PCAS Literature Review 2010

A review of threats to albatross conservation management and the creation of the Agreement on the Conservation of Albatrosses and Petrels (ACAP)

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Word count: 3082

Abstract

Wildlife managers have a difficult task in linking science to effective conservation and management outcomes. Albatross conservation provides an example where these difficulties have been ameliorated through the effective use of a legally binding multilateral agreement, the Agreement on the Conservation of Albatrosses and Petrels. This review covers some of the threats faced by albatrosses, including historical and traditional harvest, introduced mammals, fisheries-related mortality and disease. The creation of ACAP is covered in some detail, with a brief overview of how the Agreement works, and the role of an NGO, Birdlife International, in the conservation of albatrosses. The review concludes with some discussion of future challenges for ACAP.

Cover: White-capped albatross at South West Cape, Auckland Island, November 22, 2009. The wingspan of this species can reach just over 250cm. Photo property of the author.

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Introduction

Migratory and wide-ranging species present an interesting management and conservation dilemma: how do we manage and conserve endangered species whose life histories transcend many national jurisdictions? Especially when the species in question bridges the divide between marine and terrestrial ecosystems, and is subject to threats in both places? Nowhere are these questions so acutely expressed as for seabirds (Jodice & Suryan 2010). 'Seabirds' are those that typically forage in or on open water and nest on islands or coastal regions (Jodice & Suryan 2010).

In the case of the Procellariiformes or tubenoses, particularly the albatrosses and petrels, these are long-lived species, slow to reach breeding age, whose foraging patterns take them across large expanses of the Southern Ocean and many breed on sub-Antarctic islands. Several albatross species only breed every second year, and all lay a single egg (Heather & Robertson 2001). These life-history features make tubenoses vulnerable to threats both at sea and while on land; the islands where they breed often have introduced mammalian predators that greatly disrupt the chances of breeding success, while going to sea to feed presents the danger of fisheries related mortality, as many albatross and petrel species have a tendency to follow ships (Heather & Robertson 2001). Changing climatic conditions are likely to be exacerbating these pressures (Robinson et al. 2008). These combined burdens were recognised in the mid 1990s and consequently the Agreement on the Conservation of Albatrosses and Petrels (ACAP) has been created in an attempt to help protect these vulnerable species.

The aim of this review is to explore some of the scientific literature that led to this important development, through an analysis of recognised threats to albatross species, and then examine how ACAP was created and functions today. While ACAP is theoretically applicable to all species in the order Procellariiformes, this review will focus almost entirely on the best-studied family, Diomedeidae (the albatrosses) for which there are currently 22 recognised species (refer Appendix 1).

Threats to albatrosses: the need for legal protection

Albatrosses are often described as having faced a barrage of threats. This section will highlight the nature of some, but not all, of those threats.

Historical and traditional harvests

The earliest threat to albatrosses were the whalers and sealers stationed on Southern Ocean Islands from the late 1700s onward (Jones 2008, Doughty 2010). The birds were used as an easy source of nutrition, with eggs, chicks and sometimes adults being consumed; feathers were also sought after for bedding (Jones 2008, Doughty 2010). Doughty (2010) describes the islands as being "ransacked" – and then a secondary threat arose in the form of introduced mammalian predators and browsers.

Albatross species remained unprotected on Tristan da Cunha until 1986, where they were traditionally harvested at Easter and for other special events (Glass 2008). This was especially true of the larger Tristan albatross (*Diomedea dabbenena*) and the Atlantic yellow-nosed albatross (*Thalassarche chlororhynchos*). The Tristan albatross is last known to have bred on Tristan da Cunha in the 1950s and is now restricted to Gough and a few smaller islands where it is currently classified as critically endangered (Fitter 2008, Glass 2008).

Albatrosses have also been traditionally harvested by Moriori and Māori on the Chatham Islands (Jones 2008, Robertson 1991). The target species have typically been the endangered northern royal (*D. sanfordi*) and vulnerable Chatham Island albatross (*Thalassarche eremita*). Both indigenous groups made applications to renew the harvest of northern royals around 1990 (Robertson 1991), and have continued to make further applications, but permission has never been granted (DOC 2010). However there have been informal reports of ongoing illegal taking of northern royal chicks at the Chatham Islands (Robertson 1991, Gales 1998).

Introduced mammals

Land mammals were historically absent from all Southern Ocean islands until introduced by people. As a widely diverse and adaptable group of animals, a number of mammal species have done well on many of the islands. They are problematic to albatrosses through the destruction of habitat and direct predation of eggs and chicks.

A more recent and widely reported mammal-related issue in the "albatross literature" relates to the discovery of mice preying upon albatross chicks on Gough Island and subsequently on Marion Island. Wanless et al. (2007) reported mouse predation on Gough contributing significantly to extremely poor breeding success for Tristan albatrosses (*D. dabbenena*) in 2004. Using infrared cameras at selected nests, the authors were able to compile video evidence of chicks essentially being eaten alive by as many as 10 mice. The breeding success for Tristan albatrosses on Gough in 2004 was 27%, well below the expected 60-75% typically expected for *Diomedea* albatrosses, with mice depredation believed to be a major contributing factor (Wanless et al. 2007).

Mouse depredation events on Marion Island seem to have been less devastating in terms of total numbers and impact on breeding success, but are still cause for alarm. Jones and Ryan (2010) report several deaths of wandering (*D. exulans*) and sooty (*Phoebetria fusca*) chicks since 2003. The rates of chick deaths on Marion attributed to mice attacks is currently <1% but it is worth noting that feral cats were only eradicated there in the early 1990s, and mouse depredation could very well become more of a threat in the future (Jones & Ryan 2010). Both Wanless et al. (2007) and Jones and Ryan (2010) note that for Gough and Marion, mice are the only alien mammal species *in situ*, and other islands where this is also the case may have similar issues, including New Zealand's own Antipodes Island where four species of albatross breed (Fitter 2008).

Fisheries-related mortality

Monitoring and research from both the British and French sub-Antarctic islands through the 1960/70s indicated dramatic declines in population levels for several albatross species; French observers noted a 50% decrease for some albatross populations on Kerguelen and Crozet Islands (Doughty 2010). However it was not until the 1980s that Weimerskirsch and Jouventin (1987) observed birds with bill/throat wounds and found regurgitated hooks at some nest sites; this was concurrent with widespread longlining for pelagic tuna (*Thunnus* spp.) south of 30^{o} and it was about this time that the Patagonian toothfish (*Dissostichus eleginoides*) industry was starting to longline in the Southern Ocean (Boardman 2006, Doughty 2010). Pressures intensified further through the early 1990s as driftnets were banned and the popularity of longlining increased even further (Doughty 2010).

By 1995 there was enough global concern for the issue of fisheries related mortality that the inaugural Albatross Conference was held in Hobart. Many of these presentations were complied into a book *Albatross: Biology and Conservation* (Robertson & Gales 1998), still one of the most comprehensive volumes on these birds to date. Possible mitigation measures were high on the agenda at this conference, and discussion centred around advocacy for measures such as night-setting, using streamers and thawed baits, bait throwing machines and sinkers to reduce bait floating times (Boardman 2006).

In order to justify monitoring and mitigation measures, the spatio-temporal distribution of the species in question must be mapped in relation to fisheries and fishing effort (Dunn et al. 2008). Recent studies into fisheries impacts for albatrosses have focussed on satellite tracking adult birds in an attempt to make these connections. A brief review of two such studies follows.

Nel et al. (2002) used fixes from small satellite-tracking devices to map the foraging ranges of grey-headed albatrosses (*T. chrysostoma*) breeding at Marion Island. The authors found during the egg incubation phase, females in particular were taking long foraging trips into areas where the southern blue-fin tuna (*T. maccoyii*) fishery operates. Later during the chick raising phase trips were likely to be shorter but concentrated to the south where male birds in particular were spending time within the area exploited for Patagonian toothfish (Nel et al. 2002).

Xavier et al. (2004) tracked wandering albatrosses from South Georgia over two seasons. Their data showed foraging areas for this population overlapped with three known long-lining areas at varying ranges from South Georgia. Females tended to forage in oceanic regions and/or on the Patagonian shelf, while males focussed on the South Georgia shelf/shelf-slope area where they were at risk from local toothfish boats (Xavier et al. 2004).

The importance of such studies as proof of fisheries-albatross interactions cannot be overstated. In recognition of this, a workshop was initiated (by Birdlife

International) in 2004 where the Global Procellariiform Tracking Database was created; over 90% of all known albatross tracking data was submitted to the workshop, and the database is now considered the model standard sought by researchers of other large marine vertebrates such as marine mammals and sea turtles (Dunn et al. 2008). With access to such a comprehensive database, Regional Fisheries Management Organisations (RFMOs) that have significant overlap with albatross foraging ranges have now been identified. The five RFMOs of particular interest are the Commission for the Conservation of Southern Bluefin Tuna, the Western and Central Pacific Fisheries Commission, the Indian Ocean Tuna Commission, the International Commission for the Conservation of Atlantic Tunas and CCAMLR, the Commission for the Conservation of Antarctic Marine Living Resources. CCAMLR in particular stood out for already having monitoring and mitigation measures in place, the issue of bycatch having been raised in this forum by the United States as early as 1984 (Boardman 2006). As many of the other RFMOs were not so forward thinking, management of this issue has not been straightforward and this was one of the major driving reasons for the creation of ACAP (Boardman 2006, Cooper et al. 2006, Dunn et al. 2008).

Disease

In a 2004 paper Henri Weimerskirch reported that an outbreak of avian cholera had been identified in an Indian yellow-nosed albatross (*T. carteri*) population on Amsterdam Island. This finding was notable for several reasons: it was the first time the bacterium *Pasteurella multicida* had been identified in an albatross species and the colony in question was located three kilometres from the last remaining Amsterdam albatross colony, critically endangered with only 20-25 pairs remaining (Weimerskirch 2004). Most notably the previous and on-going decline in the *T. carteri* population had been attributed to fisheries-related mortality, which the author now suggested may be having less of an impact than the cholera. Weimerskirch (2004) asserts that “great care should be taken when attributing population decreases in other species of southern seabirds” and this study will surely have been noted with interest by other albatross researchers.

Other threats

Space does not allow further review of threats to albatrosses, other than to note that there are research papers suggesting marine pollution – especially ingestion of plastics (Aumen et al. 1997), climate change (Weimerskirch 2003, Robinson et al. 2008) and diet availability (Croxall et al. 1999) can and do have significant impacts on albatross populations.

Timeline of ACAP creation within the Bonn Convention

By the mid 1990s, reduction of fisheries-related mortality was identified as the single most important factor likely to improve the conservation status of albatrosses and petrels (Robertson & Gales 1998). Because mortality was largely occurring on the high seas (therefore beyond the limits of any national jurisdiction), management would require an international approach, such as that allowed for by the Convention on the Conservation Migratory Species of Wild Animals (CMS or Bonn Convention) (Boardman 2006, Cooper et al. 2006). The CMS arose in the 1980s as there was recognition of the need to conserve vulnerable migrating species across their total range. Under the CMS, member parties are able to work together to create legally binding "Agreements" of which there are now several for species ranging from bats to Arctic seals (UNEP/CMS 2010). The Agreement on Albatrosses and Petrels (ACAP) came into use in 2004, with the overriding objective "to achieve and maintain a favourable conservation status for albatrosses and petrels" (Article II, ACAP, amended November 2006).

Australia played an instrumental role in getting the entire ACAP process in motion; it was Australia that pushed hard to raise awareness for albatrosses at the third and fourth CMS Meeting of the Conference of Parties, in Geneva and Nairobi. At the fifth CMS Meeting in 1997, Australia successfully proposed the (then) 11 species of Southern Hemisphere albatross be added to Appendix II of the CMS (Boardman 2006, Cooper et al. 2006).The following year Australia presented a paper to the Valdivia Group, a coalition of Southern Hemisphere countries working together on environmental issues of shared concern. The Group was in support of a legally-binding, regional Agreement to protect Southern Hemisphere albatrosses under the Bonn Convention (Cooper et al

2006). A working group was set up at this point to identify the scope, function and content for such an agreement text (Cooper et al. 2006).

In 1999 at the sixth CMS Meeting, South Africa (working closely with a British NGO, Birdlife International) proposed seven petrel species be included under the provisions of CMS, and Australia then offered to host a meeting the next year where a draft text for an Agreement would be created (Boardman 2006, Cooper et al. 2006). Following the CMS meeting, the working group held an informal meeting in Paris and formal meetings in Hobart and Cape Town to work on the development of the text (Boardman 2006, Cooper et al. 2006). When the final draft of the text was released in 2000, it included an 'action plan' describing conservation measures to be implemented by all parties; this included goals of:

1. Reducing fisheries mortality
2. Eradicating invasive predators at breeding sites
3. Reducing human disturbance and habitat loss
4. Taking actions to reduce marine pollution (Cooper et al. 2006)

ACAP opened for signature in 2001, and by 2004 six countries (New Zealand, Australia, South Africa, Spain, Ecuador and the United Kingdom and Overseas Territories) had ratified allowing the agreement to enter into force. By June 2006 Argentina, Chile, France and Peru were also ratified. Since then the Agreement has also been ratified by Norway, Brazil, and Uruguay, bringing the total number of signatories up to 13 (ACAP 2010a).

How ACAP works

The Agreement and its various instruments are actioned through a number of mechanisms, outlined briefly here.

Meeting of the Parties

The Meeting of Parties (MoP) is the decision-making body of ACAP. These meetings are held at intervals of not more than three years, so there have been three MoPs since the Agreement came into force. The first Meeting of the Parties (Hobart 2004) established an Advisory Committee to provide expert advice and information to ACAP Parties, the Secretariat and others.

Advisory committee

The Advisory Committee (AC) meets every one-two years; there have been five such meetings since the first in July 2005. Information papers are presented and this is the forum in which the working groups present their findings. The next AC meeting will be held in Ecuador in August 2011.

Working groups

These are groups of experts tasked with furthering the goals of ACAP; this is done by carrying out research and providing advice to the Advisory Committee. The working groups meet at various times in addition to taking part at AC meetings. There are currently four working groups within the ACAP structure:

1. Status and trends – this group initiates research into, and reviews the conservation status and population trends of albatross and petrel species covered by ACAP;
2. Taxonomy – reviews and resolves albatross taxonomy issues;
3. Breeding sites – reviews protection and management of breeding sites, mostly on Southern Ocean islands;
4. Seabird Bycatch – this group is concerned with the mitigation of seabird bycatch; in particular work has been done with RFMOs to reduce fishing mortality in ACAP species by encouraging the adoption of CCAMLR-style mitigation measure in areas beyond the Southern Ocean (Cooper et al 2006).

Further information on the structure of ACAP is available from the tri-lingual ACAP Secretariat website (www.acap.aq); this comprehensive site makes available all ACAP meeting reports, submitted documents and information papers, as well as having a strong educational focus. The 'news' section is updated 3-4 times per week.

NGO involvement: the Albatross Task Force

Conservation NGOs have had an active role in the management developments for albatrosses in the past twenty years. In particular, the UK organisation Birdlife International (BLI) was an effective lobbyist for a CMS-style Agreement from the early 1990s. BLI went on to start the *Save the Albatross* campaign in 2000. As part of this initiative, an 'Albatross Task Force' made up of qualified bycatch-mitigation instructors was created in 2006. These instructors run workshops and observe on fishing vessels in order to build a rapport with the fishers and encourage best practice measures be put in place (Sullivan 2008). The initial targets of the programme were vessels from Brazil, Chile and South Africa; the second phase has seen the focus shift also to Argentina, Uruguay and Namibia (Dunn et al. 2008, Sullivan 2008). In addition to creating the Task Force, BLI has been very involved with the upkeep of ACAP and setting up the Global Procellariiform Tracking Database; the ACAP secretariat has limited resources, so technical input from experts affiliated with BLI has always been welcomed (Dunn et al. 2008)

The future of ACAP and the conservation of Procellariiformes

The real strength in ACAP to date has been the success in getting key range states involved, the strong scientific underpinnings, and the openness with which all affairs are conducted. The future success of ACAP will depend on continued expansion of the Agreement to relevant parties and ongoing work with RFMOs. At the third MoP in 2009, ACAP was extended to include the three albatross species that breed on islands in the Northern Hemisphere. This was a significant step for the Agreement that had until then focused solely on the Southern Hemisphere. It is hoped that this will encourage the range states of Northern Hemisphere albatrosses to sign on to ACAP, particularly Japan, Canada, and the United States (Cooper et al. 2006). Representatives from all three countries were present at the announcement and the US in particular seems keen to get more involved, having been an observer at all ACAP meetings to date and drafting an 'Albatross and Petrel Conservation Act' in 2009 (ACAP 2009, ACAP 2010b).

The new focus for ACAP membership will be on states with active fishing programmes that overlap with albatross species. It is likely that the ACAP secretariat will seek to increase involvement with Namibia and powerful Asian states including China and Korea. As of 2006, these countries were yet to demonstrate any interest in joining ACAP (Cooper et al 2006).

The other future changes for ACAP will come in the form of an increased focus for other petrel species, now that all albatrosses are covered. Already there has been discussion about including as many as seven shearwater species, smaller seabirds also in the order Procellariiformes (Cooper & Baker 2008, Cooper 2010). Three of these species are found in the Mediterranean region, and their inclusion in ACAP would very much end the Southern Hemisphere-centric focus of ACAP to date.

Regarding future research for albatross conservation, it is likely the role of climate change will become an ever noticeable feature. Many populations have already been studied over the long term, and this provides an excellent baseline from which future research can build. In particular, climate change will influence the prey availability and distribution for many albatross species, as well as increasing the susceptibility of Southern Ocean islands to habitat loss, and invasion by alien species. The discovery of avian cholera on Amsterdam Island is worrying and it is possible the disease will spread to other islands as albatrosses and other seabirds are wide-ranging vectors. All these factors will need to be considered for the successful ongoing conservation management of albatrosses.

Concluding thoughts

ACAP is still a fairly new creation, yet it seems to have been very successful so far. There is no reason to believe ACAP will not continue to guide albatross conservation management in the future and it could very well be extended to cover many more petrel species. That such a strong management jurisdiction exists is a measure of hope, because nearly all of the threats to albatrosses outlined in the earlier part of this review remain highly prevalent. Most albatross species are far from being “out of the woods” yet and careful planning and cooperation will be needed to safeguard the future of these magnificent birds.

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Appendix 1. Species covered by ACAP

Common name	Scientific name	IUCN Red list (2010)
Northern Royal Albatross	*Diomedea sanfordi*	Endangered
Southern Royal Albatross	*Diomedea epomophora*	Vulnerable
Wandering Albatross	*Diomedea exulans*	Vulnerable
Antipodean Albatross	*Diomedea antipodensis*	Vulnerable
Amsterdam Albatross	*Diomedea amsterdamensis*	Critically endangered
Tristan Albatross	*Diomedea dabbenena*	Critically endangered
Sooty Albatross	*Phoebetria fusca*	Endangered
Light-mantled Albatross	*Phoebetria palpebrata*	Near threatened
Waved Albatross	*Phoebastria irrorata*	Critically endangered
Black-footed Albatross	*Phoebastria nigripes*	Endangered
Laysan Albatross	*Phoebastria immutabilis*	Near threatened
Short-tailed Albatross	*Phoebastria albatrus*	Vulnerable
Atlantic Yellow-nosed Albatross	*Thalassarche chlororhynchos*	Endangered
Indian Yellow-nosed Albatross	*Thalassarche carteri*	Endangered
Grey-headed Albatross	*Thalassarche chrysostoma*	Vulnerable
Black-browed Albatross	*Thalassarche melanophris*	Endangered
Campbell Albatross	*Thalassarche impavida*	Vulnerable
Buller's Albatross	*Thalassarche bulleri*	Near threatened
Shy Albatross	*Thalassarche cauta*	Near threatened
White-capped Albatross	*Thalassarche steadi*	Near threatened
Chatham Albatross	*Thalassarche eremita*	Vulnerable
Salvin's Albatross	*Thalassarche salvini*	Vulnerable
Southern Giant Petrel	*Macronectes giganteus*	Least concern
Northern Giant Petrel	*Macronectes halli*	Least concern
White-chinned Petrel	*Procellaria aequinoctialis*	Vulnerable
Spectacled Petrel	*Procellaria conspicillata*	Vulnerable
Black Petrel	*Procellaria parkinsoni*	Vulnerable
Westland Petrel	*Procellaria westlandica*	Vulnerable
Grey Petrel	*Procellaria cinerea*	Near threatened