

Sustainable Development and the 1991 Madrid Protocol to the 1959 Antarctic Treaty: The Primacy of Protection in a Particularly Sensitive Environment

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Abstract

The notion of sustainable development has become, over the last fifteen years, an integral part of international environmental law and policy. It is recognition that environmental issues do not exist in a vacuum, but rather are part of much wider structural issues involving both economic and social dimensions. However, does this concern for sustainable development now mean that protecting the natural environment is no longer about ecological conservation *per se*, but rather is simply about ensuring an adequate environment to maintain economic development? And if so, what of those environments where the economic value is a secondary consideration? Or where human activity has a disproportionate effect? Can sustainable development be interpreted in a way that reconciles these seemingly opposite demands? This paper examines these issues from the perspective of the 1991 Madrid Protocol on Environmental Protection to the 1959 Antarctic Treaty. It will suggest that sustainable development is a broader concept than one that simply requires an instrumental approach to environmental protection. In fact, the paper will conclude that sustainable development is a relatively meaningless notion if it does not also contain a strong element of environmental conservation, and not only in such ecologically important areas as Antarctica.

Keywords

Antarctica; Madrid Protocol on Environmental Protection.

Editor's note: The text of the Madrid Protocol on Environmental Protection is available on the American Society of International Law's Wildlife Interest Group website: www.eelink.net/~asilwildlife/documents

1. Introduction

Antarctica is unique; it is the “coldest, windiest, highest, driest, least inhabited, most desert-like”² of all continents.³ It is surrounded by ocean, with no indigenous human population. Its land area is around 14 million km², with over 98 per cent of that

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² K. SIMMONDS, ANTARCTIC CONVENTIONS 1 (1993).

³ *Id.*

covered by ice. The ice extends seawards to form floating ice shelves, with many being hundreds of kilometres wide. Beyond the ice shelves, the sea freezes to form pack-ice, which, in winter, has an average area of 20 million km². As well as playing host to numerous unique ecosystems – both terrestrial and marine – Antarctica has a central role in determining the Earth’s climate and oceanic circulation patterns. Its vast amount of ice (which holds 90% of the planet’s freshwater) ensures that the Earth does not ‘over-heat’, as well as determines the currents of all the major oceans. There should be little doubt that the Antarctic is an extremely important place, not only in political, geographical and environmental terms, but also in the wider consciousness of the international community. With its relatively pristine environment and lack of human contact, it has fascinated explorers and scientists alike. Moreover, Antarctica has a *sui generis* position within the international community, which adds to its importance.⁴

Nevertheless, Antarctica faces a number of challenges, many of which have significant environmental implications. As will be detailed below, it is increasingly affected by human activity, not only in terms of activities that take place within the Antarctic region, but also because of activities occurring elsewhere that may have transboundary or global implications. It was primarily because of increasing concerns about the threats to the Antarctic environment that the 1991 Madrid Protocol on Environmental Protection was concluded.⁵ Moreover, its negotiation came at the same time as the wider international community was preparing for the 1992 UN Conference on Environment and Development at Rio de Janeiro. Central to these preparatory talks was the concept of “sustainable development,” the notion that economic and environmental

⁴ On the legal status of Antarctica, *see* below.

issues should be mutually supporting, and that environmental problems are also economic problems, and *vice-versa*. It was a concept that quickly found a lot of support within the international community. However, the actual implications of sustainable development remained – as they still do today – somewhat elusive. Of particular concern was whether the introduction of economic and developmental issues would prove to be an impediment to effective international environmental law and policy. This is a particular concern in relation to the Antarctic because, up to this point, there has been little human activity there other than nature conservation and scientific research. What effect the notion of sustainable development will have on the balance between environmental preservation and human activity in Antarctica remains unclear.

This paper explores the conceptual relationship between sustainable development and the 1991 Madrid Protocol, and considers whether the provisions of the Protocol can help the international community to understand more fully the wider implications of the concept. In particular, it relates sustainable development to the Protocol's ban on mineral resource activities, its requirement of environmental impact assessments, and the general principles that underpin the Protocol. The paper is divided into three sections. The first section provides a brief overview of the concept of sustainable development. The second section looks at the nature of the Antarctic environment, the threats to that environment, and the international law that governs Antarctica. Finally, the third section provides a detailed study of the reasons for protecting the Antarctic environment to be found in the Madrid Protocol, and whether such objectives are compatible with the principles behind sustainable development.

⁵ Protocol on Environmental Protection to the Antarctic Treaty, 4 October 1991, 30 ILM 1461 (1991). The Protocol entered into force in January 1998 following ratification by Japan.

2. Sustainable Development

The concept of sustainable development is an attempt to reconcile the objectives of environmental protection and economic and social development; its endorsement by the international community is recognition of their mutual importance and interrelationship. Despite the lack of a definitive meaning, sustainable development is now the stated aim of both international and national economic and environmental policies, with ‘integration’ being an often-used ‘buzz-word’.⁶ Much of the present interest in the concept is the result of the 1987 report of the World Commission on Environment and Development, an independent body established by the UN General Assembly. The report, *Our Common Future*, endorsed the concept of sustainable development as a “framework for the integration of environment policies and development strategies.”⁷ Moreover, the World Commission gave further credence to the concept by agreeing on a common definition – known as the ‘Brundtland definition’ after the Commission’s Chair, Gro Harlem Brundtland. The World Commission defined sustainable development as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”⁸ Whilst this has never been recognized as the official definition, it is as close as the international community has come to defining sustainable development. Of interest are the ‘two key concepts’ which the World Commission argues are integral to the definition, *viz.*, the “concept of needs, in particular the essential needs of the world’s poor”; and the premise that rather than there being environmental limits to economic growth, there are

⁶ P. Sands, *International Law in the Field of Sustainable Development*, LXV BYIL 338-339 (1994).

⁷ World Commission on Environment and Development (WCED), *Our Common Future* 40 (1987).

technological and social limitations to the ability of the environment to meet present and future needs. This second concept was particularly controversial as it explicitly rejected earlier theories that had argued that the environment imposed limitations on the level and extent of human activity.⁹ The World Commission believed economic growth was an essential element for the achievement of sustainable development. It felt it could reconcile increasing economic growth with improved environmental protection because improvements in technology and social organization would enable better – i.e., more efficient – use of the planet’s resources and thereby permit continued growth without damaging the environment.¹⁰ In this respect, *Our Common Future* has been criticized as technocentric, even cornucopian, in its attachment to technology and belief in its potential. Some have argued that “achieving full growth potential”¹¹ is incompatible with environmental protection¹² and that the report does not recognize this. However, less than two pages later in the report itself, the World Commission notes that there are “ultimate [environmental] limits” and that technological advances cannot always support continued economic growth.¹³ Moreover, the report also highlights the fact that some societies, such as developed States, already live beyond the environment’s ability to continue to sustain such behaviour in the future – with the implication that such behaviour needs to cease.¹⁴

⁸ *Id.* at 43.

⁹ *See, e.g.* D. MEADOWS et al, *THE LIMITS TO GROWTH* (1972).

¹⁰ The World Commission did acknowledge, however, that there would have to be a “change in the quality of [that] growth.” WCED, *supra* note 7, at 364.

¹¹ *Id.* at 44.

¹² M. Pallemmaerts, *International Environmental Law from Stockholm to Rio*, in *GREENING INTERNATIONAL LAW* 16 (P. Sands, ed., 1993): “the mythology of economic growth.”

¹³ WCED, *supra* note 7, at 45.

¹⁴ *Id.* at 44.

An alternative view supported by many is that suggested in *Caring for the Earth – A Strategy for Sustainable Living*, a 1991 joint report by the World Conservation Union (IUCN), the United Nations Environment Programme (UNEP), and the World Wide Fund for Nature (WWF). It defined sustainable development as “improving the quality of human life while living within the carrying capacity of supporting ecosystems.”¹⁵ Unlike the Brundtland definition, it does not see environmental protection merely as supporting human development. It explicitly recognizes that all human activities occur within the planet’s ecosystems and should not go beyond that which they can support. Whilst this implies (as did the Brundtland definition), respect for the environment so that future generations will have an adequate environment in which to live, it also implies an intrinsic respect for the environment. This respect is something that was somewhat lacking in the World Commission report. As *Caring for the Earth* makes clear, “[j]ust as human societies are interdependent and future generations are affected by our present actions, so the world of nature is increasingly dominated by our behaviour.”¹⁶ The report lays down some basic elements that, it argues, comprise sustainable development. These include improving the quality of human life, conserving the Earth’s natural resources, minimizing the depletion of non-renewable resources, and keeping within the Earth’s carrying capacity. Of particular interest is the acknowledgement that whilst economic growth has a part to play in improving the quality of human life, it is not a “goal in itself, nor can it go on indefinitely.”¹⁷ Regarding conservation, there are three objectives to be achieved, *viz.*, “[the] maintenance of essential ecological processes and life-support systems; [the] preservation of genetic diversity; [and the] sustainable utilization of

¹⁵ IUCN, UNEP & WWF, *Caring for the Earth – A Strategy for Sustainable Living* 211 (1991).

¹⁶ *Id.* at 9.

species and ecosystems.”¹⁸ The more ecological approach to sustainable development found in *Caring for the Earth* arguably has the advantage over the World Commission report of more clearly realizing the environmental limitations to human development. However, this is not to discredit *Our Common Future*, which remains a highly important document.

Despite the importance of such reports as *Our Common Future* and *Caring for the Earth*, neither was prepared at the intergovernmental level amongst the actors with the authority to influence the *realpolitik*. For this reason, the UN General Assembly convened the 1992 UN Conference on Environment and Development (UNCED) with the purpose of elaborating “strategies and measures to halt and reverse the effects of environmental degradation in the context of increased national and international efforts to promote sustainable and environmentally sound development in all countries.”¹⁹ Following a detailed preparatory process; regional, sectoral, and non-governmental discussions; and two intensive weeks in Rio de Janeiro in June 1992, UNCED adopted by consensus three non-binding documents, *viz.*, the ‘Rio Declaration,’²⁰ a Statement of Principles on Forests,²¹ and Agenda 21 – the international community’s plan of action for the twenty-first century.²² Many States also signed the UN Framework Convention on Climate Change²³ and the Convention on Biological Diversity.²⁴ These five documents provide the first evidence of how the international community has reacted to this concern for sustainable development. Of particular importance are the principles contained within

¹⁷ *Id.*

¹⁸ *Id.* at 228.

¹⁹ UNGA Res. 44/228 Part I, para.3.

²⁰ UN Doc. A/CONF.151/26/REV.1 (Vol. I), 3.

²¹ *Id.* at 480.

²² *Id.* at 9.

²³ United Nations Framework Convention on Climate Change, 9 May 1992, 31 ILM 849 (1992).

these documents that seek to elucidate further the concept of sustainable development. Whilst they are not new principles in the sense that many have appeared in earlier texts,²⁵ they do, however, highlight what the international community considers to be the important elements of sustainable development.²⁶ Of particular interest for the purposes of this paper, are the four principles outlined below. First, the principle that “States shall cooperate in a spirit of global partnership to conserve, protect and restore the health and integrity of the Earth’s ecosystems.”²⁷ Second, the principle that States should “protect the resource base and the environment for the benefit of future generations” – the principle of ‘intergenerational equity.’²⁸ Third, the principle that whilst States have a sovereign right to use their own natural resources, they are obligated “to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction” – the ‘no harm’ principle. And fourth, the principle that “where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation” – the ‘precautionary principle.’²⁹ Whilst these and other ‘principles’ may not all be legally binding under international law,³⁰ the role that they can play is much clearer. As one commentator has

²⁴ Convention on Biological Diversity, 5 June 1992, 31 ILM 822 (1992).

²⁵ Many of the principles within the Rio Declaration and the other texts can be seen, in some form, in the 1972 Stockholm Declaration on the Human Environment, UN Doc. A/CONF.48/14/REV.1.

²⁶ On the principles generally, see I. Porras, *The Rio Declaration*, in SANDS, *supra* note 11; INTERNATIONAL LAW ASSOCIATION, REPORT OF THE 66TH CONFERENCE 115-118 (1994); Sands, *supra* note 4; P. Malanczuk, *Sustainable Development: Some Critical Thoughts in the Light of the Rio Conference*, in SUSTAINABLE DEVELOPMENT AND GOOD GOVERNANCE 23-38 (K. Ginther et al, eds.,1995).

²⁷ Principle 7 of the Rio Declaration.

²⁸ Agenda 21, para. 8.7. See also Principle 3 of the Rio Declaration, Principle 2(b) of the Forest Principles, and the preamble of both the Climate Change and Biodiversity Conventions.

²⁹ Principle 15 of the Rio Declaration. See also Article 3.3 of the Climate Change Convention.

³⁰ As regards the ‘no harm’ principle, the International Court of Justice in the *Legality of the Threat or Use of Nuclear Weapons (Request by the General Assembly) (Advisory Opinion)* (1996) has recently acknowledged “[the] existence of the general obligation of States to ensure that activities within their

remarked, principles “embody legal standards, but the standards they contain are more general than commitments and do not specify particular actions.”³¹

3. Antarctica: International Law and the Environment

As was noted at the beginning of this paper, Antarctica is unique – both physically and legally. This uniqueness was realized very early on in humanity’s relationship with the continent. Following a highly successful scientific research programme in the Antarctic during the International Geophysical Year (1957-58), and despite the political arguments over questions of sovereignty, the States involved in Antarctica at that time realized the benefits to be gained by putting aside their territorial disputes and using Antarctica for “peaceful purposes only,”³² particularly scientific research. The Antarctic Treaty³³ was signed in Washington DC in 1959 by all States claiming territory (*viz.*, the United Kingdom, Australia, New Zealand, France, Norway, Argentina, and Chile), those States that reserved the right to make a claim (*viz.*, the United States and the Soviet Union), and a number of other interested States. Antarctica was defined as “the area south of 60° South Latitude, including all ice shelves.”³⁴ These original signatories, and other acceding States that demonstrated an “interest in

jurisdiction or control respect the environment of other States or of areas beyond national control is now part of the corpus of international law relating to the environment,” ICJ Report (1996) 226, at 241-242.

³¹ D. Bodansky, *The UN Framework Convention on Climate Change*, 18 YJIL 501 (1993).

³² On the history, law and politics, *see* F. FRANCONI and T. SCOVAZZI (eds.), *INTERNATIONAL LAW FOR ANTARCTICA* (1996); A. JORGENSEN-DAHL and W. OSTRENG (eds.), *THE ANTARCTICA TREATY SYSTEM IN WORLD POLITICS* (1991); D. ROTHWELL, *THE POLAR REGIONS AND THE DEVELOPMENT OF INTERNATIONAL LAW* (1996); E. SAHURIE, *THE INTERNATIONAL LAW OF ANTARCTICA* (1991); O. STOKKE & D. VIDAS (eds.), *GOVERNING THE ANTARCTIC* (1996); J. VERHOEVE et al (eds.), *THE ANTARCTIC ENVIRONMENT AND INTERNATIONAL LAW* (1992); and A. WATTS, *INTERNATIONAL LAW AND THE ANTARCTIC TREATY SYSTEM* (1992).

³³ Antarctic Treaty, 1 December 1959, 402 UNTS 71.

³⁴ *Id.* at art. VI. But note the following qualification: “...nothing in the present Treaty shall prejudice or in any way affect the rights, or the exercise of the rights, of any State under international law with regard to

Antarctica by conducting substantial scientific research there”³⁵ are known as Antarctic Treaty Consultative Parties (ATCPs). The ATCPs meet (now annually) at what have been termed Antarctic Treaty Consultative Meetings (ATCMs), “for the purpose of exchanging information, consulting together on matters of common interest pertaining to Antarctica, and formulating and considering, and recommending to their Governments, measures in furtherance of the principles and objectives of the Treaty.”³⁶ These ‘principles and objectives’ include the freedom of scientific research,³⁷ as well as prohibiting military measures (including weapons testing),³⁸ nuclear explosions, and the disposal of radioactive waste in Antarctica.³⁹ And although territorial claims were not resolved by the Antarctic Treaty, Article IV ‘froze them’ since nothing in the Treaty, or any act done whilst the Treaty is in force, establishes, supports or denies a territorial claim, or the basis of a claim.

Apart from the limited measures mentioned in the above paragraph, there was nothing explicitly in the 1959 Treaty about environmental protection, though ATCPs could make recommendations at an ATCM concerning, *inter alia*, the “[p]reservation and conservation of living resources.”⁴⁰ The Treaty also permitted ATCPs to nominate observers, who had unlimited access to any area of Antarctica, to ensure State Parties complied with their obligations.⁴¹ The Treaty now forms the pinnacle of what is the Antarctic Treaty System (ATS), which also includes measures in effect under the Treaty

the high seas within that area.” See D. Vidas, *The ATS and Law of the Sea*, in STOKKE & VIDAS, *supra* note 32, at 76-90.

³⁵ Art. IX(2), Antarctic Treaty, *supra* note 33.

³⁶ *Id.* at art. IX (1).

³⁷ *Id.* at art. II.

³⁸ *Id.* at art. I.

³⁹ *Id.* at art. V.

⁴⁰ *Id.* at art. IX(1)(f).

⁴¹ *Id.* at art. VII.

and “associated separate international instruments in force and the measures in effect under those instruments.”⁴² Many of these other components of the ATS have been concerned with environmental protection. And general international law relating to the environment may be applicable to Antarctica, whether that is customary international law, which is binding on all States,⁴³ or those international treaties that make special provision for Antarctica.⁴⁴

Despite the Antarctic Treaty lacking provisions on environmental protection, the ATCPs quickly recognized that one of the political, if not legal, obligations on them – as a collection of States involved in Antarctica – was to safeguard the Antarctic environment.⁴⁵ By 1964, they had adopted Recommendation III-8, which had annexed to it the Agreed Measures for the Conservation of Antarctic Fauna and Flora.⁴⁶ The Agreed Measures designated Antarctica a ‘Special Area of Conservation’ and prohibited the killing or capturing of the native wildlife without a permit. Harmful interference was to be minimized, and greater protection was to be given to those mammals and birds designated as specially protected species. The Agreed Measures also allowed Specially Protected Areas to be established in which entry would be prohibited without a permit. Areas would be designated to “preserve their unique natural ecological system.”⁴⁷ And between 1964 and the adoption of the 1991 Madrid Protocol, other ‘types’ of protected

⁴² Art. 1(e), Madrid Protocol, *supra* note 5.

⁴³ See J. Charney, *The Antarctic Treaty System and Customary International Law*, in FRANCIONI & SCOVAZZI, *supra* note 32, at 80-98.

⁴⁴ See, e.g. art. 4.6 Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, 1989, 28 ILM 657 (1989): “The Parties agree not to allow the export of hazardous wastes or other wastes within the area south of 60° South latitude, whether or not such wastes are subject to transboundary movement.”

⁴⁵ See generally WATTS, *supra* note 32, at 209-289.

⁴⁶ Agreed Measures for the Conservation of Antarctic Fauna and Flora, UK misc. 23 (1965), Cmnd. 2822.

⁴⁷ *Id.* at art. VIII(1).

areas were established, *viz.*, Sites of Special Scientific Interest, Specially Reserved Areas, and Multi-Use Planning Areas.⁴⁸

As well as measures taken under the Antarctic Treaty, the ATS also includes ‘separate international instruments’ which seek to conserve Antarctic natural resources, *viz.*, the 1972 Convention for the Conservation of Antarctic Seals (CCAS)⁴⁹ and the 1980 Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR).⁵⁰ CCAS was adopted before there was an unsustainable trade in commercial sealing, in an attempt to prevent a problem before it occurred. It seeks to conserve seal populations through, *inter alia*, setting stringent catch limits (with a total ban on hunting some species), introducing a closed season, establishing a rotating system of zones in which killing is prohibited, and creating a number of special seal reserves. CCAS is implemented through “nationally enforced prohibition and restraint”⁵¹ – the traditional approach to such problems.

CCAMLR takes a very different approach. It establishes a Commission that determines questions of conservation and exploitation.⁵² Although it regulates the commercial exploitation of species, such as krill, CCAMLR is more concerned with the ecological effect that heavy exploitation would have on the rest of the food chain. It was actually one of the first international conventions to take into account the wider ecological impact when controlling the exploitation of a particular species. For this reason it was necessary for the geographical scope of CCAMLR to go beyond the Antarctic Treaty area of south of 60° South Latitude, to the ecological boundary of the

⁴⁸ WATTS, *supra* note 32, at 259-260.

⁴⁹ Convention for the Conservation of Antarctic Seals, 1 June 1972, 29 UST 441.

⁵⁰ Convention on the Conservation of Antarctic Marine Living Resources, 20 May 1980, UKTS 48 (1982), Cmnd. 8714.

Antarctic marine ecosystem, the Antarctic Convergence – a biological/physical phenomenon where the colder waters of the Antarctic meet the warmer waters further north.⁵³ Of particular interest in CCAMLR is the mention in the preamble of the “prime responsibilities of the [ATCPs] for the protection and preservation of the Antarctic environment.”

3.1. Threats to the Antarctic Environment

Threats to the Antarctic environment⁵⁴ are either the result of activities from within the Antarctic region, or they are the consequence of activities in other areas of the world, especially developed States. Although both will obviously require action to ensure that the environment is protected, they are qualitatively different in scale and effect. The effects of a localized problem are likely to affect a rather small area and can hopefully be tackled relatively easily. However, the causes of transboundary or global problems are less easy to regulate, and the impact is more uncertain.

As regards regional problems, it is important to keep a sense of perspective. It has been said, “[o]n the one hand, there are the vastnesses of the Antarctic ice sheet...with an enormous buffering capacity...On the other hand, there are small ice-free coastal areas...where the impact of man’s activities can be very considerable.”⁵⁵ As there is no indigenous population, the major human activity in the Antarctic is scientific research – there being presently around 50 research stations in Antarctica with over 4,000 scientists and staff during the summer, falling to around 1,000 during the Antarctic

⁵¹ WATTS, *supra* note 32, at 212.

⁵² For the functions of the Commission, *see* art. IX, CCAMLR.

⁵³ *Id.* at art. I(4).

⁵⁴ *See* IUCN, *A Strategy for Antarctic Conservation* 19-21 (1991).

winter.⁵⁶ Many of these stations are to be found in the relatively fragile ice-free areas,⁵⁷ which is also where much of the Antarctic fauna and flora is to be found; for certain seal and penguin species, these areas are vital as breeding grounds. These areas are also limited in number; at most, only two percent of terrestrial Antarctica is ice-free. Around 4,000 people cannot live in Antarctica without leaving what has been colloquially termed as an environmental ‘footprint’. It is the size of that footprint in what is a largely pristine environment that has concerned environmentalists. The construction of research stations and logistic facilities, the existence of rubbish dumps and the wider deposition of waste and debris,⁵⁸ insensitive placing of sewage outfall pipes, marine pollution from land-based sources and support vessels, increased air traffic, and other negative consequences of humans living and working in Antarctic have prompted calls for greater regulation.⁵⁹ These calls were particularly vocal following the Pointe Geologie incident in the early 1980s.⁶⁰ The French intended to build an airstrip to support a research station. However, the location also happened to be an important breeding area for Emperor penguins. The project was only halted – in its original form – following negative publicity and a general concern that too little attention had been paid to the environmental consequences of the project. But it is not only scientific research and its logistic support that threaten the Antarctic environment. Tourism in Antarctica is an ever-increasing activity and there are concerns that unless strictly regulated, the numbers involved could pose a threat,

⁵⁵ POLAR PUBLICATIONS, HANDBOOK OF THE ANTARCTIC TREATY SYSTEM 2101 (1990).

⁵⁶ Information from the British Antarctic Survey.

⁵⁷ See R. Laws, *Science as an Antarctic Resource*, in THE FUTURE OF ANTARCTICA 8 (G. Cook, ed., 1990): “fragile land and inland water ecosystems are very susceptible to disturbance and pollution.”

⁵⁸ See N. Hawkes, *Penguins pick up chicken infection*, THE TIMES (LONDON), 15 May 1997, at 5.

⁵⁹ For proposals for an overall strategy, see IUCN, *supra* note 54, at 23-64.

⁶⁰ See L. Kimball, *Environmental Law and Policy in Antarctica*, in SANDS, *supra* note 12, at 130.

particularly to fragile terrestrial ecosystems.⁶¹ There are also concerns that with more marine transport in the region there is the increased risk of marine pollution, and maritime casualties.

The external threats to the environment can be neatly subdivided between those which are likely to cause only local effects, and those which are likely also to result in wider international problems.⁶² The former is essentially the discovery of toxic chemicals such as DDT and PCBs (polychlorinated biphenyls) in the tissue of Antarctic animals. Whilst some of the PCB concentrations may originate from local marine pollution, the vast majority of these chemicals have travelled by ocean current from other parts of the planet, especially from heavily industrialized States. A preventative approach to this problem needs to be coordinated at an international level, and any reductions in the concentrations in Antarctic fauna would be consequential upon the success of regimes developed outside the ATS.

The other external threats to the Antarctic environment are likely to be the most serious in the long-term and are integral components of wider global threats, *viz.*, ozone depletion and climate change. Ozone depletion is the result of the atmospheric release of numerous chemicals, such as chlorofluorocarbons (CFCs), which destroy the ozone atoms in the stratosphere that prevent dangerous ultra-violet radiation from reaching Earth. Increased levels of such radiation can cause, *inter alia*, molecular mutation (i.e., cancer). Whilst there has been general thinning of the ozone layer over the Earth, the most acute problem has occurred over Antarctica with a seasonal 'ozone hole' appearing around October and November. As well as affecting the productivity and resilience of

⁶¹ The ATCPs have recommended uniform reporting of tourist and non-governmental activities.

phytoplankton, which would have negative effects on the Antarctic marine ecosystem, such ozone depletion could also affect the planet's weather systems due to the central role played by the continent in these systems. Attempts to reduce the amount of ozone depleting chemicals in the stratosphere have resulted, *inter alia*, in the 1987 Montreal Protocol on Substances that Deplete the Ozone Layer.⁶³ As with long-range marine and air pollution, any 'gains' brought about by international and national efforts to tackle ozone depletion should have a beneficial 'knock-on' effect for Antarctica.

The other global threat to Antarctica is the anthropogenic emission of carbon dioxide, methane, and other 'greenhouse gases' into the atmosphere. These gases build up and prevent heat from the sun (which is normally reflected back into space by the Earth), from leaving the atmosphere, causing climate change and global warming. While projections of future warming remain somewhat speculative, it appears definite that there will be a steady increase in the world's average temperature. Possible effects of this temperature increase include increased desertification, famine, polewards ecological migration, climatic instability, and a rise in global sea levels. The extent of the last two possible effects – climatic instability and sea level rises – will have much to do with the effect of global warming on Antarctica. If temperatures do rise and continue to do so over a prolonged period, there is a possibility of the melting of the ice shelves. And if the whole ice cap were to melt – though this would likely take centuries to occur – global sea

⁶² J. Cousteau & B. Charrier, *Introduction*, in VERHOEVE et al, *supra* note 32, at 5: "the Antarctic must as a matter of priority benefit from a coherent management of the planet."

⁶³ Protocol on Substances that Deplete the Ozone Layer, 16 September 1987, UKTS 19 (1990), Cmnd. 977. The Montreal Protocol has been amended three times: (i) 1990 London Amendments, UKTS 4 (1993) Cmnd. 2132; (ii) 1992 Copenhagen Amendments, 32 ILM (1993) 874; and (iii) 1997 Montreal Amendments, UNEP/OzL.Pro.9/12, Annex IV (1997). Moreover, the rate of reduction of the production and consumption of the controlled substances can be adjusted through a "simplified amendment procedure."

levels would rise by 65 metres.⁶⁴ However, even a significantly less dramatic melt would result in the flooding of low-lying areas. Numerous ice shelves have already begun to disintegrate. Increased temperatures in the Antarctic would also be likely to affect global weather patterns with less seasonal predictability in the weather. And within the Antarctic region itself, global warming might threaten the present ecological balance. The international legal response, so far, has been the adoption of the 1992 UN Framework Convention on Climate Change⁶⁵ and its 1997 Kyoto Protocol.⁶⁶

3.2. CRAMRA and the Development of the Protocol

There was a widespread misconception that the 1988 Convention on the Regulation of Antarctic Mineral Resource Activities (CRAMRA)⁶⁷ negotiated within the ATS was a miner's charter. And despite criticisms of some of the provisions of CRAMRA,⁶⁸ there is support for the view that CRAMRA was "one of the most demanding and sophisticated"⁶⁹ agreements developed in international environmental law. The development of stringent safeguards and institutional mechanisms in CRAMRA would, it was hoped, guarantee environmental protection if the Commission established thereunder ever permitted mining to occur. But CRAMRA has not entered into force, nor has it received any declarations of ratification. A Franco-Australian move to prevent entry into force resulted in the ATCPs signing in 1991 the Madrid Protocol which, *inter alia*, banned mineral resource activities subject to a possible review after 50 years. All

⁶⁴ Information from the British Antarctic Survey.

⁶⁵ *Supra*, note 22. See Bodansky, *supra* note 31.

⁶⁶ Kyoto Protocol, 1997, 37 ILM 22 (1998). See D. French, *1997 Kyoto Protocol to the 1992 UN Framework Convention on Climate Change*, 10 JEL 227-239 (1998).

⁶⁷ Convention on the Regulation of Antarctic Mineral Resource Activities, 2 June 1988, 27 ILM 868 (1988).

⁶⁸ Cousteau and Charrier, *supra* note 62, at 7.

this political and law-making activity occurred notwithstanding the fact that it is unknown whether minerals are to be found in Antarctica in large quantities, that much of the technology to extract those minerals has yet to be developed, and that it is presently prohibitively expensive to start mining in Antarctica.⁷⁰

However it is wrong to presume that the adoption of the Protocol was merely the result of the collapse of CRAMRA. For many, questions over the acceptability of Antarctic mineral resource activities and the necessity of ensuring comprehensive environmental protection for Antarctica were two separate issues. And the Chilean initiative at ATCM-XV in 1989 to address the problem of the fragmentary nature of environmental protection in Antarctica as a result of the many recommendations adopted over the years, and the need instead for a comprehensive approach, was without opposition.⁷¹ It was the Franco-Australian argument that mineral activities were incompatible with what Antarctica should be, *viz.*, a “natural reserve – land of science,” that prompted tension within the ATS. Despite much debate, a consensus was gradually reached during the Special Consultative Meeting in 1990 and 1991 on the provisions of a new comprehensive instrument on environmental protection – the Protocol. There were numerous reasons for States not ratifying CRAMRA and adopting the Protocol. Some felt that CRAMRA resulted in States with territorial claims “conced[ing]...economic claims over Antarctic for virtually nothing.”⁷² Others were conscious of the influence of environmental non-governmental organizations within their domestic systems. There was also recognition that to prevent the United Nations – which had since 1983 addressed

⁶⁹ F. Francioni, *Resource Sharing in Antarctica – For Whose Benefit?*, 1 EJIL 262 (1990).

⁷⁰ A. GILLESPIE, *ANTARCTICA: ENVIRONMENTALIST’S VICTORY OR HIDDEN AGENDA* 8 (1993).

⁷¹ L. Kimball, *The Antarctic Conservation Agenda*, in *ANTARCTICA’S FUTURE: CONTINUITY OR CHANGE* 87 (R. Herr et al, eds., 1990).

the question of Antarctica in the annual session of the General Assembly – from imposing something akin to a ‘common heritage of mankind’ status on the area,⁷³ the ATCPs must preserve their hegemony in relation to Antarctica. This was best done through establishing an environmental regime banning mining, as it would not be possible then for States – particularly developing States – outside the ATS to argue as they had done in the United Nations, that they were being excluded from the benefits of the ‘carve-up’ of Antarctic resources.⁷⁴

3.3. Summary of the 1991 Madrid Protocol

The Protocol signals a new phase in the regulation of activities in Antarctica.⁷⁵ As Article 2 makes clear, the objective now is the “comprehensive protection of the Antarctic environment and dependent and associated ecosystems.” Whilst much of what the Protocol does will be to protect those relatively small areas in Antarctica where human activities occur, it will not prevent the State Parties taking a wider approach to environmental protection by designating Antarctica “a natural reserve, devoted to peace and science.”⁷⁶ And whilst this was not the language of environmental groups, which had wanted Antarctica to be designated a wilderness (or world) park,⁷⁷ as Brown notes, “[i]t

⁷² C. Redgwell, *Environmental Protection in Antarctica: The 1991 Protocol*, 43 ICLQ 601 (1994); quoting Paul Keating, former Australian Finance Minister.

⁷³ See generally, M. SHAW, *INTERNATIONAL LAW* 361-362 (1997).

⁷⁴ Redgwell, *supra* note 72, at 601. Moreover, J. Barnes, *Protection of the Antarctic*, in JORGENSEN-DAHL and OSTRENG, *supra* note 32, at 196, argues that mining would de-stabilise the Antarctic Treaty and its demilitarised status.

⁷⁵ On the Madrid Protocol generally, see Redgwell, *supra* note 72; S. Blay, *New Trends in the Protection of the Antarctic Environment*, 86 AJIL 377-399 (1992); F. Francioni, *Madrid Protocol on the Protection of the Antarctic Environment*, 28 Tex ILJ 59-72 (1993); and D. ROTHWELL, *THE MADRID PROTOCOL AND ITS RELATIONSHIP WITH THE ANTARCTIC TREATY SYSTEM* (1992).

⁷⁶ Art. 2, Madrid Protocol, *supra* note 5.

⁷⁷ L. Goldsworthy, *World Park Antarctica: An Environmentalist's Vision*, in HERR et al, *supra* note 71, at 90-93.

is concepts rather than words which are the vital elements.”⁷⁸ Comprehensive protection is concerned with ensuring that there is a coordinated and unified environmental regime. As another commentator suggests, the Protocol “offers an opportunity to fill the gaps in the present arrangements.”⁷⁹ Whilst it is true that there is little in the Protocol that is particularly novel as regards environmental regulation in Antarctica,⁸⁰ it is this attempt at comprehensiveness which is laudable. Whether, of course, this is what the Protocol achieves is open to debate.⁸¹

One of the central means by which the Protocol attempts to ensure comprehensive protection, and for that matter consistent practice amongst State Parties, is by establishing “fundamental considerations in the planning and conduct of all activities”⁸² in Antarctica. These fundamental considerations are first, protecting the Antarctic environment and dependent and associated ecosystems; second, protecting its intrinsic, wilderness and aesthetic values; and third, protecting its value as an area for conducting research, especially that which has global relevance. Article 3.2(a) requires that those human activities that do occur do so with as limited “adverse impact” as possible. Article 3.2(b) lists those impacts which are to be avoided, including “adverse effects on climate,” “significant changes in the atmospheric, terrestrial...glacial or marine environments,” “detrimental changes” in the status of species, and “substantial risk to, areas of biological, scientific, historic, aesthetic or wilderness significance.” Article 3.4(b) requires that the

⁷⁸ A. Brown, *New Proposal: The Natural Park*, in VERHOEVE et al, *supra* note 32, at 100.

⁷⁹ Blay, *supra* note 75, at 385.

⁸⁰ Redgwell, *supra* note 72, at 599.

⁸¹ Compare P. SANDS, *PRINCIPLES OF INTERNATIONAL ENVIRONMENTAL LAW* (VOL. I) 529 (1995): “the most comprehensive and stringent regime...anywhere in the world,” with ROTHWELL, *supra* note 32, at 385: “it cannot be said that the Protocol represents the very best efforts of the ATCPs to protect the Antarctic environment.”

⁸² Art. 3.1, Madrid Protocol, *supra* note 5.

Parties modify, suspend or cancel certain activities⁸³ if they “result in or threaten to result in impacts” “inconsistent with those principles.”

Activities in Antarctica are subject to “prior assessments...and informed judgments” concerning the activities’ effects on the Antarctic environment. Article 3.2(c) appears to apply this general obligation to all activities in Antarctica. However, Article 8 and Annex I strengthen this requirement by establishing a structured environmental impact assessment (EIA) procedure.⁸⁴ This is applicable to all governmental and non-governmental activities that require advance notice, except those likely to have less than a “minor or transitory impact.”⁸⁵ An activity which has been shown to have no more than a minor or transitory impact following the preparation of what the Protocol terms an Initial Environmental Evaluation, can proceed.⁸⁶ But an activity that is likely to have more than a minor or transitory impact is subject to a Comprehensive Environmental Evaluation (CEE).⁸⁷ The CEE must be particularly detailed and include consideration of direct, indirect, secondary, and cumulative impacts; potentially mitigatory measures; and possible alternatives; as well as identify gaps in knowledge.⁸⁸ A State Party cannot permit such activities to proceed until the ATCPs have had time to comment on the CEE. It is important to note that unlike CRAMRA, final decisions on whether to proceed following an assessment of the impact are taken by the party involved, not any central institution. As Redgwell notes, Annex I relies on

⁸³ For “advance notice activities,” *viz.*, expeditions and stations, *see* art. VII(5), Antarctic Treaty, *supra* note 33.

⁸⁴ Redgwell, *supra* note 72, at 616-622.

⁸⁵ Art. 2, Annex I, Madrid Protocol, *supra* note 5.

⁸⁶ *Id.*

⁸⁷ *Id.*, at art. 3.1, Annex I.

⁸⁸ *Id.* at art. 3.2, Annex I.

“self-assessment and self-monitoring.”⁸⁹ The role of the ATCM and the Committee on Environmental Protection⁹⁰ – established by the Protocol to advise the ATCM on this and other matters – is strictly limited.

“Any activity relating to mineral resources” is prohibited under Article 7. This term is not defined under CRAMRA, causing potential problems. The only thing the Protocol does say is that mineral resource activities for scientific research are outside this prohibition. As Bush comments,⁹¹ the distinguishing factor between mineral activities for scientific research and other mineral activities, though not made explicit in the text, is the purpose behind the activity – why is the information being sought? In an interpretative declaration to the Protocol, Chile said that it understood Article 7 as forbidding “mineral activities in all their phases,”⁹² including prospecting. This must be the correct interpretation of the text. But this prohibition is not necessarily permanent.⁹³ It could be amended at any time by the unanimous agreement of all ATCPs in line with the procedure under Article XII.1 of the 1959 Antarctic Treaty. Article 25 of the Protocol also allows a Review Conference to be called after 50 years following the Protocol’s entry into force.⁹⁴ Provided a modification receives the support of the majority of the parties and three-quarters of those States which were ATCPs at the time of the Protocol’s adoption, a State need not wait until such a modification has entered into force.⁹⁵ Article

⁸⁹ Redgwell, *supra* note 72, at 621. See Francioni, *supra* note 74, at 61: “the EIA Annex can be termed minimalist.”

⁹⁰ Arts. 11-12 and art. 3.4, Annex I, Madrid Protocol, *supra* note 5.

⁹¹ W. BUSH, ANTARCTICA AND INTERNATIONAL LAW, Part AT91C, 23 (1991-).

⁹² *Id.* at 24.

⁹³ *Id.* at 71: “a permanent ban can in a strict sense never be achieved by a treaty given the competence of all the parties...to agree to amend a treaty at any time.”

⁹⁴ Following the entry into force of the Madrid Protocol in 1998, this Conference could be convened in 2048.

⁹⁵ Art. 25.4 of the Madrid Protocol requires ratification by three-quarters of ATCPs (including all state parties that were ATCPs at the time of the adoption of the Protocol) for the amendment to enter into force.

25.5(b) allows the State to give notice of its intention to withdraw from the Protocol three years after the adoption of the modification, the withdrawal taking place two years after that. Article 25.5(a) requires a ‘binding legal regime on Antarctic mineral resource activities’ to be in place before a modification to Article 7 can enter into force.⁹⁶

It is not my intention to study in detail all aspects of the Protocol in this paper, and that which is important but has not yet been said will most likely be discussed in some form below. However, for completeness, a few words on the structure of the Protocol. The Protocol is a framework treaty in that numerous annexes (with simplified amendment procedures) are attached thereto. They are an integral part of the Protocol. Annex II concerns the protection of fauna and flora and largely replaces the 1964 Agreed Measures. Annex III involves the regulation of waste disposal and waste management. Annex IV tries to prevent marine pollution and incorporates much of the Convention for the Prevention of Pollution from Ships (Marpol 73/78).⁹⁷ Annex V (which was added to the Protocol at the ATCM following the Protocol’s adoption), concerns area protection and management. It simplifies the present system and establishes Antarctic Specially Protected Areas (ASPAs), which will replace Specially Protected Areas and Sites of Special Scientific Interest and Antarctic Specially Managed Areas. Both will require management plans,⁹⁸ but only ASPAs will require a permit to enter.⁹⁹ Returning to the Protocol itself, parties are also required, *inter alia*, to undertake “regular and effective

⁹⁶ BUSH, *supra* note 91, at 72: “it is important that “any such modification”...embrace the minerals regime as well as the specific amendment to Article 7 so that the three years will not start running until the text of the minerals regime plus the amendment to Article 7 has been adopted.”

⁹⁷ International Convention for the Prevention of Pollution from Ships, (Marpol 73/78), 2 November 1973, UKTS 27 (1983), Cmnd. 8924 (as amended).

⁹⁸ Art. 5, Annex V, Madrid Protocol, *supra* note 5.

⁹⁹ *Id.* at art. 3.4 Annex V.

monitoring”¹⁰⁰ of activities for adverse impacts, to establish contingency plans to respond to incidents,¹⁰¹ to provide annual reports on the implementation of the Protocol,¹⁰² and to “undertake to elaborate rules and procedures relating to liability for damage.”¹⁰³

4. Sustainable Development and the 1991 Protocol

Whilst sustainable development and Antarctica are discrete areas of international law and policy, it is the intention of this paper to go beyond treating them as separate issues and to draw them together to analyse their relationship so as to consider the effect that each has, or might have, on the other. In particular, the paper will discuss the synergies between the emerging principles of sustainable development and those to be found in the 1991 Madrid Protocol. It will be argued that, as Antarctica is a particularly sensitive environment, and one that is important to the biosphere, sustainable development requires that activities there are subject to more stringent conditions and greater levels of environmental protection. The sensitivity and lower carrying capacity¹⁰⁴ of Antarctica should be central factors in determining the acceptability of an activity. Whether an activity is sustainable or not cannot now be determined in advance without reference to the environment in which it is to occur, or which it will affect. This interpretation of sustainable development is not necessarily the same as that in *Our Common Future* or the 1992 Rio Declaration. But as there is no generally agreed legal meaning or definition of sustainable development as yet, it is important that opinions

¹⁰⁰ *Id.* at arts. 3.2(d) and (e).

¹⁰¹ *Id.* at art. 15.

¹⁰² *Id.* at art. 17.

¹⁰³ *Id.* at art. 16. See A. Aust & J. Shears, *Liability for Environmental Damage in Antarctica* (1996) RECIEL 312-320.

¹⁰⁴ IUCN, UNEP and WWF, *supra* note 15, at 210: “‘carrying capacity’ – capacity of an ecosystem to support healthy organisms while maintaining its productivity, adaptability, and capability of renewal.”

continue to be expressed on what is the best way to reconcile environmental protection and economic development. Interpreting the concept of sustainable development through its application to Antarctica is arguably a good way to examine the issues.

4.1. Justifications for Protecting Antarctica

Several reasons might be put forward for why the Antarctic environment should be protected.¹⁰⁵ The same reasons can also be used to justify the arguably high level of protection in the Protocol. These reasons are not mutually exclusive and they are in many cases highly compatible. In fact, it is often a combination of such factors that generates sufficient pressure for the international community to take action. Of course, some of the factors are purely political with only an indirect interest in ensuring that the environment is protected. One example as regards the Protocol is the maintenance of the hegemony of ATCPs over Antarctica. The States involved want to ensure that they retain their control over the continent and not let this pass to the United Nations. This obviously has little to do with environmental protection, though it might have a lot to do with wider questions of development as such States retain control over future decision-making for such issues as mineral resource activities.

Rather than such overtly political motives, the remainder of this paper looks at the ‘environmental’ reasons for protecting Antarctica, whether they be to protect the environment *per se*, or to protect the environment as a means of guaranteeing some other purpose. In particular, it is the intention of this paper to focus on five reasons. These are

¹⁰⁵ IUCN, *supra* note 54, at 65.

(a) to maintain its ecological integrity; (b) to protect its role in the biosphere;¹⁰⁶ (c) to guarantee its instrument value; (d) to safeguard future generations' interests; and (e) to protect the inherent value of Antarctica. They represent a range of values that have had a significant role in determining the balance achieved between preserving the Antarctic environment and permitting human activity to occur. These values are the philosophical basis of the Protocol. They are also important not only because they are reflected in the Protocol, but because the States that hold them will use them in interpreting and implementing the Protocol's provisions. The five reasons listed above are particularly conspicuous in the Protocol, and especially Article 3 which contains the "environmental principles." Article 3 talks broadly about 'ecosystems,' the "intrinsic value of Antarctica," its "value as an area for...research" (especially research on the global environment), and "its wilderness and aesthetic values." It then lists those effects that are to be avoided; these include damage to the climate, air quality, the local wildlife, the marine environment, and areas of significance for, *inter alia*, science and wilderness value. Annex V on Area Protection and Management requires the designation of ASPAs where sites have "outstanding environmental, scientific, historic, aesthetic, or wilderness values, and combination of those values, or ongoing or planned research."¹⁰⁷ It is, therefore, clear that the Protocol takes a multi-faceted philosophical approach to the protection of Antarctica. As has already been stated, these values are not necessarily incompatible, but can actually be complementary, although some criticize such an

¹⁰⁶ IUCN, UNEP and WWF, *supra* note 15, at 210: "'Biosphere' – the thin covering of the planet that contains and sustains life."

¹⁰⁷ Art.3.1, Annex V, Madrid Protocol, *supra* note 5.

approach because “the target of protection...which oscillates between space (i.e. area-) related and function-related aspects remains vague.”¹⁰⁸

The paper looks at each of the five reasons listed above in turn and discusses their effect on the Protocol and their compatibility with sustainable development. It is important to emphasize that the provisions of the Protocol used as examples to highlight the reasons for protecting Antarctica are merely illustrative of the point being made, and are as likely to have been informed by the other reasons as the one for which they are an illustration.

4.1.1 The Conservation of Antarctic Biodiversity

It is axiomatic that one of the most fundamental reasons for protecting Antarctica is to ensure that its ecological integrity is maintained. As was noted above, Antarctica has a unique web of ecosystems, with interdependency between marine and terrestrial life. To maintain these ecosystems, not only must the organisms be conserved, but the non-living elements must also be protected. The World Conservation Union believes that the conservation of the Antarctic environment should be a “principal objective of international policy”¹⁰⁹ and, noting the vulnerability of its ecosystems, it argues that those organisms that are rare, endangered, or endemic should be specifically protected. Any exploitation of living resources must be done on a sustainable basis. As one commentator notes, it is important to “maintain...the integrity of the environment as a whole as well as preventing localized impacts...In this view, environmental protection is

¹⁰⁸ J. Kammerer, *The Protocol on Environmental Protection to the Antarctic Treaty*, 45 LAW & STATE 74 (1992).

¹⁰⁹ IUCN, *supra* note 54, at 25.

a valuable goal in its own right, not just as a contributing factor to resource sustainability and scientific investigation.”¹¹⁰

The ATCPs, “convinced of the need to enhance protection,”¹¹¹ have recognized the importance of conservation of local ecosystems in the Protocol. Its aim of providing “comprehensive protection” in Antarctica will not necessarily be easy to implement, but, by adopting this idea of comprehensiveness, a fundamental first step has been taken. It is recognition that there is little meaning in protecting the environment against one threat if others are left unregulated. The basic standard of behaviour in Antarctica is now to be found in the principles established in Article 3. And whilst these principles can be criticized for being ambiguous in their terminology (e.g., “significant changes”¹¹²), they establish in advance what will be expected of all those who go to Antarctica. The institutionalization of an environmental impact assessment procedure in Article 8 and Annex I is one of the principal means of anticipating future threats, although the threshold of “minor or transitory impact” is not necessarily an easy standard to apply.¹¹³ However, the sensitivity of the Antarctic environment to damage and the likely impact on local ecosystems must be overriding considerations in determining this impact. The final report of ATCM-XXI (1997) records that ATCPs talked of the assessment of activities being “context dependent.” A central element of any assessment should be consideration of the cumulative impact of proximate activities, as required by the more detailed CEEs. Such assessments are pivotal as the carrying capacity of many Antarctic areas is that

¹¹⁰ L. ELLIOT, *INTERNATIONAL ENVIRONMENTAL POLITICS: PROTECTING THE ANTARCTIC* 52 (1994).

¹¹¹ Preamble, Madrid Protocol, *supra* note 5.

¹¹² Kammerer, *supra* note 108, at 74. She considers ‘significant’ to be an anthropocentric term that is inapplicable to protecting the Antarctic environment.

¹¹³ See F. Vicuna, *The Effectiveness of the Protocol on Environmental Protection to the Antarctic Treaty*, in STOKKE and VIDAS, *supra* note 32, at 191.

much lower than elsewhere.¹¹⁴ The Protocol acknowledges the importance of avoiding such cumulative impacts when it requires at Article 6.1(d), cooperation between the parties to avoid “excessive concentration” of research stations in any one area.

The Protocol has also adopted specific substantive rules on particular topics to try to ensure that, *inter alia*, Antarctica’s ecological balance is preserved. The stringency of many of these rules is the result of designating Antarctica a ‘natural reserve,’ the intention being that the rules ensure that this is what Antarctica remains. Of course, one means of implementing a natural reserve would be to prevent all human activity.¹¹⁵ Whilst this is an unrealistic option as regards the whole continent, the philosophy behind this type of reserve can be seen in the designation of ASPAs that require a permit to enter. Although Watts considers the designation of Antarctica as a natural reserve is of little legal significance,¹¹⁶ Rothwell believes it places on the ATCPs a “greater responsibility...to maintain, protect, and preserve”¹¹⁷ the environment. If Rothwell is correct and the designation has legal significance for the level of protection to be achieved in Antarctica, the annexes to the Protocol must then be one of the central means by which this responsibility is exercised. All annexes contain rules that will hopefully reduce the impact of human activity on affected ecosystems; Annex III on waste management, for example, prohibits the import of certain types of products into Antarctica and requires the complete removal from Antarctica of certain types of waste. However, it is Annex II on Conservation of Antarctic Fauna and Flora, and Annex V on

¹¹⁴ ANON, ANTARCTIC SCIENCE INTO THE 21ST CENTURY 23 (1995): “polar regions are considered to be unable to withstand as much pollution loading and other types of human impact as elsewhere.”

¹¹⁵ See, e.g. Manzoni, *Environmental Hazards in Antarctica and Man’s Impact on the Antarctic Environment*, in INTERNATIONAL ENVIRONMENTAL LAW FOR ANTARCTICA 88 (F. Francioni, ed., 1992): “the “keep out” concept is a necessary requisite for all natural reserves.”

¹¹⁶ WATTS, *supra* note 32, at 277.

¹¹⁷ ROTHWELL, *supra* note 32, at 380.

Area Protection and Management that contain the most direct rules on conservation. But in many ways, the word ‘conservation’ could be replaced by ‘preservation.’¹¹⁸ As regards Annex II, the “[t]aking or harmful interference” of fauna and flora is prohibited without a permit;¹¹⁹ this permit being issued only in limited circumstances, such as “to provide for unavoidable consequences of scientific activities.”¹²⁰ The permits issued must not individually or collectively hinder the “natural reproduction” of species, the maintenance of the “diversity of species,” or the “balance of the ecological systems.”¹²¹ Those species protected under Annex II are not being subjected to a regime of sustainable utilization, but are granted substantially greater protection. Similarly with area protection, those areas that are designated – particularly as ASPAs – are heavily protected, with any activities that are not prohibited taking place under strict management.

Conservation in itself is not a controversial aspect of sustainable development; it is actually one of the basic presumptions that underlie the concept. *Our Common Future* (which has a specific section on Antarctica), talks of the need to “conserve its unique environment,”¹²² and states that the ‘fragile ecosystem’ should not be destroyed by mineral activities lacking stringent safeguards.¹²³ At a more general level, the World Commission notes that “[s]ustainability requires the conservation of environmental

¹¹⁸ D. PEARCE and R. TURNER, *ECONOMICS AND NATURAL RESOURCES AND THE ENVIRONMENT* 311 (1990): “‘preservation’ [is used] to describe the non-development option.”

¹¹⁹ Art. 3.1, Annex II, Madrid Protocol, *supra* note 5.

¹²⁰ *Id.* at art.3.2(c), Annex II.

¹²¹ *Id.* at art. 3.3, Annex II.

¹²² WCED, *supra* note 7, at 279.

¹²³ *Id.* at 284. The World Commission, however, did not completely rule out mining: “it is important that no minerals activity takes place until [certain] conditions have changed, and then only in consonance with a regime that guarantees implementation of the most stringent standards needed to protect the continent’s environment and share the proceeds equitably.”

resources.”¹²⁴ The international community had acknowledged five years earlier the importance of conservation with the adoption at the UN General Assembly in 1982 of the World Charter for Nature.¹²⁵ And whilst the 1992 Convention on Biological Diversity differentiates between ‘sustainable utilization’ and ‘conservation,’ others have taken a wider approach in defining the term. The Expert Group on Environmental Law that reported to the World Commission saw conservation as embracing “preservation, maintenance, sustainable utilization, restoration, and enhancement of a natural resource.”¹²⁶ A similar approach is taken in *Caring for the Earth*, which divides conservation into three elements, viz., conserving life-support systems, conserving biodiversity, and using resources sustainably. It goes on to note that the Earth’s carrying capacity should not be exceeded, and that as regards protected areas, remaining natural ecosystems should be protected unless there are “overwhelming reasons for change.”¹²⁷ It is therefore not a question of whether conservation is itself compatible with sustainable development, but how it is related to the more development-orientated aspects of the concept.¹²⁸ Conservation and economic development are not necessarily easy notions to reconcile. But despite this general tension, as regards Antarctica it seems that with the adoption of the Protocol, State Parties are prepared to accept giving primacy to the conservation of its ecological processes.¹²⁹ Bowman’s comment that the “desire to

¹²⁴ *Id.* at 364.

¹²⁵ World Charter for Nature, 28 October 1982, UNGA Res. 37/7.

¹²⁶ WCED Experts Group on Environmental Law, ENVIRONMENTAL PROTECTION & SUSTAINABLE DEVELOPMENT 9 (1987).

¹²⁷ IUCN, UNEP and WWF, *supra* note 15, at 33.

¹²⁸ G. Handl, *Sustainable Development: General Rules versus Specific Obligations*, in SUSTAINABLE DEVELOPMENT & INTERNATIONAL LAW 38, n.16 (W. Lang, ed., 1995): “unless “sustainable development” is deemed to contain also an essential preservationist aspect, and not just to reflect an instrumentalist, development-orientated view of environmental resources, true sustainability will remain an elusive goal.”

¹²⁹ Moreover, non-parties such as Malaysia (which had previously advocated a common heritage regime in the UN) noted “[i]t would be to the benefit and in the interest of mankind to ban all prospecting and mining activities in Antarctica,” UN Doc. A/C. 1/44/PV.44, 19.

preserve diversity...may be increased by reference to its rarity”¹³⁰ is surely applicable to ecological conservation in Antarctica. Moreover, “full conservation...might also achieve a relevant economic role in the long term...[it being] of immense value to posterity.”¹³¹ The exact nature of this “economic role” is unclear; although various ideas of posterity are discussed below.

4.1.2 Antarctica’s Role in the Biosphere

Antarctica is of particular importance to the rest of the planet. It has a major effect on the global climate, atmosphere and oceans. As Bob Hawke, former Australian Prime Minister, has said, “this irreplaceable environment is...extremely fragile and critically important to the whole global ecosystem.”¹³² The Protocol recognizes this wider role for environmental protection in Antarctica as being “in the interest of mankind.”¹³³ The designation as a natural reserve highlights this special status. The Protocol requires that activities in Antarctica “be planned and conducted” so as to “limit adverse impacts” not only on the Antarctic environment, but also on “dependent and associated ecosystems,” and avoid, *inter alia*, “adverse effects on climate or weather patterns.” Such ecosystems and physical processes may extend beyond the limit of the Antarctic Treaty area, but nevertheless are potentially affected by the consequences of activities in Antarctica.¹³⁴ And whilst there was much concern that mineral resource

¹³⁰ M. Bowman, *The Nature, Development and Philosophical Foundations of the Biodiversity Concept in International Law*, in INTERNATIONAL LAW AND THE CONSERVATION OF BIOLOGICAL DIVERSITY 28 (M. Bowman & C. Redgwell, eds., 1992).

¹³¹ MANZONI, *supra* note 115, at 88.

¹³² GILLESPIE, *supra* note 70, at 19.

¹³³ Preamble, Madrid Protocol, *supra* note 5.

¹³⁴ Kammerer, *supra* note 108, at 74: “the Protocol does not go so far as to treat the biosphere as protected assets; on the other hand, with “dependent and associated ecosystems” it includes protected assets beyond the scope of the Treaty.”

activities would result in threats to these ecosystems and processes, Kimball believes that regulating the “burgeoning range of activities” which are now actually occurring in Antarctica is far more important in maintaining Antarctica’s role in the biosphere.¹³⁵ Moreover, it should also be noted that with Antarctica threatened by global warming and climate change, its environment also needs to be preserved so that it can better withstand the impact of such threats. As was mentioned above, the scale of the global effect will, to an extent, depend upon the impact on Antarctica.

If, as is suggested, Antarctica has a special role in maintaining the planet’s equilibrium, how important is protecting this role in achieving sustainable development? At a general level, *Caring for the Earth* argues that “the structure, functions...of the world’s natural systems”¹³⁶ must be preserved, and that the life-support systems – those processes “that keep the planet fit for life¹³⁷” – must be specifically conserved. A similar emphasis is given in the report of the World Commission’s Expert Group on Environmental Law, which, at Article 3.1, notes that States should “maintain ecosystems...essential to the functioning of the biosphere.”¹³⁸ Antarctica is one such ecosystem and should therefore be specifically protected. Nagendra Singh, former President of the International Court of Justice, summarizes these ideas when he comments that “the primacy of the environmental factor in the ‘international commons’ [by which he includes Antarctica]...[is] a matter of vital importance...and recognized as a *conditio sine qua* for the health of humanity.”¹³⁹ The means by which the Protocol ensures that the biosphere is not damaged by anything that happens in Antarctica is, of

¹³⁵ L. KIMBALL, SOUTHERN EXPOSURE 35 (1990).

¹³⁶ IUCN, UNEP & WWF, *supra* note 15, at 9.

¹³⁷ *Id.*

¹³⁸ WCED Experts Group, *supra* note 126, at 45.

course, through the same rules and regulations that are also intended to conserve the ecological integrity of Antarctica. This interrelationship between local, regional and global conservation is apparent.

4.1.3 The Interest of Future Generations in Antarctica

A central conceptual, and emerging legal, aspect of sustainable development is that the environment and its natural resources must be conserved so as to benefit future, as well as present, generations.¹⁴⁰ Professor Brown Weiss is largely credited with coining the term ‘intergenerational equity’ to describe this relationship between, and within, generations. She argues that the present generation holds the planet on trust for future generations, but as ‘beneficiaries’ of an earlier generation itself, the present generation is entitled to “use and benefit from” the resources of the planet. There is a mutuality of obligations and rights between generations as all generations hold the planet “as a partnership.”¹⁴¹ Her work is largely the result of the Brundtland definition, which argues that the needs of future generations must not be compromised as a result of development in the present generation. Brown Weiss divides intergenerational equity into three fundamental elements.¹⁴² First, there should be conservation of options for future generations –the diversity of the resource base should be conserved so as to allow future generations to have the freedom to make their own choices. Second, there should be conservation of quality –the environment should be passed on to the next generation in the same condition as when the present generation received it. Others have argued,

¹³⁹ *Id.* at xx.

¹⁴⁰ See, in particular, E. BROWN WEISS, IN FAIRNESS TO FUTURE GENERATIONS: INTERNATIONAL LAW, COMMON PATRIMONY & INTERGENERATIONAL EQUITY (1989); C. REDGWELL, INTERGENERATIONAL TRUSTS AND ENVIRONMENTAL PROTECTION (1999); and the collection of articles in 84 AJIL(1990).

however, that increases in ‘man-made capital’ (i.e. technology) can compensate for a decrease in the ‘natural capital’ that is passed on to future generations.¹⁴³ And third, there should be conservation of access – all members of the present generation should have equitable access to natural resources. Intergenerational equity can be seen, in some form, in many international treaties and other documents,¹⁴⁴ but is particularly noticeable in the 1992 Rio Declaration which at Principle 3 requires that “[t]he right to development must be fulfilled so as to equitably meet development and environmental needs of present and future generations.” The overt anthropocentrism¹⁴⁵ of intergenerational equity has been subject to some criticism, but for others there are a number of other problems and paradoxes with the principle, some being “practically impenetrable.”¹⁴⁶ One particular problem is that of non-renewable resources; how can the interests of future generations be squared with the finite nature of such resources? *Caring for the Earth* recognizes this, and recommends that their use be minimized and alternatives found where possible.¹⁴⁷

The prohibition at Article 7 of the Protocol on mineral resource activities provides a useful means by which to look at the tensions within intergenerational equity. The Protocol recognizes the importance of Antarctica to future generations, particularly in the preamble where it states that the protection of the Antarctic environment “is in the interest of mankind as a whole” – which must be read as referring to mankind yet to come, as well as the present generation. However, if the ban on mining as a central

¹⁴¹ BROWN WEISS, *supra* note 140, at 23.

¹⁴² *Id.* at 38-44.

¹⁴³ See D. PEARCE et al, BLUEPRINT FOR A GREEN ECONOMY 3 (1994).

¹⁴⁴ SANDS, *supra* note 81, at 199-200.

¹⁴⁵ Handl, *supra* note 128, at 38: “sustainable development invites an overly anthropocentric and instrumentalist approach.”

¹⁴⁶ C. STONE, SHOULD TREES HAVE STANDING? AND OTHER ESSAYS ON LAW, MORALS AND THE ENVIRONMENT 116 (1996).

¹⁴⁷ IUCN, UNEP and WWF, *supra* note 15, at 10.

feature of the Protocol “is in the interest of mankind as a whole,” how is this to be reconciled with the existence of an amendment procedure in Article 25 that would allow such a ban to be lifted? One of the arguments presented during the negotiations was that the State Parties had no right to restrict the choices of future generations. Tristan Garell-Jones, a British minister, questioned the right of ATCPs “to foreclose the options of future generations – living in very different circumstance to our own.”¹⁴⁸ Such views recognized that by the middle of the twenty-first century there may well be a real need to use the potential mineral reserves in Antarctica to compensate for depleted stocks elsewhere.¹⁴⁹ And by then, the technology would hopefully have improved to such an extent that the environmental risks of mining were considered ‘acceptable.’ Environmental groups have strongly criticized such views, arguing that the use of such minerals is the cause of the present threat of climate change, and that the precautionary principle demands that States reduce their use of such minerals and develop alternative energy sources. Mineral resource activity in Antarctica would be totally contrary to this.

However, if such an argument, whilst compelling, fails to prevent the clamour for Antarctic mineral deposits, can intergenerational equity provide reasons to foreclose, in advance, mining in Antarctica? Yes, it probably can. Whilst the ‘conservation of options’ may permit each generation to determine its own needs, the obligation on a generation to conserve the quality of the planet for the next generation is arguably an overriding obligation, especially where such use of the environment by one generation would permanently damage that environment. And taking the argument one step further,

¹⁴⁸ C. Redgwell, *Antarctica*, 40 ICLQ 980 (1991); the quotation was taken from a letter to British Members of Parliament dated 19th December 1990.

even where there is only a threat of irreversible damage, such an activity should be prohibited, especially where it would affect a particularly sensitive and pivotal environment, such as Antarctica. To summarize, the preservation of Antarctica is arguably a *sine qua non* for fulfilling the ‘environmental’ needs of future generations as required by Principle 3 of the Rio Declaration, mining being incompatible with that preservation. Of course, it might be argued that with the development of safe Antarctic mining technology, environmental damage would become less likely and that mining would not cause irreversible damage. However, if it is the retention of the pristine nature of the Antarctic environment, rather than it not being irreversibly damaged, that is the measure of the ‘quality’ which is to be preserved, mining would still be incompatible with the protection of Antarctica. Unfortunately, the present ban on mining has probably as much to do with politics as environmental protection.¹⁵⁰ And if this is the case, “Antarctica has not been saved. The decision on its fate has been postponed until a later date.”¹⁵¹

4.1.4 Protecting Antarctica’s Instrumental Value

Scientific research has been the central activity in Antarctica since the International Geophysical Year 1957-1958.¹⁵² The 1959 Antarctic Treaty talks of the “freedom of scientific investigation” and the obligation of ATCPs to cooperate in facilitating this. It is also apparent that one of the central reasons for adopting the Protocol is to protect scientific research in Antarctica, the preamble noting “the unique

¹⁴⁹ See K. SUTER, ANTARCTICA: PRIVATE PROPERTY OF PUBLIC HERITAGE 46 (1991): “a European delegate is reputed to have said [after the 1972 ATCM]...“This Treaty will last till a big mineral discovery is made – then it will be every man for himself”.”

¹⁵⁰ GILLESPIE, *supra* note 70, at 23.

opportunities Antarctica offers for scientific monitoring of and research on processes of global as well as regional importance.” The designation of Antarctica as a “natural reserve, devoted to peace and science” also emphasizes the continued importance of Antarctic research and monitoring. Article 3.3 talks of the “value” of Antarctica being used for science; this is an instrumental value, a value that is gained through the use to which it is put. The annexes to the Protocol make specific provision to ensure this scientific value is safeguarded. Annex I on environmental impact assessment requires consideration be given to the consequences of the proposed activity on scientific research.¹⁵³ Annex III on waste management requires that the impact of waste production and disposal on scientific research be minimized.¹⁵⁴ And one of the reasons for granting protected status under Annex V is the scientific value of the area.¹⁵⁵

Some have commented upon the fact that scientific activity is now subordinated to environmental protection and may suffer as a result. Kimball believes that the Protocol should “reinforce [scientific research], not oppose it.”¹⁵⁶ However, this is to confuse the importance of scientific research *per se* with that of the scientific activities that actually take place. As *A Strategy for Antarctic Conservation* notes, a pristine environment not only allows excellent research opportunities of the Antarctic environment, but provides both a baseline for measuring environmental degradation elsewhere on the planet and allows for the monitoring of global change.¹⁵⁷ The scientific value of a pristine Antarctic environment can be damaged by any activity, including the

¹⁵¹ *Id.* at 25.

¹⁵² Laws, *supra* note 57, at 10: “the region’s main resource is its potential for scientific discoveries.”

¹⁵³ Art. 3.2(i), Annex I, Madrid Protocol, *supra* note 5.

¹⁵⁴ *Id.* at art. 1.2, Annex III.

¹⁵⁵ *Id.* at art. 3.1, Annex V.

¹⁵⁶ Kimball, *supra* note 60, at 139.

¹⁵⁷ IUCN, *supra* note 54, at 59.

consequences of undertaking scientific research, if it is not adequately regulated. The logistic and human effects of having scientists in Antarctica can be particularly damaging because many of the bases are closely situated, resulting in a cumulative impact. If sustainable development is taken to apply to all human activities – including scientific research – and not just those promoting economic development, then all activities must be carried out in a sustainable manner respecting the environment, no matter how beneficial the results of such activities may be for the international community.

4.1.5 Safeguarding the Inherent Value of Antarctica

There is little doubt that Antarctica is special for most nations and peoples of the world. It inspires a sense of adventure and a love of nature.¹⁵⁸ Such feelings can be detected in the wording of the Protocol itself. But can such ideas be compatible with sustainable development? And whilst Antarctic tourism and expeditions are the consequences of these feelings, this section is less concerned with such activities – the regulation of which can be justified under the other reasons mentioned above – and more concerned with the non-consumptive ideals held about Antarctica. The Protocol places particular importance on such values and establishes amongst the fundamental considerations in Article 3, “the intrinsic value of Antarctic, including its wilderness and aesthetic values.” Areas of “historic, aesthetic, or wilderness” significance must not be degraded,¹⁵⁹ and as with the other values mentioned in Article 3, an activity might even be cancelled under Article 3.4(b) if the activity threatens to negatively affect them.

¹⁵⁸ *Id.* at 1.

¹⁵⁹ Art. 3.2(b)(vi), Madrid Protocol, *supra* note 5.

Mention is also made of such values throughout the annexes, and ASPAs can even be designated solely on the basis of their existence.

But how are these terms to be defined? They are inherent values – values which humans place upon the environment¹⁶⁰ – and do not necessarily have an established meaning. Wilderness was once defined as “a tract of solitude and savageness.”¹⁶¹ Most definitions see the limited human impact as a central feature of something being a wilderness.¹⁶² And whilst nearly all the World Conservation Union’s categories of protected areas¹⁶³ seem to see the environment as having an instrumental use – if one simply of education – it does include the category of “Natural Monument/Natural Landmark” where “significant natural features [with] unique characteristics” should be preserved. Others have gone further and argued that areas such as Antarctica should be protected not because of their ‘natural characteristics,’ but because either they symbolize human freedom (‘the monument argument’), or because they are necessary for human creativity (‘the natural human ontogeny argument’).¹⁶⁴ But are such values, which realistically had little to do with the political and legal protection of Antarctica, compatible with sustainable development? Many would say ‘no’. However, I think it depends upon one’s definition of ‘development.’” Some would argue that development is solely concerned with eradicating poverty, meeting basic needs, and ensuring an increased material standard of living. Others would see development as also encapsulating good governance, respecting human rights, and ensuring good health and adequate education. However, development can also be seen in a more holistic way, it

¹⁶⁰ Bowman, *supra* note 130, at 21-22.

¹⁶¹ As defined by Samuel Johnson in his dictionary in 1755.

¹⁶² Manzoni, *supra* note 115, at 88.

¹⁶³ J. MCNEELY et al (eds.), *PROTECTING NATURE: REGIONAL REVIEWS OF PROTECTED AREAS* 9 (1994).

being concerned with the well-being of human beings at all levels, whether that be economic, social, physical, or spiritual. If human society places an inherent value on Antarctic, it does so for a reason and it would be consequently deprived if that value were lost. If this is true, protecting Antarctica for non-consumptive reasons can be compatible with sustainable development.

5. Conclusion

This paper has examined the issue as to the place of environmental protection within the broader concept of sustainable development by relating it to the 1991 Madrid Protocol to the 1959 Antarctic Treaty. What this paper has shown is that sustainable development is not only compatible with a high level of environmental protection, but arguably actually requires it. Of course, the paper is not suggesting that the level of protection within the Protocol is what is required generally – this would be impractical; rather, it is saying that the extent and acceptable impact of human activities in any given area must be ‘context dependent.’ That is to say, for an activity to be sustainable it must be within the carrying capacity of the affected ecosystems. Whilst the utilization of environmental resources may be one of the principal means through which development occurs, the protection of that environment ensures such development remains sustainable. Effective environmental protection is therefore a precondition for achieving sustainable development. And as regards Antarctica and other areas of the biosphere – such as the rainforests – which not only play host to unique ecosystems, but have a wider importance in supporting life on Earth, specific attention should be paid to preserving their integrity.

¹⁶⁴ B. Marks Clark & K. Perry, *The Protection of Special Areas in Antarctica*, in FRANCIONI & SCOVAZZI, *supra* note 32, at 295.

This will inevitably mean placing severe limitations on human activities in these areas. The role of international and national law is to ensure that this is achieved. These lessons are being learnt in Antarctica, but they are lessons of general relevance and must be applied more widely if sustainable development is to be achieved and then maintained.