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## ENVIRONMENTAL REGULATION IN THE ANTARCTIC\*

GERALD S. SCHATZ\*\*

Enshrining environmental policy in an international agreement or domestic statute may be far easier than actually regulating conduct in accord with that policy. Long experience and recent developments in Antarctic environmental regulation illustrate some of the problems that can arise, including bureaucratic inertia, technological difficulties, potential conflicts of laws, and questions of enforceability.

Ordinary human activities in remote places are not normally the province of international law and controls. International institutions are usually not concerned with the logistics of remote scientific stations, with accommodation of tourism and various explorations, or with how and where small numbers of people should dispose of wastes.

By comparison, domestic environmental regulation rests on a reasonably convenient nexus of geography, authority, jurisdiction, scientific and technical information, and human activities. The interplay of authorities, advisors, and interests is relatively direct in domestic environmental regulation. In Antarctic affairs the regulatory dynamic is simpler in conception but much clumsier in practice.

The actual regulation of environmental conduct in an international regime requires sensitivity not only to juridical circumstances but also to specific purposes, political processes, scientific and technical problems, and legal and practical issues of enforcement. This paper examines the international and domestic legal aspects of four disparate subjects of concern in environmental protection policy and practice in U.S. Antarctic involvement: (1) protection against anthropogenic perturbation of biological research sites in the vicinity of Palmer Station; (2) environmental impact assessment; (3) waste disposal; and (4) the U.S. National Science Foundation's own Antarctic regulatory responsibilities. Antarctica is not unprotected, nor is Antarctic

environmental regulation dramatically deficient. Nevertheless, this examination suggests the need for far more attention to purpose, enforceability, and efficacy.

The individuals and organizations involved in Antarctic environmental matters somewhat overlap those involved in other international and domestic environmental issues and bring to Antarctic questions at least some of the assumptions they have formed in connection with their experiences. But the logic, values, and norms of environmental decision for the Antarctic differ greatly from those for other areas. While garbage, trash, wildlife protection, local site protection, and pollution control are domestic as well as Antarctic concerns, the differences between domestic environmental regulation and environmental regulation in the Antarctic extend not only to venues and values but also to scale:

Considerations of impact on the Antarctic environment need to come to terms with problems of scale. On the one hand, there are the vastnesses of the Antarctic ice sheet and the Southern Ocean, both with an enormous buffering capacity to absorb the impacts of man's activities. On the other hand, there are small, coastal, ice-free areas, homes of birds, seals, primitive plants and other forms of life down to the microscopic, where the impact of man's activities can be very considerable.

The view of most of those who go to the Antarctic and are able to see at first hand man's impact on it . . . tends to be strongly influenced by their immediate experience of the station or stations they visit or live in. Some stations have larger environmental impact than others; to a considerable extent the impact is related to the scale of research activities and logistics that are carried on from them. But those who have had the opportunity to get away from these stations and their concentrations of human impact . . . will have been able to appreciate how limited in scope are the environmental effects.<sup>1</sup>

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Environmental regulations usually deal with extensive perturbations and widely felt biophysical effects. Antarctic environmental regulation deals with small-scale activities and highly localized (though not necessarily insignificant) effects, some of which diminish our ability to conduct Antarctic environmental research.<sup>2</sup> These dissonances, coupled with the disparate experiences of the individuals decrying Antarctica's environmental problems and the individuals who must cope with the harsh Antarctic environment, have considerable implications for the future of Antarctic environmental regulation.<sup>3</sup>

Whether arising from the Antarctic scientific, technical, and diplomatic communities, from domestic or international political concerns, or from bureaucratic isolation and inertia, the assumptions that go into Antarctic environmental regulation ought to be considered critically. Some changes may be in order. Genuine environmental concern is inadequate without practical law. There must be a focus on the practicalities of regulation and enforcement.

#### I. THE ANTARCTIC TREATY REGIME AND THE U.S. ANTARCTIC PROGRAM

##### *The Antarctic Treaty Regime*

U.S. activities in the Antarctic are subject to regulation under a combination of international and domestic law. The over-arching international regime is the Antarctic Treaty,<sup>4</sup> which prohibits member states from asserting or derogating claims to territorial jurisdiction<sup>5</sup> in the region and requires Treaty members active in the area to consult periodically on issues of common concern, including logistics and environment.<sup>6</sup>

The regulatory system established by Article IX of the Antarctic Treaty is undergoing major change, with little considered but important implications for the regime and for U.S. regulation pursuant to the regime. The statutory operation of Article IX is simple. The consultative parties meet regularly, in the past generally every two years, to consider problems arising in the area and to recommend appropriate precautionary measures to their respective governments. A measure becomes "effective" upon the approval of all the governments that were entitled to participate in the consultative meeting that recommended it.<sup>7</sup>

In operation as a framework for multinational cooperation, Article IX has to be viewed in a political light as well. The scheme is permissive; it permits the imposition of mandates, but the consultative parties almost invariably hold back and instead cast measures in the form of recommendations. What it means for an agreed upon measure to become "effective" is unclear. Is the measure effective, or is it the recommendation that is effective? Notwithstanding this ambiguity, the consultative parties generally have treated the growing array of recommended measures as at least customary law under the Antarctic Treaty.<sup>8</sup> Compliance is left to the discretion of the individual member states, as would be the situation politically no matter what the phraseology of the recommended measures.

The United States, with one major exception, has regularly agreed to the recommendations under the Treaty but has not given them the type of treatment that would install them as U.S. law. The President has not submitted U.S. approvals of Antarctic Treaty recommended measures to the Senate for advice and consent; so, under U.S. law they fall into the vague category of executive agreements.

The exception is the Antarctic Conservation Act of 1978,<sup>9</sup> the implementing legislation sought by the Executive Branch and granted by Congress to permit the United States to regulate its nationals in accord primarily with one particular Article IX recommendation, a set of Agreed Measures for the Conservation of Antarctic Fauna and Flora<sup>10</sup>, and in accord with special site protections developed later (in the form of Article IX recommendations) pursuant to the Agreed Measures.

Now the structure and content of Antarctic Treaty consultative regulation, the honor-system norms of Antarctica, are becoming vulnerable to conflict-of-laws problems. In an attempt to establish procedures for dealing with potential mineral-resource issues and in response to pressure for increased Antarctic environmental protection, in 1989 the consultative parties called for "the further elaboration, maintenance and effective implementation of a comprehensive system for the protection of the Antarctic environment and its dependent and associated ecosystems . . . ."<sup>11</sup> The resulting agreement was submitted to their respective governments by representatives at a special Article IX consultative meeting held in June, 1991, and was signed on October 4, 1991, by 31 countries, including 23

of the 26 Antarctic Treaty consultative parties. The remaining consultative party signatures were expected soon thereafter.<sup>12</sup> The agreement<sup>13</sup> banned Antarctic mineral exploitation for at least 50 years, and established certain other environmental protections.

The agreement is something new in Antarctic regulation. The consultative parties termed it not a recommendation but a protocol (to the Antarctic Treaty) with annexes on environmental impact assessment, conservation of fauna and flora, waste management, and marine pollution and phrased the text in imperative language ("The Parties shall . . ."), including the following: "Each Party shall take appropriate measures within its competence, including the adoption of laws and regulations, administrative actions and enforcement measures, to ensure compliance with this Protocol."<sup>14</sup>

Upon entry into force, the agreement will arguably have the effect of superseding older Article IX measures wherever they might conflict. The annexes are amendable under normal Antarctic Treaty consultative procedures.<sup>15</sup> The protocol binds its parties to cooperate "with a view to ensuring the achievement" of its objectives and "avoiding any interference with the achievement of the objectives and principles" of "the other international instruments in force within the Antarctic Treaty system . . ."<sup>16</sup> Herein lies a potential conflict-of-laws problem. The problem is theoretical only until the time comes for enforcement under implementing national legislation (assuming that the protocol and its annexes enter into force).

Until then, at least the intent of the Article IX recommended measures is clear, although applicability and enforceability remain uncertain.<sup>17</sup>

#### *The United States Antarctic Program*

The U.S. Antarctic Program, which consists of the U.S. Antarctic Research Program and its logistical support, has long been the largest and most visible human activity in the Antarctic. Excepting Antarctic oceanography, in which U.S. government budget cuts have led to the eclipse of U.S. activity by other Antarctic countries, the United States continues to operate Antarctica's biggest program of science and associated support.

One additional and important exception depends on definition. The National Science

Foundation (NSF), the lead agency for the U.S. Antarctic Program, does not give high priority to mapping and environmental description as supportable science. The work most likely to get NSF science money is basic research at the scientific frontiers, work that promises to advance the fundamental scientific disciplines. This exception has important implications for Antarctic environmental regulation, notably for protection of sites of special value for reasons of science or conservation. Effective site protection planning is handicapped severely by a lack of adequate site description and maps, and adequate maps are crucial to site protection enforcement.

U.S. Antarctic Program operations include a major airlift; air and marine logistical staging facilities and year-round laboratories at McMurdo Station, on Ross Island; year-round research and the requisite logistical support at Amundsen-Scott South Pole Station; marine biology at and near Palmer Station, located on Anvers Island, west of the Antarctic Peninsula; short-term tent camps; and ship-borne oceanography.<sup>18</sup> The NSF's Division of Polar Programs manages the program, which has its roots in the brute-force expeditionary science and logistics of the 1957-1958 International Geophysical Year.<sup>19</sup> The Division's scientific program officers are preoccupied with processing grant applications, while its logisticians are preoccupied with managing a complicated, remote life-support system.<sup>20</sup>

The scope of the U.S. Antarctic Program illustrates the range of environmental protection problems likely to arise from Antarctic research. The program's experience and conduct have been variously sensitive to<sup>21</sup> and oblivious of<sup>22</sup> environmental concerns and suggest the range of challenges to environmental regulation of Antarctic research and its logistical support. This examination is not intended to suggest that other nations' Antarctic environmental performance is better or worse than that of the U.S. Antarctic Program. This examination is rather a review of illustrative problems of actual regulation of an Antarctic research program and not a comparison.

In 1987, the Division of Polar Programs began a systematic look at the program's environmental responsibilities. That year, the Division developed an environmental protection plan,<sup>23</sup> revised and formally issued the following summer as the U.S. Antarctic Program Environmental Protection Agenda.<sup>24</sup> The

agenda provided, among other things, for a thorough review of environmental law under which the program operates<sup>25</sup> and for the regular undertaking of environmental assessments and impact studies<sup>26</sup> prior to committing activities considered likely to have a significant, direct environmental impact.<sup>27</sup> The Foundation's Office of General Counsel completed the legal review of the agenda in late 1989.<sup>28</sup> As of mid-1991, the Division still lacked a regulatory mechanism to ensure the conduct of environmental assessment and impact studies.

The program's experience with site protection, environmental assessment, waste disposal, and its own regulatory responsibilities reflects distinctive sets of problems and a lack of concern not for the environment but for enforceability and enforcement.

## II. THE REGULATORY EXPERIENCE

### *Site Protection*

Two procedural avenues are available for protection of special Antarctic sites. One is a panoply of special site designations; e.g., Specially Protected Areas,<sup>29</sup> designated historic sites and monuments, Sites of Special Scientific Interest,<sup>30</sup> Marine Sites of Special Scientific Interest,<sup>31</sup> and others. Provisions for the protection of these sites are a result of measures recommended by Antarctic Treaty consultative meetings. Typically, the consultative meetings designate special sites upon the recommendation of the International Council of Scientific Unions' Scientific Committee on Antarctic Research (SCAR).<sup>32</sup> The process of designating a site for protection is slow and complex.

An alternative or complementary approach for regulation of special Antarctic sites is the establishment of station rules to govern not territory but behavior and to make compliance a condition of admission to a given station.<sup>33</sup> As of mid-1991, the National Science Foundation had yet to establish formal rules for any U.S. Antarctic station.

Facing increasing tour disruption of research activities and the possibility that tour-generated pollution might contaminate biological research sites, the Division of Polar Programs sought the help of the National Academy of Sciences' Polar Research Board, which serves as a science advisor to the NSF Division of Polar Programs and as U.S. national committee for SCAR.

Noting Palmer Station's dependence on local research sites and the area's vulnerability to ecological perturbation from both tourism and careless research logistics, in April 1988 the Division of Polar Programs proposed that the Palmer area be designated a Site of Special Scientific Interest, with commensurate restrictions and limitations to discourage tours in the vicinity.<sup>34</sup> The Marine Mammal Commission proposed alternatively that the Palmer area be designated as a multiple-use management area, pioneering a new kind of Antarctic site protection, and promised to sponsor a conference of U.S. specialists to consider the matter.<sup>35</sup>

Meanwhile, SCAR conservation specialists stiffened the informal requirements for the blessing of site-protection proposals. If special sites were to be earmarked for protection because of particular conservational or scientific value, they would have to be surveyed and characterized thoroughly first; the proposed demands were for encyclopedic description.<sup>36</sup> In effect, before a place could be protected against purposeful or inadvertent damage by scientists and their logistical support teams, it would have to be studied extensively, which could have its own environmental impacts. The United States has done little local mapping or ecological reconnaissance in Antarctica; its concentration has been on basic research.

Ultimately, proposals for protection of a few tiny sites in the Palmer area went forward to SCAR's machinery and were blocked, "noted with interest", and referred back to the United States with the suggestion that they be incorporated into a draft "Antarctic Protected Area" proposal.<sup>37</sup> Meanwhile, no international regulatory mechanisms were in place to deter tourism at Palmer, nor did the United States have regulations in effect to establish station safety and environmental rules or to make visits to Palmer conditional on compliance with safety and environmental regulations.

The Palmer planning workshop promised by the Marine Mammal Commission was held in early November 1988 under a handicap common in Antarctic work: lack of adequate mapping. The only charts available were old and inconsistent, with warnings of their inaccuracies of location and scale.<sup>38</sup> The region's only location where reasonably accurate coordinates have been determined by satellite is a point<sup>39</sup> at Palmer Station.

The workshop's participants identified several sites of pending research interest, drew a rectangle on a couple of those unreliable charts, and called for general environmental precautions within the rectangle and limited access and special precautions at specific sites. The basis for the rectangle, which included southwest Anvers Island and nearby small islands and rocks, was given as "ecological perspective,"<sup>40</sup> and the geodetic references for this rectangle was to coordinates taken from maps described on their face as unreliable.<sup>41</sup> The workshop report explained that several features of interest are within that rectangle, but there was no further explanation.<sup>42</sup>

The pressures of tourism and the consequent hazards did not cease. On January 28, 1989, the Argentine Navy supply-and-tourist vessel, *Bahia Paraiso*, left Palmer Station at high speed through rocky waters and ran hard aground, spilling oil into areas for which the U.S. Antarctic Program had sought site protection because of their importance to environmental research. The ship sank, continuing to ooze oil.<sup>43</sup>

In September 1989, SCAR's environmental specialists blocked an Antarctic Protected Area proposal for the Palmer Station area. Their official comments included the following: "It was felt by some members that there was a lack of clarity in the concept of [Antarctic Protected Areas]. Problems arose in the application of management, whether this was land management or the management of human activities."<sup>44</sup> The unofficial sentiment ran closer to the following: "[T]he U.S. proposal was criticized most consistently because it did not take a 'zoning' approach to management. The discussion resulted in an unresolvable debate about land versus human activities management."<sup>45</sup>

The Antarctic Treaty regulatory framework into which a plan for protection of the Palmer Station area was to fit continued to change. At their 15th regular meeting in 1989, the consultative parties approved and recommended to their respective governments the establishment of a new site-protection category, the multiple-use planning area (MPA).<sup>46</sup> The basic purposes of this category of protected sites are to bless appropriate restrictions and to foster coordination of activities in order to minimize mutual interference (i.e., the bunching of stations so close together as to disrupt each other's research activities) and

adverse environmental effects. Each MPA "shall be designated pursuant to a management plan developed through consultations, as appropriate, among interested Parties and approved by the Antarctic Treaty Consultative Parties."<sup>47</sup> The consultative parties seemed to expect that this kind of planning and regulation would be tried only in a few places, sites unusually vulnerable to perturbation or sites subject to heavy, competing demands (i.e., from science, logistics, and tourism).

The consultative parties approach the regulation of territory and conduct gingerly and indirectly, because of the background regime (sometimes overlapping, sometimes conflicting claims; differences on amenability to claims; and commitment through the Antarctic Treaty not to assert or derogate claims). These parties do not impose international or multinational regulation. Rather, they typically agree to permit and even to encourage the several parties that may be involved in an Antarctic area to settle local operational problems themselves. As in other matters under the Antarctic Treaty, the arrangement leaves enforcement to each of the countries involved, with the understanding that the states active in the region may make rules for their own stations<sup>48</sup> and have jurisdiction over their own nationals, ships, and airplanes.

Certain common-sense rules for the design of MPAs should follow from these unusual political and juridical circumstances. An MPA management plan should not appear to be an assertion of control on the part of any one country. Further, an MPA management plan should be identified with a region and not with an individual station. Also, an MPA management plan should be for the cooperative, independent national regulation of conduct, not of territory.

The United States rewrote its draft Palmer Station area protection plan, redesignated it as a plan for a southwest Anvers Island MPA (rather than call it a Palmer plan),<sup>49</sup> and planned to present it directly to the Antarctic Treaty consultative parties for approval at their October 1991 meeting in Bonn.

Although claimant countries simply regard the areas of their claims as domestic territory when they face legal issues that are not international in character, the United States as a non-claimant and non-recognizer cannot do so when dealing with its areas of operation. The United States thus has the problem of how

to establish a local environmental protection regime in the Palmer Station area consistent with its foreign policy position absent any territorial basis for doing so. The United States has resolved this matter by proposing international consensus regulation not of a specific region but of behavior within that territory. This comes close to being a legal fiction, asserting a property-related right without asserting or derogating a property right. Nevertheless, it is a source of law and a basis of jurisdiction, and, in turn, is a rationale for U.S. legislation and regulation asserting carefully limited jurisdiction over behavior with reference to place but not over the place itself.

However, prohibiting potentially damaging behavior in a specific place is not a legally sufficient precaution. There must also be enforcement provisions. "To enforce . . . without the sanction of punishment is obviously impossible."<sup>50</sup>

The general approach in Antarctica has been to trust each state to enforce the norms of the regime with respect to its own nationals and to enforce its own station rules. The regime has not dealt with the foreseeable practical problems that arise from the necessity of enforcing such norms and rules against non-nationals. The Antarctic Treaty obligates its parties to dissuade non-parties from conduct contrary to the regime's principles and purposes, but the issues are not quite the same.

The U.S. proposal for an MPA covering southwest Anvers Island and vicinity declared:

To minimize the potential for cumulative environmental impact and mutual interference, the United States plans to regulate the activities of its nationals, and requests that other Antarctic Treaty Parties regulate activities of their nationals in the identified areas according to the general and site-specific provisions noted below.<sup>51</sup>

The United States is thus able to regulate the behavior of U.S. nationals at its sites in the Antarctic, but this is not enough. Can the United States then use its legal machinery to compel compliance? In other words, could a U.S. prosecution for violation of an accepted legal norm of the Antarctic regime survive in a U.S. court?

The threshold tests include due process

considerations, and a critically important due process test is whether the statute or regulation is arbitrary and capricious.<sup>52</sup>

Here the Palmer Station area plan as of mid-1991 was at its weakest in two ways. The plan did not specify the boundaries of its coverage with even minimal precision and failed to offer a basis for the boundaries proposed. As proposed, the plan would proscribe certain environmentally harmful behavior within a rectangular area described by geodetic coordinates on some of the few nautical charts compiled in the region. The mapping is so inadequate, however, that the proposed area might as well not be referenced.<sup>53</sup>

Although the plan's supporting documentation offered various justifications for environmental precautions in the area and the need for precautions at a few specific sites is self-evident or nearly so, neither the plan nor its supporting documentation offered any basis for the proposed specific boundaries of the area to be protected. The plan would have established legal norms for behavior in protected areas but did not state reasonably what areas are to be protected or why certain behavior would be unacceptable inside the established boundaries, but acceptable outside of them.

The NSF perceived a substantial threat posed by tourism and tour ships in the Palmer Station area and sought help from the scientific community. But that community's procedures for protecting special sites were inadequate. Experts in the scientific community failed to consider either the urgent need for practical precautionary measures or the basic legal issues involved, primarily those of enforceability.

#### *Environmental Assessment*

Civil engineering and logistical planning inevitably require awareness of the local environment; they do not necessarily entail purposeful anticipation of the possible range of consequences of environmental modification. In its conduct of the U.S. Antarctic Program the National Science Foundation has not intentionally sought to despoil the environment to which it sends scientists to study. It has made various attempts to minimize the local environmental impacts of its Antarctic presence.<sup>54</sup> Such impacts are discrete and localized and in other geographic locations would be mostly inconsequential. In Antarctica, however, environmental disturbances can

have both political and scientific impacts. Visible pollution can bring the Antarctic Treaty regime into disrepute, and even small anthropogenic perturbations can undercut the validity of research intended to understand both the Antarctic environment and its roles in global processes.<sup>55</sup> Good intentions notwithstanding, the NSF's Division of Polar Programs has run its logistics operation without regard to the legal requirements incident to their efforts to contain environmental damage in the Antarctic.

These requirements were set forth in the National Environmental Policy Act of 1969 (NEPA)<sup>56</sup> and Executive Order No. 12,114,<sup>57</sup> promulgated in 1979 to ensure the conduct of NEPA processes for U.S. government activities abroad. The Foundation has contended in recent years that it is the executive order rather than NEPA that applies to them, but has also observed that there is no practical difference.<sup>58</sup> The U.S. District Court for the District of Columbia ruled on Aug. 29, 1991 that the executive order, not NEPA, governs environmental assessment in the U.S. Antarctic Program.<sup>59</sup> The ruling dismissed a suit by the Environmental Defense Fund in a controversy involving the incineration of waste. Legislation was already pending that would explicitly make NEPA applicable abroad.<sup>60</sup> Antarctic Treaty consultative recommendations similarly call for deliberate efforts to anticipate the environmental consequences of Antarctic projects.<sup>61</sup>

Whether through NEPA or through Executive Order No. 12,114, U.S. law requires the NSF to consider the possible environmental impacts of its proposed Antarctic activities. Although which standard applies may be immaterial from the standpoint of the agency's obligation to look before it leaps, the question is important to outsiders seeking to enforce standards of environmental conduct. A private party can sue, with difficulty, for NEPA enforcement, but it is much more difficult for private individuals to win court enforcement of an executive order.

The executive order additionally obligates the agency to respect host-regime law, which as yet is soft. The problem of Antarctic Treaty consultative measures that are facially only "recommended" and that remain unimplemented by domestic legislation continues. One way or another, the NSF is obligated to anticipate the environmental consequences of its Antarctic activities, and its compliance has been desultory at best.

The NEPA process, which is also part of the executive order, is simple. The first step is environmental assessment, the determination of whether a proposed action might significantly affect the environment. Unless the environmental assessment results in a finding of no significant impact, the proposed action and alternative actions are to be formally reviewed for possible environmental impacts, and outside views are to be sought. Draft environmental impact statements are to be circulated for public comment and for comment by other federal agencies that might be interested in the proposed action. The proposing agency can then reach its decision to go ahead, modify the proposal, pick an alternative (also subject to impact study), or abandon the idea altogether.<sup>62</sup> The proposing agency of course must have procedures for determining which proposed actions require environmental assessment and which proposed actions can be excluded categorically.<sup>63</sup> This is a look-before-you-leap law, not a don't-leap law.

In the early 1970s the NSF arranged for an environmental impact study of the pending international Ross Ice Shelf Project, which was to involve drilling.<sup>64</sup> Otherwise, the NSF has not preceded its Antarctic activity commitments with environmental assessments or impact studies.

The NSF promulgated NEPA procedures regulations for itself in 1980.<sup>65</sup> A few months later the agency issued a general environmental impact statement for the program as a whole.<sup>66</sup> A month before the public release of its programmatic impact statement, and without public notice, the Division ordered most of the program excluded from further environmental analysis. The categorical exclusions established by Division memoranda included transportation, construction, fuel handling and storage, waste disposal, and scientific activities, including the collection of geologic specimens, detonation of explosives, drilling, collection of biological specimens, and use of radioisotopes.<sup>67</sup> A decade later the NSF's general counsel urged that the agency comply with the executive order's procedural requirements "in the spirit in which they were intended" and "prepare appropriate environmental documents for major federal actions significantly affecting the Antarctic environment."<sup>68</sup>

Notwithstanding the program's array of construction and transportation projects, the Division neither conducted nor arranged for



environmental assessments until the late 1980s, when it conducted assessments for two McMurdo Station projects to which the agency had already committed itself. These were a new science laboratory and wastewater-management changes. Both assessments resulted in findings of no significant impact.<sup>69</sup> In 1989 the Division hired the Department of Energy's Oak Ridge National Laboratory to update the 1980 programmatic environmental impact statement.<sup>70</sup> A draft supplemental environmental impact statement was completed in December 1990.<sup>71</sup>

On July 9, 1990, the Division reported its plan to fund a workshop on Antarctic environmental management and assessment, to be held by the International Council of Managers of National Antarctic Programs.<sup>72</sup> The following day, the NSF's proposed regulations for implementing Executive Order No. 12,114 in the U.S. Antarctic Program were published. Among the proposed categorical exclusions were transportation, fuel handling and storage at current stations, and construction "involving interior remodeling and renovation of permanent and temporary facilities within existing stations, field camps, and bases . . . ."<sup>73</sup>

The Antarctic Program has been sending mixed messages concerning environmental impact assessment.<sup>74</sup> Program participants are instructed as follows:

All persons in the U.S. Antarctic Program must consider constantly the environmental consequences of both personal conduct and official decisions.

For some planned actions, some level of environmental assessment may be required. . . . [C]hanges in plan must be considered, too. The effort to assess environmental impact is minor compared to the possible consequences of not doing it. . . .<sup>75</sup>

The program's Environmental Protection Agenda emphasizes impact assessment,<sup>76</sup> and the program's director informed Congress that the Environmental Protection Agenda is the "backbone of USAP[U.S. Antarctic Program]'s antarctic environmental policy . . . ."<sup>77</sup>

As late as October 1991 this policy endorsement had yet to be put into practice. NSF still had not promulgated environmental impact assessment regulations for the

program. They were postponed until 1992.<sup>78</sup>

The agency did inaugurate an informal system of internal notifications of plans and projects of possible environmental concern, and between October 23, 1989, and June 27, 1991 the Division of Polar Programs produced 29 internal notifications ("environmental action memoranda") or related documents.<sup>79</sup> The subjects include installation of an experimental runway, landfill materials, wastewater dispersion, and placement of fuel tanks. None of these memoranda had triggered any full impact study.

The Environmental Protection Agenda and legal review notwithstanding, the management of the Division of Polar Programs apparently has regarded environmental assessment as an arbitrary burden. In ruling that the executive order rather than NEPA was the domestic source of the NSF's Antarctic Program environmental assessment obligations, the district court observed:

[T]he Court does note that many of the problems that have arisen in the present action could have been avoided had NSF not attempted to mix and match portions of NEPA and the Executive Order in concluding that building the incinerators would not have a significant effect on the environment. Further, the Court is troubled by NSF's response that Antarctica is not ecologically critical to EDF's comments on the Draft Environmental Impact Assessment.<sup>80</sup>

#### *Waste Disposal*

Executive Order No. 12,088<sup>81</sup> governs control of pollution from U.S. Government facilities and generally requires these facilities to comply with local standards, including applicable provisions of federal law. The Department of State has taken the position that the host regime in this instance is the Antarctic Treaty and that the U.S. Antarctic Program must conform not only to Federal statutes that apply abroad but also at least to the standards set forth in Antarctic Treaty consultative recommendations.<sup>82</sup>

Until recently, the Antarctic Treaty consultative standard was a loose, prescriptive Code of Conduct<sup>83</sup> geared primarily to very small operations. The Code directed parties to flush most liquids to the sea, to incinerate

solids if possible, and to dump noncombustibles at sea. The Code provided inadequate guidance for the logistics of a substantial science enterprise, and at the request of the Antarctic Treaty consultative parties SCAR reviewed the subject. Responding to a survey by SCAR's Panel of Experts on Waste Disposal, the NSF commented:

Waste-management situations differ. The desirability of technologies for mitigation of . . . impacts differs with scale, the local environment, access to transport, and the environmental and economic costs of alternatives. . .

The current Code recommends specific waste-disposal procedures rather than results. These recommended procedures do not take account of the wide variety of operating situations in the Antarctic, do not address questions of subsequent disposal, and do not lend themselves to measurement of performance. Nor do they suggest the importance of compliance or imply any scale of environmental consequence of non-compliance. The recommended procedures are not of comparable importance and may not always be optimal for environmental protection. . .

An international waste-disposal policy . . . must encourage constructive behavior despite the lack of the kinds of enforcement mechanisms that apply to narrowly written statutes and ordinances in domestic law. It should encourage the trust that fosters good international relations. This is more likely to be achieved by the encouragement of good-faith efforts, progress reports, consultations, and information exchanges than by stating that a specified item should be put here or there. . .<sup>84</sup>

The NSF proposed an amendment along these lines, the principles of which were included in the SCAR panel's recommendations and were adopted by the Antarctic Treaty consultative parties at their 1989 meeting.<sup>85</sup> The new code emphasizes environmental protection in waste-disposal methods and minimization of waste generation, and it forces Antarctic operators to look at what they do. The code requires each government conducting

Antarctic activities to prepare and annually update waste-management plans (including waste reduction and storage and disposal for field camps generally and for each fixed station specifically) and for annual exchange of these documents among these governments, and it brings logisticians into the environmental advisory process.<sup>86</sup>

Well in advance of the tallying of other governments' approval of the recommendation, the Foundation accepted it as part of its policy framework and initiated planning, remedial, and new waste-disposal measures accordingly.<sup>87</sup> The consultative parties agreed in their June 1991 Madrid meeting on comprehensive environmental protection that they would reiterate these waste management principles and simplify them slightly, in a proposed annex<sup>88</sup> that intended to supplant the 1989 recommendation.

#### *NSF Regulatory Responsibilities*

The National Science Foundation has statutory responsibility for enforcing the Antarctic Conservation Act of 1978,<sup>89</sup> for implementing the Agreed Measures<sup>90</sup> with respect to the behavior of U.S. nationals, and for assigning the NSF additional Antarctic conservation responsibilities. On the whole, the agency has made clear its opposition to formal regulation.

NSF responsibilities under the Act include the establishment and administration of a permit system, a hurdle that applicants would have to clear before being allowed to enter protected sites or being allowed to interfere with native Antarctic plants and animals. The agency established the permit system<sup>91</sup> and has enforced it vigorously.<sup>92</sup>

The statute authorized the NSF to designate pollutants to be regulated. This the agency had not yet done at the end of 1990. The NSF's first step here was a 1990 proposal to seek expert opinion on the subject.<sup>93</sup>

The NSF waited until 1989 to establish procedures for enforcing the Antarctic Conservation Act<sup>94</sup> except by granting or withholding permits. However, having finally established general enforcement procedures, the NSF has not appeared to use them.<sup>95</sup> In a periodic letter to U.S. Antarctic Program participants, the director of the Division of Polar Programs reported that "a graduate student violated NSF requirements for packing and shipping hazardous materials when he was

leaving McMurdo" and that "NSF advised his university of the incident, and the university informed the student that he will not be a member of the field team in Antarctica this season."<sup>96</sup> In promulgating its enforcement regulations, including provision for complaint and hearing, the agency had said that its procedures were intended to cover the "full range" of Antarctic Conservation Act enforcement proceedings.<sup>97</sup>

The one Federal court that has considered the issue of Federal science-sponsoring agencies' application of extralegal sanctions failed to find that the suspected scientist had been deprived of due process and equal protection but found the agency's conduct unlawful under the Administrative Procedure Act.<sup>98</sup> In accord with interim procedures announced but never formally promulgated under the Administrative Procedure Act, the National Institutes of Health (NIH) had placed the scientist on an alert list to warn granting agencies that he was under investigation for possible misconduct. Because the dispute involved an active grant, the court acknowledged the scientist's and his university's standing to sue. The liberty and property interests of the scientist and university in possible future grants were found insufficient to implicate due process and equal protection clauses. But the court found the interim procedures followed by the NIH invalid because they were not properly promulgated.

Asked directly in 1989 whether the United States had fined anyone for "trespassing in a penguin breeding area or other environmentally sensitive area," the NSF told Congress:

No individual U.S. citizens have been fined. One individual, a non-U.S. citizen, was censured by his host university after the NSF informed the university that he had transported a penguin skin from the Antarctic.

Several individuals have received reprimands for technical violations of the NSF regulations but no fines have been levied yet.<sup>99</sup>

Arguably, the Antarctic Conservation Act and the NSF's regulations under the Act do not apply to U.S. Antarctic Program research grantees and their assistants. Other agency regulations govern procedures for misconduct in research. Research misconduct includes failure to comply with material legal requirements

governing research.<sup>100</sup> Both sets of regulations provide specific enforcement procedures, which include notice and opportunity to be heard. They do not provide for summary debarment of grantees or members of their teams.

The NSF has made clear its preference for informality over regulation. A Division official praised "self-regulation" by operators of Antarctic tours,<sup>101</sup> although no data are available to indicate whether Antarctic tourism normally does or does not adversely and significantly affect local ecosystems.<sup>102</sup> In an experimental program, the Division arranged for conservation observers on tour ships. One observer delivered a glowing report.<sup>103</sup> Another reported that the program worked well with the exception of two incidents involving foreign nationals. No details were given, but had U.S. nationals "done the same thing they would have been in clear violation" of the Antarctic Conservation Act.<sup>104</sup>

The Division's recent environmental policy plans speak of both strict enforcement and informality, but the text of the proposal is confusing. At one point the agency declares, "[T]he USAP would strictly enforce the Antarctic Conservation Act, would consider developing additional policies on the conduct of U.S. tourism in Antarctica, and would develop and implement a tourism management plan. The policies and plans would be based on existing voluntary guidelines . . . ."<sup>105</sup> At another point the agency summarizes the same position as: "Tourist visits would continue under voluntary guidelines; USAP would continue to also develop policies on tourism and a tourism management plan for all stations."<sup>106</sup>

The NSF delayed promulgating Antarctic Conservation Act regulations. In a matter involving the Antarctic Conservation Act, the NSF went outside its own procedural regulations for enforcement. The NSF has yet to accept the broad regulatory role that the Antarctic Conservation Act has assigned to it and that changing Antarctic circumstances render increasingly important.

### III. CONCLUSIONS

U.S. Antarctic Program experience presents a picture of inconsistent responses to the challenges of Antarctic environmental regulation.

When the U.S. Antarctic Program expressed concern for site protection and sought help from the larger scientific commu-

nity, that community failed to respond efficiently or effectively. The overriding assumption of the Antarctic Treaty consultative recommendations governing the designation of special sites for protection is that the scientific community, being sensitive to environmental issues, will readily identify environmental protection problems and will recommend logical protective measures. The experience is that the machinery is slow, encyclopedic rather than efficient, and not necessarily effective. Both internationally and nationally, the scientific community has been insensitive to the practical problems and legal prerequisites of enforceability. The Scientific Committee on Antarctic Research and its national committees may wish to consider streamlining their procedures and requirements, and Antarctic Treaty governments may wish to invite and consider site protection recommendations not only from SCAR but also from national Antarctic research program managers and legal advisors. The National Science Foundation still has the opportunity to promulgate formal rules for its station personnel and visitors.

As late as October 1991, the Foundation had yet to establish regulations for environmental assessment to determine which of its proposed Antarctic activities ought to be subjected to a complete impact study. The agency's proposed environmental assessment regulations categorically excluded significant sources of environmental problems. Whether bound by the National Environmental Policy Act of 1969, or by Executive Order No. 12114 of 1978, and notwithstanding the Antarctic Treaty consultative recommendations on this subject, as of mid-1991 the NSF had yet to conduct an environmental assessment or to begin an impact study for any construction, demolition, or transportation project to which it had not already committed itself. The agency's behavior in this regard indicates the absence

of effective sanctions.

Facing political pressure to clean up its long-accumulated Antarctic mess and facing the prospect of a new and tougher waste disposal code, the Division directly involved itself on the side of realism. Responding to a SCAR survey that would lead to a proposed new code, the Division made its own proposals. One result is a proposed code that emphasizes periodic planning and progress reports and performance criteria rather than broad and possibly inappropriate technological prescriptions. The Antarctic Treaty does not and cannot provide for penalties. But to find that an Antarctic station is not complying is insufficient. Here the new process promises to force the countries that are active in Antarctica to pay collective attention to the problem. They have obligated themselves to look at their situations specifically rather than in general terms and to be candid with one another.

The NSF's failure to face the breadth and due process requirements of its own Antarctic regulatory responsibilities has long been evident. The agency's management sooner or later may have to deal with legal consequences of proceeding informally and may wish to consider separating enforcement from operational responsibilities.

The U.S. Antarctic Program's environmental conduct suggests the need for increased realism and a greater focus on legal issues in the Antarctic Treaty consultative process and related science advisory machinery. The Program's experience also suggests the need for stronger regulation by the NSF and stronger Executive and Legislative oversight of the NSF.

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#### ENDNOTES

1. JOHN HEAP, *Introductory note, General provisions for environmental protection*, HANDBOOK OF THE ANTARCTIC TREATY SYSTEM 2101 (7th ed. 1990).
2. The physical and biotic features of Antarctica, for the most part, represent extreme conditions— isolation, cold, windiness, extensive glacial ice and sea ice, depauperate terrestrial biota, and abundant marine biota. Antarctica was untouched by man until the past two centuries and is still almost pristine. It yields key information about global systems such as heat budget, magnetism, atmospheric electricity, plate tectonics, ocean currents, and ocean chemistry. Many of the Antarctic components in these global systems are in sensitive balance and thus are useful for monitoring environmental changes. The biotic systems comprise organisms and food chains that are extraordinarily adjusted to harsh conditions. The organisms are valuable sources of knowledge about physiological, ecological, and evolutionary response to stressful environments, especially

cold, polar darkness, sea ice, and terrestrial snow, ice, and desiccation. These are all reasons for protecting the Antarctic environments and resources against unnecessary disturbance. Some scientific investigations may cause a degree of degradation to environments and resident organisms, but these studies are the sources of information essential for optimum management of the areas and biotas of concern.

William S. Benninghoff, *Antarctic Ecosystem*, 13 ENVTL. INT'L 9, 13-14 (1987). "Direct impacts on the global environment are not a concern with regard to USAP [U.S. Antarctic Program] emissions [of atmospheric contaminants]. However, current or increased future emissions have the potential to bias atmospheric trace constituent monitoring, which is vitally important to understanding and tracking global environmental impacts [of phenomena originating outside the Antarctic]." NAT'L SCI. FOUND., Final SUPPLEMENTAL IMPACT STATEMENT FOR THE U.S. ANTARCTIC PROGRAM § 6.3.2 (October 1991).

3. See, e.g., Colin M. Harris, *Environmental effects of human activities on King George Island, South Shetland Islands, Antarctica*, 27 POLAR REC. 193 (1991).

4. Antarctic Treaty, Dec. 1, 1959, 12 U.S.T. 794, 402 U.N.T.S. 71 (entered into force June 23, 1961).

5. *Antarctic Treaty, art. IV*, 12 U.S.T. at 796, 402 U.N.T.S. at 74. Article IV bars signatories from derogating, asserting, or attempting to vindicate Antarctic territorial claims. Portions of the Antarctic continent are unclaimed, other portions are subject to unconflicting claims, and yet other portions are subject to overlapping claims (of Argentina, Chile, and the United Kingdom). The United States recognizes no claims. See CENTRAL INTELLIGENCE AGENCY, POLAR REGIONS ATLAS (1978). The Treaty covers the area south of 60 degrees south latitude and includes all ice shelves but is without prejudice to high-seas rights under international law. Antarctic Treaty, *supra* note 4, art. VI 12 U.S.T. at 797, 402 U.N.T.S. at 76. Signatories are obligated to "exert appropriate efforts, consistent with the Charter of the United Nations, to the end that no one engages in any activity in Antarctic contrary to the principles or purposes" of the Antarctic Treaty. *Id.* art. X., 12 U.S.T. at 799, 402 U.N.T.S. at 80. The Treaty is fundamentally an arms control instrument. "Antarctica shall be used for peaceful purposes only." *Id.*, art. I, 12 U.S.T. at 795, 402 U.N.T.S. at 72.

6. Antarctic Treaty, *supra* note 4, art. IX, 12 U.S.T. at 798, 402 U.N.T.S. at 78-80. The treaty organization has no secretariat or publication mechanism. Publication of consultative meeting reports and recommendations is irregular and limited. Polar Record, published by Scott Polar Research Institute, regularly carries the summary reports of Antarctic Treaty consultative meetings. Recommendations of the first 15 Antarctic Treaty consultative meetings (hereinafter ATCM recommendations) and summaries of approvals appear in Handbook of the Antarctic Treaty System (7th ed. 1990), published by Scott Polar Research Institute. These recommendations and specific responses of the national governments appear in WILLIAM BUSH, ANTARCTICA AND INTERNATIONAL LAW: A COLLECTION OF INTER-STATE AND NATIONAL DOCUMENTS (vols. 1-3 1982, Index vol. 1988, & 1991 supp.).

7. Antarctic Treaty, *supra* note 4, art. IX, 12 U.S.T. at 798, 402 U.N.T.S. at 78-80.

8. "The practice has been essentially pragmatic; there has been no systematic attempt to provide for an all-embracing code for the governance of Antarctic activities." HEAP, *supra* note 1, at xii (7th ed. 1990).

9. 16 U.S.C. § 2401 (1985).

10. Antarctic Treaty Consultative Meetings [hereinafter "ATCM"], recommendations III-VII, *reprinted in* HEAP, *SUPRA* note 1.

11. ATCM recommendation XV-1, *reprinted in* HEAP, *supra* note 1, at 2104.

12. PROTOCOL TO PROTECT ANTARCTICA SIGNED BY 31 NATIONS AT MEETING, UNSIGNED, INT'L ENVTL. DAILY (BNA), Oct. 10, 1991.

13. PROTOCOL ON ENVIRONMENTAL PROTECTION TO THE ANTARCTIC TREATY, October 4, 1991 [hereinafter "PROTOCOL"], Annex I, Environmental Impact Assessment; Annex II, Conservation of Antarctic Fauna and Flora; Annex III, Waste Disposal and Waste Management; [draft] Annex IV, Prevention of Marine Pollution. The draft protocol issued by the 1991 special consultative meeting in Madrid carries a date of June 23, 1991, for opening for signature. But it was subsequently announced that a clause for amendment remained to be drafted, and, "As it was impossible to accept the Protocol text in its entirety, this being acceptable to all delegations but one, it was decided that before the next Sixteenth Ordinary Meeting to take place in Bonn, a brief meeting should be held in Madrid in order to approve the pending article and therefore establishing [sic] a definitive text which could [be] signed by all the Contracting Parties to the Antarctic

Treaty." Xlth Antarctic Treaty Special Consultative Meeting, Press Release. (on file with author) The hold-out had been the United States, which subsequently announced its assent. Statement on the Environmental Protection Protocol to the Antarctic Treaty, 27 WEEKLY COMP. PRES. DOC. 889 (July 4, 1991). The protocol articles on liability and dispute settlement and the proposed annex on marine pollution were also subject to early change, because of drafting problems. Xlth Antarctic Treaty Special Consultative Meeting, Report by the Chairman of the Legal Drafting Committee.

14. PROTOCOL, *supra* note 13, at art. 13.
15. *Id.* at art. 9.
16. *Id.* at art. 5.
17. As late as mid-1991, no issue of enforcement of an Antarctic Treaty consultative recommendation had come before U.S. courts.
18. See, e.g., ANTARCTIC J. OF THE U. S. (Nat'l Sci. Found., Review 1989).
19. The International Geophysical Year, an immense international cooperative effort to understand the natural processes of the earth, focused unprecedented scientific attention on Antarctica. See LAURENCE M. GOULD, THE POLAR REGIONS IN THEIR RELATION TO HUMAN AFFAIRS (1958); PAUL SIPLE, 90° SOUTH (1959); NAT'L ARCHIVES, UNITED STATES POLAR EXPLORATION (Herman Friis & Shelby B. Bale, Jr., eds. 1970).
20. See NAT'L SCI. BOARD, COMM. ON NSF ROLE IN POLAR REGIONS, ROLE OF THE NAT'L SCI. FOUND. IN POLAR REGIONS 1-5, 45-53 (1987); DIVISIONAL ADVISORY COMM. FOR POLAR PROGRAMS, NAT'L SCI. FOUND., LONG-RANGE SCI. PLAN FOR THE DIV. OF POLAR PROGRAMS VI, 43-45 (1990), NAT'L SCI. FOUND., DRAFT SUPPLEMENTAL IMPACT STATEMENT FOR THE U.S. ANTARCTIC PROGRAM § 1.2.1.3 (1990).
21. See, e.g., CONSERVATION PROBLEMS IN ANTARCTICA (colloquium proc., Bruce Parker ed. 1972) (on file with author).
22. See, e.g., PHILIP W. QUIGG, POLE APART, 62-63 (1983).
23. See Gerald S. Schatz, *Protecting the Antarctic Environment*, 31 No. 2 OCEANUS 101, 102 (Summer 1988).
24. NAT'L SCI. FOUND., DIV. OF POLAR PROGRAMS, U.S. ANTARCTIC PROGRAM ENVIRONMENTAL PROTECTION AGENDA (1988).
25. *Id.*, at i, 18-23.
26. This paper follows terminology of the Council on Environmental Quality: An environmental assessment is a preliminary consideration of a proposed activity in order to determine whether it is likely to be of significant environmental impact, in which case an environmental impact study is required.
27. NAT'L SCI. FOUND., *supra* note 24, at 24-29.
28. NAT'L SCI. FOUND., OFF. OF GEN. COUNS., NAT'L SCI. FOUND. STRATEGY FOR COMPLIANCE WITH ENVIRONMENTAL LAW IN ANTARCTICA (1989).
29. Antarctic Treaty, *supra* note 4, art. VIII 12 U.S.T. at 797, 402 U.N.T.S. at 78. Agreed Measures for the Conservation of Antarctic Fauna and Flora, ATCM recommendation III-VIII, *reprinted in* HEAP, *supra* note 1.
30. ATCM recommendation VII-3, *reprinted in* HEAP, *supra* note 1, at 3301.
31. ATCM recommendation XIV-6, *reprinted in* HEAP, *supra* note 1, at 3337.
32. The International Council of Scientific Unions (ICSU) is a nongovernmental organization of national academies of science and international organizations in the scientific disciplines. The Scientific Committee on Antarctic Research consists of delegates from national academies or research organizations active in the Antarctic. U.S. delegates to SCAR and its various working groups are appointed by the Polar Research Board (which serves as the U.S. national committee for SCAR) of the National Academy of Sciences, a nongovernmental institution that advises U.S. government agencies in scientific and technical policy matters and that represents the U.S. scientific community in ICSU. SCAR serves as a scientific ad-

visor to the Antarctic Treaty governments. Summary reports of the meetings and recommendations of the Scientific Committee on Antarctic Research to the Antarctic Treaty consultative parties appear in Polar Record.

33. ATCM recommendations IV-27, VI-7, and X-8 require tourist compliance with local station rules. See HEAP, *supra* note 1, at 2601 and 2605. The term "station" arises frequently in Antarctic Treaty business but is left undefined. It obviously refers to a place where a country sends equipment and people, and it includes buildings. Every Antarctic station is a conglomeration of equipment and buildings. To define a station further might require saying something about boundaries. Article IV of the Antarctic Treaty seems to discourage if not preclude that.

34. NAT'L ACAD. OF SCI. POLAR RES. BD. BACKGROUND MATERIALS FOR 63D MEETING OF NAT'L ACAD. OF SCI. POLAR RES. BD. § 7.2.2 (April 28-30, 1988).

35. *Id.*

36. P.L. KEAGE, ET AL., *Improving antarctic management plans*, 25 No. 155 POLAR REC. 309, 311-13 (1989).

37. REPORT OF THE SCIENTIFIC COMMITTEE ON ANTARCTIC RES. WORKING GROUP ON BIOLOGY, SUB-COMMITTEE ON CONSERVATION, HOBART, Australia, Aug. 24-26, 1988, at ¶ 4.2(ix).

38. Charting of the vicinity of Palmer Station is long out of date. The workshop had to work with charts such as these: U.K. DIRECTORATE OF OVERSEAS SURVEYS, BRITISH ANTARCTIC TERRITORY: ANVERS ISLAND, D.O.S. 210 (1963), 1:10,000 scale, with the kilometer scale hand-corrected "Per USGS [U.S. Geological Survey] letter 5 April 1966" for a 50-percent error. U.K. ADMIRALTY, ANTARCTICA: PLANS IN GRAHAM LAND (1973), warning, "CAUTION: Mariners are warned to the incomplete nature of the surveys this chart should be used with caution." U.K. HYDROGRAPHER OF THE NAVY, ANTARCTICA—GRAHAM LAND: ANVERS ISLAND TO PITT ISLANDS 3572 (1974), 1:125,000 scale at lat. 65°00', warning, "Incomplete Surveys" in the area of the Joubin Islands, west of Palmer Station, and warning further that coordinates should be "decreased by approximately one minute" to agree with companion charts. DEFENSE MAPPING AGENCY, ANTARCTICA: ANTARCTIC PENINSULA: GRAHAM AND DANCO COASTS: ARGENTINE ISLANDS TO DALLMANN BAY, 29122 (1975), 1:200,000 scale, warning, "The area portrayed by this chart has not been completely surveyed and most of the data are of a reconnaissance nature only. Mariners are warned to exercise extreme caution when navigating in these waters." DEFENSE MAPPING AGENCY, VICINITY OF ARTHUR HARBOR, 29123 (1977), 1:25,000 scale, warning, "CAUTION: The area portrayed by this chart has not been completely surveyed and most of the data are of a reconnaissance nature only. Mariners are warned to exercise extreme caution when navigating in these waters." DEFENSE MAPPING AGENCY, APPROACHES TO ARTHUR HARBOR, 29126 (1978), 1:50,000 scale, warning: "CAUTIONS: 1. The area portrayed by this chart has not been completely surveyed and most of the data are of a reconnaissance nature only. Mariners are warned to exercise extreme caution when navigating in these waters. 2. Due to internal inconsistencies the geographic locations of some features on this chart may be displaced by as much as 2 miles." DEFENSE MAPPING AGENCY, ANTARCTICA: ANTARCTIC PENINSULA, 29002 (1981), 1:1,500,000 scale, warning, "CAUTIONS: 1. This chart is intended for offshore navigation only. Detailed information has been omitted or generalized in areas covered by larger scale charts. . . . 2. The area portrayed by this chart has not been completely surveyed and most of the data are of a reconnaissance nature only. Mariners are warned to exercise extreme caution . . ." ITT ANTARCTIC SERVICES, PALMER STATION SITE PLAN (1987), scale 1 in. = 50 ft., a plat with no base map source indicated.

39. Not shown on the ITT Antarctic Services Palmer Station plat.

40. THE BIOLOGICAL BASIS FOR AREA-WIDE PROTECTION AT PALMER STATION, ANTARCTICA, REP. OF A WORKSHOP, UNIV. OF CALIFORNIA AT SANTA BARBARA, SPONSORED BY THE MARINE MAMMAL COMMISSION, held Nov. 3-4, 1988, at 13.

41. *Id.* at 30-32. References are to Defense Mapping Agency charts 29122, 29123, and 29126.

42. The area selected seems to accord with a kind of Goldilocks and the Three Bears criterion: It should not be too big; too small an area might exclude sites known to be scientifically valuable; and something in between would be just right. This writer raised the issues of arbitrariness and enforceability, but the workshop scientists said that legal matters were, so to speak, outside their province.

43. ITT ANTARCTIC SERVICES, INC., THE U.S. ANTARCTIC PROGRAM AND THE WRECK OF THE *Bahia Paraiso*: DOCUMENTED CHRONOLOGY (May 11, 1989).

44. Sci. Comm. on Antarctic Res., Group of Specialists on Environmental Affairs and Conservation, REPORT OF MEETING SEPT. 11-14, 1989, CAMBRIDGE, U.K., SCAR Bulletin No. 96, Jan. 1990, *reprinted in* POLAR RESEARCH BOARD, BACKGROUND MATERIALS POLAR RESEARCH BOARD 67TH MEETING, NAT'L ACAD. SCI., April 1-3, 1990, at 3.6.1.

45. SHERBURNE B. ABBOTT, Memorandum to SCAR Group of Specialists on Antarctic Environmental Affairs and Conservation File, at ¶ 6.0 (Sept. 21, 1989) (on file with author).

46. FINAL REPORT OF THE FIFTEENTH ANTARCTIC TREATY CONSULTATIVE MEETING, PARIS, 9-20 Oct. 1989 ¶ 136. ATCM recommendation XV-11, *reprinted in* HEAP, *supra* note 1, at 3601.

47. *Id.*

48. The consultative parties have recognized that relative accessibility of certain areas (e.g., King George Island, in the peninsula area) may give rise to problems as stations crowd close together. But the consultative parties have not addressed the subject of station boundaries, which could raise territorial questions. This is the principal Antarctic legal problem with wide use of zoning as a general area planning technique, which Antarctic science advisory groups advocated. (Nor did the Antarctic scientists note that the efficacy of zoning as an environmental planning technique is disputed.) Of course the designation of a few dozen small, specific sites as special in some way and therefore to be protected is a kind of zoning, but it is done by consultative meeting recommendation.

49. NAT'L SCI. FOUND., DIVISION OF POLAR PROGRAMS, [Draft] Multiple-Use Planning Area, No. \_\_\_\_, Southwest Anvers Island and Vicinity Management Plan; *Background Paper: The Ecological and Scientific Basis for Multiple-Use Management of Human Activities in the Palmer Station Area.*

50. *McGrain v. Daugherty*, 273 U.S. 135, 169 (1927), quoting *Anderson v. Dunn*, 19 U.S. (6 Wheat.) 204, 232 (1821), (both decisions uphold the powers of each house of Congress to compel testimony).

51. NAT'L SCI. FOUND., *supra* note 49, at § 3.

52. See *Dent v. West Virginia*, 129 U.S. 114, 123 (1889).

As we have said on more than one occasion, it may be difficult, if not impossible, to give to the terms 'due process of law' a definition which will embrace every permissible exertion of power affecting private rights, and exclude such as are forbidden. They come to us from the law of England, from which country our jurisprudence is to a great extent derived; and their requirement was there designed to secure the subject against the arbitrary action of the crown, and place him under the protection of the law. . . . The great purpose of the requirement is to exclude everything that is arbitrary and capricious in legislation affecting the rights of the citizen. As said by this court in *Yick Wo v. Hopkins*, . . . 'When we consider the nature and the theory of our institutions of government, the principles upon which they are supposed to rest, and review the history of their development, we are constrained to conclude that they do not mean to leave room for the play and action of purely personal and arbitrary power.' 118 U.S. 356, 369 . . .

53. The inadequacies of currently available charts as a basis for scientific judgment and regulatory decision have troubled SCAR's Group of Specialists on Environmental Affairs and Conservation, although these specialists have not dealt with the dilemma of how to map sufficiently but not so precisely that the mapping expedition would inevitably damage the area to be proposed for conservation. "The Group expressed its disappointment at the poor quality of many of the maps accompanying new protected area proposals. It noted that it is crucial to the success of the proposal being approved for them to be accompanied by suitably scaled and co-ordinated maps, with appropriate place names and topographical features marked." GROUP OF SPECIALISTS ON ENVIRONMENTAL AFFAIRS AND CONSERVATION, SUMMARY REPORT TO XXI SCAR, São Paulo, Brazil, 24-27 July 1990, § 3.10, SCAR Bulletin no. 102 (July 1991), *reprinted in* 27 POLAR REC. 273 at 74 (1991).

54. Schatz, *supra* note 23.

55. *Id.*, at 101. See also Gunter E. Weller, et al., *Laboratory Antarctica: Research Contributions to Global Problems*, 238 Sci. 1361 (1987).

56. National Environmental Policy Act of 1969 as amended, 42 U.S.C. § 4321 (1990).

57. 44 Fed. Reg. 1,957 (1979).

58. NAT'L SCI. FOUND. STRATEGY FOR COMPLIANCE WITH ENVIRONMENTAL LAW IN ANTARCTICA 26 (1989).



59. Environmental Defense Fund v. Massey, 772 F. Supp. 1296 (D.D.C. 1991) (mem), dismissing a NEPA action against NSF in regard to Antarctic waste disposal. Earlier case law on extraterritorial applicability of NEPA is inconsistent; the court based its decision on the Supreme Court's recent affirmation of a restrictive standard for extraterritorial application of other U.S. law. It is a long-standing principle of American law "that legislation of Congress, unless a contrary intent appears, is meant to apply only within the territorial jurisdiction of the United States." Equal Employment Opportunity Commission v. Arabian American Oil Co., \_\_\_ U.S. \_\_\_, 111 S.Ct. 1227, 1230 (1991), a job discrimination decision quoting *Foley Bros., Inc. v. Filardo*, 336 U.S. 281, 285 (1949), a wage-hour decision. NEPA is not expressly global. Recent Congressional action (or avoidance) further muddied these waters. An explicit, deliberate attempt in 1990 by the House Committee on Merchant Marine and Fisheries to apply NEPA to the Antarctic disappeared (without public explanation) somewhere between the committee report, H.R. Rep. No. 970(I), 101st Cong., 1st Sess., (1990), and passage of the Antarctic Protection Act of 1990, Pub. L. No. 101-594, 104 Stat. 2975.
60. On July 29, 1991 the Senate Environment and Public Works Subcommittee on Superfund, Oceans, and Water Protection approved S 1278, to expressly apply NEPA extraterritorially. 22 ENV'T REP. (BNA) 844 (Aug. 2, 1991). In drafting the Environmental Protection Agenda for the USAP, this writer found mandates in both NEPA and the executive order, but these were operational and not legal judgments.
61. ATCM recommendations VIII-11 (1975), *reprinted in* HEAP, *supra* note 1, at 2201; ATCM recommendation XIV-2 (1987), *reprinted in* HEAP, *supra* note 1, at 2109; ATCM recommendation XV-1 (1989), *reprinted in* HEAP, *supra* note 1, at 2103.
62. For an examination of the environmental impact study process and its efficacy, see INTERNATIONAL INSTITUTE FOR APPLIED SYSTEMS ANALYSIS, ADAPTIVE ENVIRONMENTAL ASSESSMENT AND MANAGEMENT (Holling ed. 1978).
63. See Council on Environmental Quality, National Environmental Policy Act regulations, 40 C.F.R. §§ 1500-1508 (1990).
64. NAT'L SCI. FOUND., DIV. OF POLAR PROGRAMS, ENVIRONMENTAL IMPACT STATEMENT: ROSS ICE SHELF PROJECT (RISP) (1976).
65. 45 Fed. Reg. 39 (1980).
66. NAT'L SCI. FOUND., U.S. ANTARCTIC PROGRAM FINAL ENVIRONMENTAL IMPACT STATEMENT (1980).
67. NAT'L SCI. FOUND., DIV. OF POLAR PROGRAMS, DIV. DIR., MEMORANDUM (May 23, 1980).
68. NAT'L SCI. FOUND. STRATEGY FOR COMPLIANCE WITH ENVIRONMENTAL LAW IN ANTARCTICA, *supra* note 28.
69. NAT'L SCI. FOUND., ENVIRONMENTAL ASSESSMENT: CONSTRUCTION OF A REPLACEMENT SCIENCE FACILITY AT McMurdo Station, ANTARCTICA (June 15, 1989); NAT'L SCI. FOUND., ENVIRONMENTAL IMPACT ASSESSMENT FOR IMPROVEMENT OF SANITARY WASTEWATER MANAGEMENT AT McMurdo Station, Antarctica (Dec. 29, 1989); despite its name, the appraisal of the water project was an environmental assessment, not a formal impact study.
70. NAT'L SCI. FOUND., DIV. OF POLAR PROGRAMS & OFF. OF GEN. COUNS., IMPLEMENTATION OF THE NATIONAL SCIENCE FOUNDATION'S STRATEGY FOR COMPLIANCE WITH ENVIRONMENTAL LAW IN ANTARCTICA, at 3 (1989).
71. NAT'L SCI. FOUND., DRAFT SUPPLEMENTAL IMPACT STATEMENT FOR THE U.S. ANTARCTIC PROGRAM (1990).
72. NAT'L SCI. FOUND., DIV. OF POLAR PROGRAMS, HIGHLIGHTS ON [sic] RECENT USAP ENVIRONMENTAL PROGRESS, Briefing (1990).
73. 55 Fed. Reg. 28,236, 28,240 (1990).
74. The agency's pronouncements do not reflect internal consistency. In particular, the Division of Polar Programs seems to fear that concern for environmental impact means is just one more drain on limited funds.
- The USAP conducts research on a number of important environmental issues that include studies of the movement of the West Antarctic ice sheet . . . , ozone depletion, . . . greenhouse gas . . . concentrations . . . , Antarctica's effects on . . . the atmosphere and ocean currents, and global movements of man-made pollutants. Any USAP actions that would reduce support for conducting this type of research could have a significant impact on understanding many scientific issues, including important global environmental problems. Diversion of limited USAP resources for

logistics to focus on environmental protection would reduce the program's ability to support important global research. For example, cleaning up large numbers of deactivated sites . . . would greatly reduce the resource[s] available for research.

NAT'L SCI. FOUND., FINAL SUPPLEMENTAL IMPACT STATEMENT FOR THE U.S. ANTARCTIC PROGRAM § 5.7.6. (October 1991).

75. NAT'L SCI. FOUND., DIV. OF POLAR PROGRAMS, U.S. ANTARCTIC PROGRAM, PERSONNEL MANUAL 13 (1990).

76. U.S. ANTARCTIC PROGRAM ENVIRONMENTAL PROTECTION AGENDA 24-29 (1988).

77. *Protecting Antarctica's Environment: Hearing Before the Subcomm. on Sci., Technology, and Space of the Senate Comm. on Commerce, Sci., and Transportation*, 101st Cong., 1st Sess. 50 (1989) (statement of Peter Wilkniiss, Director, NSF Division of Polar Programs).

78. NSF Regulatory Agenda, 56 Fed. Reg. 18,128 (1991).

79. NAT'L SCI. FOUND., DIV. OF POLAR PROGRAMS, OFFICE [OF] SAFETY, ENVIRONMENT AND HEALTH, ENVIRONMENTAL ACTION MEMORANDA (Oct. 23, 1989-July 16, 1991).

80. *Environmental Defense Fund v. Massey*, *supra* note 59, at 1298 n. 1.

81. 43 Fed. Reg. 47,707 (1978), as amended by Executive Order No. 12,580, 52 Fed. Reg. 2923 (1987).

82. Letter from R. Tucker Scully, Acting Director, *Office of Oceans and Polar Affairs, U.S. Dep't of State, to Edward Todd, Director of Polar Programs, Nat'l Sci. Found.* (Mar. 20, 1980) (on file with Nat'l Sci. Found.).

83. CODE OF CONDUCT FOR ANTARCTIC EXPEDITIONS AND STATION ACTIVITIES, ATCM recommendation VIII-11 (1975), *reprinted in* HEAP, *supra* note 1, at 2201.

84. NAT'L SCI. FOUND., DIV. OF POLAR PROGRAMS, U.S. ANTARCTIC PROGRAM RESPONSE TO CIRCULAR 2 TO NATIONAL ANTARCTIC OPERATORS AND SCAR NATIONAL COMMITTEES, FROM THE SCIENTIFIC COMMITTEE ON ANTARCTIC RESEARCH, PANEL OF EXPERTS ON WASTE DISPOSAL, AT 12 (1987).

85. ATCM recommendation XV-3, *reprinted in* HEAP, *supra* note 1, at 2204.

86. *Id.*

87. IMPLEMENTATION OF THE NATIONAL SCIENCE FOUNDATION'S STRATEGY FOR COMPLIANCE WITH ENVIRONMENTAL LAW IN ANTARCTICA, *supra* note 70, at 5, 8-12 (1989). *See also* NAT'L SCI. FOUND., FINAL SUPPLEMENTAL IMPACT STATEMENT FOR THE U.S. ANTARCTIC PROGRAM § 1.2.1.2 (Oct. 1991).

88. Waste Disposal and Waste Management, Annex III to the Protocol on Environmental Protection to the Antarctic Treaty, *supra* note 13.

89. 16 U.S.C. §§ 2401-2412 (1985).

90. AGREED MEASURES FOR THE CONSERVATION OF ANTARCTIC FAUNA AND FLORA, ATCM recommendation III-8, *reprinted in* HEAP, *supra* note 1, at 2403.

91. 45 C.F.R. §§ 670.50-670.72 (1989).

92. Schatz, *supra* note 23.

93. 55 Fed. Reg. 14,980 (1990).

94. 45 C.F.R. § 670.51 (1989).

95. As late as mid-1991, federal courts had yet to rule on any Antarctic Conservation Act question.

96. NAT'L SCI. FOUND., DEAR COLLEAGUE LETTER BY PETER WILKNISS, NO. 22, DIV. OF POLAR PROGRAMS, AT 2 (Oct. 2, 1990).

97. NAT'L SCI. FOUND. RULES AND REGULATIONS, CONSERVATION OF ANTARCTIC ANIMALS AND PLANTS; ENFORCEMENT AND HEARING PROCEDURES; TOURISM GUIDELINES, 54 FED. REG. 7,132 (1989).

98. *Abbs v. Sullivan*, 756 F. Supp. 1172 (W.D. Wis. 1990).
99. *Protecting Antarctica's Environment: Hearing Before the Subcomm. on Sci., Technology, and Space of the Senate Comm. on Commerce, Sci., and Transportation*, 101st Cong., 1st Sess. 60 (1989) (Peter Wilkniss, Director, NSF Division of Polar Programs, response to follow-up question from Sen. Gore).
100. 45 C.F.R. § 689 (1989).
101. JOHN TALMADGE (director, *Polar Coordination and Information, Div. of Polar Programs, Nat'l Sci. Found.*), address to Pacific Asia Travel Ass'n, Bali, Indonesia (April 12, 1991) (on file with Nat'l. Sci. Found.).
102. WAYNE Z. TRIVELPIECE, *IMPACTS OF TOURISM ON ANIMAL POPULATIONS IN THE ANTARCTIC PENINSULA REGION*, synopsis prepared for NSF tour operators meeting 10 July 1991 (on file with Nat'l Sci. Found.).
103. NAT'L SCI. FOUND., *USAP 1990-1991 Observers Onboard Tour Ships, Final Season Report* (P. Taylor) (March 6, 1991).
104. NAT'L SCI. FOUND., *FINAL SEASON REPORT 1990-1991 USAP OBSERVERS ON TOUR SHIPS 11*, (P. JORGENSEN) (APRIL 15, 1991).
105. NAT'L SCI. FOUND., *DRAFT SUPPLEMENTAL IMPACT STATEMENT FOR THE U.S. ANTARCTIC PROGRAM § 3.1.4* (1990).
106. *Id.*, at table 5.