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Seabird Bycatch—Deathbed Conservation or a Precautionary and Holistic Approach?

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1. INTRODUCTION

The focus of this article is on public international law as it relates to the issue of the incidental mortality of birds in marine fisheries—seabird bycatch. The international regulation of seabird bycatch is an exceedingly interesting topic, among other things because it is situated in the twilight zone where international fisheries regimes and international nature conservation regimes meet, and because it has developed rapidly in recent years. The article purports to provide an overview and analysis of this particular area of international law.

At the same time, the topic is viewed from a broader perspective. In order to slow down current rates of biodiversity loss and ecosystem impairment, the international community of states appears to agree on the *need* to apply a precautionary, holistic approach to nature conservation. It is not clear, however, to what extent such an approach has until now been actually *incorporated* in international law. Against this background, the article examines the application of the precautionary principle and the ecosystem approach in international fisheries management and marine wildlife conservation law. It does so by zooming in on the specific issue of seabird bycatch. The question to what extent the precautionary principle and the ecosystem approach have been applied in the international law of relevance to this issue is dealt with by addressing four consecutive queries.

First, what do the application of the precautionary principle and the ecosystem approach require in general? This part (par. 2) of the article concisely sets out the background and basic elements of the two concepts. Second,

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how do the requirements defined under the first question relate to seabird bycatch? This part (par. 3) of the article describes the problem of seabird bycatch, its potential solutions, and determines what the application of a precautionary and ecosystem approach requires in respect of seabird bycatch. Third, how is seabird bycatch in fact being regulated in international fisheries and wildlife law? In this context the article (in par. 4) addresses, among other things, the regime of the Bonn Convention on Migratory Species (CMS),[2] as well as international fisheries law and particularly the practice of regional fisheries management organizations (RFMOs). Fourth and finally, how does the regulation of seabird bycatch in these areas of international law relate to the standards defined before? This question is addressed little by little as part of the legal analysis just mentioned (par. 4), and an overall answer is provided in the article's concluding part (par. 5).

2. PRECAUTIONARY PRINCIPLE AND ECOSYSTEM APPROACH

From Deathbed Conservation . . .

The states attending the 2002 World Summit on Sustainable Development (WSSD) in Johannesburg committed themselves to "the achievement by 2010 of a significant reduction in the current rate of loss of biological diversity,"[3] a pledge which was repeated at the 2005 UN World Summit in New York and in various other global and regional settings. Until recently international nature conservation law[4] chiefly aimed at conserving endangered species through mechanisms regulating exploitation, trade or habitat protection. Some of what can, for present purposes, be called the "traditional" treaties were negotiated for single (groups of) species such as polar bears, tuna or birds, others for defined terrestrial or ocean regions, while still others received a global scope, notably the influential conventions concluded in the 1970s known as the "big four"[5]—the Ramsar Wetlands Convention,[6] the UNESCO World Heritage Convention,[7] the Convention on International Trade in Endangered Species (CITES)[8] and the CMS.

However, by focusing on species that were already endangered international nature conservation law was inherently reactive, a condition exacerbated

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[2] Convention on the Conservation of Migratory Species of Wild Animals (1979).

[3] Johannesburg Plan of Implementation (2002), par. 44.

[4] International nature conservation law is understood here to encompass all norms of public international law concerned with management/use/preservation of ecosystems and species. Although its core is formed by instruments with conservation as main aim, it also includes fisheries instruments and parts of instruments primarily concerned with, e.g., water or air pollution.

[5] S. Lyster, International Wildlife Law (1985).

[6] Convention on Wetlands of International Importance Especially as Waterfowl Habitat (1971).

[7] Convention Concerning the Protection of the World Cultural and Natural Heritage (1972).

[8] Convention on International Trade in Endangered Species of Wild Fauna and Flora (1973).

by the fact that states usually undertook no action until a species' endangered status was scientifically well documented. Additionally, by focusing on the regulation of *some* activities affecting *some* species or sites it embodied an *ad hoc*, fragmented approach. These two features combined form an obstacle to long-term conservation. By waiting for populations to fall to dangerous levels and disregarding the broader ecosystems within which species function, the regime in fact often provided for little more than palliative care, or "deathbed conservation."[9] This insight translated into increased calls for holistic and proactive approaches to nature conservation and for the law reform necessary to achieve those.

Illustrative is the story of marine fisheries law, where attaining the goal of sustainable harvests has been the exception rather than the rule on account of conservation measures being taken too late, and where legal regimes have been created with little or no regard for the effects of fishing on the larger marine ecosystems. The outcome has been not only the frequent collapse of the targeted fish stocks themselves but also the endangerment of other marine species, whether through direct take as bycatch or through the impairment of ocean habitats. With regard to this particular branch of international law, too, there is now broad acknowledgment of the need to replace reactive, piecemeal approaches with proactive, holistic ones if the current negative trends in many marine species' populations are to be reversed.

. . . to a Precautionary and Holistic Approach

The evolution of international nature conservation law reflects the evolution of scientific understanding and societal opinion on the matter, albeit in a delayed fashion. At the intergovernmental level, it was the 1992 UN Conference on Environment and Development (UNCED) which marked the worldwide breakthrough of the awareness that fundamental changes to international nature conservation law were called for. The action programme Agenda 21, the Biodiversity Convention (CBD)[10] and a number of other instruments adopted at UNCED and in its wake are testimony of a paradigm shift from *ad hoc* endangered species conservation towards the proactive and holistic conservation and sustainable use of "biodiversity," i.e., the variability of organisms and ecosystems.[11] States formally reaffirmed the notion that species are inextricably linked to each other and to their environments, forming complex ecosystems, and that these ecosystems themselves are interconnected across the globe.

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[9] Term coined by J.C. Kunich, *The Fallacy of Deathbed Conservation Under the Endangered Species Act*, 24 Environmental Law, 501 (1994).

[10] Convention on Biological Diversity (1992).

[11] CBD, Art. 2.

Two novel concepts in particular represent the move away from "deathbed conservation": the precautionary principle[12] and the ecosystem approach.[13] The primary purpose of the precautionary principle (or approach) is to prevent serious or irreversible harm to the environment. It entails taking preventive action in response to threats of environmental harm at an early stage, including in situations of scientific uncertainty. Under the precautionary principle, the benefit of any doubt is given to nature. *In dubio pro natura*. Given the complexity of ecosystems, the ensuing difficulty of predicting the effects on them of potentially harmful human activities, and the serious and irreversible nature of species extinctions, the principle embodies the pre-eminent response to the failure of reactive conservation policies. The (or an)

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[12] The amount of available sources on the precautionary principle is rather daunting. For selected introductions and lists of further literature, see D. Freestone & E. Hey, eds., The Precautionary Principle and International Law (1996); S. Marr, The Precautionary Principle in the Law of the Sea (2003); J. Peel, The Precautionary Principle in Practice (2005); R. Cooney & B. Dickson, eds., Biodiversity and the Precautionary Principle: Risk and Uncertainty in Conservation and Sustainable Use (2005); A. Trouwborst, Precautionary Rights and Duties of States (2006); and A. Trouwborst, *The Precautionary Principle in General International Law: Combating the Babylonian Confusion*, 16 Review of European Community and International Environmental Law, 185 (2007).

[13] Literature on the ecosystem approach includes the following: R.E. Grumbine, *What Is Ecosystem Management?*, 8 Conservation Biology, 27 (1994); H.N. Scheiber, *From Science to Law to Politics: An Historical View of the Ecosystem Idea and Its Effect on Resource Management*, 24 Ecology Law Quarterly, 631 (1997); O.A. Houck, *On the Law of Biodiversity and Ecosystem Management*, 81 Minnesota Law Review, 869 (1997); N.A. Robinson, *Legal Procedures for Ecosystem Management: Environmental Law's First Challenge of the New Millennium*, 5 Asia Pacific Journal of Environmental Law, 203 (2000); E.J. Molenaar, *Ecosystem-Based Fisheries Management, Commercial Fisheries, Marine Mammals and the 2001 Reykjavik Declaration in the Context of International Law*, 17 International Journal of Marine and Coastal Law, 561 (2002); T. Ward, D. Tarte, E. Hegerl, & K. Short, Policy Proposals and Operational Guidance for Ecosystem-Based Management of Marine Capture Fisheries (2002); H. Wang, *Ecosystem Management and Its Application to Large Marine Ecosystems: Science, Law, and Politics*, 35 Ocean Development and International Law, 41 (2003); R.D. Smith & E. Maltby, Using the Ecosystem Approach to Implement the Convention on Biological Diversity (2003); O. McIntyre, *The Emergence of an 'Ecosystem Approach' to the Protection of International Watercourses Under International Law*, 13 Review of European Community and International Environmental Law, 1 (2004); S. Jennings, *The Ecosystem Approach to Fishery Management: A Significant Step Towards Sustainable Use of the Marine Environment?*, 274 Marine Ecology Progress Series, 279 (2004); M. Sissenwine & S. Murawski, *Moving Beyond 'Intelligent Tinkering': Advancing an Ecosystem Approach to Fisheries*, 274 Marine Ecology Progress Series, 291 (2004); S.J. Hall & B. Mainprize, *Towards Ecosystem-based Fisheries Management*, 5 Fish and Fisheries, 1 (2004); S.M. Garcia & K.L. Cochrane, *Ecosystem Approach to Fisheries: A Review of Implementation Guidelines*, 62 ICES Journal of Marine Science, 311 (2005); S. Parsons, *Ecosystem Considerations in Fisheries Management: Theory and Practice*, 20 International Journal of Marine and Coastal Law, 381 (2005); C. Frid, O. Paramor, & C. Scott, *Ecosystem-based Fisheries Management: Progress in the NE Atlantic*, 29 Marine Policy, 461 (2005); K.F. Kroepelien, *The Norwegian Barents Sea Management Plan and the EC Marine Strategy Directive: Some Political and Legal Challenges with an Ecosystem-Based Approach to the Protection of the European Marine Environment*, 16 Review of European Community and International Environmental Law, 24 (2007); J. Morishita, *What Is the Ecosystem Approach for Fisheries Management?*, 32 Marine Policy, 19 (2008); A. Fabra & V. Gascón, *The Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR) and the Ecosystem Approach*, 23 International Journal of Marine and Coastal Law, 567 (2008).

ecosystem approach, in turn, is for *ad hoc* approaches what precaution is for reactive approaches: their opposite. It stands for holism, the "complete picture." By aiming for "healthy" ecosystems or "ecosystem integrity," the ecosystem approach protects component species in the process. Roughly synonymous terms include "ecosystem management," "ecosystem-based management," and "ecosystem considerations" in management.

Both the precautionary principle and the ecosystem approach are hot topics, which is probably due as much to their complexity as to their importance. Their precise definitions, status and implications in terms of international law, as well as the relationship between them, continue to be debated by states and scholars alike.[14] Although premature elements of each concept can be traced further back, the incorporation of the precautionary principle and the ecosystem approach into international nature conservation law did not start in earnest until the early 1990s, with UNCED acting as watershed between the old and new approaches. The two novel approaches have since been incorporated to varying extents in newly negotiated instruments and infused into pre-existing regimes like the "big four." In accordance with these international developments states have also begun to implement the precautionary principle and the ecosystem approach in their pertinent domestic laws and policies. Although the reform of the law is thus underway, there is concern as to whether its speed and comprehensiveness are satisfactory when accepting the existence of an urgent need for a precautionary and holistic approach to nature conservation.[15] This appraisal is as specific as the available information allows, however, because a clear picture of the extent and quality of the law reform is lacking.

As stated above, this article is intended to contribute, however modestly, to improving the picture's clarity. It is not concerned with the international legal status of the precautionary principle and ecosystem approach as such, nor with the question what rights and duties, if any, either concept confers on states as a matter of international law. It merely attempts to verify to what degree the two approaches are actually being *applied* in intergovernmental regimes in respect of seabird bycatch—whether or not such application is *required* under international law. For present purposes it suffices to set out the basic substantive attributes of a precautionary and ecosystem approach to nature conservation.

It is easy to think that the ecosystem approach is about managing ecosystems. According to mainstream opinion, however, this is erroneous. As a recent

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[14] Some of these issues are the focus of an article by the present author on *The Precautionary Principle and the Ecosystem Approach in International Law: Differences, Similarities and Linkages*, 18 Review of European Community and International Environmental Law, 26 (2009). See also the sources mentioned *supra* in notes 12 and 13.

[15] E.g., P.W. Birnie & A.E. Boyle, International Law and the Environment (2002); Trouwborst, ibid., 36–37.

UN General Assembly resolution put it, ecosystem approaches "should be focused on managing *human activities* in order to maintain and, where needed, restore ecosystem health."[16] Such management ought to be adaptive and based on the best available information on the components, connectivity and dynamics of ecosystems. To make things more concrete, applying an ecosystem approach—that is, a holistic approach—to fisheries involves accounting for the effects that removing part of the target fish population will have on that species' predators, competitors and prey species, as well as considering the impact of the fishing method on other species, e.g., through bycatch or habitat impairment. For the exploited species itself, applying the ecosystem approach means managing[17] it as a biological unit, through its whole range, and taking account of all ecological factors affecting the species and its habitat throughout its life-cycle.

Acting on the precautionary principle means that *effective and proportional* preventive and/or abatement measures are taken when the best information available indicates that there are *reasonable grounds for concern* that *serious and/or irreversible* environmental harm may come about, including (but of course not only!) in cases of scientific uncertainty.[18] The thresholds of "reasonable grounds for concern" and "serious and/or irreversible" make clear that not *every* chance of *any* harm ought to trigger action. The action taken is to effectively safeguard the threatened part of the environment, and must therefore be timely, tailor-made, and regularly reviewed and adapted as need be. The proportionality criterion ensures that excessively rigorous measures are avoided. There is no requirement that precautionary action be cost-effective in the traditional economic sense, although in practice this will obviously be helpful.

As in the present article, the precautionary principle and the ecosystem approach are frequently mentioned in one breath, especially in relation to the marine environment. In fact, the two are so intertwined that sometimes the latter is presented as an essential ingredient of the former and sometimes the former as an essential ingredient of the latter. From the perspective of the precautionary principle, the ecosystem approach points out *what* harm is to be prevented, namely damage to ecosystem health. Conversely, from the perspective of the ecosystem approach, the precautionary principle indicates *when* action to prevent such damage is called for, namely when there are reasonable grounds for concern that serious/irreversible harm may occur. Evidently, when checking whether particular norms conform to a precautionary

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[16] Resolution 62/215 on Oceans and the Law of the Sea (2008), par. 99(b); emphasis added.

[17] To avoid confusion, 'managing cod' in this context of course again comes down to 'managing cod fisheries' and other anthropogenic impacts on cod.

[18] See also Trouwborst 2006, *op. cit.*; and Trouwborst 2007, *op. cit.*

and holistic approach to nature conservation, both their timing and substance must be looked at.

3. SEABIRD BYCATCH

Birds as "Nomo-indicators"

Birds are representative of the downward trend of biodiversity generally,[19] and linked to most international environmental problems. For instance, migratory birds are affected by climate change, tropical species by the wild bird trade, and—the focus of this article—seabirds by modern fishing methods. In the past, birds were looked upon as harbingers of change and people tended to observe their behaviour as a way of telling the future. Today's practice is not that much different, with birds acting as harbingers of environmental and ecosystem change. The altered timing and direction of some birds' migrations formed part of the first real evidence of climate change, and it was the reproduction failure of raptors that first pointed at the deleterious effects of DDT on ecosystems. Bird diversity and population trends are thus increasingly adopted as "bio-indicators" to gauge the general health of ecosystems.[20] The extensive distribution of birds, their position in the sensitive upper segments of food chains, the overlap of important bird areas with important biodiversity concentrations generally, and the relatively abundant scientific information on birds all contribute to their suitability as bio-indicators. Due to the same traits bird conservation efforts usually benefit other species too.

Migratory birds are the classic case for intergovernmental cooperation. Indeed, some of the first conservation treaties were concerned with bird protection[21] and the issue has not been off the international conservation agenda since, as witnessed by bird-related measures adopted under conventions like the "big four" or fisheries regimes, and specific bird agreements like the African-Eurasian Waterbirds Agreement (AEWA)[22] and the Agreement on the Conservation of Albatrosses and Petrels (ACAP),[23] which are among the most ambitious conservation treaties yet adopted. New agreements continue to be negotiated. A notable recent addition is the CMS Memorandum

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[19] S. Pimm *et al.*, *Human Impacts on the Rates of Recent, Present, and Future Bird Extinctions*, 103 Proceedings of the National Academy of Sciences, 10941 (2006).

[20] E.g., R.W. Furness & C.J. Camphuysen, *Seabirds as Monitors of the Marine Environment*, 54 ICES Journal of Marine Science, 726 (1997); R.W. Furness & J.J.D. Greenwood eds., Birds as Monitors of Environmental Change (1993).

[21] E.g., Convention between the United States and Great Britain for the Protection of Migratory Birds (1916); International Convention for the Protection of Birds (1950).

[22] Agreement on the Conservation of African-Eurasian Migratory Water Birds (1995).

[23] Agreement on the Conservation of Albatrosses and Petrels (2001).

of Understanding on migratory raptors of Eurasia and Africa.[24] Also in the European Union (EU), the Wild Birds Directive is both one of the oldest and most influential pieces of environmental legislation.[25]

Hence, international bird law can be considered a type of "fossil archive" of wider legal development. According to Bowman, bird law constitutes such a record for international environmental law as a whole.[26] It is submitted here that the evolution and present state of bird law can, with all due caution, at a minimum be regarded as broadly representative of the evolution and present state of international *nature conservation* law. Birds can, in other words, not only serve as bio-indicators but also as "nomo-indicators" to gauge the state of international nature conservation law generally. In particular, if the latter is becoming more proactive and holistic, then birds should be amongst the first to notice it. Surprisingly, the status of birds as the best studied group of organisms by the natural sciences contrasts with their position in the international law discipline,[27] despite the keystone position of bird conservation law within the wider field of international nature conservation law. There is, therefore, more than one good reason for putting the spotlight on birds in this article.

Seabird Bycatch

More specifically the spotlight is on seabirds, that is, the likes of gannets and gulls, penguins and pelicans, fulmars and frigate birds, skuas and shearwaters.[28] Before proceeding it is appropriate to make a number of points in order to place the article's topic, seabird bycatch, in context: (1) fisheries do not account for the only anthropogenic impacts on seabirds; (2) bycatch is not the only impact of fisheries on seabirds; and (3) not all impacts of fisheries on seabirds are by definition adverse. As for the first, four significant non-fishery impacts on seabirds[29] are human harvesting of eggs, chicks and adults at breeding colonies; predation by introduced alien species at breeding

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[24] Adopted 23 October 2008, see <www.cms.int>.

[25] Directive 79/409/EEG of the Council (1979).

[26] M.J. Bowman, *International Treaties and the Global Protection of Birds: Part II*, 11 Journal of Environmental Law, 281 (1999).

[27] Scarce exceptions include Bowman, *ibid.*; M.J. Bowman, *International Treaties and the Global Protection of Birds: Part I*, 11 Journal of Environmental Law, 87 (1999); B. Lenten, *A Flying Start for the Agreement on the Conservation of African-Eurasian Migratory Waterbirds (AEWA)*, 4 Journal of International Wildlife Law and Policy, 159 (2001); R. Boardman, The International Politics of Bird Conservation: Biodiversity, Regionalism and Global Governance (2006); R. Adam, *Waterbirds, the 2010 Biodiversity Target, and Beyond: AEWA's Contribution to Global Biodiversity Governance*, 38 Environmental Law Review, 87 (2008). Significantly more research has been published on bird protection in EU law.

[28] Although ornithologists tend to reserve the term "seabirds" for truly oceanic species such as albatrosses and auks, in this article it is understood as the equivalent of marine birds in a broader sense, including nearshore species such as cormorants and seaducks.

[29] For one overview, see M. Brooke, Albatrosses and Petrels Across the World, 149–165 (2004); for a more popular account, see C. Safina, Eye of the Albatross (2002).

sites;[30] marine pollution, for instance through the ingestion of plastic litter; and climate-related alterations in food supplies. As for the second point, fishery-related effects other than bycatch in fishing operations include entanglement in abandoned and lost fishing gear ("ghost nets"), harvesting for use as bait (e.g., boobies as bait in Brazilian lobster traps[31]), culling, disturbance, and impacts on the availability of seabirds' food.[32] As for the third remark, although fishermen sometimes compete with seabirds for the same prey species, the impact of fisheries on food availability is not always negative. Indeed, fisheries can augment the food supply for seabirds, either indirectly by removing predatory fish that feed on the same species as seabirds, or directly by throwing discarded fish and fish waste (offal) overboard. Northern fulmars, northern gannets, and several gull species, including the rare Audouin's gull, have in fact benefited greatly from adapting their behavior to scavenging discards and offal behind fishing vessels[33] —although other seabird species appear to suffer adverse side-effects of discarding at the same time.[34]

Bycatch of seabirds, also known as "incidental catch" or "incidental mortality," is obviously in the category of unfavorable effects. It involves many species and many fisheries in many sea areas. After all, seabirds occur in all oceans and, as one study observes:

> Any net set within the feeding range of seabirds carries the risk of unintentional by-catch. Similarly, lines of hooks, particularly those with bait, may catch seabirds. The scale of the by-catch varies with many factors, including time and location of fishing, precise fishing method [. .], behaviour of the target species, nature and abundance of seabird prey, and demography of the seabird populations.[35]

At any rate, fisheries employing driftnets and other gillnets, longlines and trawl nets, account for most seabird bycatch in the last few decades.

Offshore driftnets are essentially screens of netting suspended in the water column from buoys at the sea surface and are set for extended periods in order to catch squid, salmon and a variety of other species. Large-scale pelagic driftnets, which may be many kilometers long, are well known for their non-selectivity. Seabirds—besides dolphins, turtles, and anything else

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[30] For a remarkable example, see J. Vidal, *Giant Carnivorous Mice Threaten World's Greatest Seabird Colony*, The Guardian (19 May 2008).

[31] P.T.Z. Antas, *Status and Conservation of Seabirds Breeding in Brazilian Waters*, in Seabird Status and Conservation: A Supplement, 141 (J.P. Croxall, ed., 1991).

[32] M.L. Tasker, C.J. Camphuysen, J. Cooper, S. Garthe, W.A. Montevecchi & S.J.M. Blaber, *The Impacts of Fishing on Marine Birds*, 57 ICES Journal of Marine Science, 531 (2000).

[33] *Ibid.*, 538–539.

[34] E.g., J. Haworth, *Killers of the Skies Thrive on Man's Waste*, The Scotsman (8 November 2008), describing how predation by great skuas is threatening puffins and black-legged kittiwakes, after skua numbers increased tenfold as a result of widespread discarding in the North Sea.

[35] Tasker *et al.* 2000, *op. cit.*, 531–532.

large enough to get enmeshed—can get caught in driftnets and drown when scavenging on fish stuck in the net or when going after smaller prey passing through the meshes. Gillnets and other fixed gear in nearshore areas, for instance targeting cod or salmon, are just as non-selective as their oceanic counterparts. Longlining is a rather different method which is applied in a variety of fisheries, either targeting bottom-dwelling (demersal) species like sablefish or Patagonian toothfish,[36] or midwater (pelagic) species such as tuna or swordfish. This technique employs baited hooks on short branch lines which are attached to an extensive main line at regular intervals. Seabirds are not only attracted to longlining vessels because of discarded fish waste, but may also attempt to scavenge bait or caught fish off the lines. Most bycatch occurs during line setting, in the area between the point where baited hooks go overboard and the point where they sink out of the birds' reach. The setting (and hauling) of a longline may take several hours, as a typical tuna longline can measure 80 kilometers and have a hook every 25 meters. In trawl fisheries, finally, a net is dragged behind one or more vessels to catch any of a wide variety of demersal and pelagic target species. Seabird mortality occurs principally through net entanglement or collisions with cables (warp cables, netsonde cables, paravanes).

Impact of Bycatch on Seabirds

Incidental mortality in fishing gear affects a large number of seabird species, common and endangered ones alike, in all the seven seas. The relative impact of bycatch on these birds' conservation status, as far as it is known, is different for each species or population thereof. For each of the main gear types (gillnet, longline, trawl), a selection of the species and conservation concerns involved will now pass in review, whereas a compilation of references to scientific literature documenting and discussing bycatch in relation to that fishing method is provided in an accompanying footnote.

In the various types of gillnet, many different seabird species have been and continue to be bycaught in seas around the globe.[37] In the North Pacific,

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[36] Also known as Chilean sea bass.

[37] D.G. Ainley, A.R. DeGange, L.L. Jones & R.J. Beach, *Mortality of Seabirds in Highseas Salmon Gillnets*, 79 Fisheries Bulletin, 800 (1981); J.F. Piatt & D.N. Nettleship, *Incidental Catch of Marine Birds and Mammals in Fishing Nets off Newfoundland, Canada*, 18 Marine Pollution Bulletin, 344 (1987); N. Atkins & B. Henemann, *The Dangers of Gill Netting to Birds*, 41 American Birds, 1395 (1987); K. Falk & J. Durinck, *The By-Catch of Thick-Billed Murres (Uria lomvia) in Salmon Drift-Nets in West Greenland*, 69 Canadian Wildlife Service Occasional Papers, 23 (1987); M. Robins, Synthetic Gill Nets and Seabirds (1991); K. Strann, W. Vader & R. Barrett, *Auk Mortality in Fishing Nets in North Norway*, 13 Seabird, 22 (1991); A.R. DeGange & R.H. Day, *Mortality of Seabirds in the Japanese Land-Based Gillnet Fishery for Salmon*, 93 Condor, 251 (1991); E. Melvin, J. Parrish & L. Conquest, *Novel Tools to Reduce Seabird Bycatch in Coastal Gillnet Fisheries*, 13 Conservation Biology, 1386 (1999); A. Simeone *et al.*, *Incidental Mortality of Humboldt Penguins* Spheniscus Humboldti *in Gill Nets*, Central Chile, 27 Marine Ornithology, 157 (1999); S. Uhlmann, D. Fletcher & H. Moller, *Estimating*

large-scale oceanic driftnets targeting squid and salmon were estimated to take a daunting 500,000 birds each year before they were banned in 1992, affecting short-tailed and sooty shearwater and black-footed albatross populations. Driftnet bycatch is not, however, only something of the past, as illustrated by a 2008 incident whereby no less than 500 Yelkouan shearwaters were trapped in a single driftnet in Greek waters. Seabird bycatch in *coastal* gillnets rapidly acquired problematic proportions after fishermen started to replace twine nets by less visible synthetic, monofilament ones roughly sixty years ago. Such bycatch now significantly affects, *inter alia*, Humboldt penguins off Chile; a variety of seaduck species in the Baltic Sea, including the threatened Steller's eider; and a variety of auks in the Arctic, ranging from the still numerous Brünnich's guillemot to the critically endangered Kittlitz's murrelet.[38] Speaking of auks, nearshore gillnets are also blamed for the demise of the Iberian population of the common guillemot, which declined from 20,000 to 10 pairs during the second half of the 20th century.

Of all fishing methods, longlining is responsible for the gravest seabird bycatch troubles of the past twenty years, as reflected by the relative length of the footnote with literature references below.[39] Much attention has been

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Incidental Takes of Shearwaters in Driftnet Fisheries: Lessons for the Conservation of Seabirds, 123 Biological Conservation, 151 (2005); R. Zydelis, M. Dagys & G. Vaitkus, *Beached Bird Surveys in Lithuania Reflect Marine Oil Pollution and Bird Mortality in Fish Nets*, 34 Marine Ornithology, 161 (2006); L.S. Bull, *Reducing Seabird Bycatch in Longline, Trawl and Gillnet Fisheries*, 8 Fish and Fisheries, 31 (2007); I. Munilla, C. Díez & A. Velando, *Are Edge Bird Populations Doomed to Extinction? A Retrospective Analysis of the Common Guillemot Collapse in Iberia*, 137 Biological Conservation, 359 (2007); G.K. Davoren, *Effects of Gill-Net Fishing on Marine Birds in a Biological Hotspot in the Northwest Atlantic*, 21 Conservation Biology, 1032 (2007); S. Benjamins, D.W. Kulka & J. Lawson, *Incidental Catch of Seabirds in Newfoundland and Labrador Gillnet Fisheries, 2001–2003*, 5 Endangered Species Research, 149 (2008); and International Council for the Exploration of the Seas (ICES) Working Group on Seabird Ecology (WGSE) Report 2008, ICES CM 2008/LRC:05, available from <www.ices.dk>, at 65–69.

[38] On seabird bycatch in the Arctic, see A. Trouwborst, *A Bird's-Eye View of Arctic Governance: Reflecting on the Role of International Law in Arctic Cooperation from a Bird Conservation Perspective*, in: 1 Yearbook of Polar Law (2009, forthcoming).

[39] N. Brothers, *Albatross Mortality and Associated Bait Loss in the Japanese Long-line Fishery in the Southern Ocean*, 55 Biological Conservation, 255 (1991); Y. Cherel, H. Weimerskirch & G. Duhamel, *Interactions between Longline Vessels and Seabirds in Kerguelen Waters and a Method to Reduce Seabird Mortality*, 75 Biological Conservation, 63 (1996); A. Bergin, *Albatross and Longlining—Managing Seabird Bycatch*, 21 Marine Policy, 63 (1997); H. Weimerskirch, N. Brothers & P. Jouventin, *Population Dynamics of Wandering Albatross* Diomedea Exulans *and Amsterdam Albatross* Diomedea Amsterdamensis *in the Indian Ocean and Their Relationships With Longline Fisheries: Conservation Implications*, 79 Biological Conservation, 257 (1997); K.N. Barnes, R.G. Ryan & C. Boix-Hinzen, *The Impact of the Hake* Merluccius *spp. Longline Fishery off South Africa on Procellariiform Seabirds*, 82 Biological Conservation, 227 (1997); N. Brothers & A. Foster, *Seabird Catch Rates: An Assessment of Causes and Solutions in Australia's Domestic Tuna Longline Fishery*, 25 Marine Ornithology, 37 (1997); R. Gales, N. Brothers & T. Reid, *Seabird Mortality in the Japanese Longline Fishery around Australia, 1988–1995*, 86 Biological Conservation, 37 (1995); N.P. Brothers, J. Cooper & S. Løkkeborg, *The Incidental Catch of Seabirds by Longline Fisheries: Worldwide Review and Technical Guidelines for Mitigation*, FAO Fisheries Circular No. 937 (1999);

devoted in this regard to the plight of the 19 albatrosses and several other petrels[40] of the southern hemisphere, as well as the three albatrosses of the North Pacific (black-footed, Laysan, and short-tailed). Worldwide, 100,000 albatrosses alone are assessed to die annually on the hooks set, primarily, by pelagic tuna, swordfish, and shark longliners and demersal hake and Patagonian toothfish longliners. More interesting perhaps than absolute numbers is the impact of longlining on the birds' conservation status, which can be summarized in one phrase: albatrosses have become the world's most threatened bird family and mortality on longlines is the principal cause. Albatrosses are so vulnerable to this mortality because of a number of seabird characteristics

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H. Weimerskirch, A. Catard, P.A. Prince, Y. Cherel, & J.P. Croxall, *Foraging White-Chinned Petrels* Procellaria Aequinoctialis *at Risk: From the Tropics to Antarctica*, 87 Biological Conservation, 273 (1999); N.P. Brothers, J. Cooper, & S. Løkkeborg, The Incidental Catch of Seabirds by Long-Line Fisheries: Worldwide Review and Technical Guidelines for Mitigation (1999); H. Weimerskirch, D. Capdeville & G. Duhamel, *Factors Affecting the Number and Mortality of Seabirds Attending Trawlers and Long-liners in the Kerguelen Area*, 23 Polar Biology, 236 (2000); E.J. Belda & A. Sánchez, *Seabird Mortality in Longline Fisheries in the Western Mediterranean: Factors Affecting Bycatch and Proposed Mitigating Measures*, 98 Biological Conservation, 357 (2001); P. Inchausti & H. Weimerskirch, *Risks of Decline and Extinction of the Endangered Amsterdam Albatross and the Projected Impact of Long-Line Fisheries*, 100 Biological Conservation, 377 (2001); E. Dunn & C. Steel, The Impact of Longline Fishing on Seabirds in the North-East Atlantic: Recommendations for Reducing Mortality (2001); G.N. Tuck, T. Polacheck, J.P. Croxall, & H. Weimerskirch, *Modelling the Impact of Fishery By-Catches on Albatross Populations*, 38 Journal of Applied Ecology, 1182 (2001); A. Sánchez & E.J. Belda, *Bait Loss Caused by Seabirds on Longline Fisheries in the Northwestern Mediterranean: Is Night-Setting an Effective Mitigation Measure?*, 60 Fisheries Research, 99 (2003); M. Favero, *et al.*, *Estimates of Seabird By-Catch Along the Patagonian Shelf by Argentine Longline Fishing Vessels, 1999–2001*, 13 Bird Conservation International, 273 (2003); R.L. Lewison & L.B. Crowder, *Estimating Fishery Bycatch and Effects on a Vulnerable Seabird Population*, 13 Ecological Applications, 743 (2003); G.N. Tuck, T. Polacheck, & C.M. Bulman, *Spatio-Temporal Trends of Longline Fishing Effort in the Southern Ocean and Implications for Seabird Bycatch*, 114 Biological Conservation, 1 (2003); Brooke 2004, *op. cit.*, at 156–161; T.A. Reid & B.J. Sullivan, *Longliners, Black-Browed Albatross Mortality and Bait Scavenging: What is the Relationship?*, 27 Polar Biology, 131 (2004); S. Tudela, *Ecosystem Effects of Fishing in the Mediterranean: An Analysis of the Major Threats of Fishing Gear and Practices to Biodiversity and Marine Habitats*, FAO Studies and Reviews, General Fisheries Commission for the Mediterranean No. 74 (2004); S.L. Petersen, M.B. Honig & D.C. Nel, *The Impact of Longline Fisheries on Seabirds in the Benguela Current Large Marine Ecosystem*, in Towards an Ecosystem Approach to Longline Fisheries in the Benguela: An Assessment of Impacts on Seabirds, Sea Turtles and Sharks, 9 (S.L. Petersen, D.C. Nel & A. Omardien, eds., 2007); S. Véran *et al.*, *Quantifying the Impact of Longline Fisheries on Adult Survival in the Black-footed Albatross*, 44 Journal of Applied Ecology, 942 (2007); G.B. Baker *et al.*, *A Global Assessment of the Impact of Fisheries—Related Mortality on Shy and White-Capped Albatrosses: Conservation Implications*, 137 Biological Conservation, 319 (2007); ICES WGSE 2008, *op. cit.*, at 27–40; L. Bugoni *et al.*, *Seabird Bycatch in the Brazilian Pelagic Longline Fishery and a Review of Capture Rates in the Southwestern Atlantic Ocean*, 5 Endangered Species Research, 137 (2008); H.S. Grantham, S.L. Petersen, & H.P. Possingham, *Reducing Bycatch in the South African Pelagic Longline Fishery: The Utility of Different Approaches to Fisheries Closures*, 5 Endangered Species Research, 291 (2008).

[40] E.g., black, grey, northern giant, southern giant, Providence, spectacled, Westland and white-chinned petrel; and Buller's and Hutton's shearwater.

that are especially prominent in the highly oceanic albatrosses and other large petrels, namely their naturally low reproductive and adult mortality rates:[41]

> Most marine birds are relatively long lived in comparison with land birds. Those that forage far from the coast tend to have low reproductive rates, lay small clutches (usually one or two eggs), delay breeding for 5–10 years, have slow chick growth (thus long chick rearing period), and may desert their breeding attempt if conditions deteriorate. Wandering albatrosses, for instance, do not breed until about 10 years old, lay one egg every 2 years (if successful in the previous attempt), and rear their chick for more than 270 days. The average annual survival rate of adults, once they are breeding, exceeds 90% if there is no human interference. Nearshore species have a different life strategy: common scoters have an annual adult mortality of 23%, but produce around 7 eggs per clutch each year. Most species, especially gulls and shorebirds, have intermediate strategies. As a consequence, populations of offshore species are particularly sensitive to any increases in adult mortality.[42]

In sum, longlining causes albatrosses to "get killed faster than they can breed," as Safina put it in the National Geographic Magazine.[43] As a result, all 22 albatross species are now included in the IUCN Red List.[44] Four of them are listed as "Near Threatened,"[45] eight as "Vulnerable,"[46] six as "Endangered"[47] and four as "Critically Endangered."[48]

It is becoming increasingly apparent that, apart from the well documented problems in the southern hemisphere and the North Pacific, longlining bycatch may also pose a conservation challenge for some of the 20 species known to be incidentally caught on longlines in the Mediterranean and Northeast Atlantic.[49] In respect of demersal hake longlining in the Western Mediterranean, concerns have been raised regarding the Audouin's gull ("Near Threatened") and three shearwaters. Of the latter, the Mediterranean subspecies of Cory's shearwater (presently listed as "Least Concern" on the IUCN Red

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[41] See Brooke 2004, *op. cit.*; J. Enticott & D. Tipling, Seabirds of the World: The Complete Reference (1997); R.W. Furness & P. Monaghan, Seabird Ecology (1987); L. Löfgren, Ocean Birds (1984); B. Nelson, Seabirds: Their Biology and Ecology (1980).

[42] Tasker *et al.* 2000, *op. cit.*, at 540.

[43] C. Safina, *On the Wings of the Albatross*, National Geographic Magazine (December 2007), available at <ngm.nationalgeographic.com>.

[44] See <www.iucnredlist.org>.

[45] Buller's, light-mantled, shy, and white-capped albatross.

[46] Antipodean, Campbell, grey-headed, Laysan, Salvin's, short-tailed, southern royal, and wandering albatross.

[47] Atlantic yellow-nosed, black-browed, black-footed, Indian yellow-nosed, northern royal, and sooty albatross.

[48] Amsterdam, Chatham, Tristan, and waved albatross.

[49] Audouin's gull, Balearic shearwater, black-headed gull, black-legged kittiwake, black tern, Cory's shearwater, European shag, great black-backed gull, great cormorant, great shearwater, great skua, lesser black-backed gull, Mediterranean gull, northern fulmar, northern gannet, razorbill, sandwich tern, sooty shearwater, Yelkouan shearwater, yellow-legged gull.

List) is bycaught in the largest numbers, at a pace which is considered unsustainable in the long term. Yelkouan and Balearic shearwaters are also taken in significant amounts. For the Balearic shearwater, longlining is the primary cause of at-sea mortality and contributes substantially to its current "Critically Endangered" status. The Yelkouan, in turn, switched from "Least Concern" to "Near Threatened" when the Red List was last revised in 2008. In the Northeast Atlantic, numerically speaking the longlining impact on northern fulmars and great shearwaters is largest, although this does not seem to pose immediate problems for the populations concerned.

Mortality in trawl fisheries, finally, has been exacerbating the threats posed by longlining for a number of albatross, petrel and other seabird species.[50] Finfish trawlers off the Falkland Islands have been killing, *inter alia*, black-browed and southern royal albatrosses and white-chinned petrels; black-browed albatrosses have also been affected by the Argentine hake trawl fishery, alongside kelp gulls; South African hake trawlers are causing the incidental mortality of an estimated 18,000 birds a year, including albatrosses, petrels and the endemic Cape Gannet which has a "Vulnerable" Red List status; and in New Zealand, observers recorded a bycatch of 90 white-capped albatrosses in just five trawl fishing trips. These and other recent data suggest that trawl bycatch may be a more serious issue than previously assumed.

A Precautionary and Ecosystem Approach to Seabird Bycatch

For most fisheries, the scientific reports drawn from above note a lack of precise, or any, bycatch data. Similarly, they observe that knowledge and understanding of many marine bird species' ecology and population dynamics is limited. At the same time, few would deny that the circumstances described in the previous section amount to "reasonable grounds for concern that serious and/or irreversible harm may be caused." As discussed above, applying a precautionary and holistic approach would thus require taking timely, tailor-made, and proportional action in respect of the fisheries concerned to prevent or abate such harm, as appropriate.

This may entail abolishing a fishery completely, although the criterion of proportionality demands that a less rigorous course of action, when available,

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[50] J.A. Bartle, *Incidental Capture of Seabirds in the New Zealand Subantarctic Squid Trawl Fishery*, 1 Bird Conservation International, 351 (1990); P. Yorio & G. Caille, *Seabird Interactions With Coastal Fisheries in Northern Patagonia: Use of Discards and Incidental Captures in Nets*, 22 Waterbirds, 207 (1999); Weimerskirch *et al.* 2000, *op. cit.*; B. Weinecke & G. Robertson, *Seabird and Seal-Fisheries Interactions in the Australian Patagonian Toothfish* Dissostichus Eleginoides *Trawl Fishery*, 54 Fisheries Research, 252 (2002); B.J. Sullivan, T.A. Reid, & L. Bugoni, *Seabird Mortality on Factory Trawlers in the Falkland Islands and Beyond*, 131 Biological Conservation, 495 (2006); D. González-Zevallos, P. Yorio, G. Caille, *Seabird Mortality at Trawler Warp Cables and a Proposed Mitigation Measure: A Case of Study in Golfo San Jorge, Patagonia, Argentina*, 136 Biological Conservation, 108 (2007); B.P. Watkins, S.L. Petersen, & P.G. Ryan, *Interactions Between Seabirds and Deep-water Hake Trawl Gear: An Assessment of Impacts in South African Waters*, 11 Animal Conservation, 247 (2008).

is to be preferred. For longline, trawl and—to a lesser extent—gillnet fisheries, various technical and operational seabird bycatch mitigation measures have been developed and tested, and there is now a consensus that the greatest success in terms of bycatch minimization, short of banning the fishery, can be achieved through the *mandatory* prescription of a *combination* of *fishery-specific* mitigation measures.[51]

In all types of fisheries, seabird bycatch can often be reduced by closing certain areas (e.g., near seabird colonies) and/or certain seasons (e.g., breeding seasons) to fishing. Seabird mortality in gillnets can be reduced by increasing the visibility of the nets, although further research is needed on the most effective and practicable ways to do so. In longline and trawl fisheries, bycatch of many species can be avoided by setting and hauling gear at night, while using minimal deck lighting. Given that birds are often primarily attracted to vessels because of dumped offal and discards, specific dumping practices may also reduce bycatch significantly, for instance not dumping during gear

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[51] Good, recent overviews can be found in S. Løkkeborg, *Review and Assessment of Mitigation Measures to Reduce Incidental Catch of Seabirds in Longline, Trawl, and Gillnet Fisheries*, FAO Fisheries and Aquaculture Circular No. 1040 (2008); Report of the Expert Consultation on Best Practice Technical Guidelines for IPOA/NPOA-Seabirds (Bergen, 2–5 September 2008), FAO Fisheries and Aquaculture Report No. 880 (2008); ICES WGSE 2008, *op. cit.*, at 41–49 and 69–70; Bull 2007, *op. cit.*; and E. Gilman, N. Brothers, & D.R. Kobayashi, *Principles and Approaches to Abate Seabird By-Catch in Longline Fisheries*, 6 Fish and Fisheries, 35 (2005). See also Cherel *et al.* 1996, *op. cit.*; Bergin 1997, *op. cit.*; Brothers & Foster 1997, *op. cit.*; Melvin *et al.* 1999, *op. cit.*; C.H. Boggs, *Deterring Albatrosses From Contacting Baits During Swordfish Longline Sets*, in Seabird Bycatch: Trends, Roadblocks, and Solutions, 79 (E. Melvin & J.K. Parrish eds., 2001); Belda & Sánchez 2001, *op. cit.*; P.G. Ryan & B. Watkins, *Reducing Incidental Mortality of Seabirds With an Underwater Longline Setting Funnel*, 104 Biological Conservation, 127 (2002); S. Løkkeborg & G. Robertson, *Seabird and Longline Interactions: Effects of a Bird Scaring Streamer Line and Line Shooter on the Incidental Capture of Northern Fulmars* Fulmarus Glacialis, 106 Biological Conservation, 359 (2002); Sánchez & Belda 2003, *op.cit.*; S. Løkkeborg, *Review and Evaluation of Three Mitigation Measures—Bird-Scaring Line, Underwater Setting, and Line Shooter—to Reduce Seabird Bycatch in the North Atlantic Longline Fishery*, 60 Fisheries Research, 11 (2003); E. Gilman, C. Boggs, & N. Brothers, *Performance Assessment of an Underwater Setting Chute to Mitigate Seabird Bycatch in the Hawaii Pelagic Longline Tuna Fishery*, 46 Ocean and Coastal Management, 985 (2003); E. Trippel *et al.*, *Nylon Barium Sulphate Gillnet Reduces Porpoise and Seabird Mortality*, 19 Marine Mammal Science, 240 (2003); B.J. Sullivan, P. Brickle, T.A. Reid, D.G. Bone, & D.A.J. Middleton, *Mitigation of Seabird Mortality on Factory Trawlers: Trials of Three Devices to Reduce Warp Cable Strikes*, 29 Polar Biology, 745 (2006); J.P. Pierre & W.S. Norden, *Reducing Seabird Bycatch in Longline Fisheries Using a Natural Olfactory Deterrent*, 130 Biological Conservation, 406 (2006); G. Robertson *et al.*, *Fast Sinking (Integrated Weight) Longlines Reduce Mortality of White-chinned Petrels (*Procellaria Aequinoctialis*) and Sooty Shearwater (*Puffinus Griseus*) in Demersal Longline Fisheries*, 132 Biological Conservation, 458 (2006); S.L. Petersen, *Development of Mitigation Measures to Reduce Seabird Mortality in Longline Fisheries in the Benguela Large Marine Ecosystem*, in Towards an Ecosystem Approach to Longline Fisheries in the Benguela: An Assessment of Impacts on Seabirds, Sea Turtles, and Sharks (S.L. Petersen, D.C. Nel, & A. Omardien eds., 2007), 68; González-Zevallos *et al.* 2007, *op. cit.*; E. Gilman, N. Brothers, & D. Kobayashi, *Comparison of the Efficacy of Three Seabird Bycatch Avoidance Methods in Hawaii Pelagic Longline Fisheries*, 73 Fisheries Science, 208 (2007); T.M. Cox *et al.*, *Comparing Effectiveness of Experimental and Implemented Bycatch Reduction Measures: The Ideal and the Real*, 21 Conservation Biology, 1155 (2007); Grantham *et al.* 2008, *op. cit.*

setting or dumping on the opposite side of the ship from where the line or the net is. When positioned correctly, bird-scaring lines (also known as streamer lines, tori lines, or tori poles) can also be an effective tool to keep birds away from longlines, trawl nets and cables. Many mitigation methods have been developed specifically for longlining. Principal among these is the use of external or integrated line weights in order to ensure that hooks sink out of reach fast. Other measures include the use of side-setting methods, blue-dyed baits, underwater setting devices, and other contraptions with intriguing names like "brickle curtains," "bait-throwing machines," "line shooters" and the "umbrella system." Trawl-specific mitigation measures include the removal of netsonde cables and various techniques to keep birds away from dangerous areas. In this respect, trials have reportedly demonstrated the superiority of paired bird-scaring lines and "warp scarers" over "bird bafflers."

Most of these bycatch mitigation measures are cheap to implement and some are even—arguably or demonstrably, depending on the measure and the fishery in question—cost-effective in a narrow monetary sense. Direct and indirect economic benefits result from reduced bait loss and reduced operational costs—the latter as a result of a reduced need to handle bycaught birds. Some Maltese fishermen reportedly have an even longer-term perspective, their principal motive for bycatch mitigation being their dependence on seabird concentrations for the location of fish schools. In some fisheries, therefore, fishermen have implemented seabird bycatch mitigation measures of their own initiative. In many other fisheries, however, they have failed to do so voluntarily, whether on account of lack of information, conservative attitudes or otherwise.

A precautionary and holistic approach to seabird bycatch not only calls for the implementation of mitigation measures, but also for increased research and monitoring. This is needed to identify as completely as possible the fisheries with a bycatch problem, and the effectiveness of measures taken. In light of the resultant data, measures should regularly be reviewed and, as appropriate, adapted. As a final point, under a precautionary and ecosystem approach, bycatch mitigation action should evidently not be focused exclusively on threatened species, but also on "least concern" species bycatch rates of which appear unsustainable.

4. INTERNATIONAL LAW

Overview

At the global level, the legal framework pertaining to the issue of seabird bycatch consists of various customary norms and treaty provisions, backed up by pertinent non-binding instruments. The content of the rules in question varies from very general to very specific. Relevant global treaties include the Law of

the Sea Convention (LOSC),[52] the Fish Stocks Agreement (FSA),[53] the CBD, the CMS, ACAP, the Ramsar Convention and the World Heritage Convention. Among significant 'soft law' instruments are several UN General Assembly (UNGA) resolutions, the UN Food and Agriculture Organization's (FAO) Code of Conduct,[54] and the FAO International Plan of Action on seabird bycatch in longline fisheries (IPOA-Seabirds).[55] Selected elements of this global legal framework are dealt with below in some more detail. By way of a preliminary, general remark, however, it is safe to say that especially the more recent legal and policy instruments reflect a consensus that a precautionary and holistic approach to marine fisheries entails addressing bycatch issues. The most important rules with a regional scope can be found in AEWA and decisions adopted by the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) and other regional fisheries management bodies. Some regional seas agreements, EU legislation, bilateral migratory bird agreements concluded between the U.S. and some of its neighbors, and several other regimes are relevant as well.

The following sections deal, consecutively, with global "hard" law generally, global "soft" law, the CMS, AEWA, ACAP, CCAMLR, and the practice of other RFMOs. Whereas this article focuses on international law itself, it is convenient at this stage to acknowledge the substantial role that non-governmental entities, particularly BirdLife International and the fishing industry, have played and continue to play in the development and implementation of the intergovernmental regimes discussed below.[56]

CBD, LOSC, FSA, and Other Global Hard Law

Although various substantive and procedural rules of general, customary international law have a bearing on seabird bycatch, they are not discussed in further detail here.

Two objectives of the CBD, a global treaty to which virtually all states are contracting parties, are the conservation of biodiversity and the sustainable use of its components, that is, use "in a way and at a rate that does not lead to the long-term decline of biological diversity."[57] The Convention's preamble recognizes that it is "vital to anticipate, prevent and attack the causes of significant reduction or loss of biological diversity at source," and also that "where

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[52] United Nations Convention on the Law of the Sea (1982).

[53] Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (1995).

[54] FAO Code of Conduct for Responsible Fisheries (1995).

[55] FAO International Plan of Action for Reducing Incidental Catch of Seabirds in Longline Fisheries (1999).

[56] See, e.g., J.P. Croxall, *The Role of Science and Advocacy in the Conservation of Southern Ocean Albatrosses*, 18 Bird Conservation International, 1 (2008).

[57] Art. 1–2.

there is a threat of significant reduction or loss of biological diversity, lack of scientific certainty should not be used as a reason for postponing measures to avoid or minimize such a threat."[58] The CBD reiterates the obligation of each state to make sure that activities within its "jurisdiction or control" do not harm "the environment of other States or of areas beyond the limits of national jurisdiction."[59] Among the many other substantive provisions of relevance to seabird bycatch, two stand out. First, "as far as possible and as appropriate," states are to monitor species and ecosystems and to identify "processes and categories of activities which have or are likely to have significant adverse impacts" on biodiversity.[60] Second, where this results in the actual determination of such impacts, states are to "regulate or manage" the responsible processes or activities.[61] Several non-binding decisions by the Conference of the Parties touch more or less directly upon seabird bycatch. One of them mentions "restrictions on fishing practices that cause a by-catch of species such as albatross" as an example of sustainable management practices.[62]

Given that the CBD is to be implemented "consistently with the rights and obligations of States under the law of the sea,"[63] it is important to note that the LOSC establishes a duty for states, with regard to all relevant maritime zones, to ensure that the exploitation of natural resources under their jurisdiction conforms to their "obligation to protect and preserve the marine environment."[64] When deciding on the fisheries conservation measures prescribed by the Convention for the exclusive economic zone (EEZ) and the high seas, the LOSC specifies that states shall "take into consideration the effects on species associated with or dependent upon harvested species with a view to maintaining or restoring populations of such associated or dependent species above levels at which their reproduction may become seriously threatened."[65]

The necessity of a precautionary and holistic approach was more explicitly recognized by the states negotiating the FSA. When adopting the Agreement in 1995, they expressed their consciousness of "the need to avoid adverse impacts on the marine environment, preserve biodiversity, maintain the integrity of marine ecosystems and minimize the risk of long-term or irreversible effects of fishing operations."[66] With regard to the management of straddling and highly migratory fish stocks, the FSA stipulates the duty of states to "protect biodiversity in the marine environment."[67] More concretely,

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[58] Preamble, par. 8–9.
[59] Art. 3.
[60] Art. 7(b)–(c).
[61] Art. 8(l).
[62] COP Decision VII/5 (2004), Appendix 3, par. 17(c).
[63] CBD, Art. 22(2).
[64] Art. 192–193.
[65] Art. 61(2) and 61(4); and 117–119.
[66] Preamble, par. 7.
[67] Art. 5(g).

states are to assess the impacts of fishing both on target stocks *and* on "species belonging to the same ecosystem,"[68] and to "adopt, where necessary, conservation and management measures for species belonging to the same ecosystem [. .] with a view to maintaining or restoring populations of such species above levels at which their reproduction may become seriously threatened."[69] In contrast with the straightforward formulation of these duties, the FSA provision most specifically addressing seabird bycatch is also the most qualified one, by stating the duty to:

> minimize [. .] catch of non-target species, both fish and *non-fish species*, [. .] and impacts on associated or dependent species, in particular endangered species, through measures including, *to the extent practicable*, the development and use of selective, environmentally safe, and *cost-effective* fishing gear and techniques.[70]

The FSA furthermore stipulates that, in managing the fisheries covered by the Agreement, parties "shall apply the precautionary approach widely [. .] in order to protect the living marine resources and preserve the marine environment."[71] This means, *inter alia*, that they "shall be more cautious when information is uncertain, unreliable or inadequate."[72] In implementing this approach, states are to "take into account" uncertainties concerning "the impact of fishing activities on non-target and associated or dependent species,"[73] and to "adopt plans which are necessary to ensure the conservation of such species."[74] Finally, where the status of non-target species is "of concern," the FSA obliges states to subject such species to "enhanced monitoring in order to review their status and the efficacy of conservation and management measures," and to "revise those measures regularly in the light of new information."[75]

The relevance of the Ramsar Convention and the World Heritage Convention in the present context follows from the fact that they may trigger, or consolidate, the banning or restriction of potentially harmful fisheries operations in the vicinity of breeding colonies and in other foraging areas of seabirds. One instance is constituted by the Prince Edward Islands and a marine zone around them, which were designated by South Africa in 2007 as a Wetland of International Importance under the Ramsar Convention.[76] This sub-Antarctic site is home to almost half of the world's breeding wandering albatrosses, as well as breeding populations of several other albatross and

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[68] Art. 5(d).
[69] Art. 5(e).
[70] Art. 5(f); emphasis added.
[71] Art. 6(1).
[72] Art. 6(2).
[73] Art. 6(3)(c).
[74] Art. 6(3)(d).
[75] Art. 6(5).
[76] See <www.ramsar.org>.

petrel species.[77] The CMS regime, which is a key component of the global legal framework governing seabird bycatch, is treated separately below.

IPOA-Seabirds and Other Global Soft Law

Although the UN General Assembly has adopted plenty resolutions which are of relevance for present purposes, the most important ones are probably those which instigated the global moratorium on large-scale pelagic driftnet fishing in the early 1990s.[78] They contributed to the removal of a major source of seabird bycatch—and, unintentionally, spurred the surge of the next major threat to seabirds, longlining.

At the global level, the most specific provisions on seabird bycatch in longline fisheries are also contained in a non-legally binding instrument, namely the International Plan of Action drawn up on the issue under the auspices of the FAO in 1999. The development of this IPOA-Seabirds, which was sponsored by the governments of Japan, Norway, the U.S. and the European Commission (EC), was intended to give effect to the more general provisions on bycatch regulation in the overarching FAO Code of Conduct for Responsible Fisheries.[79] The latter stipulates that states and relevant international organizations ought to take "appropriate measures to minimize" bycatch[80] and, in particular, that they should "require that fishing gear, methods and practices, to the extent practicable, are sufficiently selective so as to minimize [. .] catch of non-target species."[81]

In order to achieve its sole objective, which is to "reduce the incidental catch of seabirds in longline fisheries where this occurs,"[82] the IPOA sets out a number of activities to be performed by states, "as appropriate in conjunction with relevant international organizations."[83] The first step for every state under whose jurisdiction longline fisheries is conducted—i.e., by any vessels fishing in its maritime zones as well as vessels flying its flag outside these zones[84]—is to carry out an assessment to determine whether a seabird bycatch problem exists in these fisheries.[85] "If a problem exists," the second step is to adopt a National Plan of Action (NPOA-Seabirds) in order to deal with it.[86] If a state

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[77] Including grey-headed albatross, Indian yellow-nosed albatross, dark-mantled sooty albatross, light-mantled sooty albatross, southern giant petrel, northern giant petrel, white-chinned petrel, and grey petrel.

[78] See Resolutions 44/225 (1989) and 46/215 (1991) on Large-Scale Pelagic Driftnet Fishing and its Impact on the Living Marine Resources of the World's Oceans and Seas.

[79] See par. 8 of the IPOA-Seabirds.

[80] Art. 7.6.9 of the Code.

[81] Art. 8.5.1.

[82] Par. 10 of the IPOA-Seabirds.

[83] Par. 11.

[84] Par. 9.

[85] Par. 12.

[86] *Ibid.*

determines, on the basis of its assessment, that an NPOA is *not* called for, it is to review that decision "on a regular basis."[87] A "Technical Note" appended to the IPOA provides guidance for the assessment and the drafting of NPOAs.[88]

> The NPOA-SEABIRDS should prescribe appropriate mitigation methods. These should have a proven efficiency, and be cost-effective for the fishing industry. If effectiveness of mitigation measures can be improved by combining different mitigation measures or devices, it is likely that each State will find it advantageous to implement a number of different measures that reflect the need and particular circumstances of their specific longline fishery.[89]

Another appendix contains detailed descriptions of bycatch mitigation measures[90]—also referred to as "precautions"[91]—in use or under development by states and RFMOs. With a view to the uniqueness of each longline fishery, it is noted that identification of appropriate measures will require on-the-spot appraisal of every fishery involved.[92] The deadline for states to begin the implementation of their NPOAs was set at 2001.[93]

The IPOA itself provides little to no guidance as to what precisely constitutes a "bycatch problem." Neither does it clarify to what degrees or levels seabird bycatch is to be reduced. It is important in this respect, however, to record that the IPOA is to be interpreted and applied "in conformity with" the LOSC, the FSA, and "other applicable rules of international law," and "in light of" the Rio Declaration and other relevant soft law.[94] Moreover, the most recent meeting of the FAO Committee on Fisheries (COFI) endorsed a set of "Best Practice Technical Guidelines" (BPTG) to aid the implementation of the IPOA-Seabirds.[95] These guidelines, which were elaborated by a group of experts in September 2008 and are to be published as part of the FAO Technical Guidelines for Responsible Fisheries series, have been hailed by some as setting the "gold standard" in the field of seabird bycatch mitigation.[96] Significantly, the scope of the BPTG extends beyond longlining to include other relevant fishing methods, in particular trawling and gillnetting. The scope of the guidelines is also comprehensive in the sense that they are

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[87] Par. 13.

[88] Technical Note on Developing a National Plan of Action for Reducing the Incidental Catch of Seabirds in Longline Fisheries (NPOA-Seabirds).

[89] *Ibid.*, par. II(1).

[90] Parts II and III of the Technical Note on Some Optional Technical and Operational Measures for Reducing the Incidental Catch of Seabirds in Longline Fisheries.

[91] *Ibid.*, par. III(5).

[92] IPOA-Seabirds, par. 16.

[93] Par. 17.

[94] See par. 8 of the IPOA in conjunction with Art. 3 of the FAO Code of Conduct.

[95] 28th COFI session, March 2009, see <www.fao.org>.

[96] BirdLife International news report "UN Set Gold Standard for Reducing Seabird Bycatch" of 3 March 2009, at <www.birdlife.org>.

directed to RFMOs besides states. The BPTG contain up-to-date information on bycatch mitigation measures and further best practices in order to assist states and RFMOs in drawing up and implementing effective NPOA-Seabirds and regional strategies, respectively.[97]

NPOA-Seabirds

According to the information available to the author at the time of writing, NPOA-Seabirds are currently in place for ten states or territories: Brazil, Canada, Chile, Falkland Islands, Japan, New Zealand, South Africa, Taiwan, United States, and Uruguay. Five of these adopted their NPOA within the past three years, with South Africa providing the most recent addition in August 2008.[98] Five other states are in the process of developing an NPOA, namely Argentina, Australia, Namibia, South Korea, and Vietnam. Ten years after the adoption of the IPOA-Seabirds, at least 16 states which may, on the face of it, well have a longlining seabird bycatch "problem," seem to have undertaken no action towards the drafting of an NPOA so far.[99]

Even though these statistics provide some indicator of the progress made by states in implementing the IPOA-Seabirds, they should be interpreted with caution. For instance, the specificity and comprehensiveness of the measures contained in the various NPOAs varies widely, with the Falklands NPOA probably representing best practice in this regard.[100] The same is true for the selection criteria used by states to establish whether fisheries should be subject to an NPOA. These range from specific bycatch thresholds like 0.05 birds /1000 hooks,[101] to an "Endangered" status of the seabirds involved[102]—the latter not being a very precautionary standard. What is more, the presence of an NPOA does not coincide in each case with the presence of legally prescribed, adequate mitigation measures, and *vice versa*—quite the contrary. As noted during the preparatory meetings for the IPOA, developing an NPOA may well be most appropriate for those states which have *not* yet regulated seabird bycatch to a sufficient degree, and may be less necessary for states which

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[97] See Appendix E of the Report of the Expert Consultation on Best Practice Technical Guidelines for IPOA/NPOA-Seabirds (Bergen, 2–5 September 2008), FAO Fisheries and Aquaculture Report No. 880.

[98] Other recent NPOA-Seabirds are the ones of Canada (March 2007), Chile (December 2006), Uruguay (October 2006) and Brazil (June 2006).

[99] Angola, China, Colombia, Ecuador, France, Madagascar, Mozambique, Mexico, Norway, Panama, Peru, Russian Federation, Spain, United Kingdom (except for Falkland Islands), Ukraine, Venezuela.

[100] Falkland Islands Plan of Action for Reducing Incidental Catch of Seabirds in Trawl Fisheries (2004).

[101] E.g., the Chilean NPOA-Seabirds (Plan de Acción Nacional para Reducir las Capturas Incidentales de Aves en las Pesquerías de Palangre, 2006), at 4; borrowing a criterion used in the Australian Threat Abatement Plan, mentioned below, as well.

[102] Under reference to Art. 7.6.9 of the FAO Code of Conduct, the Falkland Islands NPOA states in par. 9.1: 'Given the recent decline in the local black-browed albatross breeding population and the subsequent IUCN reclassification of the species from Vulnerable to Endangered it is deemed necessary for a FI POA-Trawling to be drafted.'

already have a functioning bycatch management regime.[103] A good illustration of the latter is the Australian "Threat Abatement Plan" for seabird bycatch in longlining, which was in operation well before Australia started contemplating the drafting of an NPOA-Seabirds.[104] Similarly, Argentina launched a suite of binding seabird mitigation measures in August 2008, ahead of the formal adoption of its NPOA. The other way around, despite the existence of an NPOA, New Zealand's national bycatch mitigation controls did not until recently deliver the desired results, leading to their replacement in February 2008 by a more comprehensive regime of mandatory seabird bycatch mitigation measures applicable, incidentally, to longliners and trawlers alike.[105] In line with the growing attention for seabird bycatch in trawling operations, two of the existing NPOAs (Falklands and Uruguay) address trawling besides longlining. It is worth noting that the freshly adopted South African NPOA-Seabirds is restricted to longlining, despite the significant danger South African trawling is known to pose for various seabirds.[106]

The EU deserves specific mention in this context, given the major influence of the Common Fisheries Policy (CFP) on fisheries by EU member states, the mounting concerns about the impacts of longlining on seabird populations in EU waters—including the Mediterranean shearwaters discussed earlier—and the active role of the EU in several RFMOs. The European Commission (EC) presented a preliminary draft proposal for a Community Plan of Action on seabird bycatch (the EU equivalent of an NPOA-Seabirds) in 2001. Despite pressure from the European Parliament[107] and NGOs like Birdlife International,[108] this initial step has to date not been followed up by the elaboration and formal adoption of such a plan. Judging by the answers given by the Commission to various parliamentary questions in 2007, this may nonetheless change in the near future. According to the Commission, the situation in international (non-EU) waters does not warrant a Community Plan of

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[103] See, e.g., Appendix 2 of the Report of the FAO Technical Working Group Meeting on Reduction of Incidental Catch of Seabirds in Longline Fisheries (Tokyo, March 1998), FAO Fisheries Report No. 585 (1999).

[104] Threat Abatement Plan for the Incidental Catch of Seabirds During Oceanic Longline Fishing Operations (1998; last revised 2006); see also S.J. Bache, Marine Wildlife Bycatch Mitigation: Global Trends, International Action and the Challenges for Australia (2003), 77–81.

[105] This was triggered by 2007 reports that a single longliner in New Zealand waters had killed 36 albatrosses, twelve of which were Chatham albatrosses—a species more endangered than mountain gorillas and snow leopards; see BirdLife International news report "Urgent Call to Action Follows New Zealand Albatross Deaths" of 20 September 2007, at <www.birdlife.org>.

[106] E.g., Watkins *et al.* 2008, *op. cit.* Tori lines are legally required as part of trawl fishing permit conditions, however.

[107] Including parliamentary questions P-0233/02, 31 January 2002 (T. Lund); P-3193/07, 15 June 2007 (C. Stihler); E-3033/2007, 19 June 2007 (C. Jackson); E-3455/2007, 27 June 2007 (B. de Brún).

[108] See, e.g., E. Dunn, The Case for a Community Plan of Action for Reducing Incidental Catch of Seabirds in Longline Fisheries (2007); and the BirdLife International news report 'Stop Seabird Slaughter Through EU Fisheries Policy' of 26 June 2008, at <www.birdlife.org>.

Action, because mitigation measures adopted by RFMOs have already been transposed into EU legislation and because the EC "will continue to promote adoption of new measures and improvement of current measures for the protection of seabirds by Regional Fisheries Management Organisations."[109] The situation for waters under the jurisdiction of EU member states is different, however:

> As regards EU waters, recent scientific information shows that seabird by-catch may be a serious problem in certain areas within the EU. This could justify priority action at EU level. There is a need to make a general assessment of the situation in EU waters and identify the main areas affected, as well as the main kind of gear responsible for mortality, in order to build a solid case for possible action. The Commission is currently gathering information and scientific advice with a view to completing a Community action plan by 2009.[110]

Specifically, scientific advice was requested by the EC from the Working Group on Seabird Ecology (WGSE) of the International Council for the Exploration of the Seas (ICES). With regard to longlining, the WGSE in 2008 reported back that insufficient data existed to accurately assess the degree to which seabird populations in the EU are being affected by bycatch.[111] At the same time, the WGSE concluded that the available information *does* indicate that there is "indeed a chronic problem."[112] The situation in the Mediterranean is described as "especially acute" in this regard. "This alone justifies the recommendation of WGSE that the European Union formulates a Plan of Action (POA) to reduce the bycatch."[113] In line with the WGSE advice, an EC "Communication" from April 2008 announced that "a plan of action to protect seabirds will be published in 2009."[114] The plan is likely to cover all fisheries rather than just longlining, but it remains unclear what weight, if any, will be given to addressing bycatch in non-EU waters. To be continued.

Convention on Migratory Species

Of all treaties with a primary focus on nature conservation, the CMS regime has assumed particular importance in the field of bycatch regulation[115]

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[109] Answer by J. Borg on behalf of the EC to question E-3455/2007, 10 August 2007.

[110] Answer by J. Borg on behalf of the EC to question P-3193/2007, 25 July 2007.

[111] ICES WGSE 2008, *op. cit.*, at 1–2.

[112] *Ibid.*, at 2.

[113] *Ibid.*

[114] COM(2008)187 on the Role of the CFP in Implementing an Ecosystem Approach to Marine Management, at 9.

[115] See also S.J. Bache & S. Rajkumar, *Marine Wildlife Bycatch Under the CMS: Progress and Prospects*, 18 International Journal of Marine and Coastal Law, 215 (2003); A. Gillespie, *Wasting the Oceans: Searching for Principles to Control Bycatch in International Law*, 17 International Journal of Marine and Coastal Law, 161 (2002).

—including the bycatch of seabirds, many species of which are migratory and wide-ranging. The CMS, the steadily rising number of parties to which now totals 110,[116] lists a significant number of seabirds affected by mortality in fishing gear in its appendices. Appendix I ("Endangered Migratory Species") currently lists the Humboldt penguin, short-tailed albatross, Amsterdam albatross, Galapagos petrel, pink-footed shearwater, Balearic shearwater, and Peruvian diving-petrel. Appendix II ("Migratory Species to Be the Subject of AGREEMENTS") incorporates a rather larger number of species implied in seabird bycatch, including twelve albatrosses and various *Procellaridae* petrels, divers, grebes, cormorants, gulls, ducks, and the African penguin.

Three resolutions adopted by the CMS COP on bycatch affecting migratory species, including seabirds,[117] in this context stress the obligations of CMS parties to "take action to avoid migratory species from becoming endangered"[118] and, with regard to Appendix I species, to "prevent, reduce or control factors that are endangering or are likely to further endanger the species."[119] Resolution 6.2 in this respect:

> *Reaffirms* the obligation on all Parties to protect migratory species against by-catch, including seabirds [. .];
> *Requests* all Parties to strengthen the measures taken to protect migratory species against by-catch by fisheries within their territorial waters and exclusive economic zones, and by vessels fishing on the high seas under their flags;
> *Requests* all Parties, as a matter of gravity, to continue and strengthen measures within fisheries under their control, to minimize as far as possible the incidental mortality of migratory species listed in Appendices I and II, including seabirds [. .];
> *Requests* those Parties which are also Parties to regional fisheries organizations to highlight there the serious problems of incidental mortality of migratory species listed in Appendices I and II, including seabirds [. .], with a view to the adoption of mitigating measures.[120]

Resolution 8.14 was adopted at the before-last COP in 2005. After observing that "significant additional efforts" are required to reduce bycatch to levels which do not threaten the conservation status of the species concerned, it specifically requests CMS parties to implement the IPOA-Seabirds and to develop and implement NPOAs.[121] Moreover, it calls on parties to "*require* the implementation of proven by-catch solutions"[122] in fisheries under their

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[116] As of 1 November 2008.
[117] Resolutions 6.2 (1999), 8.14 (2005) and 9.18 (2008).
[118] CMS, Article II(2).
[119] CMS, Article III(4)(c).
[120] Par. 1–4.
[121] Par. 2(a).
[122] Par. 2(b); emphasis added.

control, and to work within RFMOs to diminish bycatch through, *inter alia*, "the development of by-catch action plans, independent observer schemes, assessments of the scale of the problem, awareness raising, and promoting technical mitigation."[123] Resolution 9.18 of December 2008, despite noting "considerable progress," observes that bycatch "still remains one of the major causes of mortality" of CMS-listed species, including seabirds.[124] It calls on states parties to apply appropriate fisheries management measures to reduce bycatch and to raise the issue within RFMOs.[125] "Parties that have not already done so" are urged once more to implement the IPOA-Seabirds and adopt NPOAs.[126]

African–Eurasian Waterbirds Agreement

Pursuant to Article IV of the CMS, the African–Eurasian Waterbirds Agreement was adopted in 1995 and entered into force in 1999.[127] Parties to the Agreement are to achieve or maintain a favorable conservation status for a lengthy list of African-Eurasian migratory waterbird species, including Cape gannet, African penguin, Audouin's gull, Steller's eider, and many other birds (divers, grebes, cormorants, ducks, and gulls) that are subject to incidental mortality in fishing gear.[128] AEWA's huge geographic scope covers extensive ocean areas, including the Mediterranean and large sections of the Atlantic and Indian Oceans.[129] Besides states located within the Agreement Area, other states whose vessels operate within this area may also become parties. AEWA's present 62 parties[130] include the European Community, Norway, the UK, France, Spain, Portugal, Italy, Libya, Senegal, and South Africa. These parties are under a duty to take various conservation measures, set out in the Agreement and in a detailed and mandatory Action Plan annexed thereto.[131] In implementing these, they are to "take into account the precautionary principle."[132] AEWA in fact employs a precautionary approach by including many species within its remit whose conservation status is currently favorable, and by actively seeking to maintain them in that status, while at the same time requiring parties to pay "special attention" to endangered species and those with an unfavorable conservation status.[133] The Agreement's

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[123] Par. 2(c).
[124] Preamble, par. 1.
[125] Par. 3–4.
[126] Par. 2.
[127] Generally, see Lenten 2001, *op. cit.*; Adam 2008, *op. cit.*
[128] See Art. II(1) and Annex 2 of the Agreement.
[129] Annex 1.
[130] As of 1 November 2008.
[131] Art. III and Annex 3.
[132] Art. II(2).
[133] Art. III(1).

approach is holistic as well in the sense that it covers the entire ranges of the populations involved and seeks to address all threats thereto.

Of relevance to seabird bycatch is the general obligation set out in the Agreement to "investigate problems that are posed or are likely to be posed by human activities and endeavour to implement remedial measures."[134] Recently, the relevance of AEWA for seabird bycatch has been augmented substantially as a result of two amendments adopted by the last Meeting of the Parties (MOP) in 2008.[135] The first incorporated the following new provision into the Action Plan:

> Parties are urged to take appropriate actions nationally or through the framework of Regional Fisheries Management Organisations (RFMOs) and relevant international organisations to minimise the impact of fisheries on migratory waterbirds, and where possible cooperate with these forums, in order to decrease the mortality in areas within and beyond national jurisdiction; appropriate measures shall especially address incidental killing and bycatch in fishing gear including the use of gill nets, longlines and trawling.[136]

The second amendment added twenty seabird species to the AEWA species list, including the northern gannet, great skua, various auks,[137] and other "bycatch birds."[138]

Agreement on Albatrosses and Petrels

Notwithstanding its recent seaward shift of focus, AEWA does not cover species from the *Procellariiformes* order (tube-nosed birds like albatrosses, fulmars, shearwaters and storm-petrels), to avoid overlap with the Agreement on the Conservation of Albatrosses and Petrels. This other CMS daughter is of more recent origin and entered into force in 2004.[139] ACAP currently applies to 19 albatross and seven other petrel species, all of the southern hemisphere.[140] The concept of "range state" of the species covered by ACAP is understood to encompass states exercising jurisdiction over parts of the

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[134] Art. III(2)(e).

[135] 4th MOP, September 2008.

[136] New par. 4.3.7 of the Action Plan, introduced by Resolution 4.11.

[137] Little auk, common guillemot, Brünnich's guillemot, razorbill, black guillemot, Atlantic puffin.

[138] Resolution 4.11.

[139] On ACAP generally, see J. Cooper, G.B. Baker, M.C. Double, R. Gales, W. Papworth, M.L. Tasker, & S.M. Waugh, *The Agreement on the Conservation of Albatrosses and Petrels: Rationale, History, Progress, and the Way Forward*, 34 Marine Ornithology, 1 (2006); and S.J. Bache 2003, *op. cit.*, at 25–29.

[140] The full list from Annex 1: northern royal, southern royal, wandering, antipodean, Amsterdam, Tristan, sooty, light-mantled, waved, Atlantic yellow-nosed, Indian yellow-nosed, grey-headed, black-browed, Campbell, Buller's, shy, white-capped, Chatham and Salvin's albatross; southern giant, northern giant, white-chinned, spectacled, black, Westland, and grey petrel.

albatrosses' and petrels' range, and states "flag vessels of which are engaged outside its national jurisdictional limits in taking, or which have the potential to take, albatrosses and petrels."[141] Brazil's and Urugay's recent ratifications[142] lifted the number of ACAP parties to thirteen. The other eleven are Argentina, Australia, Chile, France, Ecuador, New Zealand, Norway, Peru, South Africa, Spain, and the UK. The U.S. has been a productive observer for some time and may become one of the next parties, now that President George W. Bush has submitted the Agreement to the Senate for approval.[143] Several other key players, such as South Korea and Japan, are not on board yet either.

The aim of ACAP is to warrant a favourable conservation status for the tube-nosed seabirds covered by it.[144] Parties must take appropriate conservation action to attain this objective, and in doing so "shall widely apply the precautionary approach."[145]

> In particular, where there are threats of serious or irreversible adverse impacts or damage, lack of full scientific certainty shall not be used as a reason for postponing measures to enhance the conservation status of albatrosses and petrels.[146]

Where human activities are suspected to have adverse consequences for the birds' conservation status, the Agreement requires the development and implementation of measures to "prevent, remove, minimize or mitigate" these effects.[147] Similar to AEWA, more detailed obligations have been elaborated in an Action Plan appended to ACAP.[148] This Action Plan clearly reflects that bycatch has been a priority focus of ACAP from the outset. Even though, like AEWA, ACAP lacks fisheries management authority as such, it does require parties to "take appropriate operational, management and other measures to reduce or eliminate the mortality of albatrosses and petrels resulting incidentally from fishing activities."[149] Such measures should, where possible, "follow best current practice."[150] Furthermore, with regard to fisheries regulated by an RFMO, each party "shall adopt, in its area of competence, the measures agreed by that organization for reducing the incidental take of albatrosses and petrels,"[151] and must encourage the institutions and member states of relevant

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[141] Art. I(2)(p).
[142] Entry into force 1 December 2008 and 1 January 2009, respectively.
[143] On 26 September 2008.
[144] Art. II(1).
[145] Art. II(2)-(3).
[146] Art. II(3).
[147] Art. III(1)(c).
[148] Annex 2.
[149] Annex 2, par. 3.2.1.
[150] *Ibid.*
[151] *Ibid.*, par. 3.2.2.

RFMOs to give effect to the objective of ACAP.[152] More specifically, ACAP parties committed themselves at the most recent MOP:

1. to develop and implement appropriate seabird bycatch reduction measures in those fisheries in which seabird bycatch is known to occur, and conduct assessments of all other fisheries operating within their EEZs;
2. to develop National Plans of Action-Seabirds (NPOA-S) to help achieve this objective, and as required by the IPOA-Seabirds;
3. to address all fishing methods that impact seabird populations in NPOA-S or similar plans;
4. to proactively engage and facilitate information exchange with relevant RFMOs;
5. to ensure that seabird experts are included on Parties' delegations to relevant RFMOs;
6. to propose, develop, support and implement RFMO resolutions and other measures that aim to reduce seabird bycatch.[153]

A Seabird Bycatch Working Group has been established to coordinate and support ACAP efforts in this field.

Whereas ACAP's geographic scope is potentially global, its actual scope is determined by the ranges of the species covered—and is therefore currently limited to the southern hemisphere. A northward extension, however, was already anticipated when ACAP was adopted[154] and now appears imminent. The third MOP, to be held in April/May 2009 in Bergen, Norway, is scheduled to consider adding the three North Pacific albatrosses—short-tailed, Laysan, and black-footed—to the ACAP species list.[155] This would of course bring along a new set of range states and, therefore, potential ACAP parties. Another possible future addition to the Agreement's species list is the Balearic shearwater. This candidate species has been proposed by Spain,[156] the only state where it is known to breed. If this Mediterranean species is listed, this would bring yet another region within the scope of ACAP. Its listing would, in any case, not at all seem inappropriate, as the Balearic shearwater was singled out by the latest CMS COP as a species for which concerted action is urgently required.[157] Yelkouan shearwater and Cory's shearwater, two other Mediterranean species mentioned before, are likely to be considered for listing in the less immediate

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[152] *Ibid.*, par. 3.2.3.

[153] Resolution 2.7 (2007).

[154] ACAP's preamble states in par. 11: "Northern Hemisphere albatrosses and petrels may in future benefit from incorporation into this Agreement with a view to promoting co-ordinated conservation actions between Range States."

[155] See section 17 of the Report of the 4th Meeting of the ACAP Advisory Committee (August 2008), at <www.acap.aq>.

[156] *Ibid.*, par. 17.6.

[157] CMS Resolution 8.29 (2005).

future.[158] Especially the addition of the Cory's shearwater *before* it acquires a "Near Threatened," "Vulnerable," or other worrying IUCN Red List status, would constitute a precautionary feat.

Commission for the Conservation of Antarctic Marine Living Resources

Of all intergovernmental bodies endowed with fisheries management authority, the practice of the CCAMLR[159] Commission is commonly viewed as coming closest to a consistent application of the precautionary and ecosystem approaches—which latter CCAMLR has pioneered among RFMOs.[160] Also in the field of seabird bycatch, CCAMLR has been a front runner and its practice is considered exemplary.[161] For this reason, CCAMLR will be looked at in more detail than the other fisheries bodies, treated in the next section. It will be noted that key attributes of a holistic and precautionary approach as defined above, are clearly recognizable in the seabird bycatch measures adopted by CCAMLR, especially in relation to their timing, aim, comprehensiveness and adjustability.

Since 1984, CCAMLR member states have been asked to submit data on seabird bycatch. When demersal longlining commenced in the CCAMLR area in 1989, the Commission resolved to undertake action from the outset, based on concerns about bycatch in longline fisheries elsewhere.[162] A Conservation Measure—a decision member states are obliged to implement—prescribing the use of streamer lines was adopted soon afterwards.[163] An *ad hoc* working group dedicated to seabird bycatch, IMALF (now IMAF),[164] was established in 1992. Nevertheless, vast uncertainty regarding the actual impact of longlining on seabirds in the CCAMLR area existed throughout the first half of the 1990s.

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[158] For more details, see AC2 Doc. 21 (J. Cooper & B. Baker, *Choosing Candidate Species for Future Inclusion within the Agreement on the Conservation of Albatrosses and Petrels*), submitted by South Africa and Australia to the 2nd Meeting of the Advisory Committee (June 2006), at <www.acap.aq>.

[159] Convention on the Conservation of Antarctic Marine Living Resources (1980).

[160] Generally, see G. Parkes, *Precautionary Fisheries Management: The CCAMLR Approach*, 24 Marine Policy, 83 (2000); K.-H. Kock, ed., Understanding CCAMLR's Approach to Management (2000); E.J. Molenaar, *CCAMLR and Southern Ocean Fisheries*, 13 International Journal of Marine and Coastal Law, 465 (2001); D.G.M. Miller, E.N. Sabourenkov, & D.C. Ramm, *Managing Antarctic Marine Living Resources: The CCAMLR Approach*, 19 International Journal of Marine and Coastal Law, 317 (2004); Fabra & Gascón 2008, *op. cit.*

[161] Miller *et al.*, *ibid.*, at 329–336; C. Small, Regional Fisheries Management Organisations: Their Duties and Performance in Reducing Bycatch of Albatrosses and Other Species (2005); J.P. Croxall, K. Rivera, & C.A. Moreno, *Seabird Bycatch Mitigation: The Southern Ocean (CCAMLR) Experience*, in Bycatch Reduction in the World's Fisheries, 271 (S.J. Kennelly, ed., 2007); S.M. Waugh, G.B. Baker, R. Gales, & J.P. Croxall, *CCAMLR Process of Risk Assessment to Minimise the Effects of Longline Fishing Mortality on Seabirds*, 32 Marine Policy, 442 (2008).

[162] Resolution 4/VIII on Protection of Seabirds from Incidental Mortality Arising from Longline Fishing.

[163] Conservation Measure 29/X (recoded 25-02 in 2002) on Minimisation of the Incidental Mortality of Seabirds in the Course of Longline Fishing or Longline Fishing Research in the Convention Area.

[164] Incidental Mortality Associated with (Longline) Fisheries; the word "Longline" was removed in 2002 to reflect concerns regarding trawl fisheries as well.

The first coordinated but incomplete estimates, carried out in the 1995/1996 fishing season, indicated that thousands of albatrosses may have been bycaught within the CCAMLR area in that season, although little was known for sure. As one account of this period recalls:

> At that time, only some areas had been assessed for bycatch rates, and anecdotal information suggested a widespread problem, although the magnitude of the bycatch was uncertain. The range of species caught included vulnerable and endangered species of albatross and petrel. It was recognized that adopting an approach of "sustainable catch" for management of the incidental deaths of seabirds in CCAMLR longline fisheries was neither appropriate nor possible. This approach would have required a thorough knowledge of the distribution, biology and ecology of all species at risk, together with an understanding of all sources of mortality including identification of which populations were being impacted by fishing mortality across a range of fisheries, spanning national and geographic boundaries. [..] As a result, a precautionary approach was adopted, with an objective to minimize seabird mortality in longline fisheries in the CCAMLR area to levels approaching zero.[165]

This quote captures the essence of the reasoning behind the precautionary principle. First, the recognition of the impracticality of accurately calculating a prediction of safe seabird bycatch levels[166] reminds one of the acknowledgement of the unfeasibility of calculating the ocean's assimilative capacity, which was at the cradle of the precautionary principle's adoption in the context of marine pollution.[167] Second, notwithstanding this uncertainty, there are reasonable grounds for concern about the adverse impacts of bycatch on seabird populations. Third, in these circumstances, a decision is made to err on the side of caution, in the form of the extremely precautionary target of virtually eliminating seabird bycatch.

The effectiveness of seabird bycatch mitigation measures, and compliance with them, has been monitored by independent observers since the introduction of the CCAMLR Scheme of International Scientific Observation in 1992. Observers are present on all member state vessels longlining in the CCAMLR area, watching all setting operations and much of the hauling. In light of the data gathered by these observers, mitigation measures have been reviewed annually and, as appropriate, revised. Step by step, this

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[165] Waugh *et al.*, *ibid.*, at 444.

[166] As Waugh *et al.*, *ibid.*, clarify: "Calculating total seabird bycatch in a fishery can be challenging for many national fisheries agencies, and to do this at the species-level for a wide geographical area was not considered feasible. Further, it was recognised that population responses due to 'unsustainable' fisheries take would have been impractical to measure in real time. This is because demographic responses could be delayed due to the life-history traits of albatross and petrel species, and vital parameters remain largely unknown for burrow-nesting petrel species. Therefore, colony-based monitoring to assess fisheries impacts was not pursued."

[167] See A. Trouwborst, Evolution and Status of the Precautionary Principle in International Law (2002), 18–19.

adaptive management has led to the, truly tailor-made, mandatory suite of bycatch mitigation measures currently in place. These include obligations to set lines only at night and to employ streamer lines during line-setting, prescriptions to weight lines sufficiently, and a prohibition on dumping of-fal during line-setting.[168] Instructions regarding line-weighting, streamer lines, and offal management are detailed and technical, and vary depending on the precise longlining technique utilized. Other measures concern temporal and spatial restrictions. Very significant was the 1997 decision to delay the start of fishing seasons until the end of the breeding season of most albatross and petrel species.[169] The implementation of this decision led to a ten-fold bycatch reduction from one year to the next. Compliance is promoted by the fact that granting of fishing permits is conditional upon observance of Conservation Measures. At any rate, once a vessel catches three seabirds, it must abort all further fishing in the CCAMLR area for that season.

As for results, seabird bycatch numbers in the CCAMLR area dropped to negligible levels by 2001. At its 2007 meeting the CCAMLR Commission noted "with great satisfaction" that in the 2006/2007 fishing season "for the first time *no seabirds* were reported killed in regulated longline fishing in the Convention Area, outside the French EEZs."[170] It was the second year in a row that no albatrosses were killed. Among the modest amount of seabirds bycaught in French waters that season there were no albatrosses either.[171] The zero bycatch record was continued in the 2007/2008 season.[172] In view of the proportionality criterion mentioned earlier in connection with the precautionary principle, it is notable that these results were not achieved by following the most rigorous course of action available, which would have been the outright banning of longlining in the CCAMLR area, as happened with pelagic drift-net fishing. Instead, it was achieved through the less rigorous reduction of the fishing season and the prescription of a number of technical and operational mitigation measures. What is more, it may well be that increased knowledge regarding Southern Ocean seabird populations and the impact of bycatch on them will permit relaxation of some of the current measures, for instance a lengthening of the fishing season in particular areas.[173]

It should be noted, incidentally, that the bright statistics just referred to concern the regulated fisheries, and that illegal, unregulated and unreported (IUU) fishing remains a problem. CCAMLR is actively combating

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[168] Conservation Measure 25–02, *op. cit.* (last revised 2008); Conservation Measure 24–02 on Longline Weighting for Seabird Conservation (last revised 2008).

[169] Report of the 16th CCAMLR Meeting (October/November 1997), par. 6.46, at <www.ccamlr.org>.

[170] Par. 6.6 of the Report of the 26th CCAMLR Meeting (October/November 2007), at <www.ccamlr.org> (emphasis added); in the 2005/2006 season only two birds had been killed.

[171] *Ibid.*, par. 6.7.

[172] Report of the 27th CCAMLR Meeting (October/November 2008), par. 6.6 and 6.7, at <www.ccamlr.org>.

[173] Waugh *et al.* 2008, *op. cit.*, at 449.

IUU fisheries,[174] however, and the estimates of seabird numbers presumably killed in these fisheries show a decreasing trend.

Other fisheries conducted in the CCAMLR area employ trawls and pots. It was decided in 1990 not to allow pelagic driftnet fishing on the high seas of the CCAMLR area,[175] and to date no such fishing has been carried out there. In the pot fisheries, which target squid and Patagonian toothfish, bycatch of seabirds is nonexistent. Not so in the CCAMLR trawl fisheries. In reaction to reports that birds were occasionally killed through interaction with trawl netsonde cables, use of these cables has been forbidden since 1994. This measure was later accompanied by other mandatory prescriptions prohibiting offal discharge during setting and hauling, and requiring net cleaning prior to setting and deck lighting minimization, among other things.[176]

In sum, it is evident that in the field of seabird bycatch the CCAMLR Commission has rather successfully endeavored to give effect to the duties to ensure that Southern Ocean fisheries do not impair "the ecological relationships between harvested, dependent, and related populations of Antarctic marine living resources,"[177] and to prevent or minimize the risk of "changes in the marine ecosystem which are not potentially reversible over two or three decades"[178]—in other words, to apply a holistic and precautionary approach.

Now that seabird bycatch has been virtually eliminated in regulated CCAMLR fisheries, the greatest threat to many of the seabirds breeding in the Antarctic, besides IUU vessels operating in the CCAMLR area, is bycatch *outside* this area. The distribution of most of these species extends beyond the Antarctic convergence and CCAMLR jurisdiction into areas where pelagic tuna and swordfish longliners, among other fishing vessels, take their toll in areas under the jurisdiction of other RFMOs. The gravity of this problem was stressed by repetition at the Commission's 2007 meeting, alongside acknowledgments of the significance of CCAMLR as "world leader" and "role model" in the field of seabird bycatch.[179] A 2006 resolution[180] already commits the Commission and its member states to undertake conscious efforts, in close cooperation with ACAP, to widely export the formula for CCAMLR's successful tackling of seabird bycatch—that is, the *timely* application of a

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[174] See, e.g., CCAMLR Resolution 25/XXV on Combating Illegal, Unreported and Unregulated Fishing in the Convention Area by the Flag Vessels of Non-Contracting Parties (2006).

[175] Resolution 7/IX.

[176] Conservation Measure 25–03 on Minimisation of the Incidental Mortality of Seabirds and Marine Mammals in the Course of Trawl Fishing in the Convention Area (last revised 2003).

[177] CCAMLR Convention, Art. II(3)(b).

[178] *Ibid.*, Art. II(3)(c).

[179] Report of the 26th CCAMLR Meeting (2007); quotes from, resp., ACAP (par. 6.16) and the US (par. 6.9).

[180] Resolution 22/XXV on International Action to Reduce the Incidental Mortality of Seabirds Arising from Fishing (2006).

combination of *tailor-made* and *mandatory* mitigation measures, which are constantly reviewed and *adapted*, with comprehensive *observer coverage* to supply the data for their review and to promote compliance.

Regional Fisheries Management Organizations

Various reviews of RFMO performance in relation to seabird bycatch have been conducted in recent years. A rather comprehensive, comparative analysis was conducted by Small in 2005.[181] More concise, but by now more up-to-date reviews were produced under the auspices of the FAO and ACAP in 2007 and 2008, respectively.[182] Various relevant parameters were analyzed in these reports, including bycatch assessment, mitigation measures, data reporting requirements, the existence of a bycatch working group, observer coverage, monitoring, education, and measures against IUU fishing. The reports show that for all these parameters the CCAMLR blueprint has been applied by other RFMOs only partially, if at all. It should be noted, however, that several RFMOs have made important progress—from a seabird conservation point of view—in the last few years. Generally speaking, there seems to be a correlation between the age of RFMOs and the extent of the action taken by them to address seabird bycatch. This can be partly explained by reference to their constitutive instruments. The mandates of most of the older RFMOs do not, or did not originally, reflect modern standards concerning a precautionary and ecosystem approach to fisheries in general and consideration of non-target species in particular. Having said that, this section focuses on the most crucial parameter for present purposes, namely to what extent mandatory mitigation measures have been prescribed by the various fishery bodies.

Particularly important RFMOs from the perspective of albatross and petrel conservation are the five "tuna commissions" dealing with fisheries for tuna and tuna-like species such as swordfish and other billfish (IATTC,[183] ICCAT,[184] CCSBT,[185] IOTC[186] and WCPFC[187]), and the South East Atlantic Fisheries Organization (SEAFO) which oversees a number of non-tuna fisheries. The tuna commissions are looked at now in order of age, oldest first, followed by SEAFO.

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[181] Small 2005, *op. cit.*

[182] E. Gilman, T. Moth-Poulsen, & G. Bianchi, *Review of Measures Taken by Intergovernmental Organizations to Address Sea Turtle and Seabird Interactions in Marine Capture Fisheries*, FAO Fisheries Circular No. 1025 (2007); ACAP AC4 Doc. 56 ("Engaging with Regional Fisheries Management Organisations to Reduce Bycatch of Albatrosses and Petrels"), submitted by BirdLife International, ACAP Seabird Bycatch Working Group & ACAP Secretariat to the 4th Meeting of the ACAP Advisory Committee (August 2008), available at <www.acap.aq>.

[183] Inter-American Tropical Tuna Commission.

[184] International Commission for the Conservation of Atlantic Tunas.

[185] Commission for the Conservation of Southern Bluefin Tuna.

[186] Indian Ocean Tuna Commission.

[187] Western and Central Pacific Fisheries Commission.

To date, no mandatory seabird bycatch mitigation measures have been agreed by the Inter-American Tropical Tuna Commission, which has been operational since 1950. A proposal for such measures, modeled on the WCPFC measures discussed below, was unsuccessfully submitted by Spain in 2007. The 2008 meeting of the Commission rejected a revised proposal, but adoption of a slightly adapted version in the near future does not seem unlikely. Until that time, IATTC action will essentially remain limited to a non-binding call on parties, issued in 2005, to implement the IPOA-Seabirds.[188] Between 2002 and 2007, the latter description applied as well to the International Commission for the Conservation of Atlantic Tunas, established in 1969.[189] In 2007, however, a binding decision was adopted requiring all longline vessels fishing in the ICCAT area south of 20°S to employ a streamer line.[190] Some swordfish vessels are exempted on the condition that they implement a particular line-weighting regime and conduct line-setting at night only. The Commission for the Conservation of Southern Bluefin Tuna, operational since 1994, was the first tuna commission to agree on mandatory seabird bycatch mitigation measures when in 1997 it adopted a requirement for CCSBT longline vessels to utilize bird-scaring lines when fishing south of 30°S.[191] The effectiveness of this measure has not been reviewed since, however, nor have proposals for additional measures been successful due to a persistent deadlock in the Commission. In 2008, however, a Recommendation was produced which, besides counseling implementation of the IPOA-Seabirds "to the extent possible," calls on members and cooperating non-members, when fishing in IOTC and WCPFC waters, to "comply with all current binding and recommendatory measures" adopted by these RFMOs in the field of bycatch mitigation.[192]

Recent action undertaken by the two tuna commissions referred to has been more comprehensive. The Indian Ocean Tuna Commission, which dates back to 1996, adopted a familiar non-binding decision urging states to implement the IPOA-Seabirds in 2005.[193] This was followed a year later by the adoption of a long-term goal of achieving zero bycatch, especially of threatened seabird species, in IOTC longline fisheries, accompanied by a binding requirement for longliners to employ bird-scaring lines to the south of 30°S.[194] The latter requirement was subject to a significant exception for swordfish

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[188] Resolution C-05–01 (2005).

[189] See the similar voluntary commitment in ICCAT Resolution 2002–14 (2002).

[190] Recommendation 2007–07 (2007).

[191] Report of 4th CCSBT Annual Meeting (1997), Part 1, Attachment U, at <www.ccsbt.org>.

[192] Recommendation to Mitigate the Impact on Ecologically Related Species of Fishing for Southern Bluefin Tuna, 15th CCSBT Annual Meeting (2008).

[193] Recommendation 05(09 (2005).

[194] Recommendation 06/04 (2006).

TABLE 1.

Column A	Column B
Side setting with a bird curtain and weighted branch lines[195]	Tori line[196]
Night setting with minimum deck lighting	Weighted branch lines
Tori line	Blue-dyed bait
Weighted branch lines	Deep setting line shooter
	Underwater setting chute
	Management of offal discharge

vessels of a certain configuration.[197] In 2008, the 2006 measures were superseded by another resolution applying to *all* longline vessels in the southern Indian Ocean beyond 30°S.[198] It replaced the existing obligation by a duty to implement a combination of *two* mitigation measures, while introducing flexibility in that these may be chosen from a "menu" setting out six measures: streamer line, night setting, line weighting, blue-dyed bait, offal management, and line shooter. At least one of them must be picked from the first three. This IOTC resolution, which has been dubbed a "major step forward" by seabird conservationists,[199] in fact copies the approach taken earlier by the youngest tuna RFMO, the Western and Central Pacific Fisheries Commission, which was established in 2004. After robust campaigning by the U.S., Australia, New Zealand, and the EU, the WCPFC pioneered the "menu approach" in a binding Conservation and Management Measure (CMM) of 2006,[200] which was refined in terms of technical specifications in 2007.[201] WCPFC states must require their longlining vessels in the "albatross waters" of the Convention area, i.e., north of 23°N and south of 30°S, to implement "at least two of the mitigation measures in Table 1, including at least one from Column A" (see figure).[202] The CMM was hailed as setting the hitherto highest standard among tuna commissions, but criticized for the fact that smaller vessels in the southern

[195] In a note the CMM indicates: 'This measure can only be applied in the area north of 23 degrees north until research establishes the utility of this measure in waters south of 30 degrees south. If using side setting with a bird curtain and weighted branch lines from column A this will be counted as two mitigation measures.'

[196] The CMM states in a note: "If tori line is selected from both Column A and Column B this equates to simultaneously using two (i.e., paired) tori lines."

[197] Namely, vessels equipped with a line-throwing device and utilizing the "American longline system" whereby baited hooks sink rapidly.

[198] Resolution adopted by the 12th Meeting of the IOTC (June 2008).

[199] BirdLife International news report "Indian Ocean Seabirds Get Thrown a Lifeline" of 12 June 2008, at <www.birdlife.org>.

[200] CMM-2006-02 (2006)

[201] CMM-2007-04 (2007), replacing CMM-2006-02.

[202] In the northern area, the regime does not apply to vessels smaller than 24 meters.

area of application—including a thousand Taiwanese longliners—were exempted from the regime until February 2009.[203]

All five tuna RFMOs have thus adopted seabird bycatch decisions and all but the IATTC now require vessels to implement mitigation measures. At the 2007 joint tuna RFMO meeting in Kobe, Japan, the five commissions identified the following as one of several "key areas and challenges to be urgently addressed through effective cooperation and coordination" in order to improve RFMO performance:

> Implementation of the precautionary approach and an ecosystem-based approach to fisheries management including improved data collection on incidental by-catch and non-target species and establishment of measures to minimize the adverse effect of fishing for highly migratory fish species on ecologically related species, particularly sea turtles, seabirds and sharks, taking into account the characteristics of each ecosystem and technologies used to minimize adverse effect.[204]

No matching concrete actions to further cooperation on seabird bycatch were agreed, however, and a proposal by NGOs to set up a cross-RFMO working group on bycatch reduction was not adopted.

Like the WCPFC, the non-tuna SEAFO Commission commenced work in 2004 and adopted mandatory measures to address seabird bycatch two years later. The Conservation Measure in question includes an obligation to set long-lines at night only and with minimal deck lighting, a prohibition to discharge offal while lines are being set, and a streamer line requirement which applies only at latitudes beyond the familiar 30°S.[205] The same Conservation Measure addresses seabird bycatch in trawl fisheries, including an offal dumping ban during net shooting and several other prescriptions similar to the CCAMLR trawling rules. In 2009, the SEAFO Commission is to review the various measures and consider taking additional ones, "including those applied and tested by the Commission for the Conservation of Antarctic Marine Living Resources."[206]

In summary, five of the six RFMOs just discussed presently have mandatory seabird bycatch mitigation measures in place, albeit in some cases after lengthy delays. The full suite of measures adopted by CCAMLR has not been prescribed by any of them. For instance, none of the RFMOs in question has shortened the fishing season to reduce seabird bycatch,[207] and only SEAFO has categorically prohibited offal discharge during gear setting. Moreover,

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[203] BirdLife International news report 'Pacific Seabird Mitigation Measures "A Step in the Right Direction"' of 21 December 2006, at <www.birdlife.org>.

[204] Course of Actions for RFMOs from the Kobe Meeting of Joint Tuna RFMOs (January 2007), par. I(10).

[205] Conservation Measure 05/06 (2006).

[206] *Ibid.*, par. 12.

[207] As noted by Waugh *et al.* 2008, *op. cit.*, at 450.

in the interrelated areas of observer coverage, monitoring and compliance, the practice of the six fisheries bodies falls far short of the standards set by CCAMLR.

Although some of the other eight currently active RFMOs—CCBSP,[208] GFCM,[209] IPHC,[210] NAFO,[211] NASCO,[212] NEAFC,[213] NPAFC[214] and PSC[215]—have been discussing the problem of seabird bycatch and have commissioned studies,[216] no significant mitigation action has been taken by any of them. Sometimes this is due to a lack of mandate, although the experience of the IPHC demonstrates that even without the authority to adopt seabird bycatch mitigation measures much can be achieved.[217] An especially prominent gap exists for coastal gillnet fisheries, as no binding measures have to date been adopted by any RFMO requiring the mitigation of seabird bycatch in these fisheries.[218]

5. CONCLUSION

A precautionary and holistic approach to the issue of seabird bycatch has been defined above as entailing effective and proportional action—meaning a combination of timely, tailor-made, mandatory bycatch mitigation measures—with regard to each fishery the impact of which on seabirds gives rise to reasonable grounds for concern that serious or irreversible harm may be caused, in order to prevent such harm. The central question this article set out to answer is to what extent such an approach has been prescribed and applied in the international law of relevance to seabird bycatch.

It is fitting to realize in this regard that seabird bycatch belongs to the category of environmental problems the solution of which is relatively straightforward, despite the inherent difficulty of enforcing bycatch prescriptions in vast and distant ocean areas. As experience in the CCAMLR area, the Chilean longline fishery,[219] and in Australian, Falklands, and Hawaiian waters[220] has

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[208] Convention on the Conservation and Management of Pollock Resources in the Central Bering Sea.
[209] General Fisheries Commission for the Mediterranean.
[210] International Pacific Halibut Commission.
[211] Northwest Atlantic Fisheries Organization.
[212] North Atlantic Salmon Conservation Organization.
[213] North East Atlantic Fisheries Commission.
[214] North Pacific Anadromous Fishery Commission.
[215] Pacific Salmon Commission.
[216] E.g., the GFCM study by Tudela 2004, *op. cit.*
[217] The IPHC has been instrumental in coordinating the mitigation measures prescribed individually by Canada and the US for demersal halibut longline fisheries in the IPHC area.
[218] As noted by Gilman *et al.* 2007, *op. cit.*, at 10.
[219] From 2002 to 2006, seabird mortality in Chilean longline fisheries went from 1,600 (including 1,500 albatrosses) to zero.
[220] In a matter of years, mandatory mitigation measures in these areas resulted in, resp., 99%, 97%, and 90% bird mortality drops.

shown, reducing bycatch to insignificant levels—or even to zero—is technically possible, does not require major socio-economic reforms, and is not terribly expensive. In several cases such reduction is cost-effective or even profitable from a narrow fishery business point of view. The issue is thus incomparable with a problem like climate change and, put plainly, it is hard to see why states would *not* apply a precautionary and holistic approach to seabird bycatch and minimize it. These considerations ought to be taken into account when extrapolating the findings of the present article beyond the context of seabird bycatch.

As the length of the article indicates, answering its central question is a nuanced affair. At the global level, the 1982 LOSC merely requires states to "take into consideration" effects of fishing on associated species with a view to maintaining or restoring them "above levels at which their reproduction may become seriously threatened." The 1995 FSA comes much closer to actually prescribing a holistic and precautionary approach to seabird bycatch with its general duty to adopt, "where necessary," conservation and management measures with a view to achieving the same purpose, and its specific duty to "minimize" bycatch of non-fish species through the use of selective fishing gear and techniques. However, the latter obligation seems to fall short of the standards required by a truly precautionary and holistic approach to nature conservation, because it is subject to the "practicability" and "cost-effectiveness" of such gear and techniques. Notably, the latter qualifications are repeated in germane soft law instruments like the FAO Code of Conduct and the IPOA-Seabirds. All the same, the purpose of keeping species away from levels "at which their reproduction may become seriously threatened" is obviously thwarted when seabirds "get killed faster than they can breed," and bycatch mitigation measures which are both practicable and cost-effective *do* happen to exist. In consequence, for the "risky" fisheries involved, the FSA spells out an obligation for its parties, and by extension the RFMOs constituted by them, to require the implementation of such measures in the fisheries under their jurisdiction.

For many states, this obligation is reinforced by commitments under several global and regional nature conservation treaties, in particular the CBD, CMS, AEWA, and ACAP. One will recall, for instance, the precautionary CMS obligation to take action to avoid migratory species from becoming endangered. Similarly, AEWA contains a commitment to "minimise the impact of fisheries" on a number of seabird species, many of which do *not* at present figure on the IUCN Red List, and to take "appropriate measures" to "address incidental killing and bycatch in fishing gear including the use of gill nets, longlines and trawling." Seabird bycatch mitigation duties under ACAP are more elaborate still. Although ACAP's focus has so far been on the most endangered species, this would change with the inclusion of species like Cory's shearwater.

As described above, the degree to which these generic obligations have filtered through to the more specific, and crucial level of RFMO conservation and management measures, is highly variable. It ranges from the exemplary practice of CCAMLR to a complete lack of action on the part of some other RFMOs. Of those bodies which *have* adopted binding mitigation measures, some have waited many years before doing so, putting measures off for the reason that information on bycatch impacts was still insufficient. None of these RFMOs, on the other hand, have waited for complete and conclusive scientific information on the precise impact of "their" fisheries on the population trends of individual seabird species before taking action, as such information still does not exist. The CCAMLR experience, in any event, evidences that the consistent application of a holistic and precautionary approach can be expected to deliver conservation results.

With the exception of CCAMLR, for individual RFMOs it is not possible to determine whether mitigation measures are having effect, because their effectiveness is not consistently monitored, if at all. Consequently, as others have also noted recently, "there appears to be little opportunity to assess the efficacy of mitigation measures used by most RFMOs, and to understand if reduction of seabird bycatch has occurred."[221] When looking at the international fisheries regime as a whole, effects should become visible in improving population trends of the seabirds involved. Some birds' population declines have been found to slow down, others continue to plummet. Isolating the effect of bycatch mitigation measures from other factors impacting on seabird populations is, however, a complicated affair.

Although it was not within the scope of this article to exhaustively review national practice, it is apparent that such practice is patchy as well. Until now only a selected few states, including Australia, Argentina, Canada, Chile, Japan, New Zealand, South Africa, Taiwan, the UK, and the U.S., have adopted binding national seabird bycatch regulations of some sort. Other states, like Spain, have voluntary codes in place, and the majority of states none whatsoever.

All things considered, the article's findings appear to shed considerable doubt on the feasibility of the WSSD commitment to implement an ecosystem approach to fisheries by 2010. They also corroborate some of the conclusions of the 2006 FSA Review Conference:

> [A] number of challenges remain in achieving full implementation of the UNFSA provisions so as to ensure the long-term sustainability of SFS and HMS fisheries, particularly with respect to the application of the precautionary approach and ecosystem approaches to fisheries management.

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[221] Waugh *et al.* 2008, *op. cit.*, at 453.

States, both individually and through RFMOs, have begun to apply the precautionary approach to fisheries management. While the application of the precautionary approach is widely accepted, the extent to which the precautionary approach is being implemented in practice varies widely.

While many RFMOs have adopted measures to minimize the catch of non-target and associated and dependent species, the scope and effectiveness of these measures could be improved, particularly with respect to the species covered, compliance and data reporting.[222]

As for the future, much will depend on the dynamics between "wildlife law" and "fisheries law," and the ability of progressive regimes like CCAMLR, ACAP and AEWA to influence state practice at the RFMO and national levels. Much will also depend on the willingness and ability of states and RFMOs to improve compliance with prescribed mitigation measures and to deal with IUU fishing. As it is, seabirds around the world continue to interact with "many boats unconcerned about birds or law."[223] For instance, the Japanese southern bluefin tuna longline fleet is still taking an estimated 6,000 to 9,000 seabirds a year, in spite of a mandatory requirement that bird-scaring lines be employed.

To return to the title question—seabird bycatch: deathbed conservation or a precautionary and holistic approach?—it would seem the answer is a bit of both. Finally, even though shooting an albatross with a crossbow hardly constitutes a case of "incidental catch," it is of course entirely appropriate to end an article with *seabird* and *deathbed* in its title by quoting Coleridge. "And the good south wind still blew behind/But no sweet bird did follow."[224]

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[222] Report of the Review Conference on the Fish Stocks Agreement (July 2006), UN Doc. A/CONF.210/2006/15, par. 3, 4 and 8; see also Y. Takei, *UN Fish Stocks Agreement Unfinished Business: Review Conference on the 1995 Fish Stocks Agreement*, 21 International Journal of Marine and Coastal Law, 551 (2006.)

[223] Safina 2007, *op. cit.*

[224] S.T. Coleridge, *The Rime of the Ancient Mariner* (1798). At the risk of spoiling a perfectly dramatic ending, in the present context this does not have to mean the albatross has gone extinct; it may also mean the bird stopped following as a result of prudent offal management.