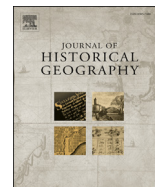




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The rise of technocratic environmentalism: the United States, Antarctica, and the globalisation of the environmental impact statement

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ABSTRACT

Environmental impact statements (EISs), and the related environmental impact assessments (EIAs) which precede them, have become central elements of environmental management, governance, and policy worldwide since their introduction in the United States in 1970. Assessing environmental impact has a particular force and centrality within modern Antarctic environmental management and governance too. This article investigates the ways in which the United States used EISs and EIAs in Antarctica between 1970 and 1982 – during their first decade of existence in US law and during a geopolitically and scientifically vibrant decade in Antarctic affairs – as a way of illuminating the broader conceptual and historical aspects of this central, though understudied, environmental governance tool and framework. We historicise and draw attention to the EIS – individually, as a regulatory genre, and as a genre that articulates regional, global and planetary environments – as highly influential and powerful documents demanding attention from environmental historians and historical geographers. We argue that the prominence of EISs in Antarctica arose because they appealed to top-down, process-oriented approaches favoured in Antarctic governance – a technocratic environmentalism – and because of their spatial elements, particularly their tendency to upscaling.

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Since the creation of the environmental impact statement (EIS) in United States legislation in 1970, they have spread globally to become powerful documents in environmental governance in nearly all countries, articulated as regulatory best practice in major statements of international environmental law, and central to the operation of several international environmentally-based treaty regimes and international organisations.¹ Like many elements of technocratic governance, the centrality and ubiquity of EISs in environmental governance suggests an uncontroversial permanence. Yet, in their development as a regulatory tool, their written form, their contribution to environmental protection, their articulation of environmental ideas, their place in public debates, their

spatial and temporal registers, and in their spread and use in the United States and globally, the EIS has a now fifty-year history filled with dispute and contestation. And it is a history that has been unevenly investigated, despite what it can illuminate about the constitution of, and ideas and knowledges about, the global environment.

Antarctica is one notable site of contestation that illuminates the larger history of the EIS as a technocratic environmental practice that spread globally and as a genre that constitutes contemporary environmental and geographical ideas and knowledges. The Protocol on Environmental Protection to the Antarctic Treaty (known as the Madrid Protocol, signed in 1991 and coming into force in 1998) has the EIS and environmental impact assessment (EIA) at its

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core.² For Antarctica, the human activities that are assessed are not major energy or industrial projects, but the small footprint of scientific infrastructure. While the Madrid Protocol was notable for its comprehensiveness in this area, it built upon pre-existing negotiations and practices within the Antarctic Treaty regime dating back to 1970, when the actions of the United States in Antarctica became bound by the terms of the National Environmental Policy Act (NEPA).³

This article focuses on the statements produced for US Antarctic actions from 1970 to 1982 and the scientific and diplomatic discussions surrounding them, both in the US and internationally. In these years, under the terms of NEPA, the US National Science Foundation (NSF) assessed two large scientific programs – the Dry Valley Drilling Program and the Ross Ice Shelf Project – and the Department of State assessed three international treaties relating to Antarctica's resources and environments.⁴ US Antarctic policy at this time was organised through the Antarctic Policy Group, a body created by the President, and consisting of the Secretary of State as chair, the NSF director and the Secretary of Defense (or their delegates), with other agencies invited on an ad hoc basis.⁵

Existing scholarship on the history of the EIS is dispersed and there has not yet been a concerted effort by scholars working in environmental history or critical and historical geography to approach them as documents to be analysed in a collective sense, nor a more systematic historicising of divergent practices and the genre's diffusion.⁶ The most significant efforts on this front – from Michael Goldman on the World Bank and Stephen Macekura on US overseas aid as well as the World Bank – have demonstrated how environmental NGOs pushed for EIAs as a condition of aid funding from the developed to the developing world.⁷ Javiera Barandiarán's work on Chile is a rare example that closely examines EIS uptake in a single jurisdiction.⁸ From other perspectives, historians of science

Stephen Bocking and Etienne Benson have each also elucidated the ways in which EISs affected scientific research programs and practices.⁹ Additionally, some scholars have scrutinised a handful of notable and highly contentious EISs, like those for the Trans-Alaska Pipeline and the Central Arizona Project.¹⁰

This article advances these efforts through a close reading of the five American Antarctic EISs produced between 1970 and 1982 and a range of governmental and personal archives surrounding them.¹¹ We analyse how the idea of 'impact' was developed and articulated for the Antarctic context and the beginnings of its entrenchment as a practice of environmental governance. We argue that, despite some frustrations with the form, EISs appealed to officials and scientists working in Antarctica because they fitted neatly with the process-oriented, science- and scientist-centric vision of a regionally-spatialised Antarctic environment that was useful to individual, institutional, and geopolitical projects. EISs offered a convenient way to reconcile tensions and move forward in a way that was acceptable to competing views on how best to manage the Antarctic environment. While they were certainly not uncontested, EISs offered a useful framework for containing underlying tensions, and helped drive the creation of what anthropologist Jessica O'Reilly has labelled the 'Technocratic Antarctic'.¹²

The spatial elements of these EISs, we further contend, were crucial to their appeal. The statements involved two upscaling movements. The first was to conceive of environmental impact as applying to the Antarctic region as a unified whole. Each of the five EISs analysed here, while they did consider potential localised impacts, resolutely conceived of the Antarctic as a single, unified region. For the scientists forced to engage in these assessments, a focus on the whole region allowed them to justify localised impacts. Recalling as well that these were field scientists in geophysical and biological disciplines, we can also see the EIS – and other similar regulatory texts – as being a useful tool that they could use to 'scale up' their localised field sites rather than aping the 'placeless place' of the laboratory, complementing Jeremy Vetter's argument about how field scientists created global environmental knowledge.¹³ At the same time, these EISs allowed the US to portray its actions, both scientific and diplomatic, as environmentally-sound – a framing that was useful to the rest of the Antarctic Treaty parties staring down demands for a further internationalisation of the region by developing countries in the 1970s. This scaling through EISs also perpetuated the older, continent-spanning exploratory projects of the United States and Soviet Union, as Klaus Dodds has suggested was evident during the

² There is a range of terminology in this area, though the dominant terms are: 'environmental impact assessment' (EIA) or 'environmental assessment' (EA), which can refer to both the process and the document that eventuates; and 'environmental impact statement' (EIS) or 'environmental statement', which generally refers to the public document. In this article we tend to refer to 'assessment' as the process preceding the release of the 'statement' as a document.

³ On EIA under Madrid, see A.D. Hemmings and L.K. Kriwoken, High level Antarctic EIA under the Madrid Protocol: state practice and the effectiveness of the Comprehensive Environmental Evaluation process, *International Environmental Agreements* 10 (2010) 187–208. On the environmental history of Antarctic geopolitics and the Antarctic Treaty, see A. Antonello, *The Greening of Antarctica: Assembling an International Environment*, New York, 2019 and A. Howkins, *Frozen Empires: An Environmental History of the Antarctic Peninsula*, New York, 2017.

⁴ There has been a great deal of work on NEPA from various perspectives and disciplines. Valuable entry points to the literature include R.N.L. Andrews, *Managing the Environment, Managing Ourselves: A History of American Environmental Policy*, second edition, New Haven, 2006; M.J. Lindstrom and Z.A. Smith, *The National Environmental Policy Act: Judicial Misconstruction, Legislative Indifference, and Executive Neglect*, College Station, TX, 2001; M. Schudson, *The Rise of the Right to Know: Politics and the Culture of Transparency, 1945–1975*, Cambridge, MA, 2015.

⁵ C.C. Joyner and E.R. Theis, *Eagle over the Ice: The U.S. in the Antarctic*, Hanover, NH, 1997, 47–50.

⁶ Some attention is given to this in S.P. Hays, *Beauty, Health, and Permanence: Environmental Politics in the United States, 1955–1985*, Cambridge, 1987. One of the few major works addressing the question of how EIA and EIS affected government actions and thinking in a comparative and overarching sense is S. Taylor, *Making Bureaucracies Think: The Environmental Impact Statement Strategy of Administrative Reform*, Stanford, 1984. Practitioners of environmental assessment have their own extensive technical literature, articulated in such journals as the *Environmental Impact Assessment Review* and *Impact Assessment and Project Appraisal*.

⁷ M. Goldman, *Imperial Nature: The World Bank and Struggles for Social Justice in the Age of Globalisation*, New Haven, 2005 and S.J. Macekura, *Of Limits and Growth: The Rise of Global Sustainable Development in the Twentieth Century*, New York, 2015.

⁸ J. Barandiarán, *Science and Environment in Chile: The Politics of Expert Advice in a Neoliberal Democracy*, Cambridge, MA, 2018 and J. Barandiarán, Chile's Environmental assessments: contested knowledge in an emerging democracy, *Science as Culture* 24 (2015) 251–275.

⁹ S. Bocking, Ecosystems, ecologists, and the atom: environmental research at Oak Ridge National Laboratory, *Journal of the History of Biology* 28 (1995) 1–47 and E. Benson, Endangered science: the regulation of research by the U.S. Marine Mammal Protection and Endangered Species Acts, *Historical Studies in the Natural Sciences* 42 (2012) 30–61.

¹⁰ A. Stuhl, *Unfreezing the Arctic: Science, Colonialism, and the Transformation of Inuit Lands*, Chicago, 2016, chapter 5; P. Coates, *Trans-Alaska Pipeline Controversy: Technology, Conservation, and the Frontier*, Bethlehem, PA, 1991; W.N. Espeland, *The Struggle for Water: Politics, Rationality, and Identity in the American Southwest*, Chicago, 1998. For a Canadian example, see J. Peyton, Corporate ecology: BC Hydro's Stikine-Iskut project and the unbuilt environment, *Journal of Historical Geography* 37 (2011) 358–369.

¹¹ The attention to the effect texts have in geopolitics has been a hallmark of critical geopolitics. See M. Müller, Text, discourse, affect and things, in: K. Dodds, M. Kuus and J. Sharp (Eds), *The Ashgate Companion to Critical Geopolitics*, Farnham, 2012, 49–68.

¹² J. O'Reilly, *The Technocratic Antarctic: An Ethnography of Scientific Expertise and Environmental Governance*, Ithaca, NY, 2017.

¹³ J. Vetter, Introduction, in: J. Vetter (Ed), *Knowing Global Environments: New Historical Perspectives on the Field Sciences*, New Brunswick, NJ, 2011, 1–16.

International Geophysical Year (IGY) of 1957–1958.¹⁴

The second upscaling occurred through the EISs placement of Antarctica as a necessary site for planetary measurement and international peace. Thus, these EISs were part of a larger corpus of texts that articulated regional, global, and planetary environments. These kinds of texts have been produced throughout the early modern and modern periods, and cover such diverse genres as circumnavigation accounts, hydrographic narratives, or more recent large-scale scientific ‘assessments’.¹⁵ Although a leaden, awkward, and jargon-laden genre, EISs nevertheless fixed and articulated the global environment in powerful political-ecological and regulatory ways. In fact, NEPA committed the US to ‘lend appropriate support to initiatives, resolutions, and programs designed to maximize international cooperation in anticipating and preventing a decline in the quality of mankind’s world environment’.¹⁶ This manifested a pre-existing US conception of the global environment, one where global resources demanded American stewardship. This conception supported institutional and bureaucratic agendas – as Megan Black has forensically uncovered for the US Department of the Interior – and the infrastructures and technologies of global surveillance, as described by Simone Turchetti and Peder Roberts, among others.¹⁷

Far from being peripheral to wider debates about the management of the global environment, the US experience in Antarctica during the 1970s and early 1980s offers a revealing case study for considering the globalisation of the EIS and the rise of technocratic environmentalism. Involvement in Antarctica forced US policymakers to confront the question of how to apply new environmental legislation and regulations beyond the borders of the United States in the international context created by the Antarctic Treaty. Despite their imperfections, EISs offered a convenient means of defusing environmental conflict and the processes for continuing cooperation. The process of creating an EIS reinforced a sense of the continental and global importance of work being done at a particular location and this proved attractive to many of the actors involved. A close reading of early Antarctic EISs reveals that despite the pretence of technocratic neutrality, this form of environmental management functioned to promote US political interests in the continent through the reduction of conflict, the crowding out of subtly different environmentalisms, and the maintenance of the political status quo. Importantly, the Antarctic example suggests that there was little planned or premeditated about the political consequences of the EIS, but the close overlap with US interests helps to explain why this approach became so successful. It was not designed for Antarctica, but it worked there. Insights gained from analysing the early development of the EIS in Antarctica therefore suggest that this is not only an important episode in the history of the globalisation of the EIS, but also a useful case study to encourage a more critical approach to be taken in studying the broader history of technocratic environmentalism.

Conceptualising impact within Antarctica’s international context

Environmental impact statements rely on an underlying conception of environmental ‘impact’. In the midst of globally changing ideas about the environment at the turn of the 1970s, definitions and relative emphases in relation to ‘impact’ were still in flux, with different registers of concern about how the environment was being affected by human actions and which humans were responsible for those changes. These discussions occurred in Antarctica too and competing environmentalisms for the region were played out in Antarctic Treaty meetings as well as in conferences and working groups of the Scientific Committee on Antarctic Research (SCAR), the leading international body for scientific research in the region, which had been founded in 1958. As an internationalised region with underlying geopolitical and territorial tensions, environmental definitions and practices were thus subject to competing national histories, approaches and environmentalisms.

Partly following the thrust of the recently enacted NEPA, US diplomats placed environmental impact on the agenda for the Antarctic Treaty Consultative Meeting of October 1970. This move was coincident with others the US made at the time to discuss environmental questions in diplomatic contexts.¹⁸ During preparatory discussions in February 1970 between US and British polar officials, Henry Francis, head of Antarctic policy at the US National Science Foundation (NSF) and a long-term Antarctic hand, responded to a New Zealand proposal to regulate the scientific use of radioactive isotopes in Antarctica by calling for ‘environmental pollution as a whole’ to be the ‘larger framework’ of discussion. Notably, Francis framed his intervention through the local pollution experiences of the US McMurdo station – the largest scientific base on the continent – as well as the recent discoveries, newsworthy at the time, of the presence of the pesticide DDT in Antarctic penguins.¹⁹ He stated to an Australian diplomat in March that, ‘in view of the extensive public interest aroused in the United States and elsewhere on the issue of pollution, the United States could hardly fail to initiate discussion within the Antarctic Treaty context’.²⁰ New Zealand officials were more cynical about the US move, later interpreting it as an attempt to head off discussion of radioactive isotopes, which had arisen in the context of personal disagreements between American and New Zealand scientists.²¹

For much of 1970, it seems that British and New Zealand officials, for example, interpreted the matter narrowly, seeing it as an ‘American problem’. The long-serving British polar diplomat Brian Roberts – who had attended Antarctic Treaty consultative meetings since the first in 1961, and had advised the British Foreign Office on polar matters since 1944 – was reported as saying that ‘the United States should be told to find its own solution to its own problems’.²² The New Zealand brief stated that ‘We are very much in the dark as to what the Americans are seeking by proposing this particular

¹⁴ K. Dodds, Assault on the unknown: geopolitics, Antarctic science, and the International Geophysical Year (1957–8), in: S. Naylor and J.R. Ryan (Eds), *New Spaces of Exploration: Geographies of Discovery in the Twentieth Century*, London, 2010, 148–172.

¹⁵ J.E. Chaplin, Planetary power? The United States and the history of around-the-world travel, *Journal of American Studies* 47 (2013) 1–21; K. Anderson, The hydrographer’s narrative: writing global knowledge in the 1830s, *Journal of Historical Geography* 63 (2019) 48–60; M. Oppenheimer, N. Oreskes, D. Jamieson, K. Brysse, J. O’Reilly, M. Shindell and M. Wazeck, *Discerning Experts: The Practices of Scientific Assessment for Environmental Policy*, Chicago, 2019.

¹⁶ National Environmental Policy Act of 1969, Public Law 91–190, *United States Statutes at Large* 83 (1970) 852–865, section 102(E).

¹⁷ M. Black, *The Global Interior: Mineral Frontiers and American Power*, Cambridge, MA, 2018; S. Turchetti and P. Roberts, *The Surveillance Imperative: Geosciences during the Cold War and Beyond*, New York, 2014.

¹⁸ T. Robertson, ‘This is the American Earth’: American empire, the Cold War, and American environmentalism, *Diplomatic History* 32 (2008) 561–584; J.B. Flippen, Richard Nixon, Russell Train, and the birth of modern American environmental diplomacy, *Diplomatic History* 32 (2008) 613–638.

¹⁹ B. Roberts, Preparations for Sixth Antarctic Treaty Consultative Meeting, Notes on discussions with H.S. Francis, 2–5 February 1970, 20 February 1970, National Archives of the United Kingdom [hereafter TNA], FCO 7/1741.

²⁰ J.L. Lavett, Australian Embassy Washington, Memorandum, 19 March 1970, National Archives of Australia [hereafter NAA], A1838, 1495/3/2/17 Part 1.

²¹ Australian Embassy Washington, Memorandum to Canberra, 15 September 1970, NAA, A1838, 1495/3/2/17 Part 3.

²² J.M.C. Watson, Australian High Commission London, Memorandum to Canberra, 8 July 1970, NAA, A1838, 1495/3/2/17 Part 2. On Roberts, see Antonello, *The Greening of Antarctica*, 58–59.

agenda item'.²³ In turn, the British brief before the October meeting noted that 'There is very little evidence that the pollution activities of man in the Antarctic are producing any irreversible effects ... Our interest in this problem is only to see how the Americans suggest methods to solve it'.²⁴

While US intentions were perhaps opaque, the 1970 meeting did pass a recommendation on 'Man's Impact on the Antarctic environment'. This recommendation blended an older language of conservation with newer concepts (such as 'ecosystem'), privileged scientific activity, used a rhetoric of urgency, and elevated the treaty parties as the prime protectors of the Antarctic environment. In contrast, the treaty parties only placed on themselves loose obligations to be mindful of human impacts. They also called on SCAR to investigate 'impact' and suggest measures for minimising and investigating it.²⁵

The SCAR Working Group on Biology, with some assistance from the Working Group on Logistics, took up the treaty parties' request at their 1972 meeting in Canberra. The biology working group outlined a ten-part general classification of impacts: general pollution; introduction of non-native organisms; impact generated by travel by foot, vehicle, and aircraft; disturbance of penguin and seal breeding colonies; changes in the chemical balance of natural waters; uncontrolled dumping of wastes in inshore waters; use of explosives; scientific sampling and experiments; non-scientific collecting; and the taking of animals and eggs for food.²⁶

In its discussions, the group noted specifically that environmental impact in Antarctica had been 'extremely localised'. They noted that there were fewer than '50 isolated stations with very small numbers of ships and aircraft used to resupply them and extremely small numbers of surface vehicles and aircraft used in support of scientific research'.²⁷ Importantly, the SCAR delegates also quickly scaled up their approach by noting that environmental impact assessments were essential because 'Antarctica can serve as a unique and useful baseline for global pollution' and had 'an important role to play in future global monitoring programmes'. In these articulations, the ideas of impact and assessment were blurred and remained general. There were local impacts upon local sites and the Antarctic as a whole was affected by global pollution at large. The emphatic point by the end was that new scientific bases and major research projects should undergo an 'evaluation'.²⁸ This report did make it, just in time, to the 1972 Antarctic Treaty Consultative Meeting, where the parties, preoccupied with the first official discussion of mineral exploitation in Antarctica, carried over their 1970 sentiments about impact and concern for protecting the environment.

The first Antarctic impact assessments

The first concrete experiences of environmental impact assessments in Antarctica came in response to two projects in the Ross Sea region: the Dry Valley Drilling Project (DVDP) and the Ross Ice Shelf Project (RISP). While certainly not on a huge scale, these two projects had some characteristics of 'big science' and were larger

than much of the research that had taken place in Antarctica since the end of the International Geophysical Year (1957–1958). RISP was a US project, funded by the NSF.²⁹ The DVDP was an international research endeavour involving scientists from the United States, New Zealand, and Japan, but most of the funding came from the NSF, and the project was run from the University of Northern Illinois.³⁰ Both projects involved drilling, which was a highly-polluting invasive activity that used foreign fluids and emitted pollution locally. Both projects were interdisciplinary, but they were heavily weighted towards the earth sciences. While conservation ideas in the southern continent had been building through the 1960s, it was with these two scientific projects that specific threats generated a concrete form of Antarctic environmentalism.

There is some confusion over which environmental impact assessment came first: RISP or DVDP. Part of this uncertainty relates to terminology and the difference between an environmental impact appraisal and an environmental impact statement.³¹ The confusion seems to have been exacerbated by the fact that it was RISP that was specifically mentioned in the 1972 SCAR recommendation on 'Man's impact on the Antarctic environment'. Despite this, the first DVDP environmental impact appraisal was released on 30 November 1973, over half a year before the RISP environmental impact statement in July 1974.³² In reality, however, both studies were part of the same trend and involved several of the same people, both directly and indirectly.

Though cloaked in technocratic, procedural and impersonal language, individual personalities played an important role in promoting this approach to environmental protection. One of the most important individuals was George Llano, a distinguished lichenologist who had worked with the Arctic Institute during the IGY.³³ After moving to the NSF in 1961 Llano became biology program director of its Division of Polar Programs. He wrote several important articles on Antarctic terrestrial biology and became an active proponent of a conservationist agenda in the region.

Among Llano's most important contributions to Antarctic conservation were his efforts to encourage the work of like-minded scientists. The Virginia Tech biologist Bruce Parker was one of those he actively promoted. Following a degree in biology from Tufts University, Parker received a master's degree in conservation from Yale University – in a novel and short-lived program run by ecologist Paul Sears, with input from ecologist G. Evelyn

²⁹ J. Zumberge, Ross Ice Shelf Project: drilling in and below ice will reveal physical, chemical, biological features, *Antarctic Journal of the United States* 6 (1971) 258–263.

³⁰ For an overview of the work of the DVDP, see Lyle D. McGinnis (Ed), *Dry Valley Drilling Project*, Washington D.C., 1981.

³¹ Bruce Parker goes some way to explaining the terminology: 'this Environmental Impact Appraisal, while possessing similarities with the United States' Environmental Impact Statements, differs in many ways from the latter. Most notably, the information base of the Appraisal is inadequate for the thorough analysis required for Environmental impact statements', B.C. Parker and M.C. Holliman, *Environmental Impact in Antarctica: Selected Papers by Scientists Addressing Impact Assessment, Monitoring and Potential Impact in the Antarctic*, Blacksburg, VA, 1978, 60.

³² Parker and Holliman, *Environmental Impact in Antarctica*, 7 and 38.

³³ Llano's influence is recognised in the dedication of Parker and Holliman, *Environmental Impact in Antarctica*: 'This volume is dedicated to one of Our Country's Leading Proponents of Conservation and Environmental Impact Assessment in Antarctica: George A. Llano'.

²³ New Zealand Ministry of Foreign Affairs, Brief for the New Zealand Delegation, Antarctic Treaty: Sixth Consultative Meeting, undated, Archives New Zealand, AAEG, 6956, TKY322/1/1 Part 19.

²⁴ Foreign and Commonwealth Office, Brief, Agenda Item No. 6, The effects of man and his activities on the Antarctic environment, c.5–7 October 1970, TNA, FCO 7/1744.

²⁵ *Antarctic Treaty, Report of the Sixth Consultative Meeting, 19–31 October 1970*, Tokyo, 1970, recommendation VI-4.

²⁶ *SCAR Bulletin* 43 (January 1973) 637.

²⁷ *SCAR Bulletin* 43 (January 1973) 637.

²⁸ *SCAR Bulletin* 43 (January 1973) 639.

Hutchinson – before receiving a PhD in botany from the University of Texas.³⁴ Parker's academic work in microbiology retained a strong conservationist agenda. At the invitation of Llano, Parker began work in the Antarctic Peninsula in the 1970–1971 season. Another influential scientist with a conservationist mentality was Roy Cameron, a soil biologist already working in the McMurdo Dry Valleys in the 1960s. Llano's efforts to foster a cohort of conservation-minded scientists came on top of a general expansion of biological research in Antarctica during the 1960s. This meant that when plans for RISP and DVDP were announced, there was already a community of concerned scientists and conservationists in place to respond to these proposals.

Plans for both RISP and DVDP began coalescing in the late 1960s and early 1970s. Despite different geographical settings, the two projects had much in common. RISP intended to drill through the Ross Ice Shelf into the sea beneath and then into the sediments of the sea floor.³⁵ DVDP was an effort to use the more readily accessible soils and rocks of the predominantly ice-free McMurdo Dry Valleys to learn more about geological and glacial history. The DVDP was deliberately conceived as an international project that would bring together researchers from the United States, New Zealand, and Japan working in the Dry Valleys. Rock drilling was an expensive activity – and one that had not previously been attempted in Antarctica to any significant extent – and the prospect of sharing costs and logistics was attractive to all three participants.

Despite their similarities, the DVDP caused more immediate concern than RISP among biologists and conservationists. In large part, this difference can be attributed to the fact that biologists were already working in the Dry Valleys, often in exactly the same locations as the proposed drilling. In addition to the basic problem of having their study sites disturbed, Dry Valley biologists feared that activities connected to the drilling project – such as pouring diesel fuel down boreholes to prevent them freezing – might damage what they were coming to see as the fragile ecosystems of the area. In September 1971, concerns about the environmental consequences of the DVDP were extensively discussed at the Colloquium on Conservation Problems in Antarctica hosted by Bruce Parker at Virginia Tech.³⁶ Roy Cameron was particularly outspoken at this meeting in his criticism of the proposed project.³⁷

Llano's immediate reaction to the DVDP seems to have been to try to hope it would not happen. But it quickly became clear that the program would go ahead, in part as a result of its diplomatic value in bringing together scientists from the United States, New Zealand, and Japan.³⁸ At this stage, biologists and conservationists turned their attention to limiting its environmental impact. In their efforts to do this, the procedures for environmental impact assessment and monitoring put in place following NEPA offered an obvious, if new and relatively untested, template. While NEPA

regulations provided a model, proponents of environmental impact studies in the Dry Valleys quickly realised that they needed to be adapted to the Antarctic context, using, for example, a simplified version of Leopold's matrix for assessing environmental impact.³⁹ Another important part of limiting environmental impact was the attempt to keep some parts of the Dry Valleys, such as Lake Bonney, off limits to drilling.⁴⁰

The first project coordinators of the DVDP showed almost no interest in seriously dealing with environmental concerns when they were raised in early discussions. Bruce Parker's first letter to the project's lead scientist, Lyle McGinnis, went unanswered.⁴¹ McGinnis's silence connected to wider uncertainties about the need for an EIS, especially for US actions overseas. The Department of State and other US agencies conducting government work overseas asserted that NEPA did not apply extraterritorially. This was mostly resolved for Antarctica by late 1972, by which time the Department of State had accepted that, because the United States held that Antarctica was not under any one nation's jurisdiction, government actions there were subject to NEPA.⁴² Armed with copies of Parker's newly published Antarctic conservation book, environmentally inclined scientists from the United States – clearly playing off the international audience against the domestic audience and vice versa – succeeded in having the 1972 SCAR meeting in Canberra formally articulate the scope of concern surrounding 'impact'.⁴³ This did not go down particularly well with the scientists and program officers in favour of DVDP. The head of the NSF's Office of Polar Programs, Phil Smith, ordered Llano and others to 'tone down' their discussion of DVDP.⁴⁴ There was some international resistance to the US 'impact' talk too: the Australian biology delegate complained about 'the subservience' of the US delegate 'to the public emotions of his country', and that the subject was 'influenced greatly by emotional assessments'.⁴⁵

In October 1972 Cameron and Parker attended an NSF Polar Biology meeting where they gave a detailed presentation on the DVDP and drafted a statement on its environmental impact.⁴⁶ In May 1973, a 'consultants meeting' in Washington concurred in the environmental assessment approach.⁴⁷ By that stage an environmental assessment team consisting of two biologists (Parker and Cameron) and two geologists (Michael Mudrey and Keros Cartwright) was in place. A complete draft of the first environmental impact appraisal was completed by Parker and Mudrey and sent out

³⁴ Parker's main project for his master's degree was to study algae in Lake Zoar, Connecticut: B.C. Parker, Limiting factors to growth of algae in Lake Zoar, 25 January 1957 and B.C. Parker, Some observations on the ecology of Lake Zoar (Connecticut). Proposed outline of a year-round study, c. November 1956, Yale University Library, Paul Bigelow Sears Papers, MS 663, Series III, Folders 204 and 205. The broader connections between the post-war political and cultural context, including its 'technocratic optimism', and the development of ecology and scientific approaches to conservation, have been elucidated in P.J. Taylor, Technocratic optimism, H.T. Odum, and the partial transformation of ecological metaphor after World War II, *Journal of the History of Biology* 21 (1988) 213–244.

³⁵ Zumberge, Ross Ice Shelf Project.

³⁶ B.C. Parker, *Proceedings of the Colloquium on Conservation Problems in Antarctica*, Blacksburg, VA, 1972.

³⁷ G. Llano, Office of Polar Programs diary note, 11 November 1974, Subject: McGinnis Conference, 11/19/74, Mort Turner Papers, Byrd Polar Research Center, The Ohio State University [hereafter BPRC], box 36, folder 6.

³⁸ Llano, Office of Polar Programs diary note, 11 November 1974.

³⁹ The Leopold matrix is discussed in both RISP and DVDP EISs. See Parker and Holliman, *Environmental Impact in Antarctica*, 7–146, in particular 22–23. In making a case for this simplified matrix, the authors of the EIA made the familiar argument that Antarctica is relatively less complex than other parts of the world. The Leopold Matrix had been developed by Luna Leopold (one of the sons of Aldo Leopold, the noted US conservationist and author of *A Sand Country Almanac*, 1949). See L.B. Leopold, F.E. Clarke, B.B. Hanshaw and J.R. Balsley, *A Procedure for Evaluating Environmental Impact*, Geological Survey Circular 645, Washington, D.C., 1971.

⁴⁰ See, for example, B.C. Parker, R.V. Howard and F.C.T. Allnutt, Summary of environmental monitoring and impact assessment of the DVDP, in: Parker and Holliman, *Environmental Impact in Antarctica*, 234.

⁴¹ Llano, Office of Polar Programs diary note, 11 November 1974.

⁴² NEPA's role in protecting the world environment, *University of Pennsylvania Law Review* 131 (1982) 353–387, n. 48; N.A. Robinson, Extraterritorial environmental protection obligations of foreign affairs agencies: the unfulfilled mandate of NEPA, *New York University Journal of International Law and Politics* 7 (1974) 257–270.

⁴³ Parker's collection was also given to delegates to the 1972 Antarctic Treaty Consultative Meeting in Wellington: US Department of State, Telegram to Wellington, 1 September 1972, US National Archives, College Park [hereafter NACP], RG 59, Records of the Department of State, Subject Numeric Files 1970–1973.

⁴⁴ Llano, Office of Polar Programs diary note, 11 November 1974.

⁴⁵ M.D. Murray, Report on Meetings of Biology Working Group, 7 September 1972, National Library of Australia, Papers of Phillip Law, MS 9458, series 7, folder 32.

⁴⁶ Llano, Office of Polar Programs diary note, 11 November 1974.

⁴⁷ Parker and Holliman, *Environmental Impact in Antarctica*, 37.

for review in July 1973. Availability for agency review was announced in the *Federal Register* on 30 August and comments were received by 1 November (the only 'public' in this context were other federal agencies). After Parker and Mudrey completed their replies, the environmental impact assessment for Phase 3 of the DVDP was issued on 30 November 1973. It is worth noting that by this stage two seasons of preparation and drilling work had already taken place in Antarctica without any EIA (although monitoring had taken place through Cameron), and the Phase 3 EIA came so close to the beginning of the field season to make it difficult to implement fully its recommendations.⁴⁸

The three environmental impact appraisals that were produced for the DVDP (for phases 3, 4 and 5 in the 1973–1974, 1974–1975 and 1975–1976 seasons respectively) tell us much about American attitudes towards the Antarctic environment in the first half of the 1970s and contain language that slowly infused the technocratic Antarctic environmentalism of the years following.⁴⁹ There is a strong sense in the DVDP EISs that their authors were making up the process as they went along. Indeed, to a large extent they were, a fact exacerbated by a lack both of knowledge about the Antarctic environment and baseline data. This was made worse in the Dry Valleys by the heterogeneity of the soils. The authors could only refer to the trans-Alaska pipeline assessments as one of the few models for work of this sort.⁵⁰

In comparison to the DVDP, the environmental impact work for the RISP was much less contentious. In December 1972, Llano had recommended Bruce Parker as chair of a committee to compose its EIS.⁵¹ Parker worked on this project alongside his work on the DVDP, and this direct personal link ensured connections between the two projects—for example, the modified Leopold matrix was used in both. As an American environmental impact study on an American project, RISP was relatively straightforward, and the process of developing the statement seems to have gone relatively smoothly. Unlike the DVDP there was no real monitoring of the environmental impacts of RISP, and the whole project seems to have had an 'out of sight, out of mind' quality. That the project was occurring on a slowly-moving body of ice fated to calve off as an iceberg some time in its future perhaps also encouraged a sense that human activity couldn't really 'impact' such a landscape.

The RISP EIS also articulated general American attitudes to the Antarctic environment in this period. Scientists were optimistic that environmental impacts could be identified and avoided. In relation to cleaning the drilling fluid out of the core holes for example, it noted that 'the pumping operation will probably leave traces behind'. From today's perspective this looks far more like a certainty than a probability. Quite a bit of the environmental concern focused on the possibility of accidentally penetrating a hydrocarbon deposit in the sea bed and releasing petroleum into the ice-covered ocean. While such a possibility was classified as unlikely, and drilling permitted to continue regardless, such a concern tells us much about expectations of finding mineral resources in the Antarctic.⁵²

The Department of State and the impact of treaties

While the NSF assessments dealt with on-the-ground activities, US treaty negotiations relating to Antarctica were led by the

Department of State, and partly formulated through the Antarctic Policy Group. While the department was resistant to the comprehensive application of NEPA to its diplomatic activities, it did accept that the act applied extraterritorially to its actions in Antarctica, as the United States considered that no state had sovereignty in the region.⁵³ It therefore conducted an EIA after the United States had signed the Convention for the Conservation of Antarctic Seals (CCAS) in June 1972, though before senate ratification. The seals convention had been negotiated by the Antarctic Treaty parties to manage the exploitation of seals in Antarctica's high seas, which had been excluded from the first conservation measures under the treaty in 1964, as the treaty only applied to land and ice shelves.⁵⁴ The seals convention was negotiated and signed in February 1972, before the Department of State had finalised its guidelines on compliance with NEPA in August 1972. Indeed, even these guidelines did not specifically outline the appropriate time at which an EIA should be conducted in relation to treaties and negotiations to which the United States was a party.⁵⁵

The Department of State began the CCAS environmental assessment in early 1973. By that time, the department had only completed the EIS process for three other actions: the 1972 ocean dumping convention, a US-Canadian oil pipeline, and developments surrounding the Colorado River. Rather than directly approaching a scientist or other technical expert to prepare the EIS, they requested the NSF Office of Polar Programs to organise it, which in turn engaged the marine mammal biologist Don Siniff.⁵⁶ Siniff worked at the University of Minnesota, from which he had received his PhD in 1967. A skilled statistician as well as biologist, Siniff had undertaken path-breaking work on the population dynamics of crabeater seals, as well as pioneering radio-tracking devices on wildlife for the purposes of research and management.⁵⁷

Working within the framework set out by the Council on Environmental Quality—the government body created by NEPA—Siniff's EIS was a text suffused with uncertainties and generalities. It emphasised the dearth of scientific knowledge about Antarctic seals. The main text of the statement was preceded by a table with a 'rough estimate' of the population of each of the six Antarctic seals. The population of crabeater seal was estimated at 5 to 50 million, the Weddell seal at 48 to 500 thousand, the leopard seal at 320,000 to 3.5 million, and the Ross Seal at 10 to 50 thousand. Only the elephant and fur seals, those species most affected by earlier sealing activities, were more specifically sized, at 600,000 for elephant seals, and 250,000 to 300,000 for fur seals. Siniff stated later in the report that 'The processes which contribute to regulation of the population of the Antarctic seals are mostly unknown'.⁵⁸

Siniff constituted the seals problem as a regional, rather than a

⁵³ The extent to which NEPA applied to all US foreign activities was contentious throughout the 1970s and into later decades. See Hearings before the Subcommittee on Fisheries and Wildlife Conservation of the Committee on Merchant Marine and Fisheries on Federal Agency Compliances with Section 102(2) (C) and Section 103 of the National Environmental Policy Act of 1969, House of Representatives, 91st Congress, 2nd Session, 551 and 554; Robinson, Extraterritorial environmental protection obligations; NEPA's role in protecting the world environment, note 48.

⁵⁴ A. Antonello, Nature conservation and Antarctic diplomacy, 1959–1964, *The Polar Journal* 4 (2014) 335–353.

⁵⁵ U.S. Department of State, Environmental impact statements: issuance of final Department procedures for compliance with federal environmental statutes, 31 August 1972, *Federal Register*, 37, no. 182 (1972) 19167–19168.

⁵⁶ T.O. Jones, Memorandum to Director, Office of Environmental Affairs, Department of State, 14 May 1974, NACP, RG 307, Records of the National Science Foundation, Office of Polar Programs, Central Subject Files, 1969–1975.

⁵⁷ E. Benson, *Wired Wilderness: Technologies of Tracking and the Making of Modern Wildlife*, Baltimore, 2010.

⁵⁸ U.S. Department of State, *Environmental Impact Statement on the Convention for the Conservation of Antarctic Seals [EIS CCAS]*, Washington, D.C., 1974, 3 and 11.

⁴⁸ Llano, Office of Polar Programs diary note, 11 November 1974.

⁴⁹ For copies of the DVDP environmental appraisals see Parker and Holliman, *Environmental Impact in Antarctica*, 37–145.

⁵⁰ Parker and Holliman, *Environmental Impact in Antarctica*, 37.

⁵¹ Llano, Office of Polar Programs diary note, 11 November 1974.

⁵² Parker and Holliman, *Environmental Impact in Antarctica*, 28–31.

local one. The entire statement was framed around Antarctica as a whole, and seal species in total. The effects on localised populations garnered only a brief mention when Siniff noted that because Weddell seals congregated in colonies they might experience local impacts. He opined that the low sealing quotas set out in the convention 'will have essentially no effect on the overall species numbers'. He went on to suggest that 'When a population undergoes changes such as those indicated above, it does not mean that the population has been damaged or that the ecological system is being unduly disturbed'. He also considered that, given 'the very large geographical area involved', even the local impact of sealing vessels was 'difficult to evaluate'.⁵⁹

Interestingly, Siniff suggested a positive normative or discursive impact. 'It has been alleged', he wrote, 'that another detrimental influence of the Convention is the focussing of attention on Antarctic seal resources'. His passive voice obscured an objection to the draft EIS by the chair of the US Marine Mammal Commission, John Twiss. Siniff discounted this given the wide availability of scientific literature, and the fact that 'all knowledgeable persons concerned with either seal biology or the sealing industry are already well aware of the existence of these stocks'. Siniff forcefully concluded that the United States would, in fact, be 'its most strongly conservation-oriented members'.⁶⁰ In a different sense, and in the context of the emergent krill fishery, Siniff noted that the positive impact of the seals convention was that it might set a 'precedent for concluding international agreements on renewable resources before they are commercially exploited and before they have any chance of depletion'.⁶¹

Siniff's assessment is also notable for its truncated historical consciousness. The time scale he considered was essentially limited to the period after 1964. That is, it covered the period after the passage of the Agreed Measures for the Conservation of Antarctic Fauna and Flora, which failed to protect seals in the oceans because of legal barriers surrounding the high seas. The US Department of Commerce comment upon the draft gently chided Siniff's claim that 'Historically the United States is not a sealing nation', by calling it 'open to question'. They corrected Siniff's blunder by making the uncontroversial claim that 'The United States has historically sealed the world oceans, and the Alaskan Indians and Eskimos have sealed from time immemorial'.⁶²

In its final form, Siniff's EIS concentrated quite closely on the effects of the convention on seals. It was precisely this relatively narrow focus that Bruce Parker challenged upon reading the draft before its official release. Parker asked pointedly: 'Is this an assessment of the potential impact of man's exploitation of seals on seals, or does it concern the impact of the convention or impact of man's activities generally?'⁶³ As a relatively new form of regulatory writing, Siniff and others were working with unclear genre boundaries. As a seal biologist, Siniff's narrow focus is understandable. Yet NEPA did demand an attention to larger environments, including the global environment as a whole.

Assessing the exploitation of the Southern Ocean

Towards the end of Siniff's assessment he remarked upon the potential krill fishery as the more likely and more consequential

human impact on the Antarctic marine ecosystem in the near future. The krill fishery was one of two resource issues – the other being mineral resource exploitation – that were the central matters of contention and negotiation under the Antarctic Treaty in the 1970s. While mineral exploitation seemed a far-off (but still realistic) prospect, increasing fisheries exploitation, particularly for krill but also other fish, had begun in the mid 1960s, led by Soviet, Japanese, and Polish ships. Given this quickly emerging industry, the Antarctic Treaty consultative parties agreed in 1977 – having already discussed the matter in 1975 – to begin formal negotiations towards a regime for managing Antarctica's marine living resources.⁶⁴ Additionally, these negotiations occurred in the context of greater demands by developing countries in the Global South for access to the earth's resources, particularly through the lengthy negotiations of the Third United Nations Conference on the Law of the Sea, as well as concerns in both developed and developing countries about resource scarcity, particularly generated by the oil shock, resurgent Malthusianism, and newly-emerging computer-generated models and projections.

The Department of State therefore commissioned an environmental impact assessment of the proposed marine living resources regime. The immediate difference to the seals convention was that the EIA occurred before negotiation began in 1978, rather than after signature in 1980. The department turned to Katherine Green, a marine biologist it and other government agencies had previously commissioned to provide reports on krill and the Southern Ocean ecosystem. At the time, Green was a recent graduate of the Texas A&M University oceanography program, her adviser having been Sayed el-Sayed, a leading researcher on primary productivity in the Southern Ocean. Green's 1975 doctoral dissertation had developed the first advanced simulation of the Southern Ocean ecosystem, based on data collected by the US research ship *Eltanin*. Green's model quickly became influential in the development of SCAR's Biological Investigation of Marine Antarctic Stocks and Systems (BIOMASS) research program as well as in the development of US policy towards the Southern Ocean and the krill fishery.⁶⁵

The resulting EIS was framed around the impacts of the proposed conservation regime on the Antarctic marine ecosystem as a whole. Relatedly, and contributing to the impulse to conceive of the region and ecosystem as a unified whole, was the immense collective size of the species at the heart of the proposed action, krill, by some estimates the largest animal species on earth by biomass. Green had to admit the scientific uncertainty of whether krill was 'a single breeding stock or may be composed of several separate stocks'. Furthermore, the estimate of the krill standing stock in 1977–1978 ranged between 180 million tons and 1,350 million

⁶⁴ Antonello, *The Greening of Antarctica*, chapters 4–5.

⁶⁵ K.A. Green Hammond, Modelling of Antarctic ecosystems, in: Scientific Committee on Antarctic Research, Scientific Committee on Oceanic Research, Group of Specialists on Living Resources of the Southern Ocean, SCOR Working Group 54 and S.Z. El-Sayed (Eds), *Biological Investigations of Marine Antarctic Systems and Stocks (BIOMASS)*, Volume 2: Selected contributions to the Woods Hole Conference on Living Resources of the Southern Ocean 1976, Cambridge, 1981; K.A. Green, Simulation of the pelagic ecosystem of the Ross Sea, Antarctica: a time varying compartmental model, unpublished PhD thesis, Texas A&M University, 1975; K.A. Green, Antarctic marine ecosystem modeling revised Ross Sea model, general Southern Ocean budget, and seal model (MMC-76/03), Marine Mammal Commission, Washington, D.C., 1977; Scientific Committee on Antarctic Research, Scientific Committee on Oceanic Research, Group of Specialists on Living Resources of the Southern Ocean, SCOR Working Group 54 and S.Z. El-Sayed (Eds), *Biological Investigations of Marine Antarctic Systems and Stocks (BIOMASS)*, Volume 1: Research proposals, Scientific Committee on Antarctic Research and Scientific Committee on Oceanic Research, Cambridge, 1977.

⁵⁹ EIS CCAS, 21–22.

⁶⁰ EIS CCAS, 25.

⁶¹ EIS CCAS, 27.

⁶² EIS CCAS, unpaginated.

⁶³ B.C. Parker, Memorandum to G. Llano, J. Heg and D. Siniff, 16 April 1974, NACP, RG 307, Records of the National Science Foundation, Office of Polar Programs, Central Subject Files, 1969–1975.

tons.⁶⁶ She detailed the estimated consumption of krill by other animals, including 106 million tons taken by crabeater seals, 100 million tons taken by squid, 60 million tons by fish, and 43 million tons by whales (at their late 1970s population).⁶⁷ While the seals convention articulated the difficulty of pinning down seal numbers, the krill numbers at play in Green's analysis were astonishingly large, even despite the large range.

In only one section of two short paragraphs did Green break from a framing that took in the whole Antarctic marine ecosystem. She noted only one 'area of special biological importance': the Scotia Sea, in the Atlantic sector of the Southern Ocean, because it was 'one of the regions of greatest krill abundance'.⁶⁸ She did not further consider the potentials for zonation in the proposed US negotiating position, despite the fact that statistical areas and management areas were, by then, significant elements of fisheries and environmental management.

Given krill's connection to whales, Green's assessment also took in the history of Southern Ocean exploitation. Unlike Siniff's problematic account of Antarctic history regarding seals, Green showed a greater awareness of the past. She bluntly stated that 'Most species of baleen whales have been reduced to roughly a tenth of their populations of a century ago'.⁶⁹ More euphemistically, she noted that 'In the early 19th century, fur seals were harvested until populations declined'. She also described more recent efforts in Antarctic fishing, thereby covering all the major human exploitation efforts in the Antarctic over two centuries. Green did not buy into a notion of the Southern Ocean as pristine, stating that 'Even though the Antarctic marine ecosystem is relatively undisturbed in comparison with other oceanic regions, it is not a pristine area by any means'.⁷⁰

In Green's final analysis, the proposed negotiated agreement would entail less impact than several alternative routes regarding the Antarctic marine ecosystem: 'assuming that commercial harvesting in Antarctic waters will increase in the future, the United States seeks to minimize the adverse environmental impacts of such harvesting through negotiation of a conservation regime'.⁷¹ Green mostly avoided discussion of the minerals question in Antarctica, avoiding the demands set by the Council on Environmental Quality (CEQ) that EISs must also be sensitive to the cumulative impact of US actions on the environment. In spite of this, a senior CEQ official, Lee Talbot – himself a noted conservation biologist – thought that Green's work was 'a good EIS [since it] it clearly points out the options and dangers of the proposed actions'.⁷²

Assessing the exploitation of minerals

The Antarctic Treaty parties resolved to negotiate each resource question separately, and so with the signing of the Convention on the Conservation of Antarctic Marine Living Resources in 1980, they turned towards minerals. In the early 1970s context of seeming global resource scarcity, especially energy scarcity, a mix of actors speculated about the potential of Antarctica as a source of minerals and hydrocarbons. That speculation was abetted by two prominent scientific missions that, in addition to their fundamental scientific

aims, literally introduced the spectre of drilling to the region: one, the already-mentioned Dry Valley Drilling Project, the other, the deep-sea drilling cruise of the *Glomar Challenger* in 1972–1973. While certainly technically and economically unfeasible at the time, the treaty parties saw that the lack of a legal framework for managing mineral exploitation was a potential source of geopolitical instability. In the first place, without certainty regarding access or benefits, relations among themselves might deteriorate and thus weaken, perhaps fatally, the treaty regime. In addition to this, most treaty parties felt that a lack of formal regime that guaranteed their own rights over others might invite unwelcome intrusions into Antarctica from third world nations demanding economic rights through the Non-Aligned Movement and the New International Economic Order.⁷³

In the first half of the decade the parties loosely discussed potential legal frameworks for managing mineral exploitation, but at their 1975 meeting they also called upon SCAR to assess possible impacts of Antarctic minerals exploration and exploitation.⁷⁴ Between 1975 and the beginning of negotiations in 1982, SCAR went through two rounds of environmental assessment for mining activities. The SCAR executive first tasked the British ecologist Martin Holdgate and British glaciologist Gordon Robin with drafting a text the treaty parties could consider at a 1976 meeting. That document suggested that 'The sheer size of the Antarctic region should ... permit the development of a pattern of exploitation which would allow reasonable access to minerals which the world may need without endangering either the major living resources or the value of the Antarctic as a study and research area'. Yet it also cautioned that 'Even relatively minor widespread pollution of the ice sheet from airborne effluents is likely to affect significantly the unique usefulness of the Antarctic ice sheet for providing baseline data on global pollution levels and climatic conditions'.⁷⁵ In response to the treaty parties' demands for more information in 1976, SCAR created the twelve-member Group of Specialists on the Environmental Impact Assessment of Mineral Exploration/Exploitation in Antarctica (EAMREA), chaired by the American geologist James Zumberge. EAMREA's eventual 1977 report, though it repeated many points in Holdgate and Robin's paper, was more explicitly an EIS that focused on localised impacts, as well as conceiving of Antarctica's resources in broader terms than simply the mineral or living resources and including scientific research and the knowledge gained from it as a resource.⁷⁶

With formal negotiations towards a minerals regime slated to begin in 1982, the Department of State therefore began its process of environmental assessment. It contracted the assessment to Ecology and Environment, Inc., a New York-based international environmental consultancy, founded in 1970. While there were thirteen 'preparers' listed for the EIS, there were three leaders, all from the State University of New York, Buffalo: Chet Langway, one of the leading glaciologists of the period, who had been particularly influential in developing ice core drilling with the Cold Regions Research and Engineering Laboratory of the US Army; Dwayne Anderson, who had been chief scientist of the NSF's Division of Polar Programs; and Virginia Leary, an international lawyer with

⁶⁶ U.S. Department of State, *Final Environmental Impact Statement for a Possible Regime for Conservation of Antarctic Living Marine Resources [EIS ALMR]*, Washington, D.C., 1978, 28.

⁶⁷ *EIS ALMR*, 33.

⁶⁸ *EIS ALMR*, 33–34.

⁶⁹ *EIS ALMR*, 42.

⁷⁰ *EIS ALMR*, 34 and 37.

⁷¹ *EIS ALMR*, 65.

⁷² *EIS ALMR*, 14.

⁷³ Antonello, *The Greening of Antarctica*, chapter 5.

⁷⁴ *Antarctic Treaty, Report of the Eighth Consultative Meeting*, Oslo, 9–20 June 1975, Oslo, 1976, recommendation VIII-14.

⁷⁵ Antarctic resources – effects of mineral exploration. Initial response by SCAR, dated May 1976, to Antarctic Treaty Recommendation VIII-14, *SCAR Bulletin* 57 (1977) 634 and 630–631.

⁷⁶ Scientific Committee on Antarctic Research, Group of Specialists on the Environmental Impact Assessment of Mineral Exploration/Exploitation in Antarctica, A preliminary assessment of the environmental impact of mineral exploration/exploitation in Antarctica, August 1977, 4. Copy available at TNA, FCO 76/1682.

expertise in international labour and human rights law.

Very much mirroring Green's approach to marine living resources, the minerals EIS suggested that there was a range of options relating to the management of mineral resources – from no action to a permanent ban – and that the proposed federal action, a 'regime allowing only activities which would be judged acceptable', was seemingly the most achievable, even if it risked damaging the fragile Antarctic environment. The proposed action 'would provide an effective mechanism for developing measures to protect the Antarctic environment in the context of satisfying the full range of United States Antarctic interests'.⁷⁷ While a permanent ban on mining would stop any environmental damage, the statement noted that it 'would probably be unstable over time'.⁷⁸ The thrust of the statement clearly painted the chosen US course as the ideal one.

Like the seals and marine living resources EISs before it, the minerals EIS had to contend with a deep lack of knowledge. Despite the results of the DVDP and other geological investigations, the location and size of mineral deposits, and the capacity of Antarctic ecosystems to deal with human impacts, were both great unknowns. The EIS made clear that there was 'no firm information on the resource potential of Antarctica', and that 'new technologies would be required' even if resources could be located.⁷⁹ The complexity and variety of minerals exploration and extraction practices – digging and drilling in inshore, coastal, and offshore environments – also underpinned a longer and more complex statement of environmental impact. This dearth of knowledge meant that, in many places, the EIS repeated earlier statements, including the SCAR EAMREA report.

The impacts envisaged were diverse. Unlike the seals and marine living resources statements, the minerals EIS had much clearer descriptions of localised impacts. The preparers presented three scenarios of local impacts – one in the Dufek Massif, one in a coastal region, and one for offshore hydrocarbons with three different versions of drilling – each emphasising the large and complex array of people and infrastructure necessary to overcome the challenging Antarctic environment.⁸⁰ The EIS described how 'Impacts on marine living resources from offshore hydrocarbon exploitation might be severe', yet went on in the spirit of Holdgate and Robin from 1976 to say that 'the circumpolar distribution of species and the immense size of the Southern Ocean relative to the potential size of an oil spill combine to reduce the potential impact from a single spill. Moreover, the short life cycles of plankton and mixing from undisturbed water masses may allow a rapid re-establishment of normal plankton communities'.⁸¹ The statement also continued with the trend of a wide appreciation of resources. In this case, the aesthetic value of the 'virtually unspoiled' continent and its scientific value as a site of global pollution monitoring would be affected.⁸²

The temporal framework of the minerals EIS was also subtly different from Green's historicity for marine living resources. The minerals EIS was distinctly situated within a narrative of Antarctic history focused on international cooperation, in addition to the more obvious narrative of Antarctica's history of over-exploitation of whales and seals. International comity through environmental regulation, rather than heroism, was the teleological thread of

Antarctic history here.⁸³ Institutions would be the guarantors of environmental protection and also embodied the widest range of 'resources'.

The minerals EIS was hardly a novel or surprising document. By 1981 and 1982, when it was being drafted and disseminated, knowledge of mineral deposits and locations remained scarce or non-existent, and the statement had to repeat what had already been stated in other documents that preceded it. The statement reads as an extended justification of what the US was already essentially planning to do: negotiate a regime that would control access to Antarctica's minerals without an outright ban. While the statement detailed potential impacts on the environment – in ecological, aesthetic, and scientific terms – the 'impact' that mattered was a geopolitical one: could the US help maintain an international treaty system that it had found worked in keeping peace and stability in a distant region?

Conclusion: top down, technocratic environmentalism

As a case study of the broader history of the development and globalisation of the EIS, the US use of it in Antarctica before 1982 shows that the adoption of this form of environmental management was often contested and that there was nothing inevitable about its processes, acceptance, and institutionalisation. There are a number of explanations for why EISs did become embedded. For US officials and program managers, EISs appealed to the top-down, process-oriented way that the US Antarctic Program functioned. For scientists on both sides of the early environmental debates EISs proved attractive by offering a process to follow and bringing clarity to any environmental protection measures that needed to be taken. Central to the self-perpetuating 'technocratisation' evident in the US experience in Antarctica during this period was the spatial upscaling brought about by the tendency of EISs to consider impacts on a continental scale rather than a local one. Because of NEPA, the conduct of EISs became a legal requirement in Antarctica. Through this act and subsequent regulations, the federal government in Washington D.C. found itself in a position where it was aspiring to protect the Antarctic environment through a standardised process that could be universally applied, eradicating specificity and making sense of divergent environments. This can be seen, for example, in the way standardised matrices for environmental impacts were adopted and simplified still further for the Antarctic by scientists such as Bruce Parker.

It should not be forgotten that the underlying reason that the United States found itself in Antarctica conducting EISs during the 1970s and early 1980s was because it was a superpower attempting to dominate global geopolitics. As a form of environmental management, the EIS fitted neatly into the overarching US geopolitical ambition for Antarctica of maintaining their interests and keeping the peace. Far from being politically neutral, these EISs functioned to promote US political interests in the region but did so in a very subtle manner, reinforcing the centrality of science to the region and constituting a technocratic discourse that could easily be taken up by others. As such, despite brief initial frustrations with the US putting environmental impact on the Antarctic Treaty's agenda, other treaty parties and actors also saw an appeal in EISs, as they fit into the top-down, process-oriented way that SCAR and the treaty parties functioned within a regime founded on consensus decision making.

The early history of the US experience suggests that EISs became the 'path of least resistance' for environmental protection in Antarctica. EISs were useful as a genre, allowing for the articulation of various narratives and temporalities that could justify certain actions, whether concentrating on exploitation, science, heroism, or institutions. They offered a clearly defined way of bringing

⁷⁷ U.S. Department of State, *Final Environmental Impact Statement on the Negotiation of an International Regime for Antarctic Mineral Resources [EIS minerals]*, Washington, D.C., 1982, ix.

⁷⁸ *EIS minerals*, §2, 7.

⁷⁹ *EIS minerals*, §1, 7.

⁸⁰ *EIS minerals*, §6, 1–5.

⁸¹ *EIS minerals*, §6, 18 and 23.

⁸² *EIS minerals*, viii.

⁸³ *EIS minerals*, §1, 3–5.

environmental critics into the system, without creating a major obstacle to scientific research. In fact, the cost-benefit analysis implicit to the EIS process played into the idea of 'a continent for science', since it forced scientists to highlight the importance of their work to justify environmental disturbance. EISs worked because they supported and encouraged continent-wide thinking in a technocratic system that was comfortable working at this scale.

Technocratic environmentalism in Antarctica very quickly became self-perpetuating as EISs appealed to the technocratic vision that dominated official thinking, and the institutionalisation of EISs reinforced this vision. Such an observation has utility both for understanding recent Antarctic history and for understanding the globalisation of the EIS more generally. Within Antarctica, the signing and ratification of the Madrid Protocol in 1991 is frequently presented as a depoliticisation of the region, bringing an end to the potential resource conflict and environmental disputes of the 1970s and 1980s. The early history of the US experience of the EIS in Antarctica suggests instead that the provisions of the Madrid Protocol reflected the power of a specific political vision of Antarctica rooted in high technocracy and mobilising the apparent neutrality of procedural documents to bring about the desired political

outcomes. More broadly, the self-perpetuating nature of the EIS in Antarctica might help to explain the widespread adoption of this particular approach to environmental management around the world. The underlying political explanations for the success of EISs in Antarctica might encourage scholars to think more critically about the implications of these superficially boring documents in other regions.

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