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NSF director dedicates McMurdo science and engineering center

More than 16,000 kilometers from the United States at McMurdo Station, distinguished visitors, scientists, and support personnel celebrated the beginning of a new era for antarctic science on 5 November 1991, as Walter Massey, Director of the National Science Foundation (NSF), dedicated Antarctica's first modern research center. NSF, which

funds and manages the U.S. research program in Antarctica, anticipates that the new science and engineering center will improve scientific understanding of this remote region by bringing advanced technology to scientists working there.

Dr. Massey told those assembled for the ceremony that the "new lab and its highly sophisticated scientific equip-

On 5 November 1991, Walter Massey, the Director of the National Science Foundation (NSF), dedicated the Albert P. Crary Science and Engineering Laboratory, the new \$23-million McMurdo Station science laboratory, which began limited operation for the 1991-1992 austral summer. The center will primarily support NSF-funded investigators and provide much needed laboratory space, analytical instrumentation, and staging areas for a variety of scientific disciplines. The facility will replace the station's old, outdated science buildings, some of which were built as early as 1959.

NSF photo by Guy Guthridge.



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ment will enable the Nation's scientists to do research procedures not formerly feasible in Antarctica." The state-of-the-art equipment housed in the \$23-million laboratory will help scientists to learn more about Antarctica's role in global change. From this site, Dr. Massey said, "We will learn more about the ozone hole, its effect on antarctic life forms,



Editor: Winifred Reuning

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and the role of ice sheets in global change."

Joining Dr. Massey at the ceremony were the U.S. Ambassador to New Zealand, Della M. Newman; the Director of the National Oceanic and Atmospheric Administration, John A. Knauss; the Director of the U.S. Geological Survey, Dallas L. Peck; and E.U. Curtis Bohlen, the head of the U.S. delegation to the recently completed negotiations for the Environmental Protocol to the Antarctic Treaty.

The 46,500-square-foot laboratory, construction of which began in 1987, is named for Albert P. Crary, a geophysicist and glaciologist who served as chief scientist for the U.S. Antarctic Program in the years following the International Geophysical Year. (See the sidebar on page 3 for a brief biography of Dr. Crary.) When completed, the center will consist of five "pods," which will provide such facilities as laboratories, office space, storage, computer facilities, and meeting rooms.

Phase I of the structure, which contains a two-story core pod and the biology pod, began limited operations during the 1991-1992 austral summer. Its first occupants were environmental researchers from Oak Ridge National Laboratories, Montana State University biologists, and University of Alaska ocean scientists. Full operation of Phases I and II, which houses the earth sciences pod and the atmospheric pod, are scheduled for November 1992. The final phase, Phase III, will contain an aquarium and a dive locker. NSF plans to have this section completed by January 1993. McMurdo's older biology and geology laboratories (Eklund Biological Center and Thiel Earth Science Laboratory) will be phased out gradually beginning in early 1992.

Besides supporting scientists funded by NSF, the center will support an Environmental Monitoring and Enforcement Laboratory (EMEL), a Snow and Ice Mechanics Laboratory (SIML), and Antarctic Meteorological Research Cen-

ter (AMRC). The EMEL will consist of two laboratory areas—one dedicated to sample preparation and environmental analyses and a second equipped for general laboratory procedures. Under the direction of the Cold Regions Research and Engineering Laboratory, research at the SIML will focus on studying and testing the mechanical and engineering properties of snow and ice. Discussions also are underway on the installation of a very-long-base-line interferometry telescope (VLBI) and synthetic-aperture-radar (SAR) ground station.

The Albert P. Crary Science and Engineering Center was designed in close collaboration with researchers working in the polar regions. It is intended not only to be a sophisticated, modern laboratory but also to be flexible enough to meet the changing needs of science. NSF also hopes that this new center will facilitate and encourage cooperative research among scientists from other countries.

For nearly four decades, McMurdo Station has served as a base to U.S. scientists as they probe the mysteries of the vast antarctic continent and its surrounding seas. The U.S. station, sometimes called the gateway to the antarctic interior, is the most southern sea port in the world and the logistic hub of the U.S. Antarctic Program. The addition of the Crary Center, with its specialized equipment, to the facilities already provided at McMurdo and other U.S. stations will enhance the ability of scientists to go beyond the field collections and observations that have typified earlier research in Antarctica.

Articles in earlier issues of the *Antarctic Journal* describe the planning and construction of the laboratory, as well as some of the planned facilities. Readers who are interested in these more detailed descriptions should read "Designing a new science facility for McMurdo Station" by Robert Haehle in the December 1988 issue (Volume 23, number 4, pages 4-6) and the September 1991 issue (Volume 26, number 3, page 4).

Bonn meeting stresses environmental stewardship and international cooperation

Shortly after the Protocol on Environmental Protection to the Antarctic Treaty was signed, representatives of the 26 Antarctic Treaty Consultative Parties (ATCP)—the original 12 treaty signatory nations and the 14 other nations that have gained consultative status since 1961—gathered in Bonn, Germany, for the 16th consultative meeting. Delegates

from 12 of the 14 acceding nations, which have signed the treaty and agree to abide by it but do not have voting rights, joined the consultative party representatives. Among the topics discussed at this meeting were the operation of the Antarctic Treaty system, environmental protection of Antarctica, and cooperation among treaty nations.

Albert P. Crary, 1911–1987

A pioneer in polar glaciogeophysics, Albert P. Crary was a scientist and science administrator whose career was as varied as it was notable. Crary began his research in the polar regions in 1951, studying sea ice, ice islands, ice shelves, and the ocean. When ice island T-3 ("Fletcher's Ice Island") in the Arctic Ocean was occupied in 1952, Crary became chief scientist for U.S. Air Force work there and continued in this capacity until T-3 was abandoned in 1955. While working on T-3, he discovered and explained "Crary waves," an unusual type of guided, elastic-plate wave, and also flew to, and landed at, the North Pole.

In 1955 Dr. Crary set up the Glaciological Headquarters for the U.S. National Committee for the International Geophysical Year (IGY) and organized the U.S. antarctic work in glaciology, including oversnow traverses. In 1957 he went to Antarctica as deputy leader of the U.S. scientific program for the IGY and scientific leader at Little America Station. He remained in Antarctica until 1959, leading the austral summer traverses on the Ross Ice Shelf and in Victoria Land. During the traverse across the Ross Ice Shelf, he painstakingly recorded ice-surface elevations. These measurements, so exact that they are comparable to modern satellite observations, were used later by other glaciologists to identify a thinning of the ice shelf along the Siple Coast near the Crary Ice Rise.

In 1959 he left Antarctica for the United States to become the chief scientist of the U.S. Antarctic Research Program; however, he returned during the 1960–1961 austral summer to lead a 2,400-kilometer traverse from McMurdo Station to the South Pole.

When he arrived at the South Pole, he became the first person to set foot on both Poles.

Although his last trip to the southern continent was in 1966 aboard the research ship *Eltanin*, his interest in and enthusiasm for antarctic research did not wane. As chief scientist and later deputy division director and division director of the National Science Foundation's Division of Environmental Sciences, he was influential in expanding U.S. antarctic research to include biology, geology, cartography, and oceanography. Because he recognized that radio-echo sounding techniques could be used for studying ice sheets, he encouraged the use of this technique in Antarctica. The result was a joint U.S., British, and Danish project that provided earth scientists with a detailed series of maps that cover more than half the surface and bedrock of the southern continent.

Albert P. Crary was born in Pierrepont, N.Y., on 25 July 1911. He graduated *magna cum laude* from St. Lawrence University (B.S. in chemistry) in 1931 and received an M.S. in physics from Lehigh University in 1933. That same year, he began geophysical research with Maurice Ewing, with whom he published papers in seismology, electrical resistivity of rocks, and submarine geophysics. These papers included the first of the landmark series of papers on "Geophysical Investigations in the Emerged and Submerged Atlantic Coastal Plain."

From 1935 to 1945 Crary worked in geophysical oil prospecting in Colombia, Venezuela, and England, with interruptions for antisubmarine research during 1941 and 1942 at Woods Hole Oceanographic Institution and for a short period of oil exploration in the Persian Gulf. His research on upper air acoustics for the U.S. Air

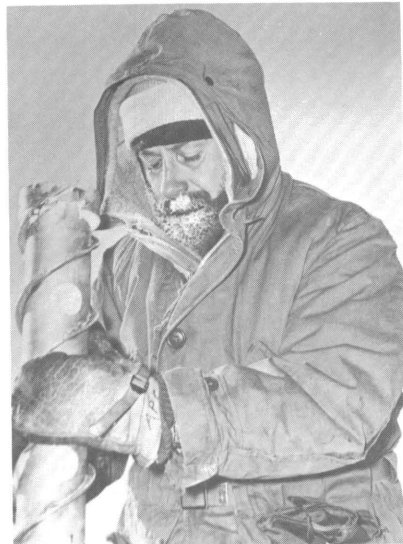


Photo courtesy of Mildred Crary.

Force resulted in a series of papers on upper atmospheric winds and temperatures.

His research was both versatile and vast, and he is regarded as one of the outstanding scientists in his field. In recognition of his scientific efforts, Crary received many awards, including the U.S. Department of Defense Distinguished Civilian Service Award, the Cullum Geographical Medal of the American Geographical Society, the Patron's Medal of the Royal Geographical Society, the U.S. Department of the Navy Distinguished Public Service Award, the Vega Medal of the Swedish Society of Anthropology and Geography, a medal from the Soviet Academy of Sciences commemorating 100 years of international geophysics, an Honorary D.Sc. degree from St. Lawrence University, and the Albert P. Crary Professorship of Geophysics at the University of Wisconsin. He retired from the National Science Foundation in 1976 and died in 1987.

Also attending the meeting were the president of the Scientific Committee on Antarctic Research (SCAR), the chairman of the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR), and the chairman of the Council of Managers of National Antarctic Programs (COMNAP). The representatives noted the importance of the cooperative efforts of SCAR and COMNAP in complementary fields of antarctic activities and urged them to continue because such cooperation is essential in pursuing international scientific programs and for implementing treaty recommendations and the new environmental protocol. They also agreed

that COMNAP should be invited to participate in consultative meetings on the same basis as SCAR.*

The following organizations, invited by the consultative parties to attend the meeting, sent observers to provide expert assistance in discussions of various agenda items:

- the Antarctic and Southern Ocean Coalition (ASOC)

*Recommendation XIII-2, paragraph c., describes SCAR's participation in Antarctic Treaty Consultative Party Meetings as follows:

"(c) through their National Committees, [the consultative parties] invite the Scientific Committee on Antarctic Research (SCAR) to appoint its President or other persons to represent the Committee as an

- the International Civil Aviation Organization (ICAO)
- the International Hydrographic Organization (IHO)
- the International Maritime Organization (IMO)
- the Intergovernmental Oceanographic Commission (IOC)
- the International Union for the Conservation of Nature and Natural Re-

observer for the specific purpose of reporting on:
(i) the general proceedings of SCAR;
(ii) matters within the competence of SCAR under the Convention for the Conservation of Antarctic Seals;
(iii) such publications and reports as may have been published or prepared in accordance with Recommendations IV-19 and VI-9 respectively."

sources (IUCN—World Conservation Union)

- the United Nations Environmental Program (UNEP)
- the World Meteorological Organization (WMO)
- the World Tourism Organization (WTO).

At the end of the 2-week meeting, the ATPC representatives adopted by consensus 13 recommendations that refine the operation of the treaty system, improve environmental protection, and promote increased cooperation in science and operations among the treaty parties. The remainder of this article highlights some of the important points of these discussions.

Protocol on Environmental Protection to the Antarctic Treaty

In discussing future actions related to the newly signed environmental protocol, the representatives stressed that early ratification and entry-into-force of the protocol are absolute priorities. They agreed that the treaty nations should begin applying the provisions of the protocol, as far as possible within their own legal systems, and that any submitted environmental impact assessments should be considered at the next consultative meeting. During the 17th meeting, they also will begin preparing draft rules of procedure for the protocol's Committee for Environmental Protection.

As part of the group's discussion of the antarctic protected areas system, a draft for a fifth annex to the protocol was introduced. This draft argues that regulations related to protected areas have become confusing under the present system because of the many types of designations. It recommends that the existing system should be redefined, without losing any of the quality of protection, and replaced with a more concise, unambiguous system that conforms with the protocol and its annexes. After intense discussions, the representatives reached consensus on the final text and adopted it as Recommendation XVI-10, which forms Annex V to the Protocol on Environmental Protection to the Antarctic Treaty.

Protected areas

The representatives reviewed proposals for two new Specially Protected Areas (SPAs), two new Sites of Special Scientific Interest (SSSIs), two new marine SSSIs, and revisions to existing sites.

The two newly approved SPAs are

- SPA 22—Cryptogam Ridge, Mount Melbourne, Victoria Land (74°21'S 164°42'E), and
- SPA 23—Forlidas Pond and Davis Valley Ponds, near the east end of the Dufek Massif (82°27'S 51°21'W).

The new SSSIs and marine SSSIs are

- Site number 33—Ardley Island, Maxwell Bay King George Island, South Shetland Islands (62°13'S 58°54'W),
- Site number 34—Lions Rump, King George Island, South Shetland Islands (62°8'S 58°8'W),
- Site number 35 (marine site)—Western Bransfield Strait, off Low Island, South Shetland Islands, and
- Site number 36 (marine site)—East Dallmann Bay, off Brabant Island.

Avian Island, Marguerite Bay (SSSI site number 30), was redesignated a Specially Protected Area (SPA number 21) because in the Peninsula region it is unique for its abundance and diversity of breeding sea birds and has the largest Adélie penguin colony. For the Byers Peninsula, Livingston Island, South Shetland Islands (SSSI site number 6), a new management plan was adopted.

The date of expiry was extended to 31 December 2001 for the following SSSIs:

- SSSI number 4—Cape Crozier, Ross Island
- SSSI number 5—Fildes Peninsula, King George Island, South Shetland Islands
- SSSI number 7—Haswell Island
- SSSI number 10—Caughley Beach, Cape Bird, Ross Island
- SSSI number 11—Tramway Ridge, Mount Erebus, Ross Island
- SSSI number 12—Canada Glacier, Lake Fryxell, Taylor Valley, Victoria Land
- SSSI number 18—Northwest White Island, McMurdo Sound.

For existing SPAs, the representatives approved revised descriptions and proposed management plans for the following sites:

- Site number 8—Dion Islands, Marguerite Bay, Antarctic Peninsula
- Site number 9—Green Island, Berthelot Islands, Antarctic Peninsula
- Site number 13—Moe Island, South Orkney Islands
- Site number 14—Lynch Island, South Orkney Islands
- Site number 15—Southern Powell Island, and adjacent islands, South Orkney Islands
- Site number 16—Coppermine Peninsula, Robert Island, South Shetland Islands
- Site number 19—Lagotellerie Island, Marguerite Bay, Antarctic Peninsula.

Environmental monitoring

At the 15th Antarctic Consultative Party Meeting, participants agreed to continue and, when appropriate, expand programs to detect and monitor global environmental change and to establish monitoring programs to verify predicted effects and detect possible unforeseen effects (Recommendation XV-5). The same recommendation calls for a meeting of a

group of experts to consider various aspects of long-term monitoring.

At the 16th meeting, representatives agreed that the 1992 SCAR and COMNAP meetings in Argentina offered an appropriate opportunity for such a meeting. In preparation for implementing the protocol and in response to Recommendation XV-5, they provided the following guidance for the group. The group will consider monitoring to obtain a regular, verifiable record of activities and environmental data in order to

- assess and quantify impacts of activities,
- provide early warning of negative impacts,
- identify preventive or remedial measures needed to reduce or eliminate adverse impacts, and
- plan similar activities in the future.

As part of this effort, these experts will identify the nature or possible significance of adverse impacts on the values of Antarctica (as described in Article 3 of the protocol), activities and environmental or other data needed to detect and monitor possible impacts and to distinguish these from natural variability, methodologies and technologies for monitoring, the necessary steps to create national and cooperative data systems, and existing relevant data sets (including baseline data repositories and programs that generate these data).

Human impact on the antarctic environment

General discussions focused on waste disposal, marine pollution, implementing environmental impact assessment procedures, and the protection of antarctic flora and fauna. In relation to environmental impact procedures, they noted that, at the 1992 COMNAP meeting, the group will review and revise the 1991 draft procedures so that the procedures are consistent with the protocol and its annexes.

Marine pollution continued to be a concern. Although the representatives welcomed the Standing Committee on Antarctic Logistics and Operations' (SCALOP) work on preventing oil pollution and developing comprehensive oil-spill contingency plans, they stressed that other types of marine pollution in Antarctica still need to be addressed. To this end, they encouraged SCALOP, working with the Marine Environment Protection Committee of the IMO, to convene a group of experts to review the SCALOP oil pollution prevention and spill-contingency plan, to assess environmental effects of marine dumping and disposal of sewage and food waste in antarctic waters, to study the best means to prevent or reduce this pollution, and to investigate the best ways to monitor marine pollution.

Tourism and nongovernmental expeditions

After receiving working papers and information papers from several delegations, the representatives established a sub-working group to examine in detail the question of tourism in Antarctica. Keeping in mind recommendations made at previous consultative meetings, this sub-working group reviewed the working papers, three of which contained proposals for an annex to the protocol, and the information papers.

Their efforts resulted in a draft that was adopted by consensus as Recommendation XVI-13, "Tourism and nongovernmental activities in the Antarctic Treaty area." This recommendation calls for an informal meeting to develop proposals for the 17th Consultative Meeting on comprehensive regulation of tourism and nongovernmental activities. The major issues to be addressed are

- environmental—including implementation of the protocol and its annexes; concentration and dispersal of activities; agreed standards for ships; and access to unexplored areas

- operational—including expansion of exchanged information; a system for granting permission to visit stations; insurance; information obligations of the consultative parties; preparation and training of tour guides and visitors' guides; and examination of the need for specific kinds of control and monitoring.

Operation of the Antarctic Treaty System

The representatives discussed establishing an Antarctic Treaty Secretariat. Most delegations felt that a small, modern, and cost-effective secretariat is needed urgently. In their view, this need arises from three considerations—support for the increased and more complex operations of the consultative mechanism, circulation of information, and implementation of the protocol. Despite these concerns, some delegations felt that more study was necessary, and all representatives agreed that discussions would continue at the 17th meeting.

The representatives also reviewed proposals in two other areas—the status of existing recommendations to the treaty and the requirements for the exchange of information. Several delegations supported the review of recommendations to provide new or future consultative parties with a better understanding of their obligations. They decided that two lists should be developed—one of recommendations that are no longer applicable and one of recommendations that may be affected by the new protocol. Draft lists were submitted to the meeting and will be reviewed by all consultative parties before the 17th meeting.

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Although all of the consultative parties recognize the importance of maintaining the exchange of information (as outlined in Articles III and VII of the treaty), some representatives expressed concern over the amount of information and the burden that increased requirements for exchanging information have created. Some also were concerned that exchanged information may not be reaching the people who could make the best use of it. The representatives agreed that all information exchange provisions should be reviewed before the 17th meeting and that this review should consider the type of information to be exchanged, the level of detail, to whom material should be sent, and the most appropriate time for information to be circulated.

In a related discussions, the representatives considered whether it would be useful to exchange information on domestic legislation enacted to give effect to the treaty and to obligations arising from recommendations adopted at consultative meetings. All parties agreed that this type of information would be a valuable addition, and the requirement was adopted as Recommendation XVI-1.

Conclusion

December 1991 marked the thirtieth anniversary of the entry-into-force of the Antarctic Treaty. Recognizing this anniversary, representatives noted that cooperation among treaty nations has increased steadily since the International Geophysical Year and that the new protocol designates Antarctica as a nat-

ural reserve devoted to peace and science. Many delegations called attention to the significant contributions made by antarctic research to understanding the global environment but also emphasized that such large-scale programs increase the costs and the technical complexities of supporting research in Antarctica. The representatives felt that the time had come to consider a more systematic approach to international collaborative research programs and the associated logistic support.

They also commemorated the thirtieth anniversary of the treaty's entry-into-force by adopting a declaration. Unfortunately, space does not permit including the text of the declaration in this issue of the *Antarctic Journal*, however, it will be included in the June 1992 issue.

Before concluding the 16th meeting, the representatives reviewed the need to increase the frequency of consultative meetings. With the entry-into-force of the environmental protocol, the consultative parties will need to meet more frequently. They agreed that, starting with the 17th meeting, consultative meetings should be held annually. At the invitation of the Italian government, the next meeting will be held 11 to 20 November 1992 in Venice, Italy.

The complete texts of the 13 recommendations with associated annexes follow this summary. Copies of the complete final report, as well as the final reports from previous meetings, are incorporated into the *Antarctic Bibliography* and can be obtained through the Library of Congress.

Recommendations adopted at the 16th Antarctic Treaty Consultative Meeting

XVI-1 Exchange of Information

The Representatives,

Recalling the provisions of Articles III and VII of the Antarctic Treaty;

Noting that their Governments give effect in their domestic legislation to obligations arising from agreements reached at Antarctic Treaty Consultative Meetings;

Noting that the Convention on the Conservation of Antarctic Seals, the Convention on the Conservation of Antarctic Marine Living Resources, and the Protocol on Environmental Protection to the Antarctic Treaty contain provisions whereby information about such domestic legislation is, or is to be, exchanged between Parties;

Noting, however, that such provision has not been made in relation to obligations arising from Recommendations

adopted at Consultative Meetings;

Aware that knowledge of this domestic legislation can be of interest to the other Consultative Parties;

Recommend to their Governments that they include in their exchange of information under Article VII(5) of the Antarctic Treaty, information on any domestic legislation enacted to give effect to the Antarctic Treaty and to obligations arising from Recommendations adopted at Antarctic Treaty Consultative Meetings.

XVI-2 Antarctic Protected Area System New Sites of Special Scientific Interest

The Representatives,
Recalling Recommendations VIII-3 and VIII-4;

Noting that Management Plans have been prepared and approved by the Scientific Committee on Antarctic Research (SCAR) for certain Sites of Special Scientific Interest additional to those already designated;

Considering that it would be advantageous to gather experience of the practical effect of the Management Plans prepared for these sites;

Recommend to their Governments that they voluntarily take account of the Management Plans, annexed to this Recommendation, for the following sites:

Site number 33: Ardley Island, Maxwell Bay, King George Island, South Shetland Islands (62°13'S 58°54'W).

Site number 34: Lions Rump, King George Island, South Shetland Islands (62°08'S 58°08'W)

XVI-3 Antarctic Protected Area System New marine Sites of Special Scientific Interest

The Representatives,
Recalling Article II of the Antarctic Treaty, Recommendations VII-3, VIII-3, and XIV-6;

Noting that Management Plans have been prepared and approved by the Scientific Committee on Antarctic Research (SCAR) for two Marine Sites of Special Scientific Interest;

Considering that it would be advantageous to gather experience of the practical effect of the Management Plans prepared for these sites;

Recommend to their Governments that they voluntarily take account of the Management Plans, annexed to this Recommendation, for the following sites:

Number 35—Western Bransfield Strait, off Low Island, South Shetland Islands;

Number 36—East Dallmann Bay, off Brabant Island

XVI-4 Antarctic Protected Area System

**Specially Protected Areas:
Re-designation of Site of Special
Scientific Interest number 30,
Avian Island, Marguerite Bay,
Antarctic Peninsula as a Specially
Protected Area number 21**

The Representatives,
Recalling Recommendation XV-8 and XV-9;

Noting that a Management Plan has been approved by the Scientific Committee on Antarctic Research (SCAR);

Considering that Avian Island, together with its littoral zone is unique in

the Antarctic Peninsula region for its abundance and diversity of breeding seabirds, including Adélie penguins, blue-eyed shags, giant petrels, dominican gulls, south polar skuas, and Wilson's petrels, and that the colony of Adélie penguins is the largest on the Antarctic Peninsula, and that other species are at or near the southern limits of their breeding range, and that the island is vulnerable to visits by tourists and uncontrolled personnel.

Recommend to their Governments that:

(i) the designation of Avian Island as Site of Special Scientific Interest number 30 under Recommendations VIII-3 and VIII-4 be terminated;

(ii) the number 30 should not be used for another Site of Special Scientific Interest;

(iii) The following area of outstanding ornithological interest be inserted in Annex B, Specially Protected Areas, of the Agreed Measures for the Conservation of Antarctic Fauna and Flora (1964), along with the Management Plan accompanying the description of the said Specially Protected Area:

Specially Protected Area number 21: Avian Island, Marguerite Bay, Antarctic Peninsula (67°46'S 68°54'W)

XVI-5 Antarctic Protected Area System Sites of Special Scientific Interest: Interim guidelines

**Site of Special Scientific
Interest number 6,
Byers Peninsula,
Livingston Island,
South Shetland Islands**

The Representatives,
Recalling Recommendation VIII-4 and the Management Plan for Site of Special Scientific Interest number 6; Byers Peninsula, Livingston Island, South Shetland Islands, annexed thereto;

Noting that its Twenty-First Meeting the Scientific Committee on Antarctic Research (SCAR), held at Sao Paulo, Brazil (24–27 July 1990) reviewed the Management Plan and scientific interests of Site of Special Scientific Interest number 6: Byers Peninsula, Livingston Island, South Shetland Islands;

Recommend to their Government that:
(i) The Management Plan for Site of Special Scientific Interest number 6, Byers Peninsula, Livingston Island, South Shetland Islands, annexed to Recommendation VIII-4 be terminated;

(ii) They voluntarily take account of the Management Plan, annexed to this Recommendation, for Site number 6: Byers Peninsula, Livingston Island, South Shetland Islands.

XVI-6 Antarctic Protected Area System: Specially Protected Areas: Revised descriptions and proposed management plans for Specially Protected Areas

The Representatives,
Recalling Recommendations XV-8 and XV-9;

Noting that revised Area Descriptions and proposed Management Plans have been approved by the Scientific Committee on Antarctic Research (SCAR);

Recommend to their Governments that for the Specially Protected Sites listed below:

(i) the Descriptions inserted in Annex B, Specially Protected Areas, of the Agreed Measures for the Conservation of Antarctic Fauna and Flora be deleted;

(ii) that the Descriptions and Management Plans of Specially Protected Areas, annexed to this Recommendation, be inserted in Annex B, Specially Protected Areas, of the Agreed Measures for the Conservation of Antarctic Fauna and Flora.

The Specially Protected Areas Involved are:

Site number 8: Dion Islands, Marguerite Bay, Antarctic Peninsula

Site number 9: Green Island, Berthelot Islands, Antarctic Peninsula

Site number 13: Moe Island, South Orkney Islands

Site number 14: Lynch Island, South Orkney Islands

Site number 15: Southern Powell Island, and adjacent islands, South Orkney Islands

Site number 16: Coppermine Peninsula, Robert Island, South Shetland Islands

Site number 18: North Coronation Island, South Orkney Islands

Site number 19: Lagotellerie Island, Marguerite Bay, Antarctic Peninsula

XVI-7 Antarctic Protected Area System: Sites of Special Scientific Interest: Extension of designation

The Representatives,
Recalling Recommendations VIII-3, VIII-4, XII-5, and XIII-7;

Noting that:
(i) in accordance with paragraph 2 of Recommendation VIII-3, the Scientific Committee on Antarctic Research

(SCAR), at its Twenty-First Meeting at Sao Paulo, Brazil (24–27 July 1990) had reviewed the eight Sites of Special Scientific Interest designated in Recommendations VIII-4, XIII-8 and XIV-5;

(ii) experience of the practical effect of the Management Plans for these sites has shown them to be an effective means of reducing the risks of harmful interference in areas of special scientific interest;

(iii) no changes to the Management Plan of these sites had been proposed by SCAR.

Recommend to their Governments that:

(i) The date of expiry of designation of the following Site numbers be extended to 31 December 2001:

Site 4, Cape Crozier, Ross Island;

Site 5, Fildes Peninsula, King George Island, South Shetland Islands;

Site 7, Haswell Island;

Site 10, Caughley Beach, Cape Bird, Ross Island;

Site 11, "Tramway Ridge,"* Mount Erebus, Ross Island;

Site 12, Canada Glacier, Lake Fryxell, Taylor Valley, Victoria Land;

Site 18, Northwest White Island, McMurdo Sound.

(ii) The date of expiry of designation of Site number 22—"Yukidori Valley," (69°14'S 39°46'E) Langhovde, Lützow-Holm Bay—be extended to 31 December 2003.

(iii) They use their best endeavors to ensure, in accordance with paragraphs 3 and 4 of Recommendation VII-3, that the Management Plans of these sites are observed.

XVI-8 Antarctic Protected Area System Specially Protected Area, number 22, "Cryptogam Ridge": Mount Melbourne, Victoria Land

The Representatives,
Recalling Recommendations XV-8 and XV-9;

Noting that a Management Plan has been prepared and approved by the Scientific Committee on Antarctic Research (SCAR);

Considering that "Cryptogam Ridge" on the southern rim of the main summit crater of Mount Melbourne includes areas of geothermal activity which are ice-free and surrounded by numerous ice hummocks and scattered ice towers, and that the geothermal ground supports a unique community of bryophytes, algae, and microbiota including very rare species, and that this fragile habitat is of excep-

ditional biological interest and, to maintain its unique pristine state, should be afforded maximum protection from human influence;

Recommend to their Governments that the following area of outstanding scientific interest be inserted in Annex B, Specially Protected Areas, of the Agreed Measures for the Conservation of Antarctic Fauna and Flora, together with the annexed Management Plan:

Specially Protected Area number 22: "Cryptogam Ridge," Mount Melbourne, Victoria Land.

Mount Melbourne (74°21'S 164°42'E) lies between Wood Bay and Campbell Glacier, northern Victoria Land, on the western side of the Ross Sea.

XVI-9 Antarctic Protected Area System Specially Protected Area, number 23 Forlidas Pond and Davis Valley Ponds

The Representatives,
Recalling Recommendations XV-8 and XV-9;

Noting that a Management Plan has been prepared and approved by the Scientific Committee on Antarctic Research (SCAR);

Considering that the Area contains some of the most southerly freshwater ponds known in Antarctica containing plant life, and that these ponds and their immediate catchments should be protected as examples of unique near-pristine ecosystems which should be afforded maximum protection from human influence;

Recommend to their Governments that the following Area of outstanding scientific interest be inserted in Annex B, Specially Protected Areas, of the Agreed Measures for the Conservation of Antarctic Flora and Fauna, together with the annexed Management Plan:

Specially Protected Area number 23: Forlidas Pond and Davis Valley Ponds.

Situated near the east end of the Dufek Massif at position 82°27'15"S 51°21'W, the Area includes smaller ponds that occur along the ice margin at the northern edge of Davis Valley, a short distance east of Forlidas Pond.

XVI-10 Antarctic Protected Area System: Review of the System

The Representatives,
Recalling Article VIII of the Agreed Measures for the Conservation of Antarctic Fauna and Flora and Recommen-

dations V-4, VI-14, VII-2, VII-9, VIII-3, XV-10, and XV-11;

Recalling the Protocol on Environmental Protection to the Antarctic Treaty done at Madrid on 4 October 1991;

Recommend to their Governments that:

(i) The Annex attached to this Recommendation form Annex V on Area Protection and Management to the Protocol on Environmental Protection to the Antarctic Treaty;

(ii) The Annex become effective upon the date on which both the Protocol on Environmental Protection shall have entered into force and this Recommendation shall have been approved by all Consultative Parties entitled to attend the XVIth Antarctic Treaty Consultative Meeting.

XVI-11 Antarctic Protected Area System: New Historic Sites and Monuments

The Representatives,
Recalling Recommendations I-IX, V-4, VI-14, VII-9, XII-7, XIII-16, and XIV-8;

Recommend to their Governments that the following historic sites (monuments) be added to the "List of Historic Monuments Identified and Described by the Proposing Government or Governments" annexed to Recommendation VII-9 and that thereafter it be accorded the respect and protection required by the Recommendations recalled above:

56. Waterboat Point, Danco Coast, Antarctic Peninsula (64°49'S 62°52'W). The remains and immediate environs of the Waterboat Point hut, situated close to the unoccupied Chilean station, "Presidente Gabriel González Videla." The Waterboat Point hut, of which only the base of the boat, roots of door posts, and an outline of the hut and extension still exist, was occupied by the U.K. two-man expedition of Bagshawe and Lester in 1921–1922. This was, and indeed remains, the smallest expedition to ever overwinter in Antarctica.

57. Commemorative plaque at "Yankee Bay," McFarlane Strait, Greenwich Island, South Shetland Islands, near the Chilean refuge located at latitude 62°32'S and longitude 59°45'W, to the memory of Captain Robert McFarlane, who in 1820 explored the Antarctic Peninsula Area in the brigantine *Dragón*.

58. Cairn with memorial plaque erected at Whalers Bay, Deception Island, South Shetland Islands, in the vicinity of the whalers' cemetery (historic monument number 31, 62°59'S 60°34'W), to honor captain Adolfus Amandus Andresen, antarctic pioneer who was first to establish a whaling operation at Deception Island in 1906.

*Site names appearing in quotation marks are not included in the official U.S. listings of antarctic place names—*Geographic names of the Antarctic* (1980) or the *Gazetteer of the Antarctic* (1989).

59. A cairn on Half Moon Beach, Cape Shirreff, Livingston Island, South Shetland Islands, commemorating the officers, soldiers, and seamen on board the *San Telmo*, which sank in September 1819; possibly the first people to live and die in the wastes of the Antarctic.

XVI-12 Accessibility of Antarctic Geophysical Data

The Representatives,

Recalling that Article 3 of the Antarctic Treaty requires that scientific data be exchanged and made freely available;

Noting that Article 7 of the Protocol on Environmental Protection to the Antarctic Treaty signed in Madrid on 4 October 1991 prohibits any activity relating to mineral resources other than scientific research;

Aware that solid earth science disciplines have made major contributions to the understanding of our planet, and that such work has long been recognized as having global significance as applied *inter alia* to studies of plate tectonics and antarctic glacial history including its effects on world climate;

Reiterating the importance of pursuing geological and geophysical research and their commitment to the disclosure, availability, and timely publication of scientific results;

Recommend to their governments that the Seismic Data Library System (SDLS) approved by the SCAR Executive in 1991 and described in the report "A SCAR Seismic Data Library System for Co-operative Research" of the SCAR Group of Specialists on the Evolution of Cenozoic Paleoenvironments of the Southern High Latitudes (GSC)—Antarctic Offshore Acoustic Stratigraphy Project (ANTOSTRAT) be implemented. The SDLS requires *inter alia* that digital data from multichannel seismic reflection surveys be sent to the SDLS within 4 years of collection and 8 years after collection to the World Data Centres or other archives for general dissemination.

XVI-13 Tourism and Nongovernmental Activities in the Antarctic Treaty Area

The Representatives,

Bearing in mind that the XVth Consultative Meeting agreed that a comprehensive review of tourism and nongovernmental activities was required;

Noting that the Protocol on Environmental Protection to the Antarctic Treaty and its Annexes apply to tourist and nongovernmental activities in Antarctica;

Recalling that the XIth Special Consultative Meeting asked the XVIth Consultative Meeting to address the issue of tourism and nongovernmental activities;

Acknowledging that the Protocol constitutes the framework for further progress in antarctic environmental protection;

Concerned about the possible effect of increased tourism and nongovernmental activities in Antarctica;

Conscious of the need to ensure that the presence of tourists and other visitors in Antarctica be regulated so as to limit adverse impacts on the antarctic environment;

Recommend to their Governments that:

(i) An informal meeting of the Parties be convened with a view to making proposals to the XVIIth Consultative Meeting on the question of a comprehensive regulation of tourist and nongovernmental activities in Antarctica in accordance with the Protocol and taking into account the proposals made at the present XVIth Consultative Meeting, including proposals for a future Annex to the Protocol on Environmental Protection;

(ii) Prior to the convening of that meeting and in order to ensure due preparation of its work, proposals should be prepared by them taking into account the list of issues stated below, which the meeting should, *inter alia*, primarily address:

- a) environmental issues
 - implementation of the Protocol on Environmental Protection and its Annexes
 - number of tourists/carrying capacity
 - homologation of standards relating to vessels
 - permanent infrastructure for tourists
 - concentration/dispersal of tourist activities
 - access to unexplored areas
- b) operational issues
 - notification and expansion of information to be exchanged
 - system for granting permission to visit stations
 - self-sufficiency
 - insurance, including search-and-rescue insurance
 - information obligation of Parties
 - preparation and training of tour guides, and visitors' guides
 - examination of the need for specific kinds of control and monitoring
 - requirements for organizational procedures

(iii) The Meeting shall begin its work in Venice on 9 November 1992.

(iv) Representatives of the WTO, IUCN, IAATO, IMO, ASOC, PATA, SCAR, and COMNAP be invited to attend the Meeting as observers.

Annex 1 to Recommendation XVI-2

Site of Special Scientific Interest number 33 Ardley Island, Maxwell Bay, King George Island

1. Geographical location

Ardley Island (62°13'S 58°54'W) is situated about 500 meters east of the coast of Fildes Peninsula, Maxwell Bay, King George Island. It is about 1 kilometer southeast of the Soviet station Bellingshausen and the Chilean station Teniente Marsh, and approximately 0.5 kilometer east of the Chinese station Great Wall.

2. Management plan

(i) Description of site

The Site comprises the entire island and its associated littoral zone, including the isthmus between the island and Fildes Peninsula to the west. The island is about 0 kilometers long and 1.5 kilometers, at its widest, and rises about 50 meters in altitude. It comprises mainly Tertiary andesitic-basaltic lavas and tuffs, and there are some raised beach terraces. It is snow- and ice-free in summer. There is a small (about 100-meter long) freshwater pond on the southwest of the island. There is a refuge hut (FRG) near Braillard Point, and two more refuge huts (Argentina, Chile) are situated near the middle of the northern coast of the island, the latter comprising several huts.

(ii) Reason for designation

The Site is of exceptional biological interest. It has a diverse avifauna with 12 breeding species, and is of particular importance for its breeding colonies of gentoo penguins (*Pygoscelis papua*); the average number of breeding pairs is about 4,000, which is the largest concentration of gentoos within the South Shetland Islands and probably in the Antarctic. There are also about 1,200 pairs of breeding Adélie penguins (*P. adeliae*) and a small number of chinstrap penguins (*P. antarctica*). Other breeding species of particular importance are southern giant petrels (*Macronectes giganteus*), Wilson's storm petrels (*Oceanites oceanicus*), and black-bellied storm petrels (*Fregata tropica*).

The island possesses some of the best-developed and most extensive plant communities in the South Shetland Islands, notably the climax fellfield ecosystem dominated by macrolichens (*Himantornia lugubris*, *Usnea* spp.). Such vegetation is extremely sensitive to hu-

man intervention and is very easily damaged.

(iii) *Outline of research*

Detailed ornithological and botanical research has been undertaken on Ardley Island for many years by Chilean, FRG, and GDR scientists, with brief studies made also by scientists from other national stations in the area.

Results of a 10-year census and breeding study, commencing in 1979, of pygoscelid penguins have revealed large between-season fluctuations in numbers and the breeding success of each species. Also, the giant petrel breeding population has declined by about 80 percent in recent years. There is strong evidence that these population fluctuations are a direct response to disturbance by large numbers of visitors and to vehicles and low-flying aircraft. The effects of these impacts will continue to be monitored as an integral part of the long-term ornithological research being undertaken at this site.

Detailed investigations of the phytosociology of the island's vegetation and of the physiology of selected lichen species have been undertaken. Further terrestrial botanical, zoological, and littoral research is planned. Because of the extreme importance of this area to biological research, it is imperative that it is protected from the severe threat of human intervention so as to minimize its impact on this exceptional ecosystem.

(iv) *Date of expiry of designation*
31 December 2001

(v) *Access points*

None specified, although not more than five persons should enter the site from the sea anywhere east of a north-south line running through the beacon on the mid-north coast of the island.

(vi) *Pedestrian and vehicular routes*

Pedestrian activity should be restricted whenever possible to areas with minimal vegetation and should avoid any bird breeding sites, except as required for approved research studies. Tourists and non-scientific-station and ship personnel should visit only the area designated for this purpose (see *ix*) in order to minimize disturbance of biota. The use of any type of vehicle, including amphibious craft on land, is not permitted. Helicopters should not land on or overfly the island below 300-meter altitude. Aircraft landing at and taking off from Teniente Marsh airfield should avoid overflying the island.

(vii) *Other kinds of scientific investigations which would not cause harmful interference*

Other kinds of scientific investigations may be permitted as long as they cause minimum impact on the biota and ecosystems. All markers and structures associated with field experiments must be removed as soon as the research is completed.

(viii) *Scientific sampling*

All activities involving banding, capture, killing, etc., of any bird must conform with Agreed Measures for the Conservation of Antarctic Fauna and Flora. Any other sampling should be restricted to the minimum required for the purpose of the respective studies.

(ix) *Other restraints*

Large groups of visitors to the site should be limited to a maximum of 20 persons at any time. Such groups of persons should have access only to the "tourist area" marked on the map, i.e., the north coast of the island as far as 300 meters west of Braillard Point and 300 meters west of the Chilean refuge, up to an altitude of 20 meters above sea level. Groups should be accompanied by a guide, provided from the national station approving the visit, who will be responsible for their conduct and who is fully conversant with the Site Management Plan, the Agreed Measures for the Conservation of Antarctic Fauna and Flora, and the current research programs. There should be no access to dogs whether or not they are required for sledging purposes. All human waste materials should be removed from the Site and returned to the Station of origin; no combustible materials should be incinerated within the Site.

Annex 2 to Recommendation XVI-2

Site of Special Scientific Interest number 34 Lions Rump, King George Island, South Shetland Islands

1. Geographical location

The Site is situated on the south coast of King George Bay, King George Island, South Shetland Islands, and is bounded by the following coordinates: 62°07'48"S 58°09'17"W, 62°07'49"S 58°07'14"W, 62°08'19"S 58°07'19"W, 62°08'16"S 58°09'15"W.

2. Management Plan

(i) *Description of area*

The area is named after Lions Rump, a prominent rocky hill between the southern extremity of King George Bay and "Lion Cove." It includes the littoral and sublittoral extending from the eastern end of "Lajkonik Rock" to the northernmost end of Twin Pinnacles Island, and from that point to the easternmost end of the columnar plug "Lions Head" to the east of "White Eagle Glacier." On land, the Site includes the coastline of

raised beaches, freshwater pools and the streams on the south side of King George Bay and around "Lion Cove," moraines, and slopes leading up to the lower ice tongue of "White Eagle Glacier" and westward to a small moraine protruding through the ice cap southeast of "Sukiennice Hills." Lions Rump comprises Tertiary lavas and tuffs with thin brown coal intercalations and silicified wood fragments. The moraine west of "Lion Cove" consists of several Holocene stages of glacier advance and retreat. A small refuge is situated near the shore close to the main stream within the Site, about 300 meters west of Lions Rump.

(ii) *Reason for designation*

The Site is representative of the terrestrial, limnological, and littoral ecosystems of King George Island, possessing diverse biota and rock formations. There is a rich flora, especially of lichens, and the two native vascular plants, *Colobanthus quitensis* and *Deschampsia antarctica*, are frequent. Twelve species of birds breed within the Site, including many colonies of three species of pygoscelid penguins, Adélie, chinstrap, and gentoo. There are large numbers of elephant seals and fur seals on the beaches. It is a rich part of the coastal ecosystem which has not been disturbed by human activity, other than various biological, geological, and geomorphological studies which have been undertaken within the Site.

(iii) *Date of designation and originator* July 1990 by Poland

(iv) *Date of expiry of designation* 31 December 2001

(v) *Access points*

Access from the sea should be close to the outflow of the main stream within the Site about 300 meters west of Lions Rump. Helicopter landings should be restricted to the area south of the southern boundary of the Site, so as not to disturb the fauna.

(vi) *Entry permit requirement*

Entry into the Site should be in strict accordance with a current permit, issued by a Participating Government or its authorized representative, specifically for a compelling scientific purpose which cannot be served elsewhere or for site inspection, and which will not jeopardize any aspect of the natural ecosystem or its biota with the Site (see Antarctic Treaty Agreed Measures for the Conservation of Antarctic Fauna and Flora, Article VIII).

However, access to the Site shall be unlimited to parties wishing only to traverse or pass through the site to carry out *bona fide* scientific research inland of the Site. Such parties shall pass through the site as speedily as is reasonable and shall not disturb any part of the site. Details of the visit should be included in the national annual report of exchange of information for the same ant-

arctic season in which the activities were carried out. Research parties passing through the site as permitted above should also report their visits in the same way.

(vii) *Prohibitions*

To avoid or minimize human impact it is prohibited to:

- (a) drive any vehicle within the Site;
- (b) land a helicopter within the Site;
- (c) overfly the Site by any aircraft below 250 meters above the highest point;
- (d) anchor or moor any seacraft within the Site, except in accordance with the permit;
- (e) incinerate, bury, or otherwise dispose of any human waste within the Site; all such waste must be removed from the Site;
- (f) leave depots of fuel, food, or any other supplies within the Site, unless they are further required within the same season, at the end of which they must be removed;
- (g) erect any form of building additional to the existing refuge within the Site.

(viii) *Pedestrian routes*

None specified, but precautions must be taken to avoid disturbance to any breeding bird or seal or stand of vegetation, unless required as specified in the permit.

(ix) *Scientific research and sampling*

All activities must conform strictly with those specified in the permit to enter the Site.

(x) *Inspection and maintenance*

Inspection visits to the Site should be made at least once every 5 years to assess its state and to monitor significant biological or environmental changes. Other visits should be made as necessary to maintain boundary markers, notices, etc.

Annex 1 to Recommendation XVI-3

Marine Site of Special Scientific Interest number 35 Western Bransfield Strait

1. Geographical location

The Site is located off the southern shore of Low Island, western South Shetland Islands, between latitudes 63°20'S and 63°35'S and between longitudes 61°45'W and 62°30'W (with reference to U.S. Defense Mapping Agency Hydrographic/Topographic Center chart number 29121). A small portion of the Low Island landmass/snowmass projects into the northern boundary of this domain; here the northern limit of the Site will be associated intertidal zone. East, west, and south of the island the bottom slopes gently from the intertidal

zone to depths of approximately 200 meters and then drops off rapidly near the boundary limits of the Site.

2. Management Plan

(i) *Description of site*

The bottom consists of a sand/mud/cobbled-rock matrix and supports a rich benthos, e.g., numerous fish species, invertebrates (sponges, anemones, annelids, mollusks, crustaceans, asteroids, ophiuroids, echinoids, holothurioids, brachiopods, tunicates), and marine plants, in several distinct communities. Fish species commonly collected near Low Island include *Notothenia gibberifrons*, *Chaenocephalus aceratus*, *Harpagifer bispinis*, *Parachaenichthys charcoti*, *Trematomus newnesi*, and *N. coriiceps neglecta*. Species rarely found at Low Island include *Pseudochaenichthys georgianus*, *Champscephalus gunnari*, and *Chionodraco rastroripinosus*. In addition, the Low Island shelf appears to be a major spawning ground for several fish species (e.g., *N. coriiceps neglecta* and the ice fish *C. aceratus*).

(ii) *Reason for designation*

The shallow shelf south of Low Island is one of only two known sites in the vicinity of Palmer Station that are suitable for bottom trawling for fish and other benthic organisms. From an ecological standpoint, the Low Island site offers unique opportunities to study the composition, structure, and dynamics of several accessible marine communities. The Site, and in particular, its benthic fauna, is of exceptional scientific interest and require long-term protection from potential harmful interference.

(iii) *Outline of research*

Studies of this area by scientists from Palmer Station began in the early 1970s. The current research program uses fish from Low Island to study the biochemical adaptations that enable proteins to function at low temperatures and physiological adaptation of muscle and energy metabolism to low temperatures. These studies are conducted each year during the austral summer.

(iv) *Date of expiry of designation* 31 December 2001

(v) *Access points*

Any boundary point may be used for entry. Free passage of ships through this Site is permitted.

(vi) *Pedestrian and vehicular routes* Not applicable

(vii) *Other kinds of scientific investigations that would not cause harmful interference*

Ecological studies of the sea floor and its benthos by any method should be restricted to the minimum necessary for research activities and should be carried out with minimal disturbance of the Site.

(viii) *Scientific sampling*

Sampling of the sea floor and its benthos by any method should be restricted

to the minimum necessary for research activities and should be carried out with minimal disturbance of the Site.

(ix) *Other restraints*

Ships should, where possible, avoid anchoring within the boundaries of the Site.

Annex 2 to Recommendation XVI-3

Marine Site of Special Scientific Interest number 36 East Dallmann Bay

1. Geographical location

The Site is located in East Dallmann Bay off the western shore of Brabant Island, Palmer Archipelago, between latitudes 64°00'S and 64°20'S and from longitude 62°50'W east to the intertidal zone of the island's western shore (with reference to U.S. Defense Mapping Agency Hydrographic/Topographic Center, chart number 29121). West of Brabant Island the bottom forms a gently sloping shelf from the intertidal zone to depths of approximately 200 meters and then drops off rapidly near the western boundary of the Site.

2. Management plan

(i) *Description of site*

The bottom consists of a sand/mud/cobbled-rock matrix. The benthic community includes numerous fish species, invertebrates (sponges, anemones, annelids, mollusks, crustaceans, asteroids, ophiuroids, echinoids, holothurioids, tunicates), and marine plants. Fish species commonly collected at East Dallmann Bay include *Notothenia gibberifrons*, *Chaenocephalus aceratus*, *Champscephalus gunnari*, *Pseudochaenichthys georgianus*, and *Chionodraco rastroripinosus*. Specimens of *Trematomus newnesi* and *N. coriiceps neglecta* are rare in this area.

(ii) *Reason for designation*

The shallow shelf west of East Dallmann Bay is one of only two known sites near Palmer Station that are suitable for bottom trawling for fish and other benthic organisms. The Site and, in particular, its benthic fauna are of exceptional scientific interest and require long-term protection from potential harmful interference.

(iii) *Outline of research*

Studies of this area by scientists from Palmer Station began in the early 1970s. The current research program uses fish from East Dallmann Bay to study the biochemical adaptations that enable proteins to function at low temperatures and the physiological adaptation of muscle and energy metabolism to low temperatures.

(iv) *Date of expiry of designation*
31 December 2001

(v) *Access points*

Any boundary point may be used for entry. Free passage of ships through this area is permitted.

(vi) *Pedestrian and vehicular routes*

Not applicable

(vii) *Other kinds of scientific investigations that would not cause harmful interference*

Ecological studies of the composition, structure, and dynamics of the marine communities would not be harmful.

(viii) *Scientific sampling*

Sampling of the sea floor and its benthos by any method should be restricted to the minimum necessary for research activities and should be carried out with minimal disturbance of the Site.

(ix) *Other restraints*

Ships should, where possible, avoid anchoring within the boundaries of the Site.

(*Catharacta maccormicki*), 30 pairs (total adult birds about 200); Wilson's storm petrels (*Oceanites oceanicus*) several hundred pairs. Several other birds are frequent visitors, breeding elsewhere in Marguerite Bay. Weddell seals (*Leptonychotes weddellii*) breed in small numbers around the shores of the island, and other species of seals occasionally come ashore, particularly fur seals (*Arctophalus gazella*) in increasing numbers during summer. Bryophyte vegetation is sparse but nitrophilous lichen communities are well-developed; vascular plants are absent. The giant petrel colony is the farthest south known breeding population and represents about a quarter of the population breeding on the entire Antarctic Peninsula. The blue-eyed shag colony is one of the largest known in the Antarctic and is very close to the southern limit of the species breeding range; it represents about 85 percent of the total population breeding south of the Antarctic Circle. The Adélie penguin colony is the largest on the Antarctic Peninsula and contains a third of the total population breeding in the region.

(iii) *Date of designation and originator*

Originally designated as Site of Special Scientific Interest number 30, November 1989, Recommendation XV-6 by the United Kingdom; proposed designation as a Specially Protected Area July 1990 by the United Kingdom.

(iv) *Access points*

Access should be from the sea as close as possible to either of the refuge huts.

(v) *Entry permit requirement*

Entry into the Area is only in strict accordance with a current permit, issued by a Participating Government or its authorized representative, specifically for a compelling scientific purpose which cannot be served elsewhere, or for site inspection, and which will not jeopardize any aspect of the natural ecosystem or its biota within the Area (see Antarctic Treaty Agreed Measures for the Conservation of Antarctic Fauna and Flora, Article VIII). Details of the visit should be included in the national annual report of Exchange of Information for the same antarctic season in which the activities were carried out.

(vi) *Prohibitions*

To avoid or minimize human impact it is prohibited to:

(a) drive any vehicle within the Area (oversnow vehicles used to visit the island must be left at the shoreline);

(b) bring any dog into the Area;

(c) land a helicopter within the Area;

(d) overfly the Area by any aircraft below 250 meters above the highest point;

(e) use any of the Area's coves or bays for anchoring or mooring seacraft, except in accordance with the permit;

(f) incinerate, bury, or otherwise dispose of any nonhuman waste with the

Area; all such waste must be removed from the Area;

(g) leave depots of fuel, food, or any other supplies within the Area, except at the refuges, unless they are further required within the same season, at the end of which they must be removed.

(h) erect any form of building with the Area, besides the restoration and maintenance of the two existing refuges.

(vii) *Pedestrian routes*

None specified, but every precaution must be taken to avoid disturbance of any breeding bird (especially giant petrels, which pedestrians should not approach closer than 100 meters) or seal, unless required as specified in the permit.

(viii) *Scientific research and sampling*

All activities must conform strictly with those specified in the permit to enter the Area.

(ix) *Inspection and maintenance*

Inspection visits should be made to the Area at least once every 5 years to assess the state of the site and to monitor any significant biological or environmental changes. Other visits should be made as necessary to maintain boundary markers, notices, etc.

Annex to Recommendation XVI-4

Specially Protected Area, including Management Plan, Avian Island, northwest Marguerite Bay, Antarctic Peninsula

1. Geographical location

Avian Island (67°46'S 68°54'W) lies 0.25 kilometer south of the southwest tip of Adelaide Island in northwest Marguerite Bay, southwest Antarctic Peninsula.

2. Management plan

(i) *Description of area*

The Area consists of Avian Island together with its littoral zone. It is 1.45 kilometers long by 0.8 kilometer at its widest (total area about 49 hectares) and rises to just over 40 meters altitude in the south. It is almost entirely ice-free in summer. There are several shallow melt pools, the largest being on the eastern raised beach terrace. There are two small dilapidated refuge huts, one near the northwest and the other near the mideastern shores of the island.

(ii) *Reason for designation*

The Area is unique in the Antarctic Peninsula region for its abundance and diversity of breeding seabirds, the most important of which are: Adélie penguins (*Pygoscelis adeliae*) about 36,000 pairs; blue-eyed shags (*Phalacrocorax atriceps*) about 670 pairs; southern giant petrels (*Macronectes giganteus*) about 250 pairs; dominican gulls (*Larus dominicanus*) about 60 pairs (total adult birds about 200); skuas

Annex to Recommendation XVI-5

Amendment to Site of Special Scientific Interest, number 6 Byers Peninsula, Livingston Island, South Shetland Islands

This Site currently comprises three areas of varying shape and size on Byers Peninsula designated solely for their sedimentary and paleontological interest. However, the peninsula is also of considerable biological and archeological importance. The following amended management plan is proposed:

1. Geographical location

Byers Peninsula is an extensive, largely ice-free area at the western end of Livingston Island, South Shetland Islands, centered on latitude 62°38'S longitude 61°05'W.

2. Management plan

(i) *Description of site*

The Site comprises the entire area of Byers Peninsula extending from the ice margin on the west side of Rotch Dome (to a point directly north of Stackpole Rocks) westward to the west end of Ray Promontory. The littoral zone of the peninsula is included within the Site. The nearby offshore islets and islands are not included in the Site. Most of the

Site is low and undulating, below 100 meters altitude, except for Ray Promontory which has a more rugged topography, rising to over 200 meters at Penca Hill and Start Hill. Numerous volcanic plugs, lakes, pools, and streams occur between Ray Promontory and the Rotch Dome ice field. Coastal areas often have broad beaches several hundred meters wide, with raised beaches behind.

(ii) *Reason for designation*

The fossils found in this area provide evidence of the former link between Antarctica and the other southern continents. A long-term paleontological research program has been in progress since the mid-1960s. It is important to protect these Jurassic and Cretaceous rocks from being used as building materials or taken as souvenirs.

The Site is of special biological importance. It has a sparse but diverse flora of both calcicolous and calcifuge plants and cyanobacteria associated with the lavas and basalts, respectively. Basaltic plugs are particularly well-vegetated. Several rare cryptogams and the two native vascular plants (*Colobanthus quitensis* and *Deschampsia antarctica*) occur at several sites. There are several coastal and inland lakes, the latter having a particularly important biota, including aquatic mosses, and serve as breeding sites for the midge *Parochlus steineri*, the only native winged insect in the Antarctic and with exceptionally restricted distribution. The only other antarctic dipteran, the apterous *Belgica antarctica*, occurs in stands of wet moss.

The Site is also unique in possessing the greatest concentration of historical sites in Antarctica, namely the remains of refuges, together with contemporary artefacts, and shipwrecks of early nineteenth century sealing expeditions.

It is important that both the biological and archeological features are also afforded protection.

(iii) *Outline of research*

A long-term geological and paleontological research program was established in 1964. The main objectives are the description of sediments and fossils found in this area. Botanical, zoological, limnological, ornithological, and archeological investigations have also been undertaken throughout the Site at various times since the late 1950s.

(iv) *Date of expiry of designation*
31 December 2001

(v) *Access points*
None defined

(vi) *Pedestrian and vehicular routes*

Vehicles should not enter the Site, except in an emergency. Helicopters should land only on unvegetated ground at least 500 meters from any bird or seal concentrations or freshwater bodies.

(vii) *Other kinds of scientific investigations which would not cause harmful interference*

Scientific research other than archeological, biological, and geological should be kept to a minimum.

(viii) *Scientific sampling*

Samples of rocks or biological specimens should be taken only for compelling scientific purposes.

(ix) *Other restraints*

Buildings and other facilities should not be erected in the Site. All nonhuman waste should be removed from the Site. No combustible waste should be incinerated within the Site. There should be no interference of any sealers' refuges (huts, caves, etc.) nor removal of any associated artefacts (including implements, timbers, fabrics, etc.) from these features or from the beaches. No skeletal remains of any animal should be moved within or removed from the Site.

Annex to Recommendation XVI-6

Management Plan for Specially Protected Area number 8, Dion Islands, Marguerite Bay, Antarctic Peninsula

1. Geographical location

The Dion Islands (67°52'S 68°43'W) are a small group of low-lying rocky islands lying about 13 kilometers south of the southern end of Adelaide Island, in the northwestern part of Marguerite Bay.

2. Management plan

(i) *Description of area*

The Area comprises all of the Dion Islands archipelago, which lie within an area of about 12 square kilometers, together with the intervening sea. The islands and islets are small, rocky, and often precipitous, notably Emperor Island which is also the highest (46 meters altitude). The main islands are the largest of the Courtier Islands group (approximately 8 hectares), Emperor Island (approximately 5 hectares), and the largest of the Consort Islands group (approximately 3 hectares). Low-lying areas occur on the two largest islands. There are a few small permanent ice patches, but there are no streams or permanent pools.

(ii) *Reason for designation*

The Area possesses the only known breeding population of emperor penguins (*Aptenodytes forsteri*) on the west side of the Antarctic Peninsula. It is situated on a low-lying raised beach and rocky headland in the southeastern part of Emperor Island. It is also the most northerly and probably the smallest colony (annual numbers fluctuate between about 50 and 500 pairs), and is one of

only two in which breeding occurs on land (see also Specially Protected Area number 1). It is also the most isolated emperor colony, being about 2,500 kilometers (by sea) from the nearest other known rookery. Other breeding birds within the Area include a small colony of Adélie penguins (*Pygoscelis adeliae*) near the emperor penguin colony, and about 200 pairs of blue-eyed shags (*Phalacrocorax atriceps*) on the precipitous north side of the same island.

(iii) *Date of designation and originator*

November 1966, Recommendation IV-8, by the United Kingdom

(iv) *Access points*

None specified, but access should be from the sea; landing on Emperor Island should be at least 100 meters from the emperor penguin colony or any non-breeding aggregations of these birds.

(v) *Entry permit requirement*

Entry into the Area is only in strict accordance with a current permit, issued by a Participating Government or its authorized representative, specifically for a compelling scientific purpose which cannot be served elsewhere, or for site inspection, and which will not jeopardize any aspect of the natural ecosystem or its biota within the Area (see Antarctic Treaty Agreed Measures for the Conservation of Antarctic Fauna and Flora, Article VIII). Details of the visit should be included in the national annual report of Exchange of Information for the same antarctic season in which the activities were carried out.

(vi) *Prohibitions*

To avoid or minimize human impact it is prohibited to:

(a) land a helicopter within the Area;
(b) overfly the Area by any aircraft below 250 meters above the highest point;

(c) use any of the Area's coves, bays, or intervening water for anchoring or mooring seacraft, except in accordance with the permit;

(d) incinerate, bury, or otherwise dispose of any nonhuman waste within the Area; all such waste must be removed from the Area;

(f) leave depots of fuel, food, or any other supplies within the Area, unless they are further required within the same season, at the end of which they must be removed;

(g) erect any form of building with the Area.

(vii) *Pedestrian routes*

None specified, but every precaution must be taken to avoid disturbance of any breeding bird or seal, particularly emperor penguins which pedestrians should not approach closer than 50 meters, unless required as specified in the permit.

(viii) *Scientific research and sampling*

All activities must conform strictly with those specified in the permit to enter the Area.

(ix) *Inspection and maintenance*

Inspection visits to the Area should be made at least once every 5 years to assess the state of the site and to monitor any significant biological or environmental changes. Other visits should be made as necessary to maintain boundary markers, notices, etc.

Management Plan for Specially Protected Area number 9 Green Island, Berthelot Islands, Antarctic Peninsula

1. Geographical location

Green Island (65°19'S 64°10'W) is a small island on the north side of the Berthelot Islands group, lying between the northwest side of Collins Bay and Grandidier Channel, about 3 kilometers off the Graham Coast of the midwestern Antarctic Peninsula.

2. Management plan

(i) *Description of area*

The Area comprises all of Green Island, a small rocky island lying about 0.25 kilometer to the north of the largest of the Berthelot Islands. It is about 500 meters from north to south and 300 meters from east to west, rising to a dome-shaped peak at about 80 meters altitude. The island rises steeply on all sides, with high precipitous cliffs on the south and east sides. Along the north side is a gently sloping rock platform. There are several permanent snow patches with the largest occurring to the south and east of the summit. There are no streams or pools.

(ii) *Reason for designation*

Green Island is extensively vegetated on the north-facing slopes and has especially well-developed continuous banks of moss turf formed by *Chorisodontium aciphyllum* and *Polytrichum alpestre* which, over much of their extent, overlie peat of more than 1 meter in depth. Antarctic hair grass (*Deschampsia antarctica*) is frequent in small patches near the shag colony. The island has two important bird colonies. A large blue-eyed shag (*Phalacrocorax atriceps*) colony with about 250 nests occurs on the steep, rocky northwest corner; this is one of the largest shag colonies on the Antarctic Peninsula. There are also large numbers of brown skuas (*Catharacta lonnbergii*) and a few south polar skuas (*C. maccormicki*) and hybrids, but only a few of the former are known to breed.

(iii) *Date of designation and originator*

November 1966, Recommendation IV-9, by the United Kingdom

(iv) *Access points*

None specified, but landings by boat or helicopter are easiest on the north side of the island.

(v) *Entry permit requirement*

Entry into the Area is only in strict accordance with a current permit, issued by a Participating Government or its authorized representative, specifically for a compelling scientific purpose which cannot be served elsewhere, or for site inspection, and which will not jeopardize any aspect of the natural ecosystem or its biota within the Area (see Antarctic Treaty Agreed Measures for the Conservation of Antarctic Fauna and Flora, Article VIII). Details of the visit should be included in the national annual report of Exchange of Information for the same antarctic season in which the activities were carried out.

(vi) *Prohibitions*

To avoid or minimize human impact it is prohibited to:

(a) land a helicopter within the Area, except on the rock platform near sea level on the north side of the island;

(b) overfly the Area by any aircraft below 250 meters above the highest point;

(c) use any of the Area's coves for anchoring or mooring seacraft, except in accordance with the permit;

(d) incinerate, bury, or otherwise dispose of any nonhuman waste within the Area; all such waste must be removed from the Area;

(e) leave depots of fuel, food, or any other supplies within the Area, unless they are further required within the same season, at the end of which they must be removed;

(f) erect any form of building within the Area.

(vii) *Pedestrian routes*

None specified, but every precaution must be taken to cause minimal damage to the luxuriant moss banks and avoid disturbance of any breeding bird or seal, unless required as specified in the permit.

(viii) *Scientific research and sampling*

All activities must conform strictly with those specified in the permit to enter the Area.

(ix) *Inspection and maintenance*

Inspection visits to the Area should be at least once every 5 years to assess the state of the site and to monitor any significant biological or environmental changes. Other visits should be made as necessary to maintain boundary markers, notices, etc.

Management plan for Specially Protected Area number 13, Moe Island, South Orkney Islands

1. Geographical location

Moe Island (60°45'S 45°41'W) is a small island lying about 0.5 kilometers off the southwest extremity of Signy Island,

South Orkney Islands, from which it is separated by Fyr Channel.

2. Management plan

(i) *Description of area*

The Area is an irregularly shaped island about 1.8 kilometers from northeast to southwest and 1 kilometer from northwest to southeast. It rises precipitously on the northeastern and southeastern sides to Snipe Peak (226 meters altitude); there is a subsidiary summit above South Point (102 meters altitude) and lower hills on each of three promontories on the western side above Corral Point (92 meters), Conroy Point (89 meters), and Spaul Point (56 meters). Small areas of permanent ice remain on the east and south facing slopes, with late-lying snow patches on the steeply dipping western slopes. There are no streams or pools.

(ii) *Reason for designation*

Moe Island provides an excellent representative sample of the maritime antarctic terrestrial ecosystem, with particularly well-developed stands of vegetation typical of the South Orkney Islands. The dominant plant communities are *Andreaea-Usnea* fellfield and banks of *Chorisodontium-Polytrichum* moss turf (the main stand of which is continuous over 5 hectares including large areas of eroded peat, and represents the largest known example of this community type in the Antarctic). The cryptogamic flora and arthropod fauna are diverse. There are five colonies of chinstrap penguins (*Pygoscelis antarctica*) totaling about 11,000 pairs. Numerous other birds breed on the island, notably about 2,000 pairs of cape petrels (*Daption capensis*) and large numbers of antarctic prions (*Pachyptila desolata*). Weddell seals (*Leptonychotes weddellii*) and leopard seals (*Hydrurga leptonyx*) are sometimes frequent in the bays on the west side of the island. An increasing number of immature bull fur seals (*Arctocephalus gazella*) come ashore on the north side of Landing Cove and are causing some damage to vegetation. However, the nature of the terrain should restrict the animals to this small headland.

Because of the long-established intensive experimental field research and the very extensive destruction of the lowland terrestrial and freshwater ecosystems caused by fur seals on neighboring Signy Island, Moe Island serves as an important control site with which future comparisons may be made with particular regard to biological and environmental change in the region.

(iii) *Dates of designation and originator*

November 1966, Recommendation IV-13, by the United Kingdom

(iv) *Access points*

None specified, but preferably and most safely, from the sea at the northeastern corner of Landing Cove.

(v) *Entry permit requirement*

Entry into the Area is only in strict accordance with a current permit, issued by a Participating Government or its authorized representative, specifically for a compelling scientific purpose which cannot be served elsewhere or for site inspection, and which will not jeopardize any aspect of the natural ecosystem or its biota within the Area (see Antarctic Treaty Agreed Measures for the Conservation of Antarctic Fauna and Flora, Article VIII). Details of the visit should be included in the national annual report of Exchange of Information for the same antarctic season in which the activities were carried out.

(vi) *Prohibitions*

To avoid or minimize human impact it is prohibited to:

(a) land a helicopter within the Area, except on the col between hill 89 m and the western slope of Snipe Peak, to the south of Landing Cove.

(b) overfly the Area by any aircraft below 250 meters above the highest point, except for access to the landing area specified in (a), which should be directly from the cove to the north or south avoiding any seabird colonies;

(c) use any of the Area's coves or bays for anchoring or mooring seacraft, except in accordance with the permit;

(d) incinerate, bury, or otherwise dispose of any nonhuman waste within the Area; all such waste must be removed from the Area;

(e) leave depots of fuel, food, or any other supplies within the Area, unless they are further required within the same season, at the end of which they must be removed;

(f) erect any form of building within the Area.

(vii) *Pedestrian routes*

None specified, but every precaution must be taken to avoid disturbance of any breeding bird or seal or stand of vegetation, unless required as specified in the permit; in particular, stands of *Polytrichum-Chorisodontium* moss banks and areas of eroding peat should be avoided wherever possible.

(viii) *Scientific research and sampling*

All activities must conform strictly with those specified in the permit to enter the Area.

(ix) *Inspection and maintenance*

Inspection visits to the Area should be made once every year to assess the state of the site and to monitor any significant biological or environmental changes, particularly with regard to increasing damage caused by fur seals to the island's vegetation. Such visits should also be used to maintain boundary markers, notices, etc.

Management plan for Specially Protected Area number 14, Lynch Island, South Orkney Islands

1. Geographical location

Lynch Island (60°40'S 45°38'W) is a small island situated at the east end of Marshall Bay, in the midsouthern coast of Coronation Island and directly to the north of Signy Island, South Orkney Islands.

2. Management plan

(i) *Description of area*

The Area is a small rocky island, about 200 meters from the south coast of Coronation Island, and about 500 meters from east to west and 300 meters from north to south, rising to a flat plateau with a maximum altitude of 33 meters. On the south, east, and west sides there are low cliffs up to 20 meters high, and boulder-filled gulleys, while the northern side has a low cliff below a rock terrace at about 5–8 meters altitude. There are no streams or pools, and only a few small late-lying snow patches occur on the southern side of the island.

(ii) *Reason for designation*

Lynch Island supports one of the most extensive and dense stands of antarctic hair grass (*Deschampsia antarctica*) known in the Treaty Area. The only other antarctic flowering plant, antarctic pearlwort (*Colobanthus quitensis*), is also abundant. The cryptogamic vegetation is typical of the region, but several species of moss are unusually fertile here (notably *Polytrichum alpinum* and *Muelleriella crassifolia*). Beneath the grass swards on the moist north-facing slope a shallow loamlike earth resembling tundra brown soil has developed and contains a rich invertebrate fauna. Moist moss in rock crevices on the north side of the island harbors a rare terrestrial enchytraeid worm. Breeding birds are poorly represented, but most species of antarctic seals are common around the island and occasionally ashore (particularly an increasing number of immature bull fur seals, *Arctocephalus gazella*, which come ashore in summer).

(iii) *Date of designation and originator*

November 1966, Recommendation IV-14, by the United Kingdom

(iv) *Access points*

Access should be from the sea, landing at a prominent low rocky promontory or the adjacent cove to the west, on the north side of the island.

(v) *Entry permit requirement*

Entry into the Area is only in strict accordance with a current permit, issued by a Participating Government or its authorized representative, specifically for a compelling scientific purpose which cannot be served elsewhere or for site

inspection, and which will not jeopardize any aspect of the natural ecosystem or its biota within the Area (see Antarctic Treaty Agreed Measures for the Conservation of Antarctic Fauna and Flora, Article VIII). Details of the visit should be included in the national annual report of Exchange of Information for the same antarctic season in which the activities were carried out.

(vi) *Prohibitions*

To avoid or minimize human impact it is prohibited to:

(a) drive any vehicle within the Area;

(b) land a helicopter within the Area;

(c) overfly the Area by any aircraft below 250 meters above the highest point;

(d) use any of the Area's coves or bays for anchoring or mooring seacraft, except in accordance with the permit;

(e) incinerate, bury, or otherwise dispose of any nonhuman waste within the Area; all such waste must be removed from the Area;

(f) leave depots of fuel, food, or any other supplies within the Area, unless they are further required within the same season, at the end of which they must be removed;

(g) erect any form of building within the Area.

(vii) *Pedestrian routes*

None specified, but every precaution must be taken to avoid disturbance of any breeding bird or seal or stand of vegetation, unless required as specified in the permit; in particular, areas of *Deschampsia* and *Colobanthus* should be avoided wherever possible.

(viii) *Scientific research and sampling*

All activities must conform strictly with those specified in the permit to enter the Area.

(ix) *Inspection and maintenance*

Inspection visits to the Area should be made at least once every year to assess the state of the site and to monitor any significant biological or environmental changes, particularly with regard to increasing damage caused by fur seals to the island's grass-dominated communities. Such visits should also be used to maintain boundary markers, notices, etc.

Management plan for Specially Protected Area number 15, southern Powell Island and adjacent islands, South Orkney Islands

1. Geographical location

Powell Island (60°45'S 45°02'W) is the third largest of the South Orkney Islands, lying between Coronation Island to the west and Laurie Island to the east.

2. Management plan

(i) Description of area

The Area includes all of Powell Island south of the latitude of the southern summit of John Peaks (375 meters altitude), together with Michelsen Island (a peninsula rising to 38 meters altitude and separated from a long promontory at the south end of Powell Island by a low isthmus which floods at high tide) and adjacent unnamed rocky islets, Christoffersen Island (96 meters altitude) to the west, Grey Island (43 meters altitude) to the south, and Fredriksen Island (about 300 meters altitude) to the east. All but southern Powell Island ("Crutchley Ice Piedmont") are mainly ice-free in summer. All intervening sea is included within the Area.

(ii) Reason for designation

The Area is of exceptional biological interest, supporting limited stands of vegetation typical of biotically influenced coastal habitats of the region, and considerable populations of a diversity of bird and seal species. The bryophyte vegetation is best developed at the extreme northwest corner of the Area on southwest Powell Island, on Christoffersen Island and locally on northern Fredriksen Island; elsewhere there are extensive nitrophilous lichen communities on the rocks and cliffs. There are several biotically contaminated melt-pools and streams, especially on the beach on the east side of southern Powell Island where "Crutchley Ice Piedmont" is receding.

Large numbers of penguins and petrels breed throughout the Area. There are about 50,000 breeding pairs of chinstrap penguins (*Pygoscelis antarctica*) of which about 80 percent occur on Fredriksen Island, and about the same number of Adélie penguins (*P. adeliae*) of which almost all occur in the southern Powell-Michelsen Island area. There are about 3,000 pairs of gentoo penguins (*P. papua*) breeding on the southern promontory of Powell Island, Michelsen Island and Christoffersen Island. There are also a few pairs of macaroni penguins (*Eudyptes chrysolophus*). Other breeding birds include southern giant petrels (*Macronectes giganteus*), cape petrels (*Daption capensis*), snow petrels (*Pagodroma nivea*), Wilson's storm petrels (*Oceanites oceanicus*), blue-eyed shags (*Phalacrocorax atriceps*), dominican gulls (*Larus dominicanus*), antarctic terns (*Sterna vittata*), brown skuas (*Catharacta lonnbergii*), sheathbills (*Chionis alba*), and possibly antarctic prions (*Pachyptila desolata*), and black-bellied storm petrels (*Fregatta tropica*). The isthmus between southern Powell Island and Michelsen Island is the longest-known breeding site in the Antarctic for fur seals (*Arctocephalus gazella*) since their near-extirpation in the nineteenth century. However, the small number of pups born annually has not increased

substantially; a few pups are also born on suitable beaches on Fredriksen Island. Other seals are frequent on the beaches, e.g., elephant seals (*Mirounga leonina*), Weddell seals (*Leptonychotes weddellii*), and leopard seals (*Hydrurga leptonyx*), and crabeater seals (*Lobodon carcinophagus*) are occasionally seen on ice floes within the Area.

(iii) Date of designation and originator

November 1966, Recommendation IV-15, by the United Kingdom

(iv) Access points

None specified, but access should preferably be from the sea.

(v) Entry permit requirement

Entry into the Area is only in strict accordance with a current permit, issued by a Participating Government or its authorized representative, specifically for a compelling scientific purpose which cannot be served elsewhere or for site inspection, and which will not jeopardize any aspect of the natural ecosystem or its biota within the Area (see Antarctic Treaty Agreed Measures for the Conservation of Antarctic Fauna and Flora, Article VIII). Details of the visit should be included in the national annual report of Exchange of Information for the same antarctic season in which the activities were carried out.

(vi) Prohibitions

To avoid or minimize human impact it is prohibited to:

- drive any vehicle within the Area;
- land a helicopter within the Area, except on the northeastern part of the beach on the east side of the promontory of southern Powell Island providing there are no aggregations of wildlife, or on unvegetated areas in the north of Fredriksen Island, both to be at least 0.5 kilometers from any bird or seal colonies or aggregations;
- overfly the Area by any aircraft below 250 meters above the highest point;
- use any of the Area's coves or bays for anchoring or mooring seacraft, except in accordance with the permit; ships may anchor only in the strait between Michelsen Island and Fredriksen Island;
- incinerate, bury, or otherwise dispose of any nonhuman waste within the Area; all such waste must be removed from the Area;
- leave depots of fuel, food, or any other supplies within the Area, unless they are further required within the same season, at the end of which they must be removed;
- erect any form of building within the Area.

(vii) Pedestrian routes

None specified, but every precaution must be taken to avoid disturbance of any breeding bird (especially giant petrels, which pedestrians should not approach closer than 100 meters) or seal or stand of vegetation, unless required as specified in the permit.

(viii) Scientific research and sampling

All activities must conform strictly with those specified in the permit to enter the Area.

(ix) Inspection and maintenance

Inspection visits to the Area should be at least once every 5 years to assess the state of the site and to monitor any significant biological or environmental changes. Other visits should be made as necessary to maintain boundary markers, notices, etc.

Management plan for Specially Protected Area number 16, Coppermine Peninsula, Robert Island, South Shetland Islands

1. Geographical location

Coppermine Peninsula (62°23'S 59°44'W) is situated on the west side of Robert Island, which lies between Nelson Island to the east and Greenwich Island to the west, midway along the South Shetland Islands archipelago.

2. Management plan

(i) Description of area

The Area comprises all land west of a north-south line across the isthmus between Carlota Cove and Coppermine Cove, 100 meters west of a small group of Chilean refuge huts. The peninsula is about 1.7 kilometers from southeast to northwest and up to 0.6 kilometers from northeast to southwest and is largely surrounded by precipitous cliffs. There are three prominent low hills which reach a highest point at about 220 meters. The easternmost lies close to the isthmus; there is a central hill composed of basaltic columns and referred to as "Neptune's Cathedral," and the westernmost is situated above Fort William at the extreme west of the peninsula. The isthmus (mainly outside the Area) is a 250-meter wide raised beach reaching about 10 meters altitude. Much of the higher ground is permanently ice covered. There are numerous small streams and pools in summer.

(ii) Reason for designation

Coppermine Peninsula is a biologically rich area with a diverse biota typical of the South Shetland Islands. It supports a wide range of plant communities with associated invertebrate fauna; the vertebrate fauna is also particularly well represented. The outstanding feature of the vegetation is a 1.5 hectare closed carpet of the mosses *Calliergidium austro-stramineum*, *Calliergon sarmentosum*, and *Drepanocladus uncinatus*, representing one of the largest continuous moss stands in the Antarctic. It overlies a thick layer of wet moss peat. Large stands of the foliose cyanobacterium *Nostoc commune* occur on moist slopes and in depressions. A large num-

ber of bryophyte and lichen species occur within the Area, and antarctic hair grass (*Deschampsia antarctica*) is frequent. A small colony of chinstrap penguins (*Pygoscelis antarctica*) occurs at Fort William. There are about 30 small colonies of southern giant petrels (*Macronectes giganteus*). Other breeding species include about 2,000 nests of Wilson's storm petrels (*Oceanites oceanicus*) in at least 13 colonies up to 1,000 antarctic terns (*Sterna vittata*) in nine colonies, 300–400 dominican gulls (*Larus dominicanus*) in 10 colonies, and numerous brown skuas (*Catharacta lonnbergii*). Seals are common around the peninsula and frequently haul out at the isthmus, notably elephant seals (*Mirounga leonina*), Weddell seals (*Lep-tonychotes weddellii*), and increasingly large numbers of fur seals (*Arctocephalus gazella*).

(iii) *Date of designation and originator*
November, 1966, Recommendation IV-10, by Chile.

(iv) *Access points*

Access should be from the isthmus outside the Area by sea from Coppermine Cove or Carlota Cove, or by helicopter also to the east of the Area.

(v) *Entry permit requirement*

Entry to the Area is only in strict accordance with a current permit, issued by a Participating Government or its authorized representative, specifically for a compelling scientific purpose which cannot be served elsewhere or for site inspection, and which will not jeopardize any aspect of the natural ecosystem or its biota within the Area (see Antarctic Treaty Agreed Measures for the Conservation of Antarctic Fauna and Flora, Article VIII). Details of the visit should be included in the national annual report of Exchange of Information for the same antarctic season in which the activities were carried out.

(vi) *Prohibitions*

To avoid or minimize human impact it is prohibited to:

- (a) drive any vehicle within the Area;
- (b) land a helicopter within the Area;
- (c) overfly the Area by any aircraft below 250 meters above the highest point;
- (d) use any of the Area's coves or bays for anchoring or mooring seacraft, except in accordance with the permit;
- (e) incinerate, bury, or otherwise dispose of any nonhuman waste within the Area; all such waste must be removed from the Area;
- (f) leave depots of fuel, food, or any other supplies within the Area, unless they are further required within the same season, at the end of which they must be removed;
- (g) erect any form of building within the Area.

(vii) *Pedestrian routes*

None specified, but every precaution must be taken to avoid disturbance of any breeding bird (especially giant pe-

trels, which pedestrians should not approach closer than 100 meters) or seal or stand of vegetation (especially the extensive carpet of moss on the isthmus), unless required as specified in the permit.

(viii) *Scientific research and sampling*

All activities must conform strictly with those specified in the permit to enter the Area.

(ix) *Inspection and maintenance*

Inspection visits to the Area should be at least once every 3 years to assess the state of the site and to monitor any significant biological or environmental changes. Other visits should also be used to maintain boundary markers, notices, etc.

Management plan for Specially Protected Area number 18, North Coronation Island, South Orkney Islands

1. Geographical location

Coronation Island (60°38'S 45°35'W) is the largest of the South Orkney Islands, situated at the west end of the archipelago.

2. Management plan

(i) *Description of area*

The Area lies on the central north side of Coronation Island. It is bounded to the east by Foul Point (60°32'S 45°29'W) and to the west by Conception Point (60°31'S 45°41'W); the entire area between these points, together with the intervening sea, is included in the site. The eastern boundary follows a precipitous ridge 6 kilometers southward to a position at 2,500 feet (approximately 750 meters) altitude immediately to the west of Mount Nivea summit (60°35'S 45°29'W), thence west-southwestward for 5.5 kilometers to a position at 3,000 feet (approximately 900 meters) altitude to the northeast of Wave Peak summit (60°37'S 45°36'W), and from there 4 kilometers westward across the Brisbane Heights plateau, then 4 kilometers north-northwest to an unnamed summit at 3,532 feet (approximately 1,060 meters) and north for 6 kilometers to Conception Point. The summits of Mount Nivea and Wave Peak and the col known as High Stile are outside the Area. Ommanney Bay and the unnamed bay to the west are included within the Area, south of the boundary between Conception and Foul points (11.5 kilometers).

(ii) *Reason for designation*

The Area embraces areas of coastal ice-free terrain (Conception, Prong, and Foul points) with large seabird colonies and lichen-dominated cliffs, and permanent icefields (two major glaciers and ice cliffs rising to the Brisbane Heights plateau) which provide an excellent representative area of a pristine ice environment

near the northern limit of the maritime Antarctic and Antarctic Treaty Area. The interrelated terrestrial, ice, and marine components of the Area comprise an integrated example of the coastal permanent ice and sublittoral ecosystems typical of the maritime antarctic environment.

(iii) *Date of designation and originator*

October 1985, Recommendation XIII-10, by the United Kingdom

(iv) *Access points*

None specified

(v) *Entry permit requirement*

Entry into the Area is only in strict accordance with a current permit, issued by a Participating Government or its authorized representative, specifically for a compelling scientific purpose which cannot be served elsewhere or for site inspection, and which will not jeopardize any aspect of the natural ecosystem or its biota within the Area (see Antarctic Treaty Agreed Measures for the Conservation of Antarctic Fauna and Flora, Article VIII). Details of the visit should be included in the national annual report of Exchange of Information for the same antarctic season in which the activities were carried out.

(vi) *Prohibitions*

To avoid or minimize human impact prohibited to:

- drive any vehicle within the Area;
- land a helicopter within 0.5 kilometers of any bird or seal colonies or aggregations, or on any of the icefields;
- (c) overfly Conception, Prong, or Foul points below 250 meters above their respective highest points;
- (d) use any of the Area's coves or bays for anchoring or mooring seacraft, except in accordance with the permit; ships must not enter the Area;
- (e) incinerate, bury, or otherwise dispose of any nonhuman waste within the Area; all such waste, including human waste in all ice-covered areas, must be removed from the Area;
- (f) leave depots of fuel, food, or any other supplies within the Area, unless they are further required within the same season, at the end of which they must be removed;
- (g) erect any form of building within the Area.

(vii) *Pedestrian routes*

None specified, but every precaution must be taken to avoid disturbance of any breeding bird or seal.

(viii) *Scientific research and sampling*

All activities must conform strictly with those specified in the permit to enter the Area.

(ix) *Inspection and maintenance*

Inspection visits to the Area should be made no more than once every 5 years to assess the state of the site and to monitor any significant biological or environmental changes. Other visits should be made as necessary to maintain boundary markers, notices, etc.

(x) *Inspection and maintenance*

Inspection visits to the Area should be made no more than once every 5 years to assess the state of the site and to monitor any significant biological or environmental changes. Other visits should be made as necessary to maintain boundary markers, notices, etc.

Management plan for Specially Protected Area number 19, Lagotellerie Island, Marguerite Bay, Antarctic Peninsula

1. Geographical location

Lagotellerie Island (67°53'S 67°24'W) lies about 3 kilometers west of the southern part of Horseshoe Island, Marguerite Bay, southwest Antarctic Peninsula.

2. Management plan

(i) Description of area

Lagotellerie Island is about 2 kilometers from east to west by about 1 kilometer from north to south and rises steeply to twin summits of approximately 270 and 290 meters altitude separated by a broad saddle. The north side of the island is largely snow-free with extensive low-lying ground. The south and east sides have precipitous cliffs up to 180 meters high; much of the north side also has steep cliffs dissected by gulleys and traversed by broad rock terraces. There are no permanent streams or pools.

(ii) Reason for designation

The island has a relatively diverse flora and luxuriant development of plant communities, representative of the southern maritime antarctic region. The north side supports an abundance of antarctic hair grass (*Deschampsia antarctica*) which on some of the terraces forms closed swards up to 10 square meters. Antarctic pearlwort (*Colobanthus quitensis*) is also frequent. Both species are close to the southern limit of their range. There is also a rich cryptogamic flora with well-developed communities containing several rare mosses and lichens. Beneath the closed grass and moss stands a rich loamy earth up to 25 centimeters deep has developed, with a rich invertebrate fauna and microbiota. The island is one of the southernmost sites for the apterous midge *Belgica antarctica*. There is a colony of about 1,000 pairs of Adélie penguins (*Pygoscelis adeliae*) at the southeastern corner of the island. Here, there is also a small colony of about 30 pairs of blue-eyed shags (*Phalacrocorax atriceps*), which is one of the farthest south breeding sites for the species. Brown and south polar skuas (*Catharacta lonnbergii* and *C. maccormicki*) are abundant and several pairs of each nest on this island.

(iii) Date of designation and originator

October 1985, Recommendation XIII-11, by the United Kingdom

(iv) Access points

None specified

(v) Entry permit requirement

Entry into the Area is only in strict accordance with a current permit, issued by a Participating Government or its authorized representative, specifically for

a compelling scientific purpose which cannot be served elsewhere or for site inspection, and which will not jeopardize any aspect of the natural ecosystem or its biota within the Area (see Antarctic Treaty Agreed Measures for the Conservation of Antarctic Fauna and Flora, Article VIII). Details of the visit should be included in the national annual report of Exchange of Information for the same antarctic season in which the activities were carried out.

(vi) Prohibitions

To avoid or minimize human impact it is prohibited to:

(a) land a helicopter within the Area, except on the low-lying unvegetated ground in the midnorthern side of the island and on the saddle between the two peaks;

(b) overfly the Area by any aircraft below 250 meters above the highest point;

(c) use any of the Area's coves for anchoring or mooring seacraft, except in accordance with the permit;

(d) incinerate, bury, or otherwise dispose of any nonhuman waste within the Area; all such waste must be removed from the Area;

(e) leave depots of fuel, food, or any other supplies within the Area, unless they are further required within the same season, at the end of which they must be removed;

(f) erect any form of building within the Area.

(vii) Pedestrian routes

None specified, but every precaution must be taken to avoid disturbance of any breeding bird or seal or stand of vegetation, unless required as specified in the permit.

(viii) Scientific research and sampling

All activities must conform strictly with those specified in the permit to enter the Area.

(ix) Inspection and maintenance

Inspection visits to the Area should be at least once every 5 years to assess the state of the site and to monitor any significant biological or environmental changes. Other visits should be made as necessary to maintain boundary markers, notices, etc.

Annex to Recommendation XVI-8

Specially Protected Area, number 22, "Cryptogam Ridge," Mount Melbourne, Victoria Land

1. Geographical location

Mount Melbourne (74°21'S 164°42'E) lies between Wood Bay and Campbell

Glacier, northern Victoria Land, on the western side of the Ross Sea.

2. Management plan

(i) Description of area

The Area includes most of "Cryptogam Ridge" on the southern rim of the main summit crater (2,733 meters altitude), and extends about 1,200 meters by 500 meters. Geothermal activity occurs along about 300–400 meters of the ridge and is marked by discontinuous areas of ice-free ground, surrounded by numerous ice hummocks up to 1 meter high and scattered hollow ice towers up to several meters in diameter and 4 meters high. The warm ice-free areas are mostly gently sloping with narrow terraces up to 1.5 meters wide. More general details for the adjacent areas are given for the surrounding Site of Special Scientific Interest number 24.

(ii) Reason for designation

The geothermal ground within the Area supports a unique community of bryophytes, algae, and microbiota, including the only known occurrence in the Antarctic of the moss *Campylopus pyriformis* and the very rare continental occurrence of the liverwort *Cephaloziella exiliflora*, otherwise unknown above about 500 meters elsewhere in the Antarctic. This site is comparable with the only other known high-altitude, geothermally influenced ice-free area near the summit of Mount Erebus. This fragile and sterile habitat is of exceptional biological interest and should be afforded maximum protection from human influence to maintain its unique pristine state.

(iii) Date of designation and originator

June 1990 by New Zealand and Italy

(iv) Access points

Access should be only from either end of "Cryptogam Ridge" and not from the ridge slopes.

(v) Entry permit requirement

Entry to the Area is only in strict accordance with a current permit, issued by a Participating Government or its authorized representative, specifically for a compelling scientific purpose which cannot be served elsewhere, or for site inspection, and which will not jeopardize any aspect of the natural ecosystem or its biota within the Area (see Antarctic Treaty Agreed Measures for the Conservation of Antarctic Fauna and Flora, Article VIII). Details of the visit should be included in the national annual report of Exchange of Information for the same antarctic season in which the activities were carried out.

(vi) Prohibitions

To avoid or minimize human impact it is prohibited to:

(a) enter the Area without wearing sterile protective overclothing and footwear, to be provided by the supporting national operator;

(b) use any sampling or other equipment within the Area which has not been

first sterilized using an acceptable method;

(c) land a helicopter within the Area; helicopters should land near the summit of Mount Melbourne only at a specified point in or adjacent to the main crater, no closer than 200 meters from the boundary of the Area;

(d) incinerate, bury, or otherwise dispose of any waste, including all human waste, within the Area; all such waste must be removed from the Area;

(e) bring into the Area any fuel or food, or leave any form of other supplies within the Area, other than markers required for monitoring studies;

(f) erect any form of building within the Area.

(vii) *Pedestrian routes*

None specified, but pedestrians must not use the ridge crest as a way of access to parts of the surrounding Site of Special Scientific Interest. Extreme precautions must be taken to avoid disturbance of all ice-free ground or interference with ice structures within the Area, unless required as specified in the permit.

(viii) *Scientific research and sampling*

Where at all possible collections and general observations of geothermal soils and organisms should be made from positions outside the Area, unless directly related to the monitoring of "Cryptogam Ridge"; all activities within the Area must conform strictly with those specified in the permit to enter the Area.

(ix) *Inspection and maintenance*

Inspection visits should be made to the Area no more than once every 5 years to assess the state of the site and to monitor any significant biological or environmental changes. Other visits should be made as necessary to maintain boundary markers, notices, etc.

Annex to Recommendation XVI-9

Specially Protected Area number 23, Forlidas Pond and Davis Valley Ponds

1. Geographical location

Forlidas Pond, about 100 meters in diameter, is situated near the east end of the Dufek Massif in a small unnamed dry valley about 1 kilometer east of the northern edge of Forlidas Ridge and about 1 kilometer northwest of Davis Valley. The unnamed dry valley is separated from Davis Valley by a northeast-trending ridge several kilometers long. The position of Forlidas Pond is 82°27'15"S 51°21'W. The Area includes smaller ponds that occur along the ice margin

at the northern edge of Davis Valley, a short distance east of Forlidas Pond.

2. Management plan

(i) *Description of area*

The Area consists of two parts shown on the attached map, about 500 meters apart: (A) All that area within 500 meters of the center of Forlidas Pond; (B) All that area within a 500-meter radius of several meltwater ponds at the ice margin along the northern edge of Davis Valley.

(ii) *Reason for designation*

The Area contains some of the most southerly freshwater ponds known in Antarctica containing plant life which would be threatened by possible contamination by human activity. The only visitors to Forlidas Pond have been geologists and geophysicists in 1957 and possibly one or two other parties. The ponds in Davis Valley were visited in 1978 by geologists. No botanists or zoologists have visited the Area. These ponds are located in SRA number 1, North Side of Dufek Massif, which could attract visitors such as scientists or tourists. They should be protected as examples of unique near-pristine freshwater ecosystems and their catchments.

(iii) *Date of designation and originator*

October 1991 by the United States

(iv) *Access points*

None specified

(v) *Entry permit requirements*

Entry to the Area is only in strict accordance with a current permit, issued by a Participating Government or its authorized representative, specifically for a compelling scientific purpose which cannot be served elsewhere or for site inspection, and which will not jeopardize any aspect of the natural ecosystem or its biota within the Area. Details of visits should be included in national annual reports of exchange of information for the same antarctic season in which the activities were carried out.

(vi) *Prohibitions*

None specified, but camping and the landing of helicopters should be avoided within 1 kilometer of the Area.

(vii) *Pedestrian routes*

None specified, but every precaution must be taken to avoid disturbance of biota, soil, water, and periglacial features, unless required as specified in the permit.

(viii) *Scientific research and sampling*

Taking of samples of biota or soils should be done only for a compelling scientific purpose and must conform strictly with the activities specified in the permit to enter the Area.

(ix) *Inspection and maintenance*

Inspection visits should be made when opportunity arises to assess the state of the Area and to monitor biological and environmental change, and to maintain boundary markers, notices, etc.

Annex to Recommendation XVI-10

Annex V to the Protocol on Environmental Protection to the Antarctic Treaty Area Protection and Management

Article 1

Definitions

For the purposes of this Annex:

a) "appropriate authority" means any person or agency authorized by a Party to issue permits under this Annex;

b) "permit" means a formal permission in writing issued by an appropriate authority;

c) "Management Plan" means a plan to manage the activities and protect the special value or values in an Antarctic Specially Protected Area or an Antarctic Specially Managed Area.

Article 2

Objectives

For the purposes set out in this Annex, any area, including any marine area, may be designated as an Antarctic Specially Protected Area or an Antarctic Specially Managed Area. Activities in those Areas shall be prohibited, restricted or managed in accordance with Management Plans adopted under the provisions of this Annex.

Article 3

Antarctic Specially Protected Areas

1. Any area, including any marine area, may be designated as an Antarctic Specially Protected Area to protect outstanding environmental, scientific, historic, aesthetic, or wilderness values, any combination of those values, or ongoing or planned scientific research.

2. Parties shall seek to identify, within a systematic environmental-geographical framework, and to include in the series of Antarctic Specially Protected Areas:

(a) areas kept inviolate from human interference so that future comparisons may be possible with localities that have been affected by human activities;

(b) representative examples of major terrestrial, including glacial and aquatic, ecosystems and marine ecosystems;

(c) areas with important or unusual assemblages of species, including major colonies of breeding native birds or mammals;

(d) the type locality or only known habitat of any species;

(e) areas of particular interest to ongoing or planned scientific research;

(f) examples of outstanding geological, glaciological, or geomorphological features;

(g) areas of outstanding aesthetic and wilderness value;

(h) sites or monuments of recognized historic value; and

(i) such other areas as may be appropriate to protect the values set out in paragraph 1 above.

3. Specially Protected Areas and Sites of Special Scientific Interest designated as such by past Antarctic Treaty Consultative Meetings are hereby designated as Antarctic Specially Protected Areas and shall be renamed and renumbered accordingly.

4. Entry into an Antarctic Specially Protected Area shall be prohibited except in accordance with a permit issued under Article 7.

Article 4

Antarctic Specially Managed Areas

1. Any area, including any marine area, where activities are being conducted or may in the future be conducted, may be designated as an Antarctic Specially Managed Area to assist in the planning and coordination of activities, avoid possible conflicts, improve cooperation between Parties, or minimize environmental impacts.

2. Antarctic Specially Managed Areas may include:

(a) areas where activities pose risks of mutual interference or cumulative environmental impacts; and

(b) sites or monuments of recognized historic value.

3. Entry into an Antarctic Specially Managed Area shall not require a permit.

4. Notwithstanding paragraph 3 above, an Antarctic Specially Managed Area may contain one or more Antarctic Specially Protected Areas, entry into which shall be prohibited except in accordance with a permit issued under Article 7.

Article 5

Management Plans

1. Any Party, the Committee, the Scientific Committee for Antarctic Research or the Commission for the Conservation of Antarctic Marine Living Resources may propose an area for designation as an Antarctic Specially Protected Area or an Antarctic Specially Managed Area by submitting a proposed Management Plan to the Antarctic Treaty Consultative Meeting.

2. The area proposed for designation shall be of sufficient size to protect the values for which the special protection or management is required.

3. Proposed Management Plans shall include, as appropriate:

(a) a description of the value or values for which special protection or management is required;

(b) a statement of the aims and objectives of the Management Plan for the protection or management of those values;

(c) management activities which are to be undertaken to protect the values for which special protection or management is required;

(d) a period of designation, if any;

(e) a description of the area, including:

(i) the geographical coordinates, boundary markers, and natural features that delineate the area;

(ii) access to the area by land, sea, or air including marine approaches and anchorages, pedestrian and vehicular routes within the area, and aircraft routes and landing areas;

(iii) the location of structures, including scientific stations, research or refuge facilities, both within the area and near to it; and

(iv) the location in or near the area of other Antarctic Specially Protected Areas or Antarctic Specially Managed Areas designated under this Annex, or other protected areas designated in accordance with measures adopted under other components of the Antarctic Treaty System;

(f) the identification of zones within the area, in which activities are to be prohibited, restricted, or managed for the purpose of achieving the aims and objectives referred to in subparagraph (b) above;

(g) maps and photographs that show clearly the boundary of the area in relation to surrounding features and key features within the area;

(h) supporting documentation;

(i) in respect of an area proposed for designation as an Antarctic Specially Protected Area, a clear description of the conditions under which permits may be granted by the appropriate authority regarding:

(i) access to and movement within or over the area;

(ii) activities which are or may be conducted within the area, including restrictions on time and place;

(iii) the installation, modification, or removal of structures;

(iv) the location of field camps;

(v) restrictions on materials and organisms which may be brought into the area;

(vi) the taking of or harmful interference with native flora and fauna;

(vii) the collection or removal of anything not brought into the area by the permit holder;

(viii) the disposal of waste;

(ix) measures that may be necessary to ensure that the aims and objectives of the Management Plan can continue to be met; and

(x) requirements for reports to be made to the appropriate authority regarding visits to the area;

(j) in respect of an area proposed for designation as an Antarctic Specially Managed Area, a code of conduct regarding:

(i) access to and movement within or over the area;

(ii) activities which are or may be conducted within the area, including restrictions on time and place;

(iii) the installation, modification, or removal of structures;

(iv) the location of field camps;

(v) the taking of or harmful interference with native flora and fauna;

(vi) the collection or removal of anything not brought into the area by the visitor;

(vii) the disposal of waste; and

(viii) any requirements for reports to be made to the appropriate authority regarding visits to the area; and

(k) provisions relating to the circumstances in which Parties should seek to exchange information in advance of activities which they propose to conduct.

Article 6

Designation Procedures

1. Proposed Management Plans shall be forwarded to the Committee, the Scientific Committee on Antarctic Research and, as appropriate, to the Commission for the Conservation of Antarctic Marine Living Resources. In formulating its advice to the Antarctic Treaty Consultative Meeting, the Committee shall take into account any comments provided by the Scientific Committee on Antarctic Research and, as appropriate, by the Commission for the Conservation of Antarctic Marine Living Resources. Thereafter, Management Plans may be approved by the Antarctic Treaty Consultative Parties by a measure adopted at an Antarctic Treaty Consultative Meeting in accordance with Article IX(1) of the Antarctic Treaty. Unless the measure specifies otherwise, the Plan shall be deemed to have been approved 90 days after the close of the Antarctic Treaty Consultative Meeting at which it was adopted, unless one or more of the Consultative Parties notifies the Depositary, within that time period, that it wishes an extension of that period or is unable to approve the measure.

2. Having regard to the provisions of Articles 4 and 5 of the Protocol, no marine area shall be designated as an Ant-

arctic Specially Protected Area or an Antarctic Specially Managed Area without the prior approval of the Commission for the Conservation of Antarctic Marine Living Resources.

3. Designation of an Antarctic Specially Protected Area or an Antarctic Specially Managed Area shall be for an indefinite period unless the Management Plan provides otherwise. A review of a Management Plan shall be initiated at least every 5 years. The Plan shall be updated as necessary.

4. Management Plans may be amended or revoked in accordance with paragraph 1 above.

5. Upon approval, Management Plans shall be circulated promptly by the Depositary to all Parties. The Depositary shall maintain a record of all currently approved Management Plans.

Article 7 Permits

1. Each Party shall appoint an appropriate authority to issue permits to enter and engage in activities within an Antarctic Specially Protected Area in accordance with the requirements of the Management Plan relating to that Area. The permit shall be accompanied by the relevant sections of the Management Plan and shall specify the extent and location of the Area, the authorized activities and when, where, and by whom the activities are authorized and any other conditions imposed by the Management Plan.

2. In the case of a Specially Protected Area designated as such by past Antarctic Treaty Consultative Meetings which does not have a Management Plan, the appropriate authority may issue a permit for a compelling scientific purpose which cannot be served elsewhere and which will not jeopardize the natural ecological system in that Area.

3. Each Party shall require a permit holder to carry a copy of the permit while in the Antarctic Specially Protected Area concerned.

Article 8 Historic Sites and Monuments

1. Sites or monuments of recognized historic value which have been designated as Antarctic Specially Protected Areas or Antarctic Specially Managed Areas, or which are located within such Areas, shall be listed as Historic Sites and Monuments.

2. Any Party may propose a site or monument of recognized historic value which has not been designated as an Antarctic Specially Protected Area or an Antarctic Specially Managed Area, or which is not located within such an Area, for listing as a Historic Site or Monument. The proposal for listing may be

approved by the Antarctic Treaty Consultative Parties by a measure adopted at an Antarctic Treaty Consultative Meeting in accordance with Article IX(1) of the Antarctic Treaty. Unless the measure specifies otherwise, the proposal shall be deemed to have been approved 90 days after the close of the Antarctic Treaty Consultative Meeting at which it was adopted, unless one or more of the Consultative Parties notifies the Depositary, within that time period, that it wishes an extension of that period or is unable to approve the measure.

3. Existing Historic Sites and Monuments which have been listed as such by previous Antarctic Treaty Consultative Meetings shall be included in the list of Historic Sites and Monuments under this Article.

4. Listed Historic Sites and Monuments shall not be damaged, removed, or destroyed.

5. The list of Historic Sites and Monuments may be amended in accordance with paragraph 2 above. The Depositary shall maintain a list of current Historic Sites and Monuments.

Article 9 Information and Publicity

1. With a view to ensuring that all persons visiting or proposing to visit Antarctica understand and observe the provisions of this Annex, each Party shall make available information setting forth, in particular:

(a) the location of Antarctic Specially Protected Areas and Antarctic Specially Managed Areas;

(b) listing and maps of those Areas;

(c) the Management Plans, including listings of prohibitions relevant to each Area;

(d) the location of Historic Sites and Monuments and any relevant prohibition or restriction.

2. Each Party shall ensure that the location and, if possible, the limits, of Antarctic Specially Protected Areas, Antarctic Specially managed Areas and Historic Sites and Monuments are shown on its topographic maps, on hydrographic charts, and in other relevant publications.

3. Parties shall cooperate to ensure that, where appropriate, the boundaries of Antarctic Specially Protected Areas, Antarctic Specially Managed Areas and Historic Sites and Monuments are suitably marked on the site.

Article 10 Exchange of Information

1. The Parties shall make arrangements for:

(a) collecting and exchanging records, including records of permits and reports

of visits, including inspection visits, to Antarctic Specially Protected Areas and reports of inspection visits to Antarctic Specially Managed Areas;

(b) obtaining and exchanging information on any significant change or damage to any Antarctic Specially Managed Area, Antarctic Specially Protected Area, or Historic Site or Monument; and

(c) establishing common forms in which records and information shall be submitted by Parties in accordance with paragraph 2 below.

2. Each Party shall inform the other Parties and the Committee before the end of November of each year of the number and nature of permits issued under this Annex in the preceding period of 1 July to 30 June.

3. Each Party conducting, funding, or authorizing research or other activities in Antarctic Specially Protected Areas or Antarctic Specially Managed Areas shall maintain a record of such activities and in the annual exchange of information in accordance with the Treaty shall provide summary descriptions of the activities conducted by persons subject to its jurisdiction in such areas in the preceding year.

4. Each Party shall inform the other Parties and the Committee before the end of November each year of the measures it has taken to implement this Annex, including any site inspections and any steps it has taken to address instances of activities in contravention of the provisions of the approved Management Plan for an Antarctic Specially Protected Area or Antarctic Specially Managed Area.

Article 11 Cases of Emergency

1. The restrictions laid down and authorized by this Annex shall not apply in cases of emergency involving safety of human life or of ships, aircraft, or equipment and facilities of high value or the protection of the environment.

2. Notice of activities undertaken in cases of emergency shall be circulated immediately to all Parties and to the Committee.

Article 12 Amendment or Modification

1. This Annex may be amended or modified by a measure adopted in accordance with Article IX(1) of the Antarctic Treaty. Unless the measure specifies otherwise, the amendment of modification shall be deemed to have been approved, and shall become effective, 1 year after the close of the Antarctic Treaty Consultative Meeting at which it was

adopted, unless one or more of the Antarctic Treaty Consultative Parties notifies the Depositary, within that time period, that it wishes an extension of that period or that it is unable to approve the measure.

2. Any amendment or modification of this Annex which becomes effective in accordance with paragraphs 1 above shall thereafter become effective as to any other Party when notice of approval by it has been received by the Depositary.

Grunow, Anne M. Ohio State University, Columbus, Ohio. Paleomagnetic study designed to establish and refine the early Paleozoic reference poles of East Antarctica. DPP 91-18484. \$71,876.

Hart, Stanley R. Woods Hole Oceanographic Institution, Woods Hole, Massachusetts. Antarctic rift and hot-spot volcanism. DPP 91-17853. \$92,228.

Isbell, John L. Ohio State University, Columbus, Ohio. Tectonic controls on formation and evolution of Permian depositional basins in the Transantarctic Mountains as interpreted from exposed strata. DPP 91-18495. \$95,878.

Kennett, James P. University of California, Santa Barbara, California. Paleocceanographic and climatic evolution of southern high-latitude oceans based on deep-sea sedimentary sequences. DPP 89-11554. \$2,716.

Kent, Dennis V. Columbia University, Lamont-Doherty Geological Observatory, Palisades, New York. Tectonic evolution of the antarctic sector of the Pacific Margin II: Mesozoic and Paleozoic development of eastern Marie Byrd Land. DPP 89-16470. \$49,695.

McIntosh, William C. New Mexico Institute of Mining and Technology, Socorro, New Mexico. West antarctic volcano exploration (WAVE II). DPP 91-18806. \$80,082.

Meier, Mark F. University of Colorado, Boulder, Colorado. Travel for U.S. participants in the Sixth International Conference on Permafrost in Beijing, China. DPP 91-22307. \$10,000 (\$25,000).

Mensing, Teresa M. Ohio State University, Columbus, Ohio. Evidence for recent climate change and and post-Jurassic volcanism in southern Victoria Land. DPP 91-18485. \$48,228.

Nishiizumi, Kunihiko. University of California at San Diego, Scripps Institution of Oceanography, La Jolla, California. Evidence for recent climate change and a Cretaceous thermal event in southern Victoria Land. DPP 91-18560. \$15,127.

Rowell, Albert J. University of Kansas, Lawrence, Kansas. Constraints on the place of Antarctica in the Cambrian world. DPP 91-17444. \$90,017.

Taylor, Edith L. Ohio State University, Columbus, Ohio. Tree-ring structure and paleoclimate of high-latitude fossil floras from Antarctica. DPP 91-09448. \$26,027.

Foundation awards of funds for antarctic projects, 1 October to 31 December 1991

Following is a list of National Science Foundation antarctic awards made from 1 October to 31 December 1991. Each item contains the name of the principal investigator or project manager, his or her institution, a shortened title of the project, the award number, and the amount awarded. If an investigator received a joint award from more than one Foundation program, the antarctic program funds are listed first, and the total amount of the award is listed in parentheses. Award numbers for awards initiated by the Division of Polar Programs contain the prefix DPP and those initiated by the Office of Studies in Science and Technology contain the prefix SBE.

Biology

Cullen, John J. Bigelow Laboratory for Ocean Sciences, West Boothbay Harbor, Maine. Novel methods to assess the effects of ultraviolet radiation on phytoplankton photosynthesis. DPP 90-18441. \$87,245.

Detrich, H. William. Northeastern University, Boston, Massachusetts. Assembly and stability of microtubules from antarctic fish at low temperatures. DPP 89-19004. \$90,000.

Fraser, William R. Old Dominion University, Norfolk, Virginia. The *Bahia Paraiso* oil spill: Impacts on a southern-oceans seabird community. DPP 91-03429. \$104,811.

Kennicutt, Mahlon C. Texas A&M University, College Station, Texas. The role of global pollutants and localized contamination in determining hydrocarbon concentrations along the Antarctic Peninsula. DPP 90-22346. \$100,100.

Kooyman, Gerald L. University of California at San Diego, Scripps Institution of Oceanography, La Jolla, California. Biology of king and emperor penguins while at sea. DPP 87-15864. \$157,186.

Quetin, Langdon B. University of California, Santa Barbara, California. Energetics of the adults and larvae of the antarctic krill *Euphausia superba*. DPP 88-20589. \$186,829.

Sidell, Bruce D. University of Maine,

Orono, Maine. Metabolic and ultrastructural adaptations to chronically cold body temperature in antarctic fishes. DPP 88-19469. \$86,000.

Smith, Kenneth L. University of California at San Diego, Scripps Institution of Oceanography, La Jolla, California. Trophic coupling between mesopelagic and sea-ice communities in the Weddell Sea. DPP 91-18997. \$50,000.

Marine and terrestrial geology and geophysics

Bell, Robin E. Columbia University, Lamont-Doherty Geological Observatory, Palisades, New York. Airborne gravity for the CASERTZ program. DPP 91-00155. \$83,869.

Burckle, Lloyd H. Columbia University, New York, New York. Paleocceanographic geochemical study of geologically brief, warm events in the Pliocene of the southern oceans. DPP 91-18995. \$45,000 (\$90,000).

Dalziel, Ian W. University of Texas, Austin, Texas. The Pacific Margin of the Antarctic Peninsula: A marine geophysical study of the tectonic evolution of Andean-type orogens. DPP 89-16436. \$224,377.

Dalziel, Ian W. University of Texas, Austin, Texas. Geologic studies in the Shackleton Range, Coats Land, and Queen Maud Land, East Antarctica: A North American connection. DPP 91-17996. \$27,710.

Taylor, Thomas N. Ohio State University, Columbus, Ohio. Biostratigraphy and paleobotany of the Beardmore Glacier region. DPP 88-15976. \$99,402.

Wilson, Terry J. Ohio State University, Columbus, Ohio. Transverse structural segmentation of the Transantarctic Mountains. DPP 90-18055. \$90,082.

Wise, Sherwood W. Florida State University, Tallahassee, Florida. Campanian to Cenozoic calcareous nanofossil biogeography of the South Atlantic Ocean and southern-oceans basins based on new Ocean Drilling Project cores. DPP 91-18480. \$37,590 (\$75,180).

Zinsmeister, William J. Purdue University, West Lafayette, Indiana. Molluscan transition across the Cretaceous/Tertiary boundary and early Paleocene recovery, Seymour Island, Antarctica. DPP 90-17246. \$59,171.

Ocean and climate studies

Dunbar, Robert B. Rice University, Houston, Texas. Sinking and suspended particulate matter on the Antarctic Continental Margin. DPP 88-18136. \$50,811.

Gordon, Arnold L. Columbia University, Lamont-Doherty Geological Observatory, Palisades, New York. Weddell Gyre physical oceanographic studies. DPP 90-24755. \$440,000.

Martinson, Douglas G. Columbia University, Lamont-Doherty Geological Observatory, Palisades, New York. Western Weddell ice station turbulence and mixed-layer project. DPP 90-25083. \$56,000.

McPhee, Miles G. McPhee Research, Naches, Washington. Western Weddell ice station turbulence and mixed-layer project. DPP 91-10422. \$35,000.

Morrison, James H. University of Washington, Seattle, Washington. Western Weddell ice station turbulence and mixed-layer project. DPP 91-00423. \$165,000.

Muench, Robin D. Science Applications International, Austin, Texas. Regional-scale current and hydrographic observations in the western Weddell Sea: A component of AnZone. DPP 90-24828. \$165,000.

Padman, Laurence. Oregon State University, Corvallis, Oregon. Upper-ocean current and temperature measurements in the western Weddell Sea. DPP 90-24695. \$94,000.

Schlosser, Peter. Columbia University, Lamont-Doherty Geological Observatory, Palisades, New York. Deep-water formation and water/ice interaction in the Weddell Sea studied by oxygen-18, helium isotope, and tritium measurements. DPP 90-15099. \$141,000.

Astronomy, aeronomy, and upper atmosphere studies

Bering, Edgar A. University of Houston, Houston, Texas. Measurement of vertical atmospheric electric current at a network of sites in Antarctica including manned stations and geophysical observatories. DPP 89-17464. \$33,631.

Morse, Robert M. University of Wisconsin, Madison, Wisconsin. Observation of very-high-energy gamma-ray sources from the South Pole. DPP 90-22092. \$152,833.

Sivjee, Gulamabas G. Embry-Riddle Aeronautical University, Daytona Beach, Florida. Spectroscopic and interferometric studies of airglow and auroral processes in the antarctic upper atmosphere over South Pole Station. DPP 89-16639. \$66,130.

Warnow, Joan N. American Institute of Physics, New York, New York. Documenting multi-institutional collaborations, Phase II: A case study in space science and geophysics. SBE 90-24198. \$5,000 (\$92,351).

Glaciology

Craig, Harmon. University of California, San Diego, California. Helium and rare-gas studies and krypton-81 ages at Vostok. DPP 91-18494. \$83,162.

Humphrey, N. University of Wyoming, Laramie, Wyoming. Model studies of radar internal layering in west antarctic ice streams. DPP 91-17831. \$31,293.

Jacobel, Robert W. Saint Olaf College, Northfield, Minnesota. Model studies of radar internal layering in west antarctic ice streams. DPP 92-02461. \$17,406.

Kamb, Barclay. California Institute of Technology, Pasadena, California. Borehole study of antarctic ice-stream mechanisms. DPP 90-18703. \$200,000.

Mahaffy, Mary-Anne. Pennsylvania State University, University Park, Pennsylvania. A three-dimensional, time-de-

pendent ice-dynamics model of the west antarctic ice sheet. DPP 91-18362. \$70,480.

Middleton, Roy. University of Pennsylvania, Philadelphia, Pennsylvania. Determining exposure ages and erosion rates of bedrock surfaces in Antarctica. DPP 89-17581. \$7,585.

Raymond, Charles F. University of Washington, Seattle, Washington. Mechanics of ice-stream margins. DPP 91-18703. \$65,230.

Services and support

Bellew, George. Christchurch International Airport, Christchurch, New Zealand. International Antarctic Centre land and buildings. DPP 90-22329. \$450,000.

Fisher, Dwight D. Department of Defense, Washington, D.C. Logistic support of the U.S. Antarctic Program. DPP 76-10886. \$10,000,000.

Hibben, Stuart G. Library of Congress, Washington, D.C. Abstracting and indexing service for *Current Antarctic Literature*. DPP 70-01013. \$238,238.

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Link, Lewis E. U.S. Cold-Regions Research and Engineering Laboratory, Hanover, New Hampshire. Technical support for the U.S. Antarctic Program. DPP 91-49850. \$150,000.

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Shapiro, Susan F. Capital Systems Group, Inc., Rockville, Maryland. Proposal processing and travel support to the Division of Polar Programs, National Science Foundation. DPP 92-00919. \$10,001 (\$25,001).

Weather at U.S. stations

Feature	November 1991			December 1991			January 1992		
	McMurdo	Palmer	South Pole	McMurdo	Palmer	South Pole*	McMurdo	Palmer	South Pole
Average temperature (°C)	-8.0°	-0.5°	-39.2°	-1.2°	1.4°	-26.4°	-5.0°	-2.6°	-28.5°
Temperature maximum (°C) (date)	1.0° (18, 29)	6.8° (12)	-30.0° (26)	5.3° (20)	8.1° (6)	-19.9° (27)	5.0° (7)	7.6° (2)	21.1° (1)
Temperature minimum (°C) (date)	-20.7° (1)	-7.4° (26)	-48.0° (1)	-8.0° (4)	-3.8° (1)	-35.3° (1)	-11.0° (29, 30)	-1.6° (13)	-39.1° (30)
Average station pressure (mb)	984.56	985.10	683.80	894.24	997.60	698.00	989.5	988.50	685.50
Pressure maximum (mb) (date)	997.39 (21)	1002.90 (19)	697.00 (7)	1006.77 (25)	1009.30 (30)	706.10 (24)	1002.74 (5)	1008.00 (1)	691.50 (1)
Pressure minimum (mb) (date)	966.98 (2)	955.90 (4)	669.20 (1)	985.00 (10)	970.80 (13)	691.00 (10)	1014.49 (13)	976.70 (10)	678.60 (12)
Snowfall (mm)	Trace	276.00	Trace	Trace	3.00	Trace	226.06	265.00	Trace
Prevailing wind direction	70°	Northwest	360°	130°	Southwest	20°	80°	North	North
Average wind speed (m/sec)	6.18	7.31	5.66	5.66	3.09	4.32	4.63	4.22	4.12
Peak wind speed (m/sec) (date) (direction)	25.74 (1) (240°)	31.92 (10) (10°)	14.75 (6) (10°)	21.62 (22, 23) (0°)	32.95 (13) (20°)	12.52 (2) (10°)	20.08 (18) (139°)	31.92 (23) (360°)	12.35 (—) (280°)
Average sky cover	4.6	9.4	0.0	6.9	8.9	0.0	7.8	9.9	0.0
Number clear days	9.0	0.0	12.0	3.0	1.0	11.0	2.0	0.0	8.0
Number partly cloudy days	14.0	3.0	4.0	7.0	3.0	12.0	6.0	0.0	11.0
Number cloudy days	7.0	27.0	14.0	21.0	27.0	8.0	23.0	31.0	12.0
Number days with visibility less than 0.4 km	0.0	0.0	7.0	0.2	0.0	3.0	0.3	0.0	0.0

Prepared from information received from the stations. Locations: McMurdo 77°51'S 166°40'E, Palmer 64°46'S 64°3'W, Amundsen-Scott South Pole 90°S. Elevations: McMurdo sea level, Palmer sea level, Amundsen-Scott South Pole 2,835 meters. For prior data and daily logs, contact the National Climate Center, Asheville, North Carolina 28801.

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