Fishing the Southern Ocean: The Development of Fisheries and the Role of CCAMLR in their Management

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Antarctica Discovered, Claims Made

As recently as 300 years ago, Antarctica was still thought to cover almost all of the globe south of the latitude 50° South, nearly five times its actual size.[1] When Captain James Cook ventured south of Australia on three successive summers between 1772 and 1775, he stopped at 71° 10° South and declared that 'no man will ever venture farther than I have done and the lands which may lay to the south will never be explored'.[2]

However, in 1820 the first recorded landing on the Antarctic continent was made by the American John Davis on the *Cecilia*.[3] This landing was made on the far northern tip of the Antarctic peninsula, around 66° South, 60° West. The confirmation that Antarctica in fact comprised a large land mass came when the mountains of Enderby Land, in East Antarctica, were sighted in 1831.[4] It was not until the British steamship, *Challenger*, sailed south of the Antarctic circle during the years 1872 to 1876, that the most important discovery was made. As they sailed south, the crew of the *Challenger* dragged up continental rocks of granite, quartz and limestone from the sea-bed, indicating that Antarctica must indeed be a large continent and not a string of ice covered islands.[5]

The promise of vast resources—minerals and marine life—has fueled interest in the southern continent ever since. For instance, prior to sailing south on the *Nimrod* in 1907, Ernest Shackleton raised the

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1 L Crossley, *Explore Antarctica* (Cambridge, Cambridge University Press, 1995) p 28.

2 Ibid.

3 Id, at p 29.

4 Ibid.

5 Id, at p 31.

possibility of discovering mineral deposits in Antarctica to gather support for his venture.[6]

Speculation as to the extent of resources, both on the continent and in the Southern Ocean, continued during the early part of the 1900s. Following the International Geographical Conference in 1895, there was a surge of expeditions like Shackleton's to Antarctica. Indeed, a handful of nations were responsible for funding over 20 expeditions in as many years.[7]

Territorial claims soon followed, with the United Kingdom (UK) making the first claim in 1908. Other nations to make claims included New Zealand (1923), France (1924), Australia (1933), Norway (1939), Chile (1940) and Argentina (1942).[8] Many nations have rejected these claims and even amongst the seven claimant states there remains disagreement, with the claims of the UK, Chile and Argentina overlapping in West Antarctica.[9]

Whilst the complex issue of territorial sovereignty has effectively been put 'on ice' by the Antarctic Treaty,[10] the status of the maritime areas surrounding Antarctica have been the subject of much discussion.[11] Article VI of the Antarctic Treaty applies the Treaty to the area, comprising land, ice shelves and ocean, south of 60° South latitude, however the Article specifically reserves the rights of states under international law with regard to the high seas. This raised the question of whether the Antarctic Treaty actually applied to the ocean.

The right of the freedom of the high seas has been somewhat eroded by subsequent additions to what is now referred to as the Antarctic Treaty System.[12] The Convention for the Conservation of Antarctic

6 R Huntford, *Shackleton* (Abacus, London, 1996) at p 157.

7 Crossley, *Explore Antarctica*, note 1 above, at p 31.

8 GD Triggs, 'The Antarctic Treaty System: Some Jurisdictional Problems', in GD Triggs (ed) *The Antarctic Treaty Regime - Law, Environment and Resources*, (Cambridge University Press, Cambridge, 1987) at p 51.

9 Ibid.

10 Antarctic Treaty 1959. Article IV states that no act shall constitute a basis for asserting, supporting or denying a claim to territorial sovereignty in Antarctica.

11 Triggs, 'The Antarctic Treaty System', note 8 above; CC Joyner, 'The Antarctic Treaty System and the Law of the Sea - Competing Regimes in the Southern Ocean', (1995) 10 *International Journal of Marine and Coastal Law*, pp 301-331.

12 The Antarctic Treaty System is defined in Article 1 as 'the Antarctic Treaty, the measures in effect under that Treaty, its associated separate international instruments in force and the measures in effect under those instruments'.

Marine Living Resources 1981 (CCAMLR),[13] applies to all Antarctic marine living resources south of the Antarctic convergence.[14] The 1991 Madrid Protocol on Environment Protection[15] (Madrid Protocol) has the same area of application as the original 1959 Treaty, however the Protocol specifically imposes environmental obligations on Treaty members with respect to the whole Treaty area, and not just the land or ice shelves.[16] Notwithstanding an arguably increased area of application, whilst the various instruments comprising the Antarctic Treaty System apply only to member states, the enforcement of conservation measures or environmental obligations over an expanse of ocean which is essentially high seas,[17] remains problematic.

The aim of this article is to discuss both the development of fisheries in the Southern Ocean and the measures adopted to ensure that Antarctica's marine living resources are safeguarded from unchecked exploitation, in the context of the Antarctic Treaty System. Specifically, the CCAMLR will be reviewed and its success in meeting the challenges made by illegal fishing will be evaluated. The recent development of the Patagonian Toothfish fishery will also be addressed.

Marine Resources in the Southern Ocean

The Antarctic Seas are biologically the most productive on earth.[18] In particular, there is a wide variety of marine life such as seals, whales, fin fish, squid and bird life including penguins, snow petrels and albatross.[19] The Antarctic ecosystems have evolved to become inextricably reliant on the delicate balance of life in the Southern Ocean. Food chains begin in the ice-pack regions at the edges of the Southern Ocean, an area referred to as the Antarctic Convergence.[20] The Convergence is a natural physiological boundary between the sub-Antarctic waters of the Indian, Pacific, and Atlantic oceans, and the

13 (1980) 19 ILM 837.

14 Article 1. The convergence is a natural physiological boundary in the Southern Ocean which moves periodically.

15 30 ILM 1455

16 See for example Article 8 which requires prior assessments on the impact of activities conducted in the treaty area. Thus, the absolute freedom of the high seas is qualified by the Protocol, but only to the extent that it applies to member states.

17 See 1982 Convention on the Law of the Sea.

18 Suterk, *Antarctica - Private Property or Public Heritage*, (NSW Pluto Press, 1991) at p 35.

19 Joyner, note 11 above, at p 311.

20 Suterk, note 18 above, at p 35.

much colder, denser water of the Antarctic.[21] It is caused when cold fresh water from melting ice, meets warmer salt water flowing south, and it is here that the gradual exchange of heat, the presence of nutrients and high levels of carbon dioxide and oxygen creates a haven for marine life.[22] The Convergence is up to 50 miles wide and creates a natural barrier which separates Antarctic living resources from those in more temperate waters.[23] It is therefore a convenient boundary for the area of application of CCAMLR.

The food chain begins with the thriving crops of phytoplankton which provide a nutritious food source for krill and other zooplankton.[24] Krill are shrimp-like crustaceans which in turn provide a direct food source for numerous predators including five species of whale, three species of seal, twenty species of fish and several bird species, including penguins.[25] Krill only occur south of the Antarctic Convergence and are critical in the marine food chain, particularly as there is little biodiversity within the Antarctic marine ecosystem.

The principal krill species in the Southern Ocean, the *Eupausia superba*, attains a size of two to three inches.[26] Krill form swarms sometimes several hundred metres across and 15-20 metres deep, making it easy to trawl.[27] Scientific estimates have placed a sustainable annual yield of krill at 150 million tonnes.[28] Concerns over the commercial exploitation of krill gave impetus to the Antarctic Treaty members to 'promote and achieve within the framework of the Antarctic Treaty the objectives of protection, scientific study and rational use of Antarctic marine living resources'.[29] This statement was made at the ninth meeting of Consultative Parties in 1977, and is often referred to as the starting point of the CCAMLR.[30]

21 *Looking South - The Australian Antarctic Program in a Changing World*, Publication of Australian Antarctic Division 1995, at p 3.

22 Ibid.

23 SB Kaye, 'Legal Approaches to Polar Fisheries Regimes', (1995) 26 *California Western InternationalLaw Journal*, at p 83.

24 Joyner, note 11 above, at p 311.

25 Id, at p 312.

26 JN Barnes, 'The Emerging Antarctic Living Resources Convention', (1979) Proceedings of 73rd Annual Meeting, American Society of International Law, at p 272.

27 Suterk, note 18 above, at p 36.

28 Ibid.

29 Barnes note 26 above, at p 273.

30 Suterk note 18 above, at p 37.

Recognising the Need for Action

The 1959 Antarctic Treaty does not directly address the exploration, exploitation and conservation or management of living resources in the Antarctic Treaty area.[31] As to be expected in a treaty of its age, there is little attention paid to environmental protection.[32] Article IX does, however, provide for the Consultative Parties to discuss measures in futherance of the principles and objectives of the Treaty including, inter alia, the preservation and conservation of living resources in Antarctica.

Informal discussions about conservation of Antarctica's marine living resources between the Antarctic Treaty Consultative Parties commenced as early as 1972 during the seventh Consultative Party meeting.[33] As previously stated, discussions were centered on the emerging commercial krill fishery, and potential adverse impacts on the marine ecosystem if the fishery was allowed to develop unchecked.[34]

Commercial exploitation of marine living resources has a long history in Antarctica's Southern Ocean.[35] Sealers commenced operations as early as 1821 off the South Shetland Islands, south of Cape Horn.[36] During one recorded five week period, 14,000 seal skins were harvested. [37] Such was the devastation in that first season that during the 1821-22 season off the South Shetland Islands, of the 44 vessels operating, many returned almost empty.[38] In the absence of any controlling local authority, the slaughter was an unchecked free-for-all and seal stocks were reduced to near extinction.[39]

Whales in the Antarctic waters fared little better. With the development and marketing of the harpoon gun in the early 1800s, whalers

31 P Birnie and A Boyle, *Basic Documents on International Law and the Environment* (Clarendon Press, Oxford, 1995) at p 628.

32 Suterk, note 18 above, at p 24. The 1991 Madrid Protocol specifically introduces environmental protection principles into the Antarctic Treaty area, in particular the underlying principle of the precautionary approach.

33 M Howard, 'The CCAMLR: A Five Year Review', (1989) 38 *International and Comparative Law Quarterly*, at p 108.

34 Barnes, note 26 above, at p 273.

35 Howard, note 33 above, at p 109.

36 Crossley, note 1 above, at p 29.

37 Ibid.

38 JA Gulland, 'The Management Regime for Living Resources', in C Joyner and S Chopra (eds), *The Antarctic Legal Regime*, (Martinus Nijhoff, 1988) p 221.

39 Ibid.

were able to hunt the more active fin and blue whales.[40] Catches of blue whales peaked in the 1930-31 season at 28,000 carcases.[41] It was in this same year that the first international whaling treaty was drafted, prohibiting the commercial hunting of right and bowhead whales. The Treaty was limited in its objectives, aiming to protect calves and females suckling calves, yet it was still rejected by five nations: Japan, Germany, Chile, Argentina and the USSR.[42]

With blue whale stocks severely depleted, attention turned to smaller fin whales. The International Whaling Commission (IWC) maintained annual catch levels at around 26,000 from 1954-1962.[43] The IWC's objectives were to safeguard future whaling rather than to preserve the whales,[44] and it was not until 1982 that the IWC passed a recommendation for a moratorium on all commercial whaling in the Antarctic which came into effect in 1986.[45] The USSR and Japan have made formal objections to this and the moratorium is thus not binding on them.[46]

The collapse of both seal and whale populations illustrates the stark consequences of the lack of central control on resource exploitation. When a resource is *res communis*, it is open to all to exploit and interests are focused on short term profits rather than long term management issues.[47] This early example of exploitation of Antarctica's marine living resources illustrates the difficulty of achieving effective controls on exploitation, on an international level. It also explains why the CCAMLR has not been as successful as some conservationists had hoped. Even on the emotionally and politically sensitive issue of whaling, Russian and Japanese commercial interests were in conflict with international concern for the well-being of the species, and international consensus was not achieved. [48]

By 1972, the focus in the Southern Ocean was on krill harvesting. Of particular concern to the Antarctic Treaty Consultative Parties was the developing USSR krill fishing industry. Exploratory fishing com-

40 Ibid.

41 Ibid.

42 Suterk, note 18 above, at p 29.

43 Gulland, note 38 above, at p 221.

44 Suterk, note 18 above, at p 29.

45 Gulland, note 38 above, at p 239.

46 Ibid.

47 Id, at p 222.

48 *Antarctica - The Next Decade*, Report of Study Group chaired by Sir Anthony Parsons (Cambridge University Press, 1989) at p 68.

menced in 1961-62 for krill and continued for the next decade, with 2100 tonnes being taken in 1971-72.[49] Japan commenced exploratory krill fishing the following season.[50] The industry developed steadily with the catch for 1975 reaching 50,000 tonnes.[51] Catches fell in 1976 but rose again in 1977 and by 1979 were estimated at 350,000 tonnes.[52] This figure, however, was well off the estimated 1.5 million sustainable yield, and history has shown the krill industry did not develop as quickly as, nor reach the size, envisaged.

The krill fishery did not develop sufficiently to challenge the effectiveness of CCAMLR, nonetheless the lack of measures taken by the CCAMLR Commission to address the potential problem gives rise to concerns of the Commission's ability to face future problems. These concerns have to a large extent re-emerged with the recent run of illegal fishing of the Patagonian Toothfish.

CCAMLR

The principle Convention addressing marine living resources in Antarctica is CCAMLR. Once formal discussions commenced, the Consultative Parties moved with speed and the Convention was open for signature by August 1980.[53] The Convention entered into force some twenty months later on 7 April 1982, whereas the Convention for the Conservation of Antarctic Seals (CCAS) took more than 5 years to acquire enough signatures to come into force.[54] The original parties to sign were Argentina, Australia, Belgium, Chile, France, both East and West Germany, Japan, New Zealand, Norway, Poland, South Africa, USSR, UK, and the US.[55] The CCAMLR has now been in operation for fifteen years and has been subject to several reviews, not all of which have been favourable.[56] This article aims to discuss the effectiveness of the Convention in achieving its objectives.

49 Howard, note 33 above, at p 109.

50 Ibid.

51 SC-CAMLR-VII 1988, at p 5.

52 Ibid.

53 Howard, note 33 above, at p 110.

54 Ibid.

55 CCAMLR (1980) 19 ILM 837.

56 See generally Howard, note 33 above, Suterk, note 18 above, and *Antarctica - The Next Decade*, note 48 above.

Area of Application

At the ninth Consultative Meeting of the Antarctic Treaty, the parties unanimously agreed to negotiate a Convention based on an ecosystem approach that would not be limited solely to commercially exploitable species.[57] The parties agreed that the Convention should at least cover the area of the Antarctic Treaty, and where necessary for the effective conservation of the ecosystem, extend north of the latitude 60° South.[58] This ecosystem approach is a feature unique to CCAMLR, distinguishing it from the traditional fisheries agreements which refer to specific species.[59]

The US successfully argued that the extent of the Antarctic ecosystem must be defined on biological grounds, in effect the Antarctic Convergence.[60] As mentioned previously, the Convergence is a natural boundary in the ocean. It is best described as a zone of transition the exact boundaries of which change periodically with the seasons, and in 1977 these were not well mapped.[61] The US lobbied for a strict biological definition of the Convergence. However, the majority of delegates attending the negotiations supported fixed coordinates.[62] The settled draft refers to exact co-ordinates as the northern boundary of the Convention's area of application. The convergence is deemed to run along the co-ordinates contained in Article 1 Paragraph 4 of the Convention, and therefore does extend north of 60° South latitude in many areas.

The disagreement on the definition for the Convergence and the exact area of the Convention's application was the first major issue in its development.[63] The Argentineans insisted the boundary through Drake Passage be drawn further away from Argentina to protect its interests.[64] The main point of contention however centred on the sub-Antarctic islands. The French were unwilling to have both Ker-

57 Barnes, note 26 above, at p 273.

58 Ibid, recommendation IX-2.

59 See Howard, note 33 above, at p 113. The ecosystem approach has been used in UNESCOs Man and the Biosphere Programme which establishes Biosphere Reserves. See also Kaye, note 23 above, at p 83.

60 Barnes, note 26 above, at p 276

61 Id, at p 277.

62 Ibid. See also RF Frank, 'The Convention on the Conservation of Antarctic Marine Living Resources' 13 (1983-1984) *Ocean Development and International Law* at p 302.

63 Ibid (Frank).

64 Barnes, note 26 above, at p 277. Drake Passage is between Cape Horn and the Antarctic Peninsula.

guelen and Crozet Island (situated between 45° and 50° South latitude) included within the Convention area, even though French sovereignty was undisputed.[65] No other states with claimed island territories located north of 60° South latitude, yet within the proposed Convention boundary followed the French example.

The French islands were ultimately included within the Convention area of application, along with Prince Edward Island (South Africa); Heard, McDonald and Macquarie Islands (Australia); Peter and Bouvet Islands (Norway); and Scott and Balleny Islands (New Zealand).[66] Other islands included within the Treaty area are the South Shetlands, South Georgia, South Orkneys and Sandwich Islands. These later islands are subject to disputes over sovereignty.[67] The effect is a somewhat irregular and lopsided boundary which extends as far north as 50° South latitude around the South Georgia and South Sandwich Islands in West Antarctica, and to approximately 52° South latitude in East Antarctica where the French and Australian sub-Antarctic islands are located. The boundary retreats in areas where there are no islands supporting marine communities, and in particular it runs close to 60° South latitude, between the area below the Cape Horn, moving west to New Zealand.

Many nations have declared maritime zones over waters adjacent to sub-Antarctic islands. Exclusive Economic Zones (EEZ) have been declared pursuant to the 1982 Convention on the Laws of the Sea (LOSC).[68] Australia has declared an EEZ around Heard, McDonald and Macquarie Islands. These three islands are within the CCAMLR area of application and the Australian Fisheries Management Authority (AFMA) observes CCAMLR conservation measures in the development of fisheries policies.[69] The French have also declared an EEZ around Kerguelen Island and have at times closed the area to fishing to restore stocks.[70]

It should be noted that CCAMLR applies only to member states[71] and therefore non-member nations can and do fish south of the Conver-

65 Ibid. Both islands are located north of 60° South.

66 Id, at p 276.

67 Ibid.

68 See Joyner, note 11 above, pp 308-309, and Figure 1.

69 See for example AFMA, 'Heard and McDonald Islands Exploratory Fishery and Interim Management Policy Nov 1996 to Aug 1997'.

70 Gulland, note 38 above, at p 234.

71 There are currently 23 member states plus six acceding countries which participate in the CCAMLR Commission as observers.

gence in direct violation of Conservation Measures. Indeed, vessels of member states sometimes sail under flags of non-member states—so called 'flags of convenience'—to avoid the Convention. It is only when these illegal fishing boats encroach on the EEZ of a member state that firm action is taken. Recently the Australian Navy seized two illegal vessels fishing for the Patagonian Toothfish in the EEZ of Heard and McDonald Islands.[72] In May 1997 the French Navy seized illegal fishing boats within the French declared EEZ of Crozet and Kerguelen Islands.[73]

Ecosystem Approach

As previously mentioned, the Convention adopts an ecosystem approach in the conservation of marine living resources. The principal krill fishing states at the time the Convention was being drafted were Russia and Japan. Those two nations objected to the ecosystem approach proposed by the US.[74] Instead they argued for greater emphasis to be given to utilising marine resources through adopting the approach of maximum sustainable yields.[75]

Marine ecosystems are defined in CCAMLR to mean 'the complex of relationships of Antarctic marine living resources with each other and with their physical environment'.[76]

Marine living resources are defined as

> the populations of fin fish, molluscs, crustaceans and all other species of living organisms, including birds, found south of the Antarctic convergence.

The ecosystem approach expands the convention beyond a single species approach.[77] It entails a complexity of factors, both living and non-living, including such variables as nutrient levels, weather, seasons, temperature and water currents.[78] Huge amounts of scientific data are required to monitor the balance of life within the ecosystem. Without this comprehensive data, the scope for uncertainty increases.

72 Five illegal fishing boats were sighted in the Heard and McDonald Island EEZs earlier this year. See *Fishing in the Freezer*, AFMA, (1997) p 20. *Australian*, 22 October 1997, at p 15.

73 *Dominion*, 1 May 1997, at p 1.

74 Barnes, note 26 above, at p 227.

75 Ibid.

76 Article 1 paragraph 3.

77 Howard, note 33 above, at p 114.

78 Id, at p 115.

This uncertainty limits the circumstances in which member states will reach a consensus,[79] notwithstanding the emergence of the precautionary principle in recent years.[80]

The early history of the Convention illustrates the difficulty incomplete or inconclusive scientific evidence causes. It also leads one to the conclusion that international agreements are unenforceable in light of the inclination of the international community to do nothing when there is insufficient scientific data.[81] Perhaps this is why Russia and Japan ultimately went along with the ecosystem approach, because they could prevent the implementation of restrictive Conservation Measures aimed at minimising risks to the ecosystem or protecting the food chain for dependent species by voting against such measures.[82] Alternatively, they could simply elect not to comply with the measures.[83]

The complexity of delicately balanced marine ecosystems was acknowledged by the Scientific Committee in their 1984 report to the Commission. Noting reduced baleen whale stocks, the Committee stated that krill availability to other organisms had almost certainly increased, although there was no direct evidence of this.[84] The difficulty in obtaining 'hard' data in such a complex living regime is immense. There was some indirect evidence that non-exploited krill predators, such as crabeater seals, penguins and minke whales, may have increased in accordance with krill increases in the Southern Ocean. The committee noted that the increase in fur-seal populations around South Georgia could be attributable to enhanced krill availability.[85]

One writer in 1979 stated that for the achievement of these principles, both financial and political commitment by member states would be required both to support long term scientific research and to limit harvests until sufficient data was available to make informed decisions.[86] As will be discussed, this commitment has not been forthcoming and consequently, the objectives of the Convention were not satisfactorily met in the initial years.

79 *Antarctica-The Next Decade*, note 48 above, at p 68.

80 Rio Declaration 1992. Principle 15. See note 142 below.

81 Ibid.

82 See Article IX para 6, and Article XII.

83 CCAMLR Article IX (6)(c).

84 SC-CAMLR-III 1984, at 30, paragraph 9.7(a).

85 SC-CAMLR-III 1984, at 31, paragraph 9.7(b).

86 Barnes, note 26 above, at p 278.

The comments of the Scientific Committee in their 1984 report, provide an insight into the complexities of the ecosystem and the many variables involved. The Committee, in noting the low abundance of krill at South Georgia, across the Scotia Sea and around Elephant Island, concluded all evidence indicated that the cause was a natural variation in the water circulation, and not fishing, as may have been expected.[87] Further, the Scientific Committee found a corresponding high mortality rate amongst krill eating birds and seals at South Georgia; however, incomplete data suggested this was consistent with a southward shift of the secondary polar front.[88] When it is not clear that fishing is affecting stock levels, and there is room for the possibility that other natural elements may be involved, history has shown that the pro-fishing member states have not supported Conservation Measures aimed at limiting catch levels.

Objectives

As the title suggests, the objective of the Convention is the conservation of Antarctic marine living resources.[89] Some conversationists have difficulty with the very title of the Convention, stating the labelling of marine life as living resources implies commercial exploitation.[90] Further, the definition of the term 'conservation' to include 'rational use'[91] suggests that the conservation of the marine resources may not have priority over commercial exploitation.

Harvesting of resources is to be in accordance with three main principles.[92] The responses to the principles of conservation in the CCAMLR have been mixed, with comments from 'genuinely innovative', 'novel', 'a break through in conservation standards' and 'inadequate'.[93] The wording represents a compromise between exploitation and the protection of the Antarctic's marine living resources. It is therefore couched in ambiguous terms to avoid favouring one interest group over another.[94] The effect is that the fishing nations who are parties to the CCAMLR can take advantage of inclusive or insufficient data to justify inaction.

87 SC-CAMLR-III 1984, at 24, at paragraphs 8.6 and 8.7.

88 Ibid.

89 CCAMLR, Article II(1).

90 Suterk, note 18 above, at p 39.

91 CCAMLR, Article II (2).

92 See Article II para 3.

93 Howard, note 33 above, at p 114.

94 Gulland, note 38 above, at p 229.

The first principle uses terms such as 'stable recruitment' and 'greatest net annual increment'. To this limited extent, the Convention resembles a standard fisheries agreement, for the greatest net annual increase will promote the achievement of maximum sustainable yields'.[95]

It is the later two principles which introduce the ecosystem approach. Ecological relationships between harvested and dependent species are to be maintained and changes to the ecosystem which are not potentially reversible over two or three decades, are to be prevented.[96]

Therefore, when harvesting or proposing to harvest a species, that species cannot be regarded in isolation in terms of the effects of harvesting. To this extent perhaps, Conservationists should be encouraged by declared intentions of the Treaty members. However, CCAMLR is not focused solely on preservation of the ecosystem. It openly contemplates that a single species may be severely depleted and that change will occur within the marine ecosystem as a consequence of fishing within the Southern Ocean. The Convention permits these effects so long as the depleted stocks can be allowed to build up to minimum levels at which harvesting may recommence and the ecosystem can recover within two to three decades.

Based on these conservation principles it has been rather easy for fishing states to press for watered down Conservation Measures. Moreover, the marine ecosystem will forever be playing a game of catch-up, and constant fishing over time may eventually cause long term irreversible effects. In this context, the recent Conservation Measures embodying the precautionary approach are encouraging.

Commission

Article VII of the CCAMLR establishes a Commission for the Conservation of Antarctic Marine Living Resources. The Commission has a permanent headquarters at Hobart, Tasmania, and is required to hold annual meetings.[97] The function of the Commission is to give effect to the objectives and principles discussed above. The Commission is assisted by a Scientific Committee established as a permanent consultative body.[98] Ad Hoc Working Groups may be consulted by the Committee as required. The Ad Hoc Working Group on Krill for

95 Howard, note 33 above, at p 114.

96 Article II para 3.

97 CCAMLR Article XIII.

98 Id, Article XIV.

example was consulted yearly by the Scientific Committee and in 1988 was established as a permanent Working Group.[99]

In order to fulfill its role, the Commission shall, inter alia, 'identify conservation needs and analyse the effectiveness of Conservation Measures' and 'formulate, adopt and revise conservation measures on the basis of the best scientific evidence available'.[100] Conservation Measures may address such issues as the quantity of any species to be harvested, designate regions and sub-regions, designate open and closed seasons for harvesting, and methods of harvesting.[101]

The major limitation in the enforcement of these Conservation Measures is the right of every member to notify the Commission of its inability to accept them, either in whole or in part.[102] A Member State has 90 days after receiving notification of a new Conservation Measure to notify the Commission of its inability to accept the measure, after which time the State is not bound by the Measure. Thus member States do not have to accept proposed Measures to close fishing areas, limit catch volumes or cease fishing a particular species altogether. This effectively gives States a right of 'veto' which has been exercised consistently throughout the Convention's life, hindering the implementation of Conservation Measures.

The Difficulty in Consensus - Fin Fish and Krill

In the 1985 report of the Scientific Committee, the advice to the Commission was that the *N Rossii* stock (fin fish species) was severely depleted in the seas off South Georgia. The Committee advised that the only hope for significant catches in the future was to rebuild the spawning stock.[103] This followed the 1985 report to the Scientific Committee by Dr Hennemuth, the Chairman of the Ad Hoc Working Group on Fish Stock Assessment, in which he reminded the Committee that it had a responsibility to recommend Conservation Measures to restore depleted stocks such as *N Rossii*.[104] Dr Hennemuth, the US representative, acknowledged that identifying effective

99 SC-CAMLR-VII 1988, at 14.

100 CCAMLR Article IX (e) and (f).

101 Id, Article IX (2)(a) - (j).

102 Id, Article IX (6)(c).

103 SC-CAMLR-IV 1985, at 13, paragraph 4.33.

104 Id, at 14, paragraph 4.36. See also CCAMLR Article IX, paragraphs 1(e) and (f), and Article XV, paragraph 2(a), for the functions of the Scientific Committee.

measures was difficult, given variables such as by-catches and the uncertain results of the partial closures of fishing areas.[105]

Supporting the New Zealand proposal in 1984 to close South Georgia to all commercial trawling, the UK representative proposed 'an indefinite closure of the South Georgia region until enough data had been received by the Commission to estimate safe levels of yield'.[106] He was supported by New Zealand, the US, South Africa, France, Argentina, Australia, Norway and the Federal Republic of Germany (as it then was).[107] It is interesting to note than even at a time when the stocks of *N Rossii* were in a serious state of depletion, State representatives spoke in terms of 'recruitment'[108] and 'important commercial fish species',[109] indicating that the main focus was on exploitation rather than conservation.

The USSR, one of the few nations still fishing in the Southern Ocean for fin fish in 1985, did not support the proposal. Their representative stated that the closure of the 12 mile zone around South Georgia, which accounted for 30% of the Continental shelf area, adequately protected the immature stock.[110] In conclusion, the USSR stated that there was no practical or scientific justification for the closure of the whole of the South Georgia sub-area.[111] It is interesting to note that the USSR was the only state which failed to provide catch data for the 1983-84 season at the time the Working Group met in late August 1985.[112]

Japan also indicated problems with the proposal, relying on the deficiencies in data.[113] Poland questioned the need to take such drastic measures as closing the fishery area,[114] as did the German Democratic Republic.[115] Consequently, the Scientific Committee was only able to

105 SC-CAMLR-IV at 14, paragraph 4.36.

106 SC-CAMLR-IV at 14, paragraph 4.37.

107 SC-CAMLR-IV at 14-17.

108 SC-CAMLR-IV at 16, paragraph 4.47. The Australian representative, Dr Chittleborough, noted the severe decline in recruitment.

109 SC-CAMLR-IV at 15, paragraph 4.40, per the South African representative.

110 SC-CAMLR-IV at 15, paragraph 4.43.

111 Ibid.

112 SC-CAMLR-IV Annex 4, paragraph 3.

113 SC-CAMLR-IV at 15-16, paragraph 4.44.

114 SC-CAMLR-IV at 16, paragraph 4.48.

115 SC-CAMLR-IV at 16, paragraph 4.46.

'urge the commission to take action to conserve and protect the depleted stocks of *N Rossii*'.[116]

Notwithstanding the Committee's lack of consensus, the Commission adopted Conservation Measure 3/IV which states:

> Directed fishing of *N Rossii* around South Georgia is prohibited. By catches of *N Rossii* in fisheries directed to other species shall be kept to the level allowing the optimum recruitment to the stock.

It is not clear why the States which opposed the Measure before the Scientific Committee did not object to the Commission adopting 3/IV. It may be explained by the fact that, by then, the fish population had fallen to such levels as to make harvesting economically unviable.[117] Certainly catch totals had fallen dramatically over recent years, however this does not explain the suddenness of the change of heart from the opposing states.

As stated previously, the Convention was prompted primarily by concerns about over-fishing of krill. Yet Conservation Measures setting catch limits were not adopted until 1991.[118] Following CCAMLR, the USSR and Japan continued to harvest krill within the Southern Ocean, however for varying reasons, including the dissolution of the USSR, the industry has not developed at such a rate as to 'test' the CCAMLR. Of the former Soviet states, Russia and the Ukraine have taken up krill fishing, with Chile, Germany, the Republic of Korea, Poland and Spain also commencing commercial krill fishing.

As previously noted, in 1988 the Ad Hoc Working Group on Krill became a permanent Working Group, following the recommendation of the Scientific Committee.[119] The primary function of the group was to evaluate available knowledge and formulate specific recommendations on the potential effects of krill fisheries with respect to the provisions of the CCAMLR.[120] The Terms of Reference indicate that significant scientific research was still required before any opinions on the effect of krill harvesting on other species could be offered. In particular, the Working Group was to review and estimate methods and techniques for estimating krill abundance.[121]

116 SC-CAMLR-IV at 17, paragraph 4.50.
117 Howard, note 33 above, p 133.
118 Kaye, note 23 above, at p 87.
119 SC-CCAMLR-VII 1988, at 14.
120 Ibid.
121 Id, at 10.

There is also an acknowledged gap in knowledge of the effects of krill harvesting on local krill-dependent predators.[122] In 1989, the Scientific Committee acknowledged that current knowledge of the effect of krill fishing on krill predators and the impact of by-catches on depleted fish stocks is poor.[123] Some members of the Committee felt it was appropriate to consider imposing a precautionary limit on the krill catch in sub-area 48.3 (South Georgia) where there was substantial fishing activity. Other Committee members expressed doubts about such a limit, stating no functional relationship between krill and its dependent predators had been established.[124]

In 1989, the Commission requested the Scientific Committee to investigate several issues including:

> the possible management measures, including limits, that might be necessary on krill catches in the sub-area which would maintain ecological relationships with dependent and related populations, including the protection of dependent predators and the protection of young and larval fish.[125]

In 1990 the Working Group on krill reported that it was not possible to provide detailed advice due to the lack of data.[126] In the light of uncertainties with data and in the absence of any reliable estimate on the potential yield of krill in sub-area 48.3, the Scientific Committee recommended the Commission consider imposing precautionary measures for limiting krill catches in the sub-area.[127] Japan and the USSR, however, continued to express their opposition to such limits, because of the absence of yield estimates.[128]

Finally, in 1991 the Commission adopted Conservation Measure 32/X, setting a precautionary limit on annual krill catches of 1.5 million tonnes.[129] The reported catch for 1991 was 374,775 tonnes. The Scientific Committee placed three caveats on the catch limit, indicating the complexity of monitoring a marine ecosystem. Firstly, the limit needed to be divided into sub-areas to allow for possible interactions between krill populations and other oceanographic factors.

122 SC-CAMLR-V 1986, at 22.

123 SC-CAMLR-VIII 1989, at 14.

124 Ibid.

125 SC-CAMLR-IX 1990, at 13.

126 Id, at 17.

127 Ibid.

128 Ibid.

129 C Joyner 'Fragile Ecosystems: Preclusive Restoration in the Antarctic' (1994) 34 *Natural Resources Journal*, at p 887.

Secondly, other management measures might be necessary to ensure the catch is not concentrated in the foraging range of colonies of vulnerable land breeding predators. Thirdly, the limit would not allow for unreported krill catches in the fishing industry.[130]

In 1992, the Working Group on krill and the Working Group on the CCAMLR Ecosystem Monitoring Program considered it appropriate to consider the effects of substantial krill catches being taken within a very restricted area at a time of year when krill eating predators, trying to rear offspring, were restricted to foraging in that same area.[131] As was to be expected, there was a lack of data to enable a precise assessment of the magnitude of the impact on these predators. Most members of the Scientific Committee felt it was highly desirable to implement a Conservation Measure to provide adequate protection until sufficient data was available.[132] Chile, Poland, Korea and Japan did not support such action.[133] It is interesting to note that between them, these four nations reported a total krill catch of 89,517 tonnes in the 1992 fishing season.[134] The Japanese delegate stated that catch limits in the area sufficiently managed krill resources and the local ecosystem and that there was no urgency which dictated that action was required immediately. It was more appropriate to await the outcome of further studies.[135]

Conservation Measures: The 1990s

The late 1980s and early 1990s have seen a dramatic increase in the number and quality of Conservation Measures passed by the Commission. There have been 117 measures adopted up to the 15th Consultative meeting of member States; however the last eight meetings have accounted for more than 100 of those measures.[136]

The measures cover a wide range of issues such as mesh size, net monitor cables, the use of plastic packaging bands on fishing vessels (their disposal at sea endangers fur seals which become entangled in

130 SC-CAMLR-X 1991, at 23.

131 SC-CAMLR-XI 1992, at 49.

132 Ibid.

133 Id, at 50.

134 Id, at 4.

135 Id, at 50-51.

136 See Kaye, note 23 above, at p 90, and also *Heard and MacDonald Island Fishery Interim Management Policy*, note 69 above.

them), fishing limits, exploratory fisheries and data reporting.[137] The recent Measures also support the Commission's aims to protect and conserve the Antarctic marine ecosystem. In particular, long line fishing has been the subject of a number of Measures to protect the magnificent albatross which are caught in the lines. Long line hooks must be sunk with baits, measures taken to discourage the birds and the lines may only be set at night.[138] Even so, illegal fishing vessels continue to use long lines within the CCAMLR area.[139]

In 1991 the Commission recognised the need to implement measures to protect newly developing fisheries. Conservation Measure 31/X addresses exploratory fisheries and requires States who wish to develop or explore a fishery to first notify the Commission of their intentions. Scientific data must accompany the notification.[140] Australia has commenced exploratory fishing in the Heard and McDonald Island EEZ and to this end has notified the Commission, which passed Conservation Measure 111/XV in 1996. Reporting procedures have been overlaid on 111/XV by the operation of 61/XII (Ten-day catch and Effort Reporting System) and 117/XV (Biological Data Reporting system).[141]

These new Conservation Measures are evidence of the increasing acceptance of the principle of 'the precautionary approach' in the international community. The principle was first officially embodied in the text of the Rio Declaration.[142] The essence of the Principle is that the lack of scientific data shall not be used to justify avoidance or delay in the implementation of effective conservation measures. Hence, new fisheries are monitored to ensure stock are not overfished and ir-

137 For example, Conservation Measure 2/111 (1984) as amended 19/X (1990) regulates mesh size for bottom trawls. Measure 30/X (1990) prohibits net monitor cables. Measure 63/XV (1996) prohibits the use of plastic packaging bands on fishing vessels. Catch reporting systems are dealt with by 25/IX (1990) 36/X (1991) and 54/XI 91992). Limits for the fishing of the Patagonian toothfish have been set in 109/XV (1996), and 111/XV (1996) addresses a new fishery off Heard and McDonald Islands for deep water fish.

138 Kaye, note 23 above, at pp 91-91.

139 *Sydney Morning Herald*, 10 June 1997, at p 15, reported that at least a dozen illegal vessels were sighted within the Heard and McDonald Islands EEZs by AFMA and all were long liners. *Canberra Times*, 22 October 1997, at p 1, reported that the two illegal vessels seized by the Royal Australian Navy were long lining .

140 Kaye, note 23 above, at p 91.

141 'Heard and McDonald Islands Exploratory Fishery Policy', note 69 above.

142 United Nations Conference on Environment and Development (UNCED) at Rio de Janerio 1992, principle 15. The Conference was attended by 176 states.

reversible damage is not caused to the marine ecosystem. This cautious approach to fisheries in the Southern Ocean is long overdue.

The Australian Fisheries Management Authority has fully embraced the precautionary approach. The 1996-97 Interim Management Policy for the Heard and McDonald Exploratory Fishery reads in terms of 'precautionary catch limits' and 'ecologically sustainable development.'

The Most Recent Challenge: The Patagonian Toothfish

The discovery of the Patagonian Toothfish (*Dissostichus eleginoides*) in the Southern Ocean has prompted the latest challenge to the Convention. The toothfish is one of the largest species of fish in the Antarctic waters, reaching up to two metres in length and weighing as much as 100 kilograms.[143] The fish has quickly become a prized table fish with markets in Japan, South East Asia and the US.[144]

Following the 15th meeting of the CCAMLR Commission, a catch limit of 3800 tones was set for sub-areas 58.51 and 58.43 (offshore Heard and McDonald Islands) for the 1996-97 fishing season.[145] The fishing season closed on 31 August 1997. The 16th Consultative meeting of the Commission was held in late October 1997, and one of the agenda items will be the setting of new catch limits.[146]

For the whole of the Southern ocean, the catch limit for the Patagonian Toothfish was set at 23,000 tonnes.[147] The problem is that many more tonnes have been taken by illegal fishing vessels. The New Zealand Government has put the value of the illegal fishing industry in the toothfish at US$300 million.[148] This figure is supported by AFMA data which has put a value of AUD$5 million on the legal catch of only 1000 tonnes in the Macquarie Island Development Fishery.[149]

143 AFMA Information Sheet 1997, 'Patagonian Toothfish'.

144 Ibid.

145 'Heard & McDonald Islands Exploratory Fishery Policy', note 69 above. See also the Joint Media Release by Senators Warwick Parer (Minister for Resource and Energy) and Ian Campbell (Parliamentary Secretary for the Environment), 1 November 1996.

146 Telephone communication with Commission Secretariat in Hobart, October 1997.

147 *Southern Ocean Gold Rush*, published by The Antarctic Project, the Northern Hemisphere Secretariat for the Antarctic and Southern Ocean Coalition (ASOC) Vol 6 Issue 2, June 1997, at p3.

148 Ibid.

149 *Fishing in the Freezer*, publication by AFMA, June 1997, at p 16.

Simple calculations then convert the $300 million to represent 60,000 tonnes taken illegally from the Southern Ocean, a staggering amount.

As with many regulated fisheries, the illegal vessels sail under flags of convenience. The recent seizure by the Australian Navy of two vessels 4000 kilometres south of Fremantle, Western Australia, in Australia's EEZ offshore Heard and McDonald Islands, illustrates this practice. The vessels were flying the flags of Panama and Belize, although they are thought to be Argentinean vessels.[150] Argentina is a party to the 1959 Antarctic Treaty.

The difficulty faced by the Commission in enforcing Conservation Measures has been discussed. Simply put, all Treaty members have the right under Article IX to notify the Commission that they are not able to comply with a particular Measure and to that extent the Measure is not binding. As recent events in 1997 have illustrated, enforcement has fallen on the members with vested economic interests in the Southern Ocean fisheries, particularly the UK, South Africa, New Zealand, France and Australia. Various methods have been employed, France and the UK have utilized patrol vessels, whereas New Zealand has used surveillance planes to patrol their areas of interest. Australia, France, Norway, New Zealand and South Africa have agreed to co-operate to stop the illegal fishing industry.[151]

In April 1997, the New Zealand Government issued a press statement declaring that 'New Zealand will work closely with CCAMLR partners to meet this serious challenge to the Convention, we will also make sure that illegal fishing does not spread to the Ross Sea'.[152] New Zealand concerns, and therefore action, are to a large extent explained by the fact that New Zealand has recently been authorized for the first time by CCAMLR to commence fishing in the Ross Sea.[153]

Until late 1996 the illegal vessels were mainly concentrated around South Georgia. They were moved on by patrolling UK warships and have re-emerged in the ocean offshore Kerguelen, Heard and McDonald Islands.[154] In March 1997, South Africa and France boarded three vessels in the south Indian Ocean. In June 1997, *The Sydney Morning Herald* reported sightings of illegal fishing vessels off

150 *Canberra Times*, 22 October 1997, p 1.

151 *Southern Ocean Gold Rush*, note 147 above, at p 3.

152 New Zealand Government News Release, 29 April 1997, statement by Hon Simon Upton, Associate Minister of Foreign Affairs and Trade.

153 Ibid.

154 Ibid.

Heard Island. The report states that the Captain of one illegal vessel threatened to ram the *Pakura*, a licensed Tasmanian boat, when it closed in, attempting to identify the vessel.[155]

The most recent development has seen the Australian Navy seize two vessels illegally fishing in Australia's EEZ, offshore Heard and McDonald Islands.[156] It is not the first time these vessels have been sighted in Australia's EEZ, and protests had been made officially to their country of origin previously.[157]

Conclusion

CCAMLR has been described as a landmark in international law because of its ecosystem-based conservation principles. Further, the Convention was implemented before commercial fisheries, with the exception of course of the whale and seal industries which began in the 1820s, had developed to such a level as to threaten marine ecosystems.[158]

The Antarctic Treaty members point to CCAMLR as evidence of their good record in the management of Antarctica's unique environment, and it must be acknowledged that through such Conventions as CCAMLR, the CCAS and Madrid Protocol, the Antarctic Club has strengthened its position in Antarctica. The Antarctic Treaty System provides an umbrella under which specific Conventions sit, with the central Treaty being the original 1959 Antarctic Treaty. In establishing this system, the original Treaty members have successfully preserved the status quo regarding territorial claims, and for the time being the continent, and to a lesser extent the Southern Ocean, are being regarded as the 'common heritage of mankind'.

The difficulty with shared international ownership however, is the enforcement of management principles, notwithstanding that the majority of the influential States have signed up to those very principles. Hence the difficulty with CCAMLR. From the outset, the language finally settled upon for the Convention was ambiguous, to facilitate a compromise between the fishing and non-fishing states. Conservationists have since raised concerns that conservation was

155 *Sydney Morning Herald*, 10 June 1997.

156 *Canberra Times*, 22 October 1997, p 1.

157 *Sydney Morning Herald*, 10 June 1997, p 15.

158 Frank, note 62 above, at p 300.

defined in terms of rational use, employing terms such as 'stable recruitment' and 'greatest net annual increment'.[159]

Further, the Consensus rule and the 'opting-out' rule regarding Conservation Measures, have been criticized as major weaknesses of the Convention. This is the 'out' that enables fishing nations to agree to the Convention, knowing they can choose which measures they will comply with, on a case-by-case basis. Certainly, the annual reports of the Scientific Committee indicate the lack of support fishing nations gave to proposed measures to conserve the marine living resources.

This article has reviewed the inherent difficulties in managing a conservation regime based on an ecosystem approach. The studies of the management of both *N Rossii* and krill fisheries, and more recently the Patagonian Toothfish fishery, illustrates this difficulty. The success of the CCAMLR in achieving its objectives must be considered in light of the conservation principles contained in Article II. With respect to the *N Rossii* alone, the Commission was spectacularly unsuccessful. The prohibition on direct fishing of *N Rossii* was supported presumably because stocks had fallen to such low levels that continuing to fish was no longer economically viable.

With respect to krill, the Scientific Committee and Commission made much reference to the effect of krill harvesting on dependent predators, especially land breeding predators reliant on localized krill for specific periods. However, the only Conservation Measure agreed upon in 1991 was the introduction of a precautionary catch limit of 1.5 million tonnes, after the demand for the fishery had declined and a major fishing nation, the USSR, had dissolved.

Finally, the recent flagrant breaches of the Conservation Measures relating to the Patagonian Toothfish by illegal fishing vessels illustrates the inability of CCAMLR to police and enforce the Convention. These vessels, often flying flags of convenience, completely disregard CCAMLR Conservation Measures prohibiting long lining and setting catch limits.

Whilst the krill fishery did not develop to the extent where the credibility of CCAMLR was openly challenged, the illegal Patagonian Toothfish fishery has the potential to undermine fifteen years of steady progress by CCAMLR members. The fishery is still developing and CCAMLR has not yet been tested in implementing Conservation

159 Howard, note 33 above, at p 114.

Measures setting allowable catch limits in the face of economic pressure to exploit the fishery. The initial Measures were, in a way, easy to agree upon as they related to a developing fishery, the full potential of which was unknown. The test will be setting catch limits and closing fishing areas when the fishery is at its peak.

Finally, it has only been through unilateral action by Treaty members, that a handful of illegal vessels have been recently seized. Arguably, this action will assist the credibility of CCAMLR; however the States have been prompted to act by economic factors and have limited actions to areas within their EEZs. The recent act of the Australian Navy in seizing two illegal vessels in Australia's EEZ offshore Heard and McDonald Islands is encouraging. However, there remains an urgent need for joint sanctions on illegal vessels, their county of origin and their flag country to enforce the Convention. The CCAMLR is facing its biggest threat yet and its handling of the illegal vessels taking the Toothfish, and other fisheries as they develop, will determine the future for the Convention and consequently the future for Antarctica's marine living resources.