantic population, eastern North Pacific population)
- Pan-tropical spotted dolphin *Stenella attenuata* (eastern tropical Pacific population, Southeast Asian populations)
- Peale's dolphin *Lagenorhynchus australis*
- Risso's dolphin *Grampus griseus* (only North and Baltic Sea populations)
- Spectacled porpoise *Phocoena dioptrica*
- Spinner dolphin *Stenella longirostris* (eastern tropical Pacific populations, Southeast Asian populations)
- Striped dolphin *Stenella coeruleoalba* (eastern tropical Pacific population, western Mediterranean population)
- tropical Pacific populations)
- Tucuxi *Sotalia fluviatilis*
- White whale *Delphinapterus leucas*
- White-beaked dolphin *Lagenorhynchus albirostris* (only North and Baltic Sea populations)

V. AN AGREEMENT FOR THE CONSERVATION OF [SMALL] CETACEANS OF THE INDIAN OCEAN AND ASSOCIATED SEAS (ACCIOS)

There is already an understanding that there is a high level of endemism throughout the Indian Ocean. Ocean currents and monsoon seasons have a major influence on the biogeography and biodiversity patterns of the region. The transference of natural system dynamics is matched by the impacts and threats in this dense geopolitical area.[134] States are linked by many common species—such as turtles, dugong, and cetacea.

A regional *Agreement for the Conservation of [Small] Cetaceans of the Indian Ocean and Associated Seas* (ACCIOS)—could provide the strategic development of a protection system, that addresses the range of threats and also takes into account the impacts of foreign interests, while providing the necessary impetus to develop and implement domestic legislation.

The rudiments of a mandate for an ACCIOS agreement already exist in the political context of the region. A similar species protection agreement structure for turtle conservation is currently being negotiated with twenty-one countries of the south and south-east Asian region—an *Indian Oceans and South East Asian Regional Agreement on the Conservation and Man-*

134. Rodney V. Salm, *Marine Protected Areas: Issues and Solutions in the Western Indian Ocean, in* IUCN MARINE AND COASTAL WORKSHOP (World Conservation Congress, Montreal, Oct. 1996), *available at* http://www.gulfofmaine.org/library/mpas/biblio.htm#Regiongeneral.

agement of Marine Turtles and their Habitat (Marine Turtle Resolution).[135] When finalised, this Agreement will likely be housed under the CMS.

Indian Ocean inter-State cooperation exists between coastal states and their fisheries management bodies such as the *Indian Ocean Tuna Commission.* A UNEP *Convention for the Protection, Management and Development of the Marine and Coastal Environment of the Eastern Africa Region* and the *Protocol Concerning Protected Areas and Wild Flora and Fauna in the Eastern African Region* provide an existing platform for dialogue, while the *Valdivia Group* and the networks generated through the *Indian Ocean Rim Association for Regional Cooperation* and the *ASEAN Regional Forum* will also enable the necessary collaborative work.

Levy, Keohane and Haas[136] bring significant insight to the development of international institutions for environmental protection. While regimes take many forms and the participation in them varies widely, it is most common for an institution to be developed as the centre of the regime. This is proposed in the formation of small cetacean conservation regime for the Indian Ocean. In what they call the three "C's," Levy, Keohane and Haas suggest that effective institutions address the increase of government concern, the enhancement of the contractual environment, and the building of national capacity.[137] They further suggest the development of environment-centred coalitions, fostering open-ended knowledge creation, and the development of the regime from norms to rules. [138] This last point is illustrative of the two sides of the regime-theory coin. While the intent of Levy, Keohane and Haas is for reflective analysis of existing regimes and institutions, the following section will be developed under these areas as operational headings, to enable a forward-looking discussion of the institutional needs and the evident regional examples for this proposal.

A. Increasing Government Concern

Increasing government concern is a fundamental step in generating impetus for regime formation and also for increasing the influence of institutions formed within the regime. States will not enter into the process if there is insufficient interest in the issue either because of limited information or because of the potential costs outweighing the benefits perceived.[139]

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135. ENVIRONMENT AUSTRALIA, *Resolution on Developing an Indian Ocean and South East Asia Regional Agreement on the Conservation and Management of Marine Turtles* (1999).

136. Marc A. Levy et al., *Improving the effectiveness of Int'l environmental institutions, in* INSTITUTIONS FOR THE EARTH: SOURCES OF EFFECTIVE INTERNATIONAL ENVIRONMENTAL PROTECTION 397-426 (Peter M. Haas et al. eds., 1993).

137. *Id.* at 399-408.

138. *Id.*

139. *Id.* at 398.

Equally, States will be more inclined to remain outside of such negotiations if there is limited pressure from civil society to participate. In the case of environment protection regimes, this most frequently comes from the international environment organisations. Institutions within the regime can also increase their relative influence serving as magnifier of public pressure,[140] and institutional involvement in policy networks and communities will also magnify the pressure.

Conservation organisations that are organised into well-informed coalition lobbies that concentrated on developing relationships with Range States would serve to direct Government concerns to conservation issues and in turn would increase the potential of the coalition holding a central role throughout the regime development. Institutions and policy communities and networks can importantly increase concern by linking issues to other issues of greater interest.[141]

B. Enhancing the Contractual Environment

Regimes can contribute to the management of collective problems and enable burdens to be shared amongst States, while enhancing the goals of States.[142] The contractual environment must allow States to see the merit in entering into negotiations. Enhancing the contractual environment can be developed by building greater understanding between the parties through an effective institution to disseminate information. The institutions core functions should be to coordinate research and periodically assess relevant science and policy information, to provide an ongoing forum for negotiations, and to report, review, and assess national and international policy development.[143] This might be achieved through the provision of information, appropriate time spent in pre-negotiation (as was the case for MHLC), the provision of monitoring and verification systems—to report on environmental quality, State activity and compliance with the regime, non-party activity and compliance with the regime, domestic and international policy, and law developments.[144]

By world standards, the Indian Ocean region has less inherent regional solidarity (compared with South America or the Pacific Island States for instance) that can secure a strong contractual environment. State collations are building, however, as is evidenced in the *Indian Ocean Tuna Commission*,

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140. *See generally* PAUL WAPNER, ENVIRONMENTAL ACTIVISM AND WORLD CIVIC POLITICS (1999); JOHN BARRY, RETHINKING GREEN POLITICS 118-24 (1999); JOHN S. DRYZEK, THE POLITICS OF THE EARTH: ENVIRONMENTAL DISCOURSES 84-101, 131 (1997).

141. *See* Levy et al., *supra* note 136, at 400-01.

142. ROBERT KEOHANE & JOSEPH NYE, JR., POWER AND INTERDEPENDENCE 21, 38-60 (2d ed. 1989).

143. David Victor et al., *Pragmatic Approaches to Regime Building for Complex Int'l Problems* in GLOBAL ACCORD 453-74 (Nazli Choucri ed., 1995).

144. *See* Levy et al., *supra* note 136, at 399-403.

the *Convention for the Protection, Management and Development of the Marine and Coastal Environment of the Eastern Africa Region and the Protocol Concerning Protected Areas and Wild Flora and Fauna in the Eastern African Region*, the Valdivia Group, the *Indian Ocean Commission*, the *Indian Ocean Rim Association for Regional Cooperation* and the *ASEAN Regional Forum*. It is possible that the development of a regime for small cetacean conservation in the region, which seeks to address cross-jurisdictional issues such as the range of environmental threats obviously present, could form a connective web between these existing bodies.

A key part of enhancing the contractual environment is a fundamental articulation of objectives and principles. Reflecting on the Indian Ocean geopolitical areas, there are two Agreements that can be used as a model. Both ACCOBAMS and ACAP have clearly articulated objectives and principles. In the case of this proposed cetacean conservation regime, achieving and maintaining a favourable conservation status for small cetacea in the region must be paramount. All measures should be taken to eliminate the threats to this region. Key important cetacea habitats should be conserved or restored. Research and monitoring should be supported and encouraged, as should inter-organisational cooperation. National legislation should quickly reflect the regime objectives and stated conservation measures.

When considering the developing body of objectives and principles in international oceans management, significant progress has been made around the world. In the Indian Ocean region, it is evident that levels of protection afforded to the marine environment differ greatly across the geopolitical map. However, UNCLOS, a myriad of new fisheries regimes, and Australia's Oceans Policy[145] provide some guidance and enshrine the precautionary principle and adaptive ecosystem-based management, while seeking a synergy with other international management instruments.

These remain appropriate principles to apply to an area such as the Indian Ocean where multiple and sequential uses need to be managed within a complex geopolitical territory.

C. Building National Capacity

Building national capacity is key to most regime development but even more fundamental to regime development with less-developed States, economies and policy foundations.[146] Governments must have the technical, legal, and administrative capacity to carry out the requirements of regime participation. Capacity building in these areas can include increasing flow of funds and grants to enable string policy programs and the development of

145. 1 COMMONWEALTH OF AUSTRALIA, AUSTRALIA'S OCEANS POLICY (1998); 2 COMMONWEALTH OF AUSTRALIA, AUSTRALIA'S OCEANS POLICY—SPECIFIC SECTORAL MEASURES (1998).

146. *See* Duruigbo, *supra* note 117.

coalitions, training programs, sharing expertise and technology, and boosting the bureaucratic power of domestic allies.[147]

To increase capacity and ensure commitment to the process, representation within the processes should reflect the Range States and may need to be focused by an elected Executive Council. It may also be important to ensure Range State representation also has sufficient mandate representing not only Environmental Ministries but also Foreign Affairs. When considering the UNEP's Regional Seas Program, inter-Ministerial mechanisms have been proposed to facilitate consistent domestic policy development.[148] Both ACCOBAMS and ACAP prescribe similar bodies. ACCOBAMS Article VI establishes a Bureau as a policy guidance and coordination body, and Article VII establishes a Scientific Committee.[149] Similarly, Article IX of ACAP establishes an Advisory Committee to provide advice and information to the secretariat, Parties, and others.[150]

Mechanisms to ensure cooperative monitoring, compliance, and surveillance should operate at the regional coordination level and be able to operate inter and intra regionally, having the additional scope to attend and contribute to other crossover regional agreements or management systems.

Research on the Indian/Sri Lankan region has already identified that national cetacean protection agencies should be formed in India, Bangladesh, Burma (now Myanmar), Sri Lanka and the Maldives to monitor and follow up action on any new conservation measures.

Limited institutional capacity naturally exists, but it would be appropriate to give full consideration to the development of an *Indian Ocean Cetacean Management Body* and an associated *Scientific Committee* to draw in the scientific expertise from other regions and organisations as well as coordinating management objective within the region. Such a body would enable the active presence and participation of local communities and non-governmental organisations.

D. Developing Environment-Centred Coalitions

Rather than burdening regimes with overly large bureaucratic institutions, experience indicates regimes are far better with "light" institutions that are well networked with associated scientific and policies communities in similar institutions, policy networks, universities, Government and non-government organisations.[151] Developing coalitions between like-minded

147. Levy et al., *supra* note 136, at 404-05.

148. Environment Australia, *Resolution on Developing an Indian Ocean and South East Asia Regional Agreement on the Conservation and Management of Marine Turtles* (Oct. 1999).

149. *See* CMS 1979, *supra* note 102, arts. VI–VII.

150. Agreement on the Conservation of Albatross and Petrels, Cape Town South Africa, Jan. 29 – Feb. 2, 2001, art. IX [hereinafter ACAP 2001].

151. *See* Levy et al., *supra* note 136, at 409-10 (1993).

Governments also helps to maintain policy focus and commitment to the regime's aims.

The proposed *Indian Ocean Cetacean Management Body* and an associated *Scientific Committee* would also appropriately take part in other existing regional agreements, such as *the Indian Ocean Tuna Commission*, where relevant impact studies on cetaceans already exist. The regime should inform and act on behalf of other relevant agreements in the region and in so doing, develop a broader regional "ecosystem policy." Reflecting its contemporary approach, Article XI of ACAP specifically seeks to "develop and maintain coordinated and complimentary working relationships with all relevant international, regional and sub-regional bodies."[152]

The work of the Regional Seas Program in regional marine governance suggests that the establishment of transnational scientific networks and an active presence of non-governmental organisations representing issues and significant public concern are also important elements.[153]

E. Fostering Open-Ended Knowledge Creation

Fostering open-ended knowledge creation is a fundamental premise of ecosystem-based management[154] and requires a commitment to ongoing research in all areas of concern.[155] By its very nature, this instills an ethic of adaptive management practice that helps the regimes to stay contemporary and appropriate for the awareness of the time. Such a process requires ongoing scientific and policy monitoring and assessment that, in turn, becomes part of the decision-making process of the regime.

Agreements must be developed to operate under the precautionary principle and be structured to require action in the absence of scientific certainty.[156] This should not preclude active gathering of further scientific information, but the absence of this information cannot be used as a defence for no action. The ecosystem inhabited by small cetacea must also be part of any conservation agreement developed under this regime. This will require an incremental development of the agreement in order to adapt to new evidence and information. The key issues, including fisheries, pollution, climate change, habitat degradation, ozone depletion and directed hunts, should be

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152. *See* ACAP 2001, *supra* note 150, art. XI.

153. Peter M. Haas, *Prospects for Effective Marine Governance in the Northwest Pacific Region*, ESENA WORKSHOP: ENERGY-RELATED MARINE ISSUES IN THE SEA OF JAPAN 7 (Tokyo, July 11-12, 1998).

154. Keith Sainsbury & Ussif Rashid Sumalia, *Incorporating Ecosystem Objectives into Management of Sustainable Marine Fisheries, Including 'Best Practice' Reference Points and Use of Marine Protected Areas* in REYKJAVIK CONFERENCE ON RESPONSIBLE FISHERIES IN THE MARINE ECOSYSTEM 3 (Reykjavik, Iceland, Oct. 1-4, 2001), *available at* http://www.fao.org/fi/meetings/Reykjavik/default.asp.

155. Levy et al., *supra* note 136, at 412.

156. Rio Declaration on Environment and Development, U.N. Conference on Environment and Development, U.N. Doc. A./CONF.151/5/Rev.1, 1 I.L.M. 874 (1992).

the focus of the regime to ensure the benefit of management deals with the cumulative threats and flows to the ecosystems as much as to the cetacea.

F. Developing the Regime from Norms to Rules

In recognition of the slow development of regimes and institutions that often begin with commitment to norms and principle without any regulatory mechanisms being in place, it may be appropriate to consider this as proper development of a regime. By allowing all parties sufficient time to develop an understanding and trust in the contractual environment, many scholars assert that it is easier to move norms and principles to binding rules, than it would be to attempt a negotiation of this position at the start. The exception seems to be when Parties come into the negotiations with sufficient information to enable fast adoption, such as following a crisis or major event, but usually the development is slower.[157]

VI. PROPOSED AGREEMENT CONTENT

The major threats to biodiversity in the Indian Ocean region can also be considered the major threats to cetacea of the region. When considering coastal ecosystems, threats in the region originate predominantly from the highly coastal and impoverished population, leading to escalation and overharvest of subsistence resources, high levels of pollution, and coastal ecosystem loss (e.g., coral reefs, seagrass beds). It is unclear at this stage what the effects of noise pollution are having on cetacean populations, although it is likely significant in localised areas. In offshore regions, the main threats result from an unchecked fishing industry.[158] Overarching this are the global threats of climate change and ozone depletion.

The following is the content of the proposed Regional Agreement.

A. General Points of Agreement Between Parties

1. A recognition that cetacea are an integral part of the marine ecosystem which must be conserved for the benefit of present and future generations, and that their conservation is a common concern.
2. The conservation status of cetacea can be adversely affected by factors such as degradation and disturbance of their habitats, chemical and noise pollution, reduction of food resources, use and abandonment of

157. Abram Chayes & Antonia Handler Chayes, THE NEW SOVEREIGNTY: COMPLIANCE WITH INTERNATIONAL REGULATORY AGREEMENTS 9-17 (Harvard University Press, Cambridge, 1995).

158. Rodney V. Salm, *Marine Protected Areas: Issues and Solutions in the Western Indian Ocean, in* IUCN MARINE AND COASTAL WORKSHOP (World Conservation Congress, Montreal, Oct. 1996), *available at* http://www.gulfof maine.org/library/mpas/biblio.htm#Regiongeneral.

non-selective fishing gear, incidental and bycatch, effects of climate change and ozone depletion and deliberately targeting cetacea for human consumption beyond a survival need.

3. The vulnerability of cetacea to such threats warrants the implementation of specific conservation measures.
4. Through coordinated, concerted actions an Agreement will contribute to the conservation of cetacean habitat and will have additional benefits for other species and the maintenance of biodiversity in the Indian Ocean region.
5. Knowledge of the biology, ecology, and population dynamics of cetaceans is deficient, and that it is necessary to develop cooperation for research and monitoring of these species in order to fully implement conservation measures.
6. It is important to integrate actions to conserve cetacea with activities related to the socioeconomic development of the Agreement Parties, specifically the cessation of coastal pollution and destructive fishing practices in the region.
7. The need to promote and facilitate cooperation among States, regional economic integration organisations, intergovernmental organisations and the non-governmental sector for the conservation of cetacea in the region.
8. Effective implementation of such an Agreement will require that assistance be provided, in a spirit of solidarity, to some range States for research, training, and monitoring of cetaceans and their habitats, as well as for the establishment or improvement of scientific and administrative institutions.
9. The strengths and benefits of other global and regional instruments of relevance to the conservation of cetacea will be supported through this Agreement.

B. Scope, Definitions, and Interpretation

1. The Agreement area should include the whole Indian Ocean, Arabian Sea, Gulf of Oman, Gulf of Adean, Mozambique Channel, Bay of Bengal, Gulf of Martaban, Strait of Malacca, and Timor Sea including EEZs and territorial waters of Member Range States and riverine habitats where cetacea are known to live.
2. While the Agreement might initially specify a few species, its principles and initiatives should apply to all species of cetacea that are resident or transient in the Agreement area, and should protect these species and their critical habitat. The continual addition of species into the agreement and its Action Plan should reflect the goal of adaptive ecosystem-based management.
3. All range states of the Indian Ocean should aim to become signatories to the Agreement.

4. The Agreement should be open to accession by non-State regional organisations as well as appropriate non-Range States.
5. The Agreement is an agreement within the meaning of Article IV, Paragraph 4 of the CMS convention.[159]

C. Purpose and Specific Conservation Measures

1. The objective of the Agreement should be to achieve and maintain a favourable conservation status for small cetacea in the region, and seek to eliminate the threats to cetacea in this region.
2. The ecosystem inhabited by cetacea must also be part of the conservation agreement. This will require an incremental development of the agreement in order to adapt to new evidence and information. Critical habitats of importance to cetacea should be conserved or restored.
3. The key issues, including fisheries, pollution, climate change, habitat degradation, ozone depletion and directed hunts, should be the focus of the agreements to ensure the benefit of management deals with the cumulative threats and flows to the ecosystems as much as to the cetacea.
4. Deliberate taking, harm or interference should not be permitted.
5. National legislation of Range States should quickly reflect the ACCIOS objectives and stated conservation measures. Legislation should be enforced.
6. Regional capacity to collect and disseminate information and conduct training and education programs should be developed. Research and monitoring should be supported and encouraged, as should inter-organisational cooperation.
7. Ability to respond to emergency measures should be developed
8. In implementing such measures, the Parties should widely apply the precautionary approach. In particular, where there are threats of serious or irreversible adverse impacts or damage, lack of full scientific certainty should not be used as a reason for postponing measures to protect cetacea.

D. Institutional Capacity and Cooperation Between Parties

1. Institutional capacity and mechanisms to ensure cooperative monitoring, compliance and surveillance should operate at regional coordination level and be able to operate inter and intra regionally, hav-

159. *See* CMS 1979, art. IV, ¶ 4. "Parties are encouraged to take action with a view to concluding AGREEMENTS for any population or any geographically separate part of the population of any species or lower taxon of wild animals, members of which periodically cross one or more national jurisdictional boundaries." *Id.*

ing the additional scope to attend and contribute to other cross-over regional agreements or management systems.
2. Parties should cooperate in the development of systems for collecting and analysing data, and exchanging information.
3. Assistance should be available to ensure legislative and other management approaches to conservation are implemented.
4. Education and awareness programs should be developed.
5. Exchange of expertise, techniques and knowledge should be facilitated.

E. Indian Ocean Cetacean Management Body

1. Consideration should be given to the development of an *Indian Ocean Cetacean Management Body* with an associated *Scientific Sub-Committee* that would be responsible for coordinating scientific, legal and policy advice and management of programs within the region.
2. The *Indian Ocean Cetacean Management Body* should draw in the scientific legal and policy expertise from other regions and organisations as well as coordinating objectives of the short term (five year) and long term (twenty year) Action Plan, within the region. Such a body would:
    a) coordinate on-ground activities such as assistance with legislative reform, research programs, and technical advice to States on the impacts and association of other regional agreements;
    b) take part in other existing regional agreements, such as fisheries Commissions, where relevant impacts on cetaceans are known or may possibly exist—specifically the IWC Scientific Committee and regional Fisheries Policy and Scientific Committees; and
    c) enable the active presence and participation of local communities and non-governmental organisations in policy development in the region.
3. The *Indian Ocean Cetacean Management Body* should also:
    a) provide scientific, technical and other advice and information to the Meeting of the Parties;
    b) report on regional uptake of the Action Plan to each ordinary Meeting of the Parties;
    c) report and make recommendations to the Meeting of the Parties concerning the Action Plan, implementation of the Agreement and further research to be carried out; and

d) develop a system of indicators to measure the collective success of the Action Plan and activities of the Parties to the Agreement.

4. The *Indian Ocean Cetacean Management Body* should establish a specialist independent *Scientific Sub-Committee* to:

    a) Provide advice to the *Management Body* on scientific and technical matters;
    b) Conduct scientific assessments of the conservation status of cetacean populations; and
    c) Coordinate with international research and monitoring programs

5. The *Indian Ocean Cetacean Management Body* may invite other experts to attend its meetings and should establish working groups on specific issues.
6. Assistance should be available to range States for research, training or monitoring and for active participation in the proposed *Indian Ocean Cetacean Management Body.*

F. Action Plan

1. A short term (five year) and long term (twenty year) Action Plan for implementing the Agreement should be developed by the Conference of the Parties in consultation with *Indian Ocean Cetacean Management Body* and the *Scientific Sub-Committee*, who would then have carriage of implementing the on-ground objectives.
2. The Action plan should address and seek to mitigate against each of the key threats:

    a) Climate/environmental change including Ozone and UV-B radiation;
    b) Habitat degradation;
    c) Chemical pollution;
    d) Impact of noise;
    e) Direct and indirect effects of fisheries; and
    f) Disease and mortality events,

    and have clear on-ground objectives and programs that can be measured on a regular basis to ensure progressive results.
3. The Action Plan should be assessed at each ordinary session of the Meeting of the Parties, and the content of the Action Plan reviewed and forecast on a five-year basis in light of that assessment.

G. Secretariat

1. The functions of the Secretariat should be limited to administrative roles, specifically:
    a) to arrange and service the sessions of the Meeting of the Parties;
    b) to arrange and service the sessions of the *Indian Ocean Cetacean Management Body*;
    c) to arrange and service the sessions of the *Indian Ocean Cetacean Management Body Scientific Sub-Committee*;
    d) to execute the decisions addressed to it by the Meeting of the Parties; and
    e) to promote and coordinate activities under the Agreement, including the Action Plan, in accordance with decisions of the Meeting of the Parties.

H. Relationship with Relevant International Bodies

1. The Agreement should develop and maintain coordinated and complementary working relationships with all relevant international, regional and sub-regional bodies.

I. Relationship with Domestic Legislation and International Conventions

1. Parties should be required to amend their domestic legislation to reflect the Agreement purpose and conservation measures.
2. Parties should be bound by the existing international treaties, particularly in relation to the United Nations Convention on the Law of the Sea (UNCLOS)—specifically Article 65 and 120.
3. The Agreement should not affect the right of any Party to maintain or adopt stricter measures for the conservation of cetacea and their habitats.

J. Settlement of Disputes

1. Where the Parties are unable to resolve the disputes, a technical arbitration panel should be established, and should mirror the dispute resolution mechanism within UNCLOS.

K. Implementation

1. Each Party should designate an Authority or Authorities to undertake, monitor, and control all activities related to the supervision, application, and enforcement of this Agreement in their sovereign territory.

2. Each Authority should be responsible for the regular reporting of State progress in the implementation, management and enforcement of this Agreement.
3. Each Authority should participate in the proposed *Indian Ocean Cetacean Management Body.*

L. Financing

1. A fund should be established for the purpose of work relating to the conservation of cetacea, including monitoring, research, technical development, training and education, and habitat management.
2. Additional funds to maintain the Agreement and necessary scientific research should also be established.

M. Reservations

1. The Agreement should not be subject to reservations.

VII. RANGE STATES OF THE INDIAN OCEAN RIM

State	CMS Status	CMS Agreements
Australia	1991	
Bangladesh	-	
Djibouti	-	
France	1990	AEWA, BAT, ACC
India	1983	SIB
Indonesia	-	
Iran	-	
Kenya	1999	
Madagascar	-	
Malaysia	-	
Maldives	-	
Mauritius	-	
Mozambique	-	
Myanmar	-	
Oman	-	
Pakistan	1987	SIB
Republic of South Africa	1991	AEWA
Seychelles	-	
Somalia	1986	
Sri Lanka	1990	
Tanzania	1999	
Thailand	-	
United Kingdom	1985	AEWA, BAT ASC
Untied Arab Emirates	-	
Yemen	-	

Legend
AEWA *Agreement on the Conservation of African-Eurasian Migratory Waterbirds (AEWA)*
BAT *Agreement on the Conservation of Bats in Europe (EUROBATS)*
ASC *Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas* (ASCOBANS)
SIB *Memorandum of Understanding Concerning Conservation Measures for the Siberian Crane*
ACC *Agreement on the Conservation of Cetacean of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS)*

VIII. CONCLUSION

This proposal concludes that the development of a CMS agreement could not only assist with the long-term survival of cetacea, but would also be critically important to the development and implementation of broader ecosystem management in the region.

By using important keystone species such as cetacea to develop an umbrella agreement, the synthesis of legislation between coastal States and the participation of this regional body in other international forums could greatly enhance the regions capacity to manage this large oceanic region, streamlining inter-State management and increasing political cohesion around environment management decisions.

Precedent of regional corporation exists and the recent conclusion of ACAP attests to the region's capacity to deal with difficult conservation issues while not diluting the strength of the regime to manage them.

By outlining the necessary components of such an agreement, discussion can then be directed to specifics and politics. Notwithstanding the difficulties and long-term commitment necessary to negotiate such an extensive agreement, the author believes that significant regional gain would be achieved.

In 1995, Senator the Honorable Gareth Evans QC, Australian Minister for Foreign Affairs, spoke to the International Forum on the Indian Ocean Region:

> Let me . . . throw out a challenge. The descriptions 'North Atlantic' and 'Asia Pacific' these days conjure up images of strength, of alliances, of cooperation, of prosperity and economic dynamism. For too long the Indian Ocean has, in contrast, been the Forgotten Ocean, the Ocean Where Time Stood Still. Each of us today, individually, has the chance to rise above these conventional habits of mind, to reach towards a new and promising future for the countries whose shores this great ocean washes. It needs some imagination, some real flair, to envisage what cooperation among us can achieve in this new era. But the prospects are real.[160]

The challenge remains as great today as it was in 1995, but environmental security results in economic prosperity. Threats from outside the region should be confronted as a united force, enhancing the region's capacity to safeguard its future and protect the region's ocean and its cetacea from the slippery slope of decline.

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160. Gareth Evans, *Indian Ocean Regional Cooperation: Exploring the Possibilities, Keynote address, in* INT'L FORUM ON THE INDIAN OCEAN REGION (Senator the Honorable Gareth Evans QC, Minister for Foreign Affairs, Perth, June 11, 1995) *available at* http://www.garethevans.dynamite.com.au/speechtexts/foreign/geifior.htm.