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Attachment 1

Guidance for Visitors to the Antarctic and Guidance for Those Organizing and Conducting Tourism and Non-governmental Activities in the Antarctic (from Recommendation XVIII-1)

Guidance for Visitors to the Antarctic

Activities in the Antarctic are governed by the Antarctic Treaty of 1959 and associated agreements, referred to collectively as the Antarctic Treaty system. The Treaty established Antarctica as a zone of peace and science.

In 1991, the Antarctic Treaty Consultative Parties adopted the Protocol on Environmental Protection to the Antarctic Treaty, which designates the Antarctic as a natural reserve. The Protocol sets out environmental principles, procedures and obligations for the comprehensive protection of the Antarctic environment, and its dependent and associated ecosystems. The Consultative Parties have agreed that, pending its entry into force, as far as possible and in accordance with their legal system, the provisions of the Protocol should be applied as appropriate.

The Environmental Protocol applies to tourism and non-governmental activities as well as governmental activities in the Antarctic Treaty Area. It is intended to ensure that these activities do not have adverse impacts on the Antarctic environment, or on its scientific and aesthetic values.

This **Guidance for Visitors to the Antarctic** is intended to ensure that all visitors are aware of, and are therefore able to comply with, the Treaty and the Protocol. Visitors are, of course, bound by national laws and regulations applicable to activities in the Antarctic.

A) PROTECT ANTARCTIC WILDLIFE

- 1) Taking or harmful interference with Antarctic wildlife is prohibited except in accordance with a permit issued by a national authority.
- 2) Do not use aircraft, vessels, small boats, or other means of transport in ways that disturb wildlife, either at sea or on land.
- 3) Do not feed, touch, or handle birds or seals, or approach or photograph them in ways that cause them to alter their behavior. Special care is needed when animals are breeding or moulting.
- 4) Do not damage plants, for example by walking, driving, or landing on extensive moss beds or lichen-covered scree slopes.
- 5) Do not use guns or explosives. Keep noise to the minimum to avoid frightening wildlife.

- 6) Do not bring non-native plants or animals into the Antarctic (e.g. live poultry, pet dogs and cats, house plants).

B) RESPECT PROTECTED AREAS

A variety of areas in the Antarctic have been afforded special protection because of their particular ecological, scientific, historic or other values. Entry into certain areas may be prohibited except in accordance with a permit issued by an appropriate national authority. Activities in and near designated Historic Sites and Monuments and certain other areas may be subject to special restrictions.

- 1) Know the locations of areas that have been afforded special protection and any restrictions regarding entry and activities that can be carried out in and near them.
- 2) Observe applicable restrictions.
- 3) Do not damage, remove or destroy Historic Sites or Monuments, or any artifacts associated with them.

C) RESPECT SCIENTIFIC RESEARCH

Do not interfere with scientific research, facilities or equipment.

- 1) Obtain permission before visiting Antarctic science and logistic support facilities; reconfirm arrangements 24–72 hours before arriving; and comply strictly with the rules regarding such visits.
- 2) Do not interfere with, or remove, scientific equipment or marker posts, and do not disturb experimental study sites, field camps, or supplies.

D) BE SAFE

Be prepared for severe and changeable weather. Ensure that your equipment and clothing meet Antarctic standards. Remember that the Antarctic environment is inhospitable, unpredictable and potentially dangerous.

- 1) Know your capabilities, the dangers posed by the Antarctic, environment, and act accordingly. Plan activities with safety in mind at all times.
- 2) Keep a safe distance from all wildlife, both on land and at sea.
- 3) Take note of, and act on, the advice and instructions from your leaders; do not stray from your group.
- 4) Do not walk onto glaciers, or large snow fields without proper equipment and experience; there is a real danger of falling into hidden crevasses.

- 5) Do not expect a rescue service; self-sufficiency is increased and risks reduced by sound planning, quality equipment, and trained personnel.
- 6) Do not enter emergency refuges (except in emergencies). If you use equipment or food from a refuge, inform the nearest research station or national authority once the emergency is over.
- 7) Respect any smoking restrictions, particularly around buildings, and take great care to safeguard against the danger of fire. This is a real hazard in the dry environment of Antarctica.

E) KEEP ANTARCTICA PRISTINE

Antarctica remains relatively pristine, and has not yet been subjected to large scale human perturbations. It is the largest wilderness area on earth. Please keep it that way.

- 1) Do not dispose of litter or garbage on land. Open burning is prohibited.
- 2) Do not disturb or pollute lakes or streams. Any materials discarded at sea must be disposed of properly.
- 3) Do not paint or engrave names or graffiti on rocks or buildings.
- 4) Do not collect or take away biological or geological specimens or man-made artefacts as a souvenir, including rocks, bones, eggs, fossils, and parts or contents of buildings.
- 5) Do not deface or vandalize buildings, whether abandoned, or unoccupied, or emergency refuges.

Guidance for those Organising and Conducting

Tourism and Non-governmental Activities in the Antarctic

Antarctica is the largest wilderness area on earth, unaffected by large scale human activities. Accordingly, this unique and pristine environment has been afforded special protection. Furthermore, it is physically remote, inhospitable, unpredictable and potentially dangerous. All activities in the Antarctic Treaty Area, therefore, should be planned and conducted with both environmental protection and safety in mind.

Activities in the Antarctic are subject to the Antarctic Treaty of 1959 and associated legal instruments, referred to collectively as the Antarctic Treaty system. These include the Convention for the Conservation of Antarctic Seals (CCAS 1972), the Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR 1980) and the Recommendations and other measures adopted by the Antarctic Treaty Consultative Parties under the Antarctic Treaty.

In 1991, the Consultative Parties to the Antarctic Treaty adopted the Protocol on Environmental Protection to the Antarctic Treaty. This

Protocol sets out environmental principles, procedures and obligations for the comprehensive protection of the Antarctic environment, and its dependent and associated ecosystems. The Consultative Parties have agreed that, pending its entry into force, as far as possible and in accordance with their legal systems, that the provisions of the Protocol should be applied as appropriate.

The Environmental Protocol designates Antarctica as a natural reserve devoted to peace and science, and applies to both governmental and non-governmental activities in the Antarctic Treaty Area. The Protocol seeks to ensure that human activities, including tourism, do not have adverse impacts on the Antarctic environment, nor on its scientific and aesthetic values.

The Protocol states, as a matter of principle, that all activities are to be planned and conducted on the basis of information sufficient to evaluate their possible impact on the Antarctic environment and its associated ecosystems, and on the value of Antarctica for the conduct of scientific research. Organisers should be aware that the Environmental Protocol requires that “activities shall be modified, suspended or cancelled if they result in or threaten to result in impacts upon the Antarctic environment or dependent or associated ecosystems.”

Those responsible for organising and conducting tourism and non-governmental activities must comply fully with national laws and regulations which implement the Antarctic Treaty system, as well as other national laws and regulations implementing international agreements on environmental protection, pollution and safety that relate to the Antarctic Treaty Area. They should also abide by the requirements imposed on organisers and operators under the Protocol on Environmental Protection and its Annexes, in so far as they have not yet been implemented in national law.

KEY OBLIGATIONS ON ORGANISERS AND OPERATORS

- 1) Provide prior notification of, and reports on, their activities to the competent authorities of the appropriate Party or Parties.
- 2) Conduct an assessment of the potential environmental impacts of their planned activities.
- 3) Provide for effective response to environmental emergencies, especially with regard to marine pollution.
- 4) Ensure self-sufficiency and safe operations.
- 5) Respect scientific research and the Antarctic environment, including restrictions regarding protected areas, and the protection of flora and fauna.
- 6) Prevent the disposal and discharge of prohibited waste.

PROCEDURES TO BE FOLLOWED BY ORGANISERS AND OPERATORS

A) When planning to go to the Antarctic

Organisers and operators should:

- 1) Notify the competent national authorities of the appropriate Party or Parties of details of their planned activities with sufficient time to enable the Party(ies) to comply with their information exchange obligations under Article VII(5) of the Antarctic Treaty. The information to be provided is listed in Attachment A.
- 2) Conduct an environmental assessment in accordance with such procedures as may have been established in national law to give effect to Annex I of the Protocol, including, if appropriate, how potential impacts will be monitored.
- 3) Obtain timely permission from the national authorities responsible for any stations they propose to visit.
- 4) Provide information to assist in the preparation of contingency response plans in accordance with Article 15 of the Protocol; waste management plans in accordance with Annex III of the Protocol; and marine pollution contingency plans in accordance with Annex IV of the Protocol.
- 5) Ensure that expedition leaders and passengers are aware of the location and special regimes which apply to Specially Protected Areas and Sites of Special Scientific Interest (and on entry into force of the Protocol, Antarctic Specially Protected Areas and Antarctic Specially Managed Areas) and of Historic Sites and Monuments and, in particular, relevant management plans.
- 6) Obtain a permit, where required by national law, from the competent national authority of the appropriate Party or Parties, should they have a reason to enter such areas, or a monitoring site (CEMP Site) designated under CCAMLR.
- 7) Ensure that activities are fully self-sufficient and do not require assistance from Parties unless arrangements for it have been agreed in advance.
- 8) Ensure that they employ experienced and trained personnel, including a sufficient number of guides.
- 9) Arrange to use equipment, vehicles, vessels, and aircraft appropriate to Antarctic operations.
- 10) Be fully conversant with applicable communications, navigation, air traffic control and emergency procedures.
- 11) Obtain the best available maps and hydrographic charts, recognising that many areas are not fully or accurately surveyed.

- 12) Consider the question of insurance (subject to requirements of national law).
- 13) Design and conduct information and education programmes to ensure that all personnel and visitors are aware of relevant provisions of the Antarctic Treaty system.
- 14) Provide visitors with a copy of the **Guidance for Visitors to the Antarctic**.

B) When in the Antarctic Treaty Area

Organisers and operators should:

- 1) Comply with all requirements of the Antarctic Treaty system and relevant national laws, and ensure that visitors are aware of requirements that are relevant to them.
- 2) Reconfirm arrangements to visit stations 24-72 hours before their arrival and ensure that visitors are aware of any conditions or restrictions established by the station.
- 3) Ensure that visitors are supervised by a sufficient number of guides who have adequate experience and training in Antarctic conditions and knowledge of the Antarctic Treaty system requirements.
- 4) Monitor environmental impacts of their activities, if appropriate, and advise the competent national authorities of the appropriate Party or Parties of any adverse or cumulative impacts resulting from an activity, but which were not foreseen by their environmental impact assessment.
- 5) Operate ships, yachts, small boats, aircraft, hovercraft, and all other means of transport safely and according to appropriate procedures, including those set out in the Antarctic Flight Information Manual (AFIM).
- 6) Dispose of waste materials in accordance with Annex III and IV of the Protocol. These annexes prohibit, among other things, the discharge of plastics, oil and noxious substances into the Antarctic Treaty Area; regulate the discharge of sewage and food waste; and, require the removal of most wastes from the area.
- 7) Co-operate fully with observers designated by Consultative Parties to conduct inspections of stations, ships, aircraft and equipment under Article VII of the Antarctic Treaty, and those to be designated under Article 14 of the Environmental Protocol.
- 8) Co-operate in monitoring programmes undertaken in accordance with Article 3(2)(d) of the Protocol.
- 9) Maintain a careful and complete record of their activities conducted.

C) On completion of the activities

Within three months of the end of the activity, organisers and operators should report on the conduct of it to the appropriate national authority in accordance with national laws and procedures. Reports should include the name, details and state of registration of each vessel or aircraft used and the name of their captain or commander; actual itinerary; the number of visitors engaged in the activity; places, dates and purposes of landings and the number of visitors landed on each occasion; any meteorological observations made, including those made as part of the World Meteorological Organization (WMO) Voluntary Observing Ships Scheme; any significant changes in activities and their impacts from those predicted before the visit was conducted; and action taken in case of emergency.

D) Antarctic Treaty System Documents and Information

Most Antarctic Treaty Parties can provide, through their national contact points, copies of relevant provisions of the Antarctic Treaty system and information about national laws and procedures, including:

- The Antarctic Treaty (1959)
- Convention for the Conservation of Antarctic Seals (1972)
- Convention on the Conservation of Antarctic Marine Living Resources (1980)
- Protocol on Environmental Protection to the Antarctic Treaty (1991)
- Recommendations and other measures adopted under the Antarctic Treaty
- Final Reports of Consultative Meetings
- Handbook of the Antarctic Treaty System (1994)
- Handbook of the Antarctic Treaty System (in Spanish, 1991 edition)

ATTACHMENT A

INFORMATION TO BE PROVIDED IN ADVANCE NOTICE

Organisers should provide the following information to the appropriate national authorities in the format requested.

1. name, nationality, and contact details of the organiser;
2. where relevant, registered name and national registration and type of any vessel or aircraft to be used (including name of the captain or commander, call-sign, radio frequency, INMARSAT number);
3. intended itinerary including the date of departure and places to be visited in the Antarctic Treaty Area;

4. activities to be undertaken and purpose;
5. number and qualifications of crew and accompanying guides and expedition staff;
6. estimated number of visitors to be carried;
7. carrying capacity of vessel;
8. intended use of vessel;
9. intended use and type of aircraft;
10. number and type of other vessels, including small boats, to be used in the Antarctic Treaty Area;
11. information about insurance coverage;
12. details of equipment to be used, including for safety purposes, and arrangements for self-sufficiency;
13. and other matters required by national laws.

Attachment 2

POST-VISIT REPORT: PART 1 - Expedition Record

The Expedition Record is completed for every Expedition. This information is requested in compliance with Antarctic Treaty Recommendation XVIII-1 and Resolution XIX-3. Please submit both Part 1 and Part 2 to an appropriate national authority within three months of the activity having taken place.

A: Expedition Details

Company name:	Voyage/Flight number: Voyage Name:
Expedition Leaders(s) name:	Vessel / aircraft name:
Ship Yacht Aircraft (check)	Captain's/commander's name:
Port of Embarkation: Date of Embarkation:	Port of Disembarkation: Date of Disembarkation

Actual itinerary traveled: please provide description of route, giving dates:

(Note: if you consider that the Site Visit Record (SVR) provides an adequate description of itinerary, simply write "See SVR")

B: Observers

Name:	Name:	Name:
Affiliation:	Affiliation:	Affiliation:

C: Record of Expedition numbers by nationality (in alphabetical order)

Nationality	Pax ¹	Staff ²	Crew ³	Nationality	Pax ¹	Staff ²	Crew ³
TOTAL							

¹ **Passengers:** Members of the Expedition that are not Staff or Crew (exclude Observers/National representatives).

² **Staff:** Expedition personnel, guides, lecturers and small boat drivers (exclude crew serving these functions).

³ **Crew:** Vessels captain and officers, helicopter pilots, crew and hotel / catering staff (excluding above)

D: Report on Expedition by Expedition Leader (please be brief, but use additional sheets if necessary)

1. Has an expedition meteorological report been submitted to the World Meteorological Organization? Yes No Don't Know
2. List any unusual incidents affecting people or the environment:
3. If there were any unusual events, has or will an incident report be prepared: Yes No Don't Know
4. To whom has or will the incident report be provided?
5. Any other comments or information (e.g. observations of disturbance to wildlife or the physical environment, changes from expedition Advance Notification, etc.)

Signature: _____
Expedition Leader or Vessel Captain

Date: _____

POST VISIT REPORT: PART 2 – Site Visit Record

Instructions: Complete one line of the Site Visit Record wherever Expedition members disembark or journey beyond base or camp.

Voyage Number:
Embarkation Date:

Tour Company or Name:

Vessel Name:

Voyage Name:

Date(s)	Site visited	Site Latitude/Longitude	1st pax arrive shore/site (in GMT)	Last pax depart shore/site (in GMT)	Number of people making site visit				Activities at site (Use codes)
					Pax ¹	Staff ²	Crew ³	Obs ⁴	

¹Pax (Passengers): Members of the Expedition that are not Staff, Crew, Observers or National Representatives.
² Staff: Expedition personnel, guides, lecturers and boat drivers (exclude crew serving these functions).
³ Crew: Vessels Captain and officers, helicopter pilots, and crew and hotel / catering staff (excluding above).
⁴ Obs: Observers or National Representatives.

Activity codes:

Small boat landing: BL	Aircraft landing: AL	Helicopter landing: HL	Station visit: SV
Small boat cruising: ZC	Aircraft flight: AF	Helicopter flight: HF	Camping: CP

Attachment 3

Workshop on Means for Detecting the Cumulative Environmental Impacts of Tourism in the Antarctic Peninsula

The objectives of this workshop are to:

1. Identify, based upon available information and experience elsewhere, the types of cumulative adverse impacts on the physical environment and biota that could result from multiple visits, within a season and over a series of years, at the types of sites in the Antarctic Peninsula presently being visited by organized ship-based tours. The emphasis will be on typical tourist activities as opposed to visits by scientists or other field personnel;
2. Identify the variables concerning the sites and the tourist activities likely to determine the nature and severity of possible cumulative effects;
3. Consider the range of measures that possibly could be taken to avoid or minimize possible adverse cumulative effects and the questions that would have to be answered to decide which measures would be most practicable and cost-effective;
4. Identify the difficulties likely to be encountered in assessing cumulative adverse impacts to the physical environment and biota;
5. Identify the variables that would be most appropriate to assess and monitor in order to detect a) cumulative impacts; b) effectiveness of mitigation measures; c) anthropogenic vs. natural variability.
6. Review on-going research and monitoring programs in the Antarctic Peninsula to determine whether they likely will be able to detect the possible cumulative adverse effects of ship-based tourism before they reach significant levels – i.e., levels that would not be considered minor or transitory under the Protocol on Environmental Protection to the Antarctic Treaty;
7. If ongoing research and monitoring programs are judged inadequate to detect possible cumulative impacts or to determine how they might be best avoided or mitigated,
 - a) describe the changes in the existing programs or additional programs that would be required to detect cumulative adverse effects, taking into account locations, timeframe, and methodology; and
 - b) describe actions that would be required to identify and evaluate the effectiveness of measures necessary to avoid or mitigate cumulative adverse effects, taking into account locations, timeframes and other relevant variables.

Attachment 4 Workshop Participants

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Attachment 5 WORKSHOP AGENDA

Detecting the Cumulative Environmental Impacts of Tourism in the Antarctic Peninsula

Radisson Hotel, La Jolla, San Diego, California

June 7–9, 2000

Day One

- 0830 Welcome, introductions, and review of objectives (Dr. Joyce Jatko)
- 0900 Review of the history, current status, and anticipated future of ship-based tourism in the Antarctic Peninsula and compilation of site visit statistics (Ms. Victoria Underwood/Ms. Denise Landau)
- 0930 Review of variables considered in selecting sites to be visited and review of the different types of sites commonly visited in the Antarctic Peninsula area (Mr. Matt Drennan)
- 1000 Coffee break
- 1030 Review of typical activities carried out at sites and procedures used to manage and supervise activities at those sites (Mr. Matt Drennan)
- 1100 Discussion Groups – Identify the range of measures that possibly could be taken to avoid or minimize possible adverse cumulative effects and the variables that would have to be considered to decide which measures would be most cost-effective
- 1215 Lunch
- 1330 Review of site characteristics likely to affect the nature and severity of possible cumulative impacts (Mr. Ron Naveen)
- 1400 Discussion Groups – Identify the kinds of cumulative impacts at the different types of sites commonly visited that could result from multiple visits. List and rank, if feasible, the relative importance the site characteristics most likely to determine the nature and severity of cumulative effects
- 1530 Coffee break
- 1600 Review of the objectives, methods, and results of research/monitoring programs
- 1600 Overview of AMLR/CEMP program (Dr. Rennie Holt)
- 1630 Torgersen Island study (Dr. William Fraser)
- 1700 Adjourn

Day Two

- 0830 Continue review of on-going research and monitoring programs
- 0830 Palmer LTER program (Dr. Maria Vernet)
- 0900 Lessons learned from long term seal research (Dr. Donald Siniff)
- 0930 Lessons learned from long term penguin research (Dr. Wayne Trivelpiece)
- 1000 Coffee break
- 1030 Discussion Groups—Identify the variables that would be most appropriate to assess and monitor in order to detect a) cumulative impacts; b) effectiveness of mitigation measures; c) anthropogenic versus natural variability
- 1200 Lunch
- 1330 Discussion Groups—Identify limitations of on-going research and monitoring programs in detecting cumulative impacts
- 1500 Break
- 1530 Discussion Groups—Identify changes in on-going programs and/or additional programs that would be required to detect cumulative adverse environmental impacts or evaluate the effectiveness of measures intended to avoid or mitigate adverse cumulative impacts.
- 1700 Summary of findings and conclusions
- 1715 Adjourn

Day Three

- 0830 Facilitators and rapporteurs meet to develop summaries of discussion group findings and recommendations.
- 1000 Entire group reconvenes for reporting out of preliminary findings and recommendations followed by discussion and adoption by workshop.
- 1130 Adjourn

Attachment 6 Discussion Group Members, Facilitators and Rapporteurs

Group 1

Robert Hofman¹
Victoria Underwood-
Wheatley²
Martin Betts
Sally Poncet
Richard Taylor
Maj DePoorter
Pamela Yochem
Jose Valencia
Lisa King

Group 2

David Walton¹
Polly Penhale²
Scott Altmann
Louise Hampson
Matt Drennan
Martin Riddle
William Fraser
Maria Vernet

Group 3

Denise Landau¹
Chuck Kennicutt²
Joseph Montgomery
Ron Naveen
Rennie Holt
Donald Siniff
Wayne Trivelpiece

¹ Denotes group facilitator

² Denotes group rapporteur

Attachment 7

A Timeline of Human Activity in Antarctica: Some Selected Highlights

1820s	Existence of Antarctica as a continent was established.
Early 1800s	Exploitation of fur seals and elephant seals begins (and continues until the 1960s).
1899	Humans first wintered on Antarctic shores. Just prior to 1900, Antarctic whaling becomes a very large, worldwide industry and, excepting the years of World War II, continued into the mid-1980s.
1911	Amundsen reaches the South Pole (and, shortly, thereafter, Scott in 1912). Humans did not reach the South Pole again until 1956.
1930s	Scientific exploration begins with expeditions such as Byrd and Ellsworth.
1956	The 1st recorded “tourists” fly over the Antarctic continent on a flight organized by a Chilean national airline on December 23rd; 66 tourists made the trip on a Douglas DC-6B.
1957	Pan American Airways operated the 1st commercial Stratoscruiser flight to land at McMurdo Sound in October, 1957.
1957–58	International governance in Antarctica originated during the International Geophysical Year—a science-oriented, international cooperative effort whose principal objective was the comprehensive and coordinated accumulation of knowledge about the region. The 12 participating countries established more than 60 stations on or near the continent with more than 5,000 scientific and supporting personnel.
1958	Chile and Argentina took more than 500 fare-paying passengers to the South Shetland Islands by ship (aboard the <i>Les Eclaireurs</i> , an Argentine naval transport ship) in January and February.
1959	The Antarctic Treaty was signed by 12 nations on December 1st.
1961	The Antarctic Treaty enters into force on June 23rd.
1966	The concept of ‘expedition cruising,’ coupled with education as a major theme began when Lars-Eric Lindblad leads the 1st traveler’s expedition to Antarctica.
1969	The modern expedition cruise industry is born with the emergence of the m/s <i>Lindblad Explorer</i> —the 1st passen-

	ger cruise ship designed by Lars-Eric Lindblad specifically for carrying tourists to Antarctica.
1970s	“Flight-seeing,” over-flying without landing, became popular. Planeloads of tourists were flown over the continent at low altitude by both Qantas Airways and Air New Zealand. Between 1977 and 1980, 44 flights, involving more than 11,000 passengers, were operated.
1979	“Flight-seeing,” for all practical purposes, came to an end following the crash of Air New Zealand DC-10 on Mt. Erebus in November, 1979. All 257 passengers and crew were killed.
1983–84	Chileans begin operating C-130 flights, carrying 40 passengers, from Punta Arenas to Teniente Rodolfo Marsh Station on King George Island. Hotel accommodations are available at Estrella Polar, the 1st hotel in Antarctica. Small ski-equipped aircraft are also being used to fly passengers to the Antarctic. Since 1984 the dominant company has been Adventure Network International.
1989	Three major ship tour operators develop two sets of guidelines to manage the growing tourism industry: <i>Guidelines of Conduct for Antarctica Visitors and Guidelines of Conduct for Antarctica Tour Operators</i> . Guidelines, based upon these voluntary codes of conduct are adopted (in part) in 1994 by the ATCPs as Recommendation XVIII-1.
1989–90	Adventure Network International operates land-based operations from July to April (9 months). Russian research vessels enter the Antarctic tourism market following the collapse of the Soviet Union, changing the face of Antarctic ship-based tourism.
1991	The Protocol on Environmental Protection to the Antarctic Treaty was signed in Madrid, Spain. The Madrid Protocol extends and improves the Antarctic Treaty’s effectiveness in ensuring the protection of the Antarctic environment. The Protocol’s comprehensive regime is applicable to all human activity, including tourism. The International Association of Antarctica Tour Operators (IAATO) is formed by the seven tour operators active in Antarctica to act as a single organization to advocate, promote and practice environmentally responsible private-sector travel to Antarctica. IAATO has since been invited to attend meetings of the Antarctic Treaty Parties (ATCMs), as observers.

- 1991–92 Tourists, for the 1st time, are estimated to outnumber the personnel involved in national science and logistic programs in the area covered by the Antarctic Treaty System.
- 1992–93 More than 50 tourist voyages by seven U.S.-based companies and three foreign companies, carrying an estimated 6,166 fare-paying passengers visited the Antarctic. Ship-based tourists off of the *Kapitan Khlebnikov* visit the Dry Valleys by helicopter.
- 1994 Antarctic Treaty Recommendation XVIII-1 was adopted, laying out Guidance for Visitors and Operators to the Antarctic Treaty Area (based on IAATO’s voluntary guidelines).
- 1994–95 “Flight-seeing” is resumed by Croydon Travel of Australia using Qantas’s Boeing 747 aircraft.
- 1996–97 *Kapitan Khlebnikov* circumnavigates the Antarctic continent on a 66-day voyage, carrying 66 passengers. Nearly 90,000 tourists have now visited the continent by tour ship.
- 1997–98 Approximately 9,400 passengers are carried during the 1997–1998 summer aboard tour ships.
- 1998–99 Destination Management and Avant, a Chilean airline, begin operating over-flights of the Antarctic Peninsula from Punta Arenas, Chile. During the 1998-98 summer 22 flights aboard a Boeing 737 are conducted, carrying between 40-60 passengers on each flight.
- 1999–00 Approximately 14,762 tourists were carried to the Antarctic by 14 IAATO member companies operating 16 ships and 1 yacht and 3 non-IAATO member companies operating 4 ships. 139 tourists visited Antarctica on land-based programs organized by Adventure Network International. Croyden Travel operated 9 flight-seeing tours out of Australia, carrying 3,412 tourists and 193 crew.

Attachment 8

IAATO Overview of Ship- and Land-based Antarctic Tourism, 1999–00

(Based on information provided by Antarctic tour operators to the IAATO Secretariat)

Vessel	Operator/ Charterer	Number of Voyages	Number of Passengers	Member Affiliates
<i>Explorer</i>	Explorer Shipping	10	764	One voyage in conjunction with Victor Emanuel Nature Tours
<i>Kapitan Khlebnikov</i>	Quark Expeditions	2	198	Including one charter in conjunction with Zegrahm Expeditions
<i>Professor Molchanov</i>	Aurora Expeditions	9	453	
<i>Professor Molchanov</i>	Oceanwide Expeditions	1	32	
<i>Akademik S. Vavilov</i>	Quark Expeditions	8	565	
<i>Professor Multanovskiy</i>	Quark Expeditions	9	390	Including one charter in conjunction with Heritage Expeditions and Asteria
<i>Akademik Shokalskiy</i>	Heritage Expeditions	2	89	
<i>Clipper Adventurer</i>	New World Ship Management Clipper Cruise Line	7	662	
<i>Clipper Adventurer</i>	Zegrahm Expeditions	1	88	
<i>World Discoverer</i>	Society Expeditions	7	828	Including one voyage in conjunction with Zegrahm Expeditions
<i>Bremen</i>	Hapag-Lloyd	7	791	
<i>Hanseatic</i>	Hapag-Lloyd	7	1,008	
<i>Caledonian Star</i>	Lindblad Expeditions	6	523	
<i>Akademik Ioffe</i>	Marine Expeditions	10	873	
<i>Akademik Shuleykin</i>	Mountain Travel-Sobek	5	206	
<i>Akademik Shuleykin</i>	Marine Expeditions	4	144	
<i>Lyubov Orlova</i>	Marine Expeditions	9	933	
<i>Akademik Boris Petrov</i>	Peregrine Adventures	9	366	
<i>Grigoriy Mikheev</i>	Oceanwide Expeditions	4	122	
<i>Grigoriy Mikheev</i>	Aurora Expeditions	1	31	
<i>S/Y Pelagic</i>	Pelagic Expeditions	2	16	
Non IAATO Members				
<i>Marco Polo</i>	Orient Lines	5	2,583	Has been operating since 1993
<i>Aegean I</i>	World Cruise Company	2	912	Assisted by Marine Expeditions
<i>Ocean Explorer I</i>	World Cruise Company	2	889	Assisted by Marine Expeditions
<i>Yachts (~17)</i>	Various	23	221	Based on Port Lockroy and Palmer Station visits and In.Fue.Tur
<i>Rotterdam VI</i>	Holland America Line	1	936	Cruise only no landing
<i>Land-based programs</i>	Adventure Network Int'l	139		
TOTALS		153	14,762	

*Note: Full, Provisional and Associate Members will sell into the above mentioned vessels. Only the primary operator or charterers are listed here.

Attachment 9

Eleven Season (1989–2000) Overview of Sites Visited in the Antarctic Peninsula

Compiled by NSF from data provided by U.S. tour companies in response to treaty reporting requirements

Part 1: 1989 to 1994

Sites Visited	1989–1990		1990–1991		1991–1992		1992–1993		1993–1994	
	Total Visits	Total Pax Landed	Total Visits	Total Pax Landed	Total Visits	Total Pax Landed	Total Visits	Total Pax Landed	Total Visits	Total Pax Landed
Port Lockroy, Wiencke Is.	7	796	7	1067	19	2615	1* 22	57* 2139	4* 30	409* 4274
Whalers Bay, Deception Is.	17	1682	13	1496	23	2899	22	1711	37	3480
Pendulum Cove, Deception Is.	7	587	10	1215	19	2011	23	1936	33	3159
Cuerville Island	8	883	8	936	21	2565	25	1589	2* 27	226* 2174
Neko Harbor, Andvord Bay							8	357	6	275
Paulet Island	7	772	4	240	14	2239	16	1498	2* 18	266* 1664
Petermann Islands	6	761	11	1084	14	1376	14	1376	4* 30	518* 2828
Aitcho Islands	2	271	0	0	3	285	7	601	3	271
Almirante Brown (station), Paradise Bay	10	1191	16	1471	26	2889	19	1659	2* 31	78* 3513
Gonz. Videla/waterboat Pt., Paradise Bay	9	1038	10	1965	15	2398	19	1671	3* 17	330* 3248
Baily Head, Deception Is.	5	455	6	584	4* 14	315* 1182	1* 10	30* 657	1* 9	18* 990
Grytviken (station), S. Georgia	4	501	5	420	6	743	4	161	6	746
Goudier Island (small rock in harbor at Port Lockroy)										
Brown Bluff, Tabarin Penin. (Antarctic Peninsula)										
Arctowski (station), KGI	8	930	6	601	14	1509	10	598	30	3031
Paradise Bay (should specify)									1*	142*
Hannah Point, Livingston Is.	3	419	2	192	17	1632	23	1542	29	2740
Vernadsky Station, Argentine Island										
Jougla Point, Port Lockroy										
Penguin Island, KGI	3	256	0	0	1	65	7	506	1* 13	62* 1166
Gold Harbor, S. Georgia	3	274	3	282	2	203	0	0	4	504
Half Moon Island (moon Bay)	10	1191	9	1011	25	2984	14	1585	17	2961
Salisbury Plain, S. Georgia	4	412	4	307	4	390	3	128	2	164
Orcadass/scotia Bay/laurie Is., S. Orkney			1	36	2	148	1	127	2	152
Devil Island, Ne End Of Antarctic Peninsula										
Palmer Station, Anvers Is.	11	1252	9	923	11	1265	9	1014	10	1185
Esperanza Station, Hope Bay										
Cape Lookout, Elephant Is.	5	541	2	124	1* 5	50* 579	1* 4	118* 271	2* 6	133* 1131
Yankee Harbor, Greenwich Is.					2	763	2	474	1* 3	169* 233
Carcass Island										
Danco Island (off west coast Graham Land)									3	73
New Island, Falklands										
St. Andrews Bay, S. Georgia			1	45	0	0	1	46	1	49
Cooper Bay (north end), S. Georgia							1	46	0	0
Fortuna Bay, S. Georgia			1	90	0	0	0	0	0	0
Damoy Point, Wiencke Is.										
Albatross Island, South Georgia										
West Point Island, Falkland Is.										
Pleneau Island							10	447	6	370
Torgersen Island			8	788	8	872	8	890	2	126
Stromness Bay, S. Georgia			1	36	2	199	1	5	2	126
Telefon Bay, Deception Is.	6	492	4	452	6	606	1	72	12	819
Sea Lion Island, Falkland Islands										
Mikkelsen Harbor, Trinity Island	1	85	0	0	1	72	7	258	0	0
Crystal Hill, South-side Trinity Peninsula										
Hydrurga Rocks							1*	54*	3	165
Yalour Islands			1	87	1* 2	75* 177	1*	117*	1* 5	142* 378
Portal Point, Charlotte Bay			1	93	0	0	8	592	10	781
Dorian Bay, NW side Wiencke Island										
SNOW HILL ISLAND	2	125	0	0	1	90	1*	50*	0	0
Ferraz (station), Visca Anchorage, KGI	3	305	1	95	6	660	2	187	12	1135
Prion Island, S. Georgia	3	260	3	280	2	198	1*	60*	3	156
Arturo Prat (station), Greenwich Is.					2	181	0	0	0	0
Bald Head, Trinity Peninsula										
Presidente Frei (station), KGI (Marsh Base)	6	621	4	596	8	1162	2	333	1	90
Astrolabe Island							1	34	3	93
Jubany (station), Potter's Cove, KGI	1	120	1	107	3	307	4	305	6	869
Suarez Glacier (not Petzval), Paradise Bay										
Royal Bay, S. Georgia							1	5	0	0
Bellingshausen (station), KGI					9	966	1	62	1	88
Gourdin Island										
Bleaker Island, Falkland Islands										
Shingle Cove, Iceberg Bay, Coronation Is.	4	436	1	38	2	240	0	0	5	991
Elsehul Bay, S. Georgia	1	84	1	52	2* 1	182* 77	1*	65*	2*	110*
Rothera (station), Adelaide Island	1	99	0	0	0	0	0	0	0	0
Useful Island										
Enterprise Islands										
Skontorp Cove, Paradise Bay							1*	7 27*	257	0
Saunders Island, S. Sandwich Islands										
Cierva Cove							1	38	3*	85*
Rum Cove, James Ross Island										
Godthul Bay, S. Georgia										
Hercules Bay, South Georgia										
Mikkelsen Island										
Right Whale Bay, S. Georgia					1	97	0	0	0	0

% = snorkeling/scuba; # = helo landing; @ = helo overflight ONLY; + = ice walking

Attachment 9

Eleven Season (1989–2000) Overview of Sites Visited in the Antarctic Peninsula

Compiled by NSF from data provided by U.S. tour companies in response to treaty reporting requirements

Part 1: 1989 to 1994 (continued)

Sites Visited	1989–1990		1990–1991		1991–1992		1992–1993		1993–1994	
	Total Visits	Total Pax Landed	Total Visits	Total Pax Landed	Total Visits	Total Pax Landed	Total Visits	Total Pax Landed	Total Visits	Total Pax Landed
Orne Harbor (west coast Graham Land) Ronge' Island Artigas [Station-Uruguay], KGI View Point, Duse Bay, Trinity Peninsula Fort Point, S. Greenwich Island							5	186	6	267
Pleneau Bay Crystal Sound, Pendleton Strait (Biscoe Is.) Deception Island (need to be more specific) Horseshoe Island Lagarrigue Cove (Selvick Cove), Orne Harbor										
Cooper Bay (south end), S. Georgia Curtiss Bay, (west coast Graham Land) Adelaide Island Beak Island, Prince Gustav Channel Cape Dundas, Laurie Is., S. Orkney	2	183	0	0	0	0	1	44	0	0
Moltke Harbor, Royal Bay, S. Georgia King Haakon Bay (outer), S. Georgia Leith Cove, Paradise Bay, Graham Land Great Wall (Station), KGI INTERCURRENCE ISLAND, CHRISTIANIA ISLANDS	1	97	1	45	2	240	0	0	0	0
Turret Point, King George Bay, KGI Spigot Peak, Orne Island Alcock Island Heroina Island, Danger Islands Pitt Point (Victory Glacier)					1	81	0	0	1*	180*
Biscoe Point, Anvers Island (ASPA) off limits Turnbull Point, D'urville Island Blazett Island Robert Point, Robert Is., South Shetlands Cape Rosa, South Georgia						84	1	62	0	0
Pitt Islands Hercules Point, South Georgia Prince Olaf Harbor, S. Georgia Peggotty Bluff, South Georgia Booth Island							1*	36*	1	99
Larsen Harbor, S. Georgia Mt. Mill, Waddington Bay (w. coast Graham Land) Volunteer Point, Falklands Possession Bay, South Georgia Cumberland East Bay, South Georgia									1	33
Laws Beach Dundee Island Charlotte Bay Patagonia Bay, Anvers Island Ezcurra Inlet, Admiralty Bay, KGI									1	14
Leith Harbor, S. Georgia Seymour Island Leige Island Laurie Is., S. Orkneys (specify) Inverleith Harbor, Anvers Island	2	171	1	105	0	0	0	0	0	89
Perch Island, Fish Islands Cape Renard, Flandres Bay Nordenskjold Glacier, South Georgia Detaille Island Orne Islands (off west coast Graham Land)			2	191	0	0	0	0	0	0
Point Wild, Elephant Is. Melchior Islands Ardley Island Hovgaard Island Christiania Islands	1	142	0	0	1	160	0	0	0	0
Wilhelmina Bay (w. Coast of Graham Land) Drygalski Fjord, S. Georgia Dion Islands (SPA#8) Prospect Point, Graham Land Dallmann Bay (b/t Brabant & Anvers Islands)							2*	100*	1*	96*
Fish Islands (west coast Graham Land) Cape Valentine, Elephant Is. Gibbon Bay, Coronation Island Barcroft Islands (S. of Watkins and Biscoe Is.) Rosita Harbor, S. Georgia	1	94	2	195	0	0	3	278	0	0
Port Charcot, Booth Island Errera Channel (b/t Ronge Is. & Graham Land) Andersen Island Admiralty Bay, King George Island Admiralty Sound, b/t Seymour & Snow Hill Is.	2	265	2	151	2	268	4*	175*	3*	108
	1	100	7*	832	3	249	3*	305*	2	203
	4	418	2	705	0	0	1	113	1	175
					1	328	1	391	1	475
									1*	84*
									2	229
									1	118
			1	98	0	0	0	0	1*	51*
									1@	109@

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Eleven Season (1989–2000) Overview of Sites Visited in the Antarctic Peninsula

Compiled by NSF from data provided by U.S. tour companies in response to treaty reporting requirements

Part 1: 1989 to 1994 (continued)

Sites Visited	1989–1990		1990–1991		1991–1992		1992–1993		1993–1994	
	Total Visits	Total Pax Landed	Total Visits	Total Pax Landed	Total Visits	Total Pax Landed	Total Visits	Total Pax Landed	Total Visits	Total Pax Landed
Ample Bay, S. Georgia			1	88	0	0	0	0	0	0
Andvord Bay (west coast Graham Land)										
Antarctic Sound										
Arago Glacier, Andvord Bay							6	251	0	0
Argentine Is. (not same as Faraday)										
Atka Iceport, Queen Maud Land									1	115
Auguste Island, Gerlache Strait										
Bay Of Isles, Albatross Is., S. Georgia	1	142	2	88	2	158	1	46	1*	106*
Bayard Islands (off west coast Graham Land)										
Bennett Islands, Hanusse Bay										
Bernardo O'Higgins Base										
Berthelot Islands										
Bismarck Strait										
Blaiklock Island (off west coast Graham Land)										
Bone Bay, Trinity Peninsula										
Bongrain Point, Pourqoi Pas Island										
Bradbrooke Island, Aitcho Is.										
Bransfield Strait										
Brunonia Glacier										
Bryde Island (SW of Lemaire Island)										
Buls Bay, Brabant Island										
Camara Station (Arg.), Half Moon Island										
Camp Point, West Coast Graham Land										
Cape Dubouzet									1*	83*
Cape Evenson (west coast Graham Land)										
Cape Gage, James Ross Island										
Cape Kjellman, Charcot Bay, Trinity Penin.										
Cape Lachman, James Ross Island										
Cape Melville, KGI							1	58	0	0
Cape Norvegia, Queen Maud Land									1	122
Cape Saunders, Hercules Bay, S. Georgia									1	16
Cape Tuxen, Mt. Demaria (w. coast Graham Land)									1	27
Challenger Island (off west coast Graham Land)										
Cobbler's Cove, S. Georgia										
Comb Ridge, James Ross Island										
Cooper Island, S. Georgia										
Cormorant Island					1	125	0	0	0	0
Coronation Island, S. Orkneys (specify)			2	185	2	370	0	0	1	176
Crescent Island, South Georgia										
Danger Islands					1*	91*	0	0	0	0
Durville Mount, Joinville Island									1	33
Duthoit Point, Maxwell Bay, Nelson Island										
Elephant Island (should specify)									1*	135*
Emperor Rookery (no name - on Riser-Larsen Iceshelf)										
False Bay, Livingston Is.	1	127	0	0	0	0	0	0	0	0
Faraday (Station)/akademic Vernodsky	2	252	5	432	4	422	3	274	2	178
Fildes Peninsula										
Flanders Bay (btwn Capes Renard & Willens, Grahamland)										
Foyn Harbor										
Fridtjof Sound (Tabarin Peninsula)					1*	70*	3*	1 227*	66	3* 3 194*
Fumarole Bay, Deception Is.					1	8	0	0	0	0
Gabriel De Castilla Station (Deception Island)										
Gaston Islands (near tip Reclus Peninsula)									1*	69*
Gennady Cove, Intercurrence Island										
George's Point, Ronge' Island										
Gerlache Strait										
Gibbs Island, South Shetland Is.										
Gin Cove, James Ross Island										
Gosling Islands									1*	49*
Grandidier Channel										
Gunnel Channel, Hanusse Bay										
Hanusse Bay			2	148	0	0	0	0	0	0
Heim Glacier, Arrowsmith Pen. (Graham Land)										
Heywood Island							1	102	0	0
Holluschickie Bay, James Ross Island										
Hope Bay (Esperanza)	1	145	3	1130	9	1278	3	209	17	1801
Huemul Island (Megaptera Is.)										
Husvik Harbor, S. Georgia			1	19	1	99	0	0	0	0
Inner Lee Island, Bay Of Isles, S. Georgia										
James Ross Island										
Joinville Island "Molchanov Beach"									2	65
Jonassen Island, NE tip Antarctic Peninsula										
Kelsey Bay										
King George Island (need to be specific)										
King Sejong (Station), KGI					2	191	0	0	1	180
Kinnes Cove, Joinville Island									1	71

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Eleven Season (1989–2000) Overview of Sites Visited in the Antarctic Peninsula

Compiled by NSF from data provided by U.S. tour companies in response to treaty reporting requirements

Part 1: 1989 to 1994 (continued)

Sites Visited	1989–1990		1990–1991		1991–1992		1992–1993		1993–1994	
	Total Visits	Total Pax Landed	Total Visits	Total Pax Landed	Total Visits	Total Pax Landed	Total Visits	Total Pax Landed	Total Visits	Total Pax Landed
Lallemand Fjord (b/twn Arrowsmith Pen./W. Grahamland) Lapeyriere Bay, Gourdin Peninsula Lemaire Channel Lindblad Cove Lion Island, East Side Anvers Island					1*	42*	0	0	1*	46*
Lion's Rump, KGI Macaroni Point, Deception Is. Madder Cliffs, Joinville Island Marian Cove, KGI Martel Inlet, Admiralty Bay, KGI	6	625	7	772	4	382	0	0	0	0
Maxwell Bay, KGI (specify) Metchnikoff Point, Brabant Island Mount Scott, Girard Bay, Lemaire Channel Moureaux Islands, Flandres Bay Murray Harbor, Murray Is. (w. coast Graham Land)					1*	78	0	0	2	166
Murray Island (off west coast Graham Land) Neumayer Station No Name Penguin Rookery (70deg31'S;80deg42'W) Palaver Point, Two Hummock Is. Penguin Point, Seymour Island Penguin Rookery (no name - on Riser-Larsen Iceshelf)					1	86	1*	61*	0	0
Peon Peak Peter Ist Island Petrel Station, Petrel Cove, Dundee Is. Point Martin, S. Orkney Islands Point Thomas, Ezcurra Inlet, Admiralty Bay, KGI					1	144	0	0	1*	90*
Primavera Base (Arg.), Cierva Cove Prince Gustav Channel (b/t James Ross & Vega Is.) Rancho Point, Deception Island Riser-larsen Ice Shelf, Queen Maud Land Rookery Bay, S. Georgia							4	152	6	159
Rosamel Island San Martin 68 deg 08'S; 67 deg 05'W Sanae Base Schollaert Channel (btwn Anver/Brabant Islands) Seal Islands, South Shetland Islands			1	82	0	0	0	0	1	154
Shag Rocks, S. Georgia Signy Base (U.K.), S. Orkneys Signy Island, S. Orkneys Small Island, Christiania Islands Small Peak, Errera Channel	1	145	0	0	1*	93*	0	0	0	0
South Bay, Livingston Island Southwind Pass Spring Point, Brailmont Cove (w. Graham Land) Steeple Jason Island, Falkland Is. Stonington Island (East Base)	1	97	0	0	0	0	0	0	1#	108#
Takai Peninsula Triangle Point Trinity Island (need to specify) Undine South Harbor, S. Georgia Uruguayan Hut, Hope Bay					1*	60*	1	2	0	0
Wauwermans Islands Welcome Islands, S. Georgia Wiggins Glacier Will Point, S. Georgia Willis Islands, S. Georgia			1	89	0	0	0	0	0	0
Winter Island, Argentine Islands Wordie Point, Visokoi Is., S. Sandwich Is.										

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Attachment 9

Eleven Season (1989–2000) Overview of Sites Visited in the Antarctic Peninsula

Compiled by NSF from data provided by U.S. tour companies in response to treaty reporting requirements

Part 2: 1994 to 1999

Sites Visited	1994–1995		1995–1996		1996–1997		1997–1998		1998–1999	
	Total Visits	Total Pax Landed	Total Visits	Total Pax Landed	Total Visits	Total Pax Landed	Total Visits	Total Pax Landed	Total Visits	Total Pax Landed
Port Lockroy, Wiencke Is.	27	1769	3*	42	216*	3851	1*, (2-)	56	22*, (90-)	3,110
Whalers Bay, Deception Is.	66	5241	67	5033	51	3,012	1*	60	49*	5,344
Pendulum Cove, Deception Is.	41	2803	42	3492	44	2,725	31	31	3,426	50
Cuervo Island	2*	47	144*	3367	3*	59	259*	4343	3*	56
Neko Harbor, Andvord Bay	12	560	21	963	1*, (1-)	36	46*, (21-)	2,348	2*	53
Paulet Island	30	2819	31	2315	31	2,808	8	732	1*	37
Petermann Islands	42	3406	47	3504	1*	34	75*	2,576	1*	38
Aitcho Islands	10	667	23	1759	37	2,341	31	2,499	31	2525
Almirante Brown (Station), Paradise Bay	5*	43	286*	1307	1*	25	17*	2244	1*	34
Gonz. Videla/waterboat Pt., Paradise Bay	5*	20	528*	1559	14	2384	12	1,095	12	2,998
Baily Head, Deception Is.	2*	32	132*	2576	4*	19	311*	1094	2*	14
Grytviken (Station), S. GEORGIA	5	449	7	473	7	510	7	708	1%	20
Goudier Island (small rock in harbor at Port Lockroy)			1	44	3	262	6	467	1%	15
Brown Bluff, Tabarin Penin. (Antarctic Peninsula)	2	77	4	223	9	553	1*	17	135*	1,293
Arctowski (Station), KGI	1*	31	47*	2445	21	1724	22	1,789	11	1,014
Paradise Bay (should specify)			4*,1@	36	218*,92@	2772	10*	22	857*	1,739
Hannah Point, Livingston Is.	46	4010	37	3048	46	3,480	39	3,399	10*	15
Vernadsky Station, Argentine Island					6	369	19	1,094	22	1626
Jougla Point, Port Lockroy					1*	2	18*	102	5	450
Penguin Island, KGI	24	1692	23	1449	2*	12	65*	1,090	15	1,394
Gold Harbor, S. Georgia	3	398	4	308	6	438	5	365	10	752
Half Moon Island (Moon Bay)	38	3017	49	5221	35	2,258	33	4,382	33	3931
Salisbury Plain, S. Georgia	6	582	3	215	5	307	2	199	8	595
Orcadas/scotia Bay/laurie Is., S. Orkney	3	198	3	203	4	491	4	491	4	462
Devil Island, NE end of Antarctic Peninsula			4	352	9	657	1	2	3	285
Palmer Station, Anvers Is.	9	1030	8	724	11	979	14	1,417	12	1001
Esperanza Station, Hope Bay										
Cape Lookout, Elephant Is.	1*	9	103*	951	1*	4	134*	442	3*	9
Yankee Harbor, Greenwhich Is.	8	544	1*	19	43*	1893	7	473	12	1045
Carcass Island			2	110	2	174	3	152	7	635
Danco Island (off west coast Graham Land)	4	276	1*	13	34*	560	5	314	1%	6
New Island, Falklands	1	51	1	73	2	179	2	179	6	494
St. Andrews Bay, S. Georgia	3	275	3	182	4	261	1*	2	58*	99
Cooper Bay (north end), S. Georgia	4	344	2	134	3	235	1*	1	48*	58
Fortuna Bay, S. Georgia					3	224			5	348
Damoy Point, Wiencke Is.	2	188	5	503	1*	2	68*	136	1^	1
Albatross Island, South Georgia			1*	3	38*	145	3	273	1*	3
West Point Island, Falkland Is.							2	92	8	384
Pleneau Island	7*	6	445*	374	8*	20	613*	1333	10*	3
Torgersen Island	6	545	4	325	3	192	9	890	8*	15
Stromness Bay, S. Georgia	1	125			1	72			9	671
Telefon Bay, Deception Is.	5	403	7	543	4	282	7	566	6	380
Sea Lion Island, Falkland Islands									13	1039
Mikkelsen Harbor, Trinity Island	1*	3	41*	160	2	76	1	72	2	119
Crystal Hill, South-side Trinity Peninsula			4	352	2	165			3	152
Hydrurga Rocks	2	72	1	83	1*	7	31*	461	4	199
Yalour Islands	2*	226*	3*	3	268*	104	3	118	1%	8
Portal Point, Charlotte Bay	8	641	14	890	(1-)	5	(15-)	370	3	167
Doriana Bay, NW side Wiencke Island	1	133	1*	1	82	94	1	92	4	118
Snow Hill Island	4	304	2	187	1*	1	84*	35	6	453
Ferraz (Station), Visca Anchorage, KGI	10	930	4	321	3	183	5	693	4	381
Prion Island, S. Georgia	4	490	1	125	1	43			4	485
Arturo Prat (Station), Greenwhich Is.	1	112	1	66	3	224	3	267		
Bald Head, Trinity Peninsula										
Presidente Frei (Station), KGI (Marsh Base)	9	766	6	542	5	335	2	165		
Astrolabe Island	2*	4	83*	211	3*	2	147*	69	1*	1
Jubany (station), Potter's Cove, KGI	3	403					3	333	1%	6
Suarez Glacier (not Petzval), Paradise Bay					1*	1	42*	32	2*	2
Royal Bay, S. Georgia	1	40	3	142	1	40	1	49	6	83*
Bellingshausen (Station), KGI	8	573	10	530	6	138	11	146		
Gourdin Island							2	207	5	305
Bleaker Island, Falkland Islands									4	321
Shingle Cove, Iceberg Bay, Coronation Is.	4	368	2	153	4	295			2	90
Elsehul Bay, S. Georgia	1	79	1*	48*			1*	64*	1*	5
Rothera (Station), Adelaide Island	2	243	1	160					2*	2
Useful Island	1	47							2*	2
Enterprise Islands	1*	88*			1*	85*	2*	184*	3*	1
Skontorp Cove, Paradise Bay							1	90	1	98
Saunders Island, S. Sandwich Islands									1	58
Cierva Cove			3*	107*	2*	3	200*	272	3*	2
Rum Cove, James Ross Island					1	80			2	98*
Godthul Bay, S. Georgia										124
Hercules Bay, South Georgia							1*	51*	2	82
Mikkelsen Island									3	191
Right Whale Bay, S. Georgia	1	117	1*	38*			1*	127*	1*	109*

% = snorkeling/scuba; # = helo landing; @ = helo overflight ONLY; + = ice walking

Attachment 9

Eleven Season (1989–2000) Overview of Sites Visited in the Antarctic Peninsula

Compiled by NSF from data provided by U.S. tour companies in response to treaty reporting requirements

Part 2: 1994 to 1999 (continued)

Sites Visited	1994–1995		1995–1996		1996–1997		1997–1998		1998–1999					
	Total Visits	Total Pax Landed	Total Visits	Total Pax Landed	Total Visits	Total Pax Landed	Total Visits	Total Pax Landed	Total Visits	Total Pax Landed				
Orne Harbor (west coast Graham Land)			1	30	1*	3	70*	266	1*	1	31*	57	1	72
Ronge Island	1*	9	47*	664	9	546	10	534	2	215			2	135
Artigas (Station-Uruguay), KGI		3	212						1	7			2	181
View Point, Duse Bay, Trinity Peninsula				1	99	3	207						1	88
Fort Point, S. Greenwich Island													2	185
Pleneau Bay						1*	27*		1*	49*			3*	172*
Crystal Sound, Pendleton Strait (Biscoe Is.)						1*	2	153*						
Deception Island (need to be more specific)				1*	9	17*	557						11	801
Horseshoe Island									4	236				
Lagarrigue Cove (Selvick Cove), Orne Harbor	1	99						1	77				2	144
Cooper Bay (south end), S. Georgia													1*	5
Curtiss Bay, (west coast Graham Land)				2*	2	159*	72						1	42*
Adelaide Island								1	57				1	56
Beak Island, Prince Gustav Channel								1	57				1	51
Cape Dundas, Laurie Is., S. Orkney	1	138											1	76
Moltke Harbor, Royal Bay, S. Georgia								2	99				1	24
King Haakon Bay (Outer), S. Georgia														
Leith Cove, Paradise Bay, Graham Land													1	44
Great Wall (Station), KGI				1	60			1	2					
Intercurrence Island, Christiania Islands								1*	55*				1*	49*
Turret Point, King George Bay, KGI	1	146		4	180	3	185	9	858				2	138
Spigot Peak, Orne Island								1	97				1	97
Alcock Island														
Heroina Island, Danger Islands						1	90						1	37
Pitt Point (Victory Glacier)						1	88							
Biscoe Point, Anvers Island (ASPA) off limits														
Turnbull Point, D'urville Island														
Blazett Island														
Robert Point, Robert Is., South Shetlands				2	118	1	45	6	383					
Cape Rosa, South Georgia														
Pitt Islands	1	87											1	52
Hercules Point, South Georgia														
Prince Olaf Harbor, S. Georgia														
Peggotty Bluff, South Georgia														
Booth Island														
Larsen Harbor, S. Georgia	1	27				3	185	1*	45*				3*	4
Mt. Mill, Waddington Bay (w. coast Graham Land)				1	68									169*
Volunteer Point, Falklands								1	42					
Possession Bay, South Georgia								1	139					
Cumberland East Bay, South Georgia														
Laws Beach														
Dundee Island														
Charlotte Bay				4	349	1	92						2+	1
Patagonia Bay, Anvers Island														
Ezcurra Inlet, Admiralty Bay, KGI														
Leith Harbor, S. Georgia													1	54
Seymour Island				2	99	1	59						1	119
Leige Island														
Laurie Is., S. Orkneys (specify)	1	96		1*	2	53*	201	1	98				3	314
Inverleith Harbor, Anvers Island														
Perch Island, Fish Islands														
Cape Renard, Flandres Bay													1	70
Nordenskjold Glacier, South Georgia														
Detaille Island	2	236				1	108	4	413				1*	3
Orne Islands (off west coast Graham Land)	1*	7	34*	368	1	42								99*
Point Wild, Elephant Is.	4*	3	361*	185	6*	1	484*	26	7*	547*			4*	2
Melchior Islands	2*	1	177*	14	4*	324*			6*	3	411*	118	4*	1
Ardley Island		2	149					1	55					8
Hovgaard Island		2	172		2	138		1*	(1-)	2	109*	(35-)	203	7
Christiania Islands								1*	1	54*	439		1*	1
Wilhelmina Bay (w. Coast of Graham Land)								1*	1	59*	54		1	51
Drygalski Fjord, S. Georgia	1*	84*		1	41*	105							2*	201*
Dion Islands (SPA#8)													1*	54*
Prospect Point, Graham Land		4	291		1*	2	69*	122	1	91			4	294
Dallmann Bay (b/t Brabant & Anvers Islands)					2*	104*			1*	70*				
Fish Islands (west coast Graham Land)					1	113								95
Cape Valentine, Elephant Is.														
Gibbon Bay, Coronation Island														
Barcroft Islands (S. of Watkins and Biscoe Is.)	1*	1	97*	83				1*	134*				1	95
Rosita Harbor, S. Georgia	1*	30*												
Port Charcot, Booth Island					1	74								20
Errera Channel (b/t Ronge Is. & Graham Land)				2*	61*								1*	23*
Andersen Island				1*	41*									
Admiralty Bay, King George Island				1*	48*									
Admiralty Sound, b/t Seymour & Snow Hill Islands				1*	85*		3	185						
Ample Bay, S. Georgia														

% = snorkeling/scuba; # = helo landing; @ = helo overflight ONLY; + = ice walking

Attachment 9

Eleven Season (1989–2000) Overview of Sites Visited in the Antarctic Peninsula

Compiled by NSF from data provided by U.S. tour companies in response to treaty reporting requirements

Part 2: 1994 to 1999 (continued)

Sites Visited	1994–1995		1995–1996		1996–1997		1997–1998		1998–1999	
	Total Visits	Total Pax Landed	Total Visits	Total Pax Landed	Total Visits	Total Pax Landed	Total Visits	Total Pax Landed	Total Visits	Total Pax Landed
Andvord Bay (west coast Graham Land) Antarctic Sound Arago Glacier, Andvord Bay Argentine Is. (not same as Faraday)	1*	34*	1*	100*	2*	168*	1* 2*	32* 167*	1*	34*
Atka Iceport, Queen Maud Land Auguste Island, Gerlache Strait Bay Of Isles, Albatross Is., S. Georgia Bayard Islands (off west coast Graham Land) Bennett Islands, Hanusse Bay	2 3	239 111	2# 1	129# 113	2#	164	1 1	55 56	1 1	53 57
Bernardo O'higgins Base Berthelot Islands Bismarck Strait Blaikeock Island (off west coast Graham Land) Bone Bay, Trinity Peninsula	1*	93*			1*	95 50*				
Bongrain Point, Pourqoi Pas Island Bradbrooke Island, Alitcho Is. Bransfield Strait Brunonia Glacier Bryde Island (SW of Lemaire Island)	1	136					1 1	80 47	1	17
Buls Bay, Brabant Island Camara Station (Arg.), Half Moon Island Camp Point, West Coast Graham Land Cape Dubouzet Cape Evenson (west coast Graham Land)	1	96			5 1	672 78	1 2	56 395		
Cape Gage, James Ross Island Cape Kjellman, Charcot Bay, Trinity Penin. Cape Lachman, James Ross Island Cape Melville, KGI Cape Norvegia, Queen Maud Land	1 1	86 97	1*	72 41*					1	95
Cape Saunders, Hercules Bay, S. Georgia Cape Tuxen, Mt. Demaria (w. coast Graham Land) Challenger Island (off west coast Graham Land) Cobbler's Cove, S. Georgia Comb Ridge, James Ross Island	2* 1	210* 344 30			1 1	50 31			2	72
Cooper Island, S. Georgia Cormorant Island Coronation Island, S. Orkneys (specify) Crescent Island, South Georgia Danger Islands	1	108	1	38	7	240			3	199
Durville Mount, Joinville Island Duthoit Point, Maxwell Bay, Nelson Island Elephant Island (should specify) Emperor Rookery (no name - on Riser-Larsen Iceshelf) False Bay, Livingston Is.	1 3	135 259	1	109	1	50	1* 1	46* 81		
Faraday (Station)/akademic Vernodsky Fildes Peninsula Flanders Bay (btwn Capes Renard & Willens, Grahamland) Foyt Harbor Fridtjof Sound (Tabarin Peninsula)	4 1*	267 96*	5	209	1 3*	85 213*	1* 1*	64* 106*	2* 1*	179* 51*
Fumarole Bay, Deception Is. Gabriel De Dastilla Station (Deception Island) Gaston Islands (near tip Reclus Peninsula) Gennady Cove, Intercurrence Island George's Point, Ronge' Island			1	42	1 2	40 139		440	1	80
Gerlache Strait Gibbs Island, South Shetland Is. Gin Cove, James Ross Island Gosling Islands Granddier Channel	1* 2*	89* 229*	1*	107* 67	2*	247* 94 96	1* 1 1	96* 131 67*	2* 2*	140* 337* 270
Gunnel Channel, Hanusse Bay Hanusse Bay Heim Glacier, Arrowsmith Pen. (Graham Land) Heywood Island Holluschickie Bay, James Ross Island	1	19			1	91		75*		
Hope Bay (Esperanza) Huemul Island (Megaptera Is.) Husvik Harbor, S. Georgia Inner Lee Island, Bay Of Isles, S. Georgia James Ross Island	1* 1*	11 59* 45*	17	1476	7	710	10	1,210	9	1031
Joinville Island "Molchanov Beach" Jonassen Island, NE tip Antarctic Peninsula Kelsey Bay King George Island (need to be specific) King Sejong (Station), KGI	1	24	3	134	1	55			1	85
Kinnes Cove, Joinville Island	1*	82*					3	372	1	54

% = snorkeling/scuba; # = helo landing; @ = helo overflight ONLY; + = ice walking

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Eleven Season (1989–2000) Overview of Sites Visited in the Antarctic Peninsula

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Part 2: 1994 to 1999 (continued)

Sites Visited	1994–1995		1995–1996		1996–1997		1997–1998		1998–1999	
	Total Visits	Total Pax Landed	Total Visits	Total Pax Landed	Total Visits	Total Pax Landed	Total Visits	Total Pax Landed	Total Visits	Total Pax Landed
Lallemand Fjord (b/twn Arrowsmith Pen./W. Grahamland) Lapeyere Bay, Gourdin Peninsula Lemaire Channel Lindblad Cove			1*	86*	6*	455*	1* 2*	76* 131*	1 3* 1*	59 184* 87*
Lion Island, East Side Anvers Island Lion's Rump, KGI Macaroni Point, Deception Is. Madder Cliffs, Joinville Island Marian Cove, KGI	1	36			1*	33*	1*	142*	1% 1	28% 15
Martel Inlet, Admiralty Bay, KGI Maxwell Bay, KGI (specify) Metchnikoff Point, Brabant Island Mount Scott, Girard Bay, Lemaire Channel Moureaux Islands, Flandres Bay			3	148			1 1	70 55	1	2
Murray Harbor, Murray Is. (w. coast Graham Land) Murray Island (off west coast Graham Land) Neumayer Station No Name Penguin Rookery (70deg31'S;80deg42'W) Palaver Point, Two Hummock Is.	1* 1	34* 49	1	63	2# 3	140 328				
Penguin Point, Seymour Island Penguin Rookery (no name - on Riser-Larsen Iceshelf) Peon Peak Peter Ist Island Petrel Station, Petrel Cove, Dundee Is.	1	41			1	74	1	33		
Point Martin, S. Orkney Islands Point Thomas, Ezcurra Inlet, Admiralty Bay, KGI Primavera Base (Arg.), Cierva Cove Prince Gustav Channel (b/t James Ross & Vega Isls.) Rancho Point, Deception Island	1* 2	38* 63			1 2 1	80 103 105	1	98		
Riser-larsen Ice Shelf, Queen Maud Land Rookery Bay, S. Georgia Rosamel Island San Martin 68 deg 08'S; 67 deg 05'W Sanae Base	3 1	347 95			1#	91			1*	35*
Schollaert Channel (btwn Anver/Brabant Islands) Seal Islands, South Shetland Islands Shag Rocks, S. Georgia Signy Base (u.k.), S. Orkneys Signy Island, S. Orkneys					1*	25*			1	6
Small Island, Christiania Islands Small Peak, Errera Channel South Bay, Livingston Island Southwind Pass Spring Point, Brailmont Cove (w. Graham Land)	1	4	1 1@	38 101@	1	48				
Steeple Jason Island, Falkland Is. Stonington Island (East Base) Takai Peninsula Triangle Point Trinity Island (need to specify)	2 2	197 135			1 1	113 52	1	56	1	97 69
Undine South Harbor, S. Georgia Uruguayan Hut, Hope Bay Wauwermans Islands Welcome Islands, S. Georgia Wiggins Glacier Will Point, S. Georgia			1* 1#	96* 95#			1	105		
Willis Islands, S. Georgia Winter Island, Argentine Islands Wordie Point, Visokoi Is., S. Sandwich Is.			1*	38*			1	50	2 2	169 139

% = snorkeling/scuba; # = helo landing; @ = helo overflight ONLY; + = ice walking

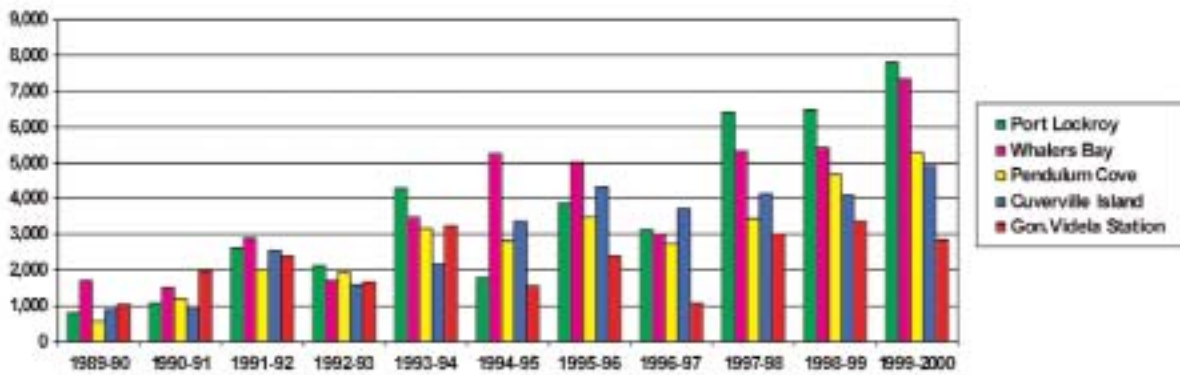
Attachment 10

Peninsula Sites Ranking in the Top 5 Most Visited Sites for 3 or More of the Last 11 Seasons

	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-2000
Port Lockroy	796	1,067	2,615	2,139	4,274	1,769	3,851	3,110	6,429	6,473	7,804
Whalers Bay	1,682	1,496	2,899	1,711	3,480	5,241	5,033	3,012	5,344	5,427	7,333
Pendulum Cove	587	1,215	2,011	1,936	3,159	2,803	3,492	2,725	3,426	4,676	5,300
Cuverville Island	883	936	2,565	1,589	2,174	3,367	4,343	3,714	4,143	4,087	4,908
Gon. Videla Station	1,038	1,965	2,398	1,671	3,248	1,559	2,384	1,095	2,998	3,379	2,871

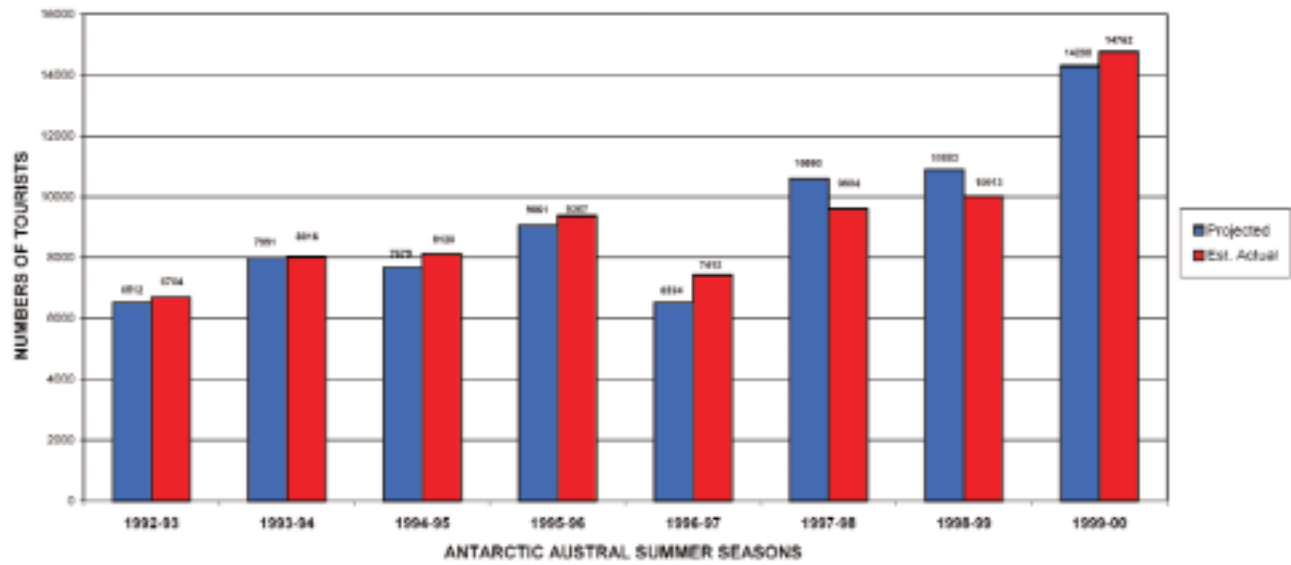
Bold = Most visited site for that season.

TOP 5 MOST VISITED SITES



Attachment 11 Antarctic Tourist Trends

[Includes Ship and Land-Based passenger numbers. 1997-98 onwards includes commercial yacht activity]



Attachment 12

Criteria Used by Expedition Leaders in Itinerary Planning and Site Selection for Expedition Cruising in the Antarctic Peninsula

A. Introduction

1. Selecting sites to visit during each shipborne tourist expedition to the Antarctic Peninsula occurs in two phases. Phase one involves initial itineraries being planned and circulated to other tour ships prior to the commencement of the expedition. The second phase involves adjustments to the initial itinerary on a day to day basis as a result of conditions and opportunities encountered en route.
2. With the majority of the companies, both phases of the detailed itinerary planning and site selection are implemented by the Expedition Leader. Though in some cases the company running the ship carries out the phase on planning, the Expedition Leader being responsible only for phase two, the criteria used in the decision making process does not vary significantly.
3. This report details the criteria considered in the decision making process for both phases. Section B deals with phase one. It concentrates on the decision making process involved in selecting sites in the context of the voyage as a whole. Section C assesses phase two, detailing criteria used when considering landing passengers as a specific site.

B. Phase One: Planning

1. Phase one, the initial itinerary, is concerned with site selection in the context of a voyage as a whole. The aim is to achieve an expedition that gives passengers an overview of the area being visited.
2. Certain parameters, such as number of days in the Antarctic region and the marketing emphasis, e.g., ice cruises, historical expeditions, etc., are set in site selection. Other factors which dictate itinerary planning are vessel speeds and the number of passengers involved.
3. There are a number of requisite sites or features to be incorporated into an itinerary (though these may be influenced by the marketing emphasis). These features are:
 - visits to renowned sites, e.g., Deception Island, Paradise Bay and Lemaire Channel;
 - 'key' components of the natural history, e.g., specific bird and marine mammal spp., geologic features, etc.;
 - a landing on the Antarctic continent;

- sites of historic interest, both exploration and sealing and whaling;
- a visit to a scientific station.

The extent to which each of these aspects are emphasized varies according to the personnel involved and time constraints.

4. Often several sites meet the criteria listed above. The decision of which site to visit and at what stage in the expedition depends on several factors. Two key principles are:
 - a) to start with landings which are 'simple.' In this instance, simple can be defined as sites which: are usually sheltered, both at the vessel's gangway and at the landing point; have ample space near the landing point for passengers to adjust to the environmental and operation procedures (adjustments to clothing and equipment, etc.) without disrupting wildlife; and are safe and easy to move around.
 - b) to manage expectations, i.e., to try to ensure that each day is 'better' than the day before. Often areas which have a high species diversity, spectacular scenery, or unusual occurrences are perceived as 'more exciting'. Equally, such areas often require better understanding of the codes of conduct because of : increased awareness of the biota and potential for disturbance; safety reasons; or proximity to protected areas.
5. Final decisions in selecting routes and sites are based on local knowledge of the areas involved, taking into account the site's attractions and how they fit in with what has been experienced and will be experienced.
6. The overall route plan, including planned landings, is then circulated to other vessels operating in the area, to avoid two vessels trying to land at the same site at the same time. It is based on the assumption that conditions will not be prohibitive to landing passengers.

Phase Two: Adjustments in Itineraries

1. Adjustments often have to be made to daily itineraries. This is due to bad weather and ice conditions, other ships schedules, and opportunities which may become apparent during the voyage. If adjustments are made 24+ hours in advance, notification is usually sent to other vessels to avoid conflict.
2. The criteria considered by an expedition leader when making the decision of whether to go to a site, assessing if the landing is feasible, and if so, how it should be organized, fall into 3 categories:
 - **Attraction of the site:** i.e., why choose to land at this site? Is there a more suitable alternative site within reasonable steaming

distance? What activities are possible here? e.g., the factors mentioned in B 3, i.e., renowned, natural history, continent landing, historical, scientific, etc.

■ **Shore operation:** do the characteristics of the site require particular visitor control methods to be used to minimise potential disturbance of the environment and ensure safety? If so, what? e.g., zodiac cruise only, guided walks, specific conduct reminders, etc.

■ **Marine operation:** Are the conditions good enough and stable enough to allow a landing? If so, how should the zodiac operations be organized, e.g., consider: ship to shore distance; conditions at landing site and gangway; selection of best landing point; potential hazards; tide and current influences; number of shoremen required; number of zodiacs, etc.

3. Based on these criteria the expedition leader is able to decide whether or not to land at a particular site, conditions permitting. The expedition leader is also able to control the use of the site to ensure that: the landing is safe; it does not encroach areas into protected areas; and that the visit causes minimal disturbance to the local environment.

Kim Crosbie
Scott Polar Research Institute
University of Cambridge

Attachment 13

Sample Annual Instruction

October 11, 1999

MEMORANDUM

TO All Antarctic Captains, Expedition Leaders and Radio Officers
FM IAATO
RE 1999/00 Season

We developed the following notice at the IAATO annual meeting to help guide the exchange of information among vessels, co-ordination of itineraries and reporting for the season.

Exchange of Itineraries

- IAATO members agree to exchange itineraries and coordinate schedules. This is a key factor in self-regulation, monitoring of activities and also in effective emergency response.
- Consult the IAATO preliminary schedule (and updates circulated by In.Fue.Tur) to determine which vessels will be in your cruising area.
- Circulate your proposed final itinerary via telex by broadcast mode or radio (preferred) or fax or e-mail. (Please note that few tour vessels have regular real-time exchange of e-mail.) Since all ships are supposed to be equipped with the new GMDSS radio station, they should be able to scan a frequency in the 6310 KZ band (24 hrs). By using broadcast mode (one way) ships can send itineraries, ice information and other information as needed. These transmissions will be picked up by all vessels and should be able to printout.
- Itineraries may also be circulated via In.Fue.Tur but this is a method of last resort. Not all ships call at Ushuaia and the responsibility to circulate information is on individual vessels.
- Be sure to also exchange environmental information and management recommendations for individual landing sites or other notices with your colleagues as the season progresses.

Itinerary Changes

- To avoid conflicts, notify vessels in the region of any changes in planned itinerary as soon as practical.
- Notification can be by fax, telex, VHF or HF (see below)

Landing Priority

- In general, priority is given to the first vessel that has made its intentions known.

- In the event of conflict, expedition leaders should coordinate between themselves to determine priority, which is best accomplished through negotiation via HF or VHF.
- Please resolve any conflicts equitably. It is assumed that vessels visiting a site with some regularity will give way to a vessel that is not but any number of factors may come into play.
- Two vessels are not to land at the same place at the same time and, to avoid any potential environmental impacts, efforts should be made to spread out visits over time.

Station Visits

- Tour operators have agreed to provide 72 hour-notice of any planned station visit.
- Follow individual procedures determined by national programs/station leaders.
- Provide timely notice of cancellation, generally 48 hours in advance.
- Please include any additional station contact information, standard procedures or incidents involving stations in your voyage report to the home office.
- Remember no visits to Palmer Station are allowed on Sunday's and preferably not on Saturdays. All Palmer visits have been pre-arranged. Any changes, please advise Palmer as soon as possible.

Channel 16

- Channel 16 is used for hailing purposes only, NOT general communication.
- After making contact, immediately switch to another channel to continue conversation.
- Expedition Leaders should periodically review radio etiquette with staff. The airwaves during the height of the season in the Peninsula have been crowded, an issue with IAATO members and potentially with research stations. Take care to follow standard international procedures.

IAATO Radio Schedule

- IAATO members have agreed to implement a twice daily radio schedule.
- All ships should report in with their position/destination at 1230 and 1930 daily (Ushuaia local time). Each radio officer should record this information.

- Suggested HF hailing frequencies are: 4146 (1°), 6224 (2°)–SSB, 8294 (3°), to be finalized by radio officers during the season based on experience. Use 6224 whenever possible.
- Expedition leaders should make use of this schedule whenever VHF communication is impossible for exchange information. This will reduce communication costs.
- Please switch to another frequency for any extended conversation.

EMER (Emergency and Medical Evacuation Response)

- Review the IAATO Emergency Contingency Plan included in your briefing package.
- The reporting scheme indicated above is an integral part of emergency response. Please insure that it is followed and report any difficulties to your home office.

Post-Visit Reporting

- Following Antarctic Treaty recommendations, complete Part 1 and Part 2 of the standard Post-Visit report for every expedition. This should be the ONLY form completed and it should be completed carefully and returned to the office. This information is tabulated and circulated internationally.
- Please note guests of the company, guest lecturers, other “non-revenue passengers” should be reported as passengers *for the purposes of this report* unless they have a specific role ashore. In general, those responsible for supervising passenger operations ashore who report to the expedition leader are considered staff. Your office will provide additional guidance.
- Please use the standard list of “Antarctic Peninsula Region Landing Sites” for Part 2, in which case you need not complete the Latitude/Longitude. Please correct duplications or inconsistencies. In general, the most specific place name is used.
- Make additions to the list of landing sites as necessary — taking note of the standard procedures included in your briefing packet for assessing new or rarely visited sites.
- EL’s, please note that this information is used for statistics that are tabled worldwide. Please do not hastily fill this out. If you have questions, consult your home office.

Have a safe and successful Antarctic season.



Attachment 14 Guidelines of Conduct for Antarctica Visitors

Antarctica, the world's last pristine wilderness, is particularly vulnerable to human presence. Life in Antarctica must contend with one of the harshest environments on earth, and we must take care that our presence does not add more stress to this fragile and unique ecosystem.

The following Guidelines of Conduct have been adopted by all members of the International Association of Antarctic Tour Operators (IATTO) and will be made available to all visitors traveling with them to Antarctica. With your cooperation we will be able to operate environmentally-conscious expeditions that protect and preserve Antarctica, leaving the continent unimpaired for future generations.

Please thoroughly study and follow these guidelines. By doing so, you will make an important contribution toward the conservation of the Antarctic ecosystem and minimize visitor impact. It will also help to ensure that you will have a safe and fulfilling experience in visiting one of the most exciting and fascinating places on earth.

1. DO NOT DISTURB, HARASS, OR INTERFERE WITH THE WILDLIFE

- never touch the animals.
- maintain a distance of at least 15 feet (4.5 meters) from penguins, all nesting birds and true seals (crawling seals), and 50 feet (15 meters) from fur seals.
- give animals the right-of-way.
- do not position yourself between a marine animal and its path to the water, nor between a parent and its young.
- always be aware of your surroundings; stay outside the periphery of bird rookeries and seal colonies.
- keep noise to a minimum.
- do not feed the animals, either ashore or from the ship.

Most of the Antarctic species exhibit a lack of fear which allows you to approach relatively close; however, please remember that the austral summer is a time for courting, mating, nesting, rearing young and molting. If any animal changes or stops its activities upon your approach, you are too close! Be especially careful while taking photographs, since it is easy to not notice adverse reactions of animals when concentrating through the lens of a camera. Disturbing nesting birds may cause them to expose their eggs/offspring to predators or cold. Maintain a low profile since animals can be intimidated by people standing over them. The disturbance of some animals, most notably fur seals and nesting skuas, may elicit an aggressive, and even dangerous, response.

2. DO NOT WALK ON OR OTHERWISE DAMAGE THE FRAGILE PLANTS, i.e., LICHENS, MOSSES AND GRASSES.

Poor soil and harsh living conditions mean growth and regeneration of these plants is extremely slow. Most of the lichens, which grow only on rocks, hard-packed sand and gravel, and bones, are extremely fragile. Damage from human activity among the moss beds can last for decades.

(continued on next page)

3. LEAVE NOTHING BEHIND, AND TAKE ONLY MEMORIES AND PHOTOGRAPHS.

- leave no litter ashore (and remove any litter you may find while ashore); dispose of all litter properly.
- do not take souvenirs, including whale and seal bones, live or dead animals, rocks, fossils, plants, other organic material, or anything which may be of historical or scientific value.

4. DO NOT INTERFERE WITH PROTECTED AREAS OR SCIENTIFIC RESEARCH.

- do not enter buildings at the research stations unless invited to do so.
- avoid entering all officially protected areas, and do not disturb any ongoing scientific studies.

Areas of special scientific concern are clearly delineated by markers and/or described in official records (the expedition staff know these sites). Scientific research in Antarctica is in the interest of everyone—visitors, scientists, and laymen.

5. HISTORIC HUTS MAY ONLY BE ENTERED WHEN ACCOMPANIED BY A PROPERLY AUTHORIZED ESCORT.

- nothing may be removed from or disturbed within historical huts.

Historic huts are essentially museums, and they are all officially maintained and monitored by various governments.

6. DO NOT SMOKE DURING SHORE EXCURSIONS.

Fire is a very serious hazard in the dry climate of Antarctica. Great care must be taken to safeguard against this danger, particularly around wildlife areas, historic huts, research buildings, and storage facilities.

7. STAY WITH YOUR GROUP OR WITH ONE OF THE SHIP'S LEADERS WHEN ASHORE.

- follow the directions of the expedition staff.
- never wander off alone or out of sight of others.
- do not hike onto glaciers or large snow fields, as there is a real danger of falling into hidden crevasses.

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In addition to the Guidelines of Conduct for Antarctic Visitors adopted by IAATO, all visitors should be aware of the Agreed Measures for the Conservation of Antarctic Fauna and Flora. This annex to the Antarctic Treaty of 1959 addresses the protection of the environment and conservation of wildlife. Citizens of any government that has ratified the Antarctic Treaty are legally bound by the following guidelines of conduct in the region south of Latitude 60° South:

Conservation of Wildlife

Animals and plants native to Antarctica are protected under the following five instruments outlined in the Agreed Measures:

1. Protection of Native Fauna

Within the Treaty Area it is prohibited to kill, wound, capture or molest any native mammal or bird, or any attempt at such an act, except in accordance with a permit.

2. Harmful Interference

Appropriate efforts will be taken to ensure that harmful interference is minimized in order that normal living conditions of any native mammal or bird are protected. Harmful interference includes any disturbance of bird and seal colonies during the breeding period by persistent attention from persons on foot.

3. Specially Protected Species

Special protection is accorded to Fur and Ross Seals.

4. Specially Protected Areas (SPAs)

Areas of outstanding scientific interest are preserved in order to protect their unique natural ecological system. Entry to these areas is allowed by permit only.

5. Introduction of Non-Indigenous Species, Parasites and Diseases

No species of animal or plant not indigenous to the Antarctic Treaty Area may be brought into the Area, except in accordance with a permit. All reasonable precautions have to be taken to prevent the accidental introduction of parasites and diseases into the Treaty Area.

Additionally, the Marine Mammal Protection Act of 1972 prohibits U.S. citizens from taking or importing marine mammals, or parts of marine mammals, into the U.S. Both accidental or deliberate disturbance of seals or whales may constitute harassment under the Act.

(continued on following page)

Further, the Antarctic Conservation Act of 1978 (U.S. Public Law 95-541) was adopted by the United States Congress to protect and preserve the ecosystem, flora and fauna of the continent, and to implement the Agreed Measures for the Conservation of Antarctic Fauna and Flora. The Act sets forth regulations which are legally binding for U.S. citizens and residents visiting Antarctica.

Briefly, the Act provides the following:

In Antarctica the Act makes it unlawful, unless authorized by regulation or permit issued under this Act, to take native animals or birds, to collect any special native plant, to introduce species, to enter certain special areas (SPAs), or to discharge or dispose of any pollutants. To “take” means to remove, harass, molest, harm, pursue, hunt, shoot, wound, kill, trap, capture, restrain, or tag any native mammal or native bird, or to attempt to engage in such conduct.

Under the Act, violations are subject to civil penalties, including a fine of up to \$25,000 and one year imprisonment for each violation. The complete text of the Antarctic Conservation Act of 1978 can be found in the ship’s library.

Our ship’s staff will make certain that the Antarctic Conservation Act and the above guidelines are adhered to.

By encouraging your fellow expeditioners to follow your environmentally-conscious efforts you will help us to ensure that Antarctica will remain pristine for the enjoyment of future generations. Thank you in advance for your cooperation.

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Attachment 15

Review of Site Characteristics Likely to Affect the Nature and Severity of Possible Cumulative Impacts

Ron Naveen, Oceanites, Inc.

NSF/OPP Workshop on Cumulative Environmental Impacts of Tourism

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San Diego, CA

ABSTRACT: In six seasons of fieldwork, 1994–2000, the Antarctic Site Inventory has begun compiling baseline data and information necessary to assess and determine how best to minimize, or potentially avoid, environmental impacts at Antarctic Peninsula visitor sites. This presentation describes site characteristics and biological and physical variables the Inventory has examined and suggests recommendations for improving the assessment and monitoring of possible environmental impacts at these sites.

Introduction

Following a year of examining methodologies and logistics, the Antarctic Site Inventory began fieldwork in November 1994. The Inventory's objectives are to:

- determine whether opportunistic visits can be used to effectively and economically detect possible changes in the physical features, flora, and fauna of sites in the Antarctic Peninsula being visited repeatedly by ship-based tourists; and
- begin compiling baseline data and information necessary to be able to detect possible changes in the physical and biological variables being monitored, and determine how best to minimize or avoid possible environmental impacts of tourism and non-governmental activities in the Antarctic Peninsula area.

Site visits are achieved by placing Antarctic Site Inventory researchers aboard expedition tour ships at key census times each austral spring and summer, coinciding with the peak of penguin egg-laying (for appropriate nest censuses) and the peak of penguin chick-crèching (for appropriate chick censuses). Site visits and aerial photodocumentation also are undertaken in cooperation with the British Royal Navy ice patrol vessel *HMS Endurance*. (Naveen: 1996, 1997a, 1999)

The project intends to assist the implementation of the 1991 Protocol on Environmental Protection to the Antarctic Treaty, which among other things requires:

- *a priori* environmental impact assessments for all human activities in Antarctica, including tourism, and
- for monitoring to be done, as and when necessary, to ensure that activities do not have unacceptable environmental impacts.

The Protocol intends to ensure that human activities do not have adverse impacts on the Antarctic environment. In assessing potential impacts, the Protocol focuses on the *initial environmental reference state* of particular locations, which in the case of tourism translates to sites shipboard passengers are visiting. While tourism sites are the locations specifically being examined by the Inventory, the project's broader concern is with possible environmental impacts from *any and all* activities. The Inventory is not constituted as a tourism study *per se*, nor does it specifically examine responses of fauna to various levels of human visitation. (Naveen: 1996, 1997a, 1999)

Approaches to assessment and monitoring

In this context, established authorities state that the environmental assessment and monitoring should identify changes to the baseline reference state at these sites and, if possible, determine whether any detected changes are naturally occurring, produced perhaps by human activities, or result from other direct, consequential, synergistic, and cumulative effects. Potential impacts may be short-term or long-term, immediate or cumulative. In the case of biological populations, the focus should be detecting and understanding changes that may occur to these populations as a whole. (Benninghoff and Bonner, 1985; Abbott and Benninghoff, 1990; SCAR, 1996; Trivelpiece, 1991; Emslie, 1997) These authorities suggest that assessment and monitoring efforts should:

- Identify the *types of activities* that could possibly have unacceptable effects on Antarctic ecosystems and the likely nature of those effects;
- Determine those *components* of Antarctic ecosystems that are most likely to be affected in unacceptable ways by human activities;
- Select possible *indicator variables and areas* to monitor; and, ultimately
- Ensure that activity causes *no unacceptable deterioration* of values or resources

With respect to examining potential impacts from tourism, such an approach suggests the importance of identifying the kinds of cumulative impacts potentially resulting from multiple visits and, if feasible, listing and ranking the relative importance site characteristics most likely to determine the nature and severity of cumulative effects. (Benninghoff and Bonner, 1985; Abbott and Benninghoff, 1990; SCAR, 1996)

Types of activities: Zodiac landing sites

With respect to Antarctic tourism, zodiac landings are the dominant activity and appear to be the activity that possibly could have unacceptable environmental effects, particularly regarding resident fauna and flora. Zodiac tours without shore landings, helicopter landings and overflights, scuba and snorkeling, ice walking, and camping do not appear to involve the same intensity or frequency of visitor contact with Peninsula fauna and flora. (Naveen: 1997a, 1999)

With the 1989–90 Antarctic tour season, the U.S. National Science Foundation Office of Polar Programs (NSF/OPP) began assembling data on Antarctic tourism, based entirely on site visit reports submitted by Antarctic tour operators (NSF/OPP, 1990–1999). The NSF/OPP compilations list more than 250 sites visited by tourists in the Antarctic Peninsula-Queen Maud Land-South Georgia-Falklands Islands region. The compilations indicate sites where visitor activity takes place, the types of activity taking place, the frequency of such activities, and the number of visiting passengers who are involved.

With regard to examining potential environmental impacts of zodiac landings at these sites, the Inventory considers overall numbers of visitors, tour ships, and departures to be less important than:

- *where* visitors make landings
- *how many* visitors go ashore during zodiac landings (i.e. the intensity of use of these landing sites); and
- *how frequently* zodiac landings occur. (Naveen, 1999)

The NSF/OPP data indicate that zodiac visitor landings occurred at 165 locations in the Peninsula in the 1989–99 period. In this period, the number of Peninsula zodiac landings per season increased more than 400%, from 164 to 858, concentrating in the South Shetland Islands (43.2% of all zodiac landings) and the northwestern part of the Peninsula (35.9% of all zodiac landings). The 10–20 Peninsula sites with the most zodiac landings per season consistently account for 54–75% of each season’s landings and visitors. (Naveen, 1999)

However, in any given season, all available sites are not visited and many sites are visited only once (Naveen, 2000b):

Season	Available Zodiac landing sites, cumulative total	Available sites with Zodiac landings during the season	Percentage of available sites visited	Sites visited only once	Percentage of sites visited only once
1989-90	35	35	100.0%	9	25.7%
1990-91	42	32	76.2%	7	21.9%
1991-92	54	44	81.5%	12	27.3%
1992-93	68	50	73.5%	16	32.0%
1993-94	84	64	76.2%	23	35.9%
1994-95	105	5	71.4%	24	32.0%
1995-96	124	71	57.3%	20	28.2%
1996-97	142	81	57.0%	28	34.6%
1997-98	153	71	46.4%	26	36.6%
1998-99	165	85	51.5%	30	35.3%

Ecosystem components and indicators

The Inventory considers the following fauna and flora, found variously at these 165 sites, to be potential indicators of environmental change:

SEALS

Southern elephant seal *Mirounga leonina*

PENGUINS

Adélie penguin *Pygoscelis adeliae*
 Chinstrap penguin *Pygoscelis antarctica*
 Gentoo penguin *Pygoscelis papua*
 Macaroni penguin *Eudyptes chrysolophus*

FLYING BIRDS

Southern giant petrel *Macronectes giganteus*
 Antarctic fulmar *Fulmarus glaciodes*
 Pintado petrel *Daption capense*
 Snow petrel *Pagodroma nivea*
 Blue-eyed shag *Phalacrocorax atriceps*
 Snowy sheathbill *Chionis alba*
 Skua, spp. *Catharacta lonnbergi*
Catharacta maccormicki
 Kelp gull *Larus dominicanus*
 Antarctic tern *Sterna vittata*

FLORA

Antarctic hair grass	<i>Deschampsia antarctica</i>
Antarctic pearlwort	<i>Colobanthus quitensis</i>
Moss, spp.	<i>Bryum</i> , spp. <i>Brachythecium</i> , spp. <i>Drepanocladus</i> , spp. <i>Polytrichum</i> , spp.
Crustose lichens, spp.	<i>Xanthoria</i> , spp.
Fruticose and foliose lichens, spp.,	<i>Caloplaca</i> , spp.
foliose alga	<i>Verrucaria</i> , spp. <i>Haematomma</i> , spp. <i>Usnea</i> , spp. <i>Umbilicaria</i> , spp. <i>Ramalina</i> , spp. <i>Phycia</i> , spp. <i>Prasiola crispa</i> (and its lichenized form, <i>Mastodia tessellata</i>)
Snow Algae	

Methods and geographical area

The Inventory's methodology (fully described in Naveen: 1996, 1997a) involves the collection of three categories of data and information:

- *Basic Site Information*, which includes descriptions of key physical and topographical characteristics; latitude and longitude; distribution of flora, seal haul-out and wallow locations, and discrete groups of breeding penguins and flying birds;
- *Variable Site Information and Data*, which includes weather and other environmental conditions (sea ice extent, cloud cover, snow cover, temperature, wind direction and speed), biological variables (number of breeding birds, nest counts, numbers and ages of chicks), and the nature and extent of visitor impacts (footprints or paths, cigarette butts, film canisters, and litter); and
- *Maps and Photodocumentation*, which portray the major features of each site, particularly the locations of colonies and assemblages of resident fauna and flora.

With respect to key biological variables — in particular, nest and chick censuses of penguins and seabirds — data are collected in accordance with the *CEMP Standard Methods for Monitoring Studies* (Scientific Committee for the Conservation of Antarctic Marine Living Resources, 1997). The *CEMP Standard Methods* delineate key census periods in each breeding season; specifically, during the peak of penguin egg-laying for penguin nest counts and during the peak of penguin chick-crèching for penguin chick counts.

The Inventory divides the Antarctic Peninsula into six subareas:

SO	South Orkneys	includes Laurie, Coronation, and Signy Islands
EI	Elephant Island	includes nearby islands
NE	Northeast Antarctic Peninsula	from Cape Dubouzet (63°16'S 64°00'W) to James Ross Island
SH	South Shetland Islands	including Deception, Low, and Smith Islands
NW	Northwest Antarctic Peninsula	from Cape Dubouzet (63°16'S 64°00'W) to north end of the Lemaire Channel
SW	Southwest Antarctic Peninsula	from the north end of the Lemaire Channel to the northern part of Marguerite Bay (68°18'S 67°11'W)

The project intends to reach as many visitor sites as possible during each austral spring and summer season, and during the key census times noted above. Expedition ships are selected carefully to meet this aim, particularly those with the longest Peninsula itineraries and with expedition leaders who strive to make as many landings as possible.

Census strategies

Regarding penguins, differences in breeding biology led to different Inventory census strategies. Chinstrap and Adélie penguins are highly faithful to specific nest sites, and do not tend to abandon regular nest sites and rookeries if there is a breeding failure in a single season. Because of the strong site fidelity of chinstrap and Adélie penguins, nest and chick censuses of discrete colonies and subgroups at a particular site may have long-term relevance, even if all colonies and subgroups at that site cannot be censused. Gentoo penguins do not exhibit the same nest site fidelity and regularly change nesting locations if there are disturbances. This means that gentoo penguin nest and chick censuses only may have long-term relevance if *all* gentoo colonies and subgroups at a particular site are censused. (Naveen: 1997a, 1999)

At a number of Peninsula sites with breeding chinstrap an/or Adélie penguins, the Inventory has begun to identify and census *control* colonies (i.e. those which are seldom disturbed) and *experimental* colonies (i.e. those which are frequently visited), which may be visited and censused regularly. Potentially, this will allow comparisons over time between areas where there is more and less human activity.

With respect to flying birds, the Inventory thus far has concentrated on nest/chick censuses of southern giant petrels, blue-eyed shags, kelp gulls, skuas (spp.), and snowy sheathbills, whose nests are reasonably discoverable and accessible.

Antarctic Site Inventory: Results and findings

1. Number of visits. From January 1994 to February 2000, with logistics assistance from various expedition ships and *HMS Endurance*, Inventory researchers made 287 survey visits to 59 Peninsula locations. (Naveen: 1997a, 1999; Naveen, et. al, 2000a)

2. Feasibility of reaching key sites. Regarding the project's goal of visiting key tourism sites repeatedly and cost-effectively, careful selection of vessels and expedition leaders has enabled the Inventory to reach all heavily visited tourism sites. (Naveen: 1997a, 1999)

The most visited Antarctic Peninsula sites over ten seasons, 1989–99, by number of zodiac landings, are:

Site	Subarea	1989–99 Landings	Rank
Whalers Bay, Deception Island	SH	425	1
Cuverville Island	NW	359	2
Port Lockroy	NW	350	3
Pendulum Cove, Deception Island	SH	300	4
Hannah Point, Livingston Island	SH	290	5
Petermann Island	SW	278	6
Half Moon Island	SH	263	7
Almirante Brown Station	NW	259	8
Paulet Island	NE	196	9
Arctowski Station, King George Is.	SH	166	10
Neko Harbor, Andvord Bay	NW	152	11
Baily Head (incl. Rancho Point)	SH	149	12
Waterboat Pt. (G. Videla Station)	NW	148	13
Aitcho Islands	SH	147	14
Penguin Island	SH	118	15

3. Basic site descriptions. Basic descriptions of more than 50 Antarctic Peninsula visitor sites have been published and made available. (Naveen: 1997a, 1997b, 1999)

4. Orientation maps. There are 16 sites at which Inventory researchers attempt to census each season, at the key census times suggested by the *CEMP Standard Methods*. These sites are: Hannah Point (SH); Penguin Island (SH); Baily Head (SH); Aitcho Islands (SH);

Turret Point (SH); Yankee Harbor (SH); Paulet Island (NE); Brown Bluff (NE); Waterboat Point (NW); Port Lockroy (NW); Orne Islands (NW); Georges Point (NW); Neko Harbor (NW); Gourdin Island (NW); Pléneau Island (SW); and Petermann Island (SW). To assist this effort, the Inventory has produced and regularly updates orientation maps for all 16 sites.

5. Aerial photodocumentation. The Inventory's collaboration with *HMS Endurance* has generated oblique aerial photodocumentation of 34 Antarctic Peninsula visitor sites.

6. Census refinements. A power analysis was undertaken to examine possibilities for improving Inventory census methods (Naveen, 1997a). As per procedures delineated in the *CEMP Standard Methods* (Scientific Committee for the Conservation of Antarctic Marine Living Resources, 1997), the Inventory methodology initially required that:

counts of adults, active nests, and chicks should be repeated until three counts are obtained that are within 5–10% range of each other.

The power analysis suggested a slight refinement, requiring that:

counts of adults, active nests, and chicks should be repeated until three counts are obtained, with the highest count being no more than 8% higher than the lowest count.

This refinement avoids a constant recalculation of mean values, which may be a particular difficulty when researchers are censusing a large colony.

7. Site diversity and sensitivity to potential disturbances. From its inception, the Inventory has collected data regarding the presence or absence of nesting species of penguins and flying birds, wallows of southern elephant seals, and large patches or beds of lichens and mosses at all sites visited (Naveen: 1996, 1997a, 1999; Naveen, et. al, 2000b). These presence/absence data have been used to rank zodiac landing sites according to the number of faunal species and major floral groups recorded, irrespective of whether nests, wallows, and floral groups may be easily accessed by tour ship visitors during a regular zodiac landing. As a result, the five Peninsula sites considered to have a “high” species diversity are: Hannah Point (SH), Penguin Island (SH), the Aitcho Islands (SH), Cuverville Island (NW), and Fort Point (SH). The 15 sites considered to have a “medium” species diversity are: Arctowski Station (SH), Astrolabe Island (NW), Baily Head (SH), Brown Bluff (NE), Half Moon Island (SH), Heroína Island (NE), Port Lockroy (NW), Point Lookout (EI), Orne Island (NW), Paulet Island (NE), Petermann Island (SW), Pléneau Island (SW), Turret Point (SH), Whaler's Bay (SH), and Yankee Harbor (SH). The other 39 sites visited by the Inventory are considered to have “low” species diversity.

Because of the physical variation in landing sites, species diversity does not equate necessarily to visitors' attaining relatively close views of resident fauna and flora. Using these presence/absence data as a base, the Inventory also ranked sites in terms of visitors' accessibility to nests, wallows, and floral groups. In this respect, it is assumed, in the course of a regular tourist landing, that sites are more or less sensitive to potential disturbance according to the number of penguin and flying bird species whose nests visitors may access easily, whether or not visitors may access southern elephant seal wallows easily, and whether or not visitors may access easily and possibly trample large patches or beds of lichens and mosses.

In this analysis, sites with five or more of these proximity tallies were considered to be "highly" sensitive to potential disturbances by visitors, and four were identified: Hannah Point (SH), Penguin Island (SH), the Aitcho Islands (SH), and Turret Point (SH). Sites with 3–4 proximity tallies were considered to be "moderately" sensitive to potential disturbances, and nine were identified: Brown Bluff (NE), Fort Point (SH), Gourdin Island (NW), Orne Island (NW), Paulet Island (NE), Petermann Island (SW), Pléneau Island (SW), Georges Point, Rongé Island (NW), and Waterboat Point (NW).

Focusing solely on the 1998–99 season, 85 Antarctic Peninsula sites experienced zodiac visitor landings. The five "high" diversity sites comprised only 5.9% of sites visited that season, but attracted 18.2% of all zodiac landings and 14.3% of all visitors. The fifteen "medium" diversity sites comprised 17.7% of the 85 sites visited, but attracted 39.4% of all zodiac landings and 35.5% of all visitors. Sites with high/medium species diversity thus accounted for more than 50% of all Peninsula zodiac landings and visitors, an attraction that is highly significant ($\chi^2 = 581$, $p < .001$ with respect to landings; $\chi^2 = 50,698$, $p < .001$ with respect to visitors) and supports the conventional wisdom that visitors come to the Peninsula to see a diversity of wildlife. (Naveen, et. al, 2000b)

Also, in the 1998–99 season, the four Peninsula sites identified as "highly" sensitive to potential disturbances by visitors comprised 4.7% of the 85 sites visited that season, but attracted 11.8% of all zodiac landings and 9.6% of all visitors. The nine sites identified as "moderately" sensitive to potential disturbances by visitors comprised 10.6% of the 85 sites visited that season, but attracted 15.4% of landings and 14.6% of all visitors. Sites with high/moderate sensitivity to potential visitor disturbances by visitors thus accounted for more than 24% of all Peninsula zodiac landings and visitors, an attraction that is highly significant ($\chi^2 = 124$, $p < .001$ with respect to landings; $\chi^2 = 11,140$, $p < .001$ with respect to visitors). This also suggests that visitors either come to the Peninsula to see wildlife that is easily accessed, or that the modus

operandii of zodiac landing procedures and expedition staff guidance make wildlife easily accessible to visitors. (Naveen, et. al, 2000b)

When the 1998–99 season is analyzed in terms of the 55 Peninsula sites experiencing two or more zodiac visitor landings, the highly significant attraction to diverse and sensitive sites is maintained. Seventeen sites with high/medium species diversity were visited, representing 30.9% of these 55 sites, account for 59.5% of the zodiac landings ($\chi^2 = 320$, $p < .001$) and 59.7% of the visitors ($\chi^2 = 28,271$, $p < .001$). Twelve sites with high/moderate sensitivity to potential disturbances by visitors, representing 21.8% of these 55 sites, accounted for 28.1% of the zodiac landings ($\chi^2 = 33$, $p < .001$) and 29.0% of the visitors ($\chi^2 = 2,721$, $p < .001$). (Naveen, et. al, 2000b)

In the *Compendium of Antarctic Peninsula Visitor Sites* (Naveen, 1997a), site sensitivity was analyzed in another fashion. Recalling the guidance from Abbott and Benninghoff (1990) to identify unacceptable effects that are likely to occur and components of the ecosystem likely to be affected in unacceptable ways by human activities, the *Compendium* listed nine factors that would suggest a site's sensitivity to potential environmental damage:

- unusually high science values, which have the potential of being easily disturbed (e.g. the possibility of disturbing a major project being conducted on site, or disturbing a site like the Dry Valleys, which has clearly “recognized” science value);
- presence of an unusually high species diversity (for this purpose, reference may be made to the sites scoring in the “high” category, as explained on the previous page);
- presence of geological or physical features that may be easily disturbed (e.g. rare penguin fossils on Seymour Island; potentially serious erosion);
- close proximity to a boundary of a Site Of Special Scientific Interest (SSSI) or Specially Protected area (SPA), which boundary is poorly defined or easily encroached;
- presence of environmental elements that focus visitor attention and may be disrupted, (e.g. a species with very limited distribution or rare occurrence in the area, like macaroni penguins at Hannah Point);
- close proximity to any southern giant petrel nests, this being one species of flying bird that is very easily disturbed (Emslie, 1996; Trivelpiece, 1991);
- situations where nests of regularly encountered flying birds like blue-eyed shags, kelp gulls, or Antarctic terns may be easily disturbed;

- restricted visitor space at a particular site, where there are only very narrow (or perhaps, non-existent) pathways between visitors and penguins; and
- presence of large beds or patches of moss or foliose-fruticose lichens, which may be easily accessed and trampled.

On this basis, Hannah Point (SH) and Penguin Island (SH) were considered the two most environmentally sensitive sites, presenting five or more factors that would suggest a sensitivity to potential environmental damage. Nine sites presented two or more of these factors: Half Moon Island (SH); the Aitcho Island (SH); the vicinity of Arctowski Station (SH); the vicinity of Ferraz Station (SH); Turret Point (SH); Whalers Bay (SH); Paulet Island (NE); Astrolabe Island (NW); and Port Lockroy (NW).

8. Trends: Blue-eyed shags. An analysis of Inventory data for the period January 1994 to January 2000 indicate a downward trend in blue-eyed shag nesting populations at five of thirteen sites where the Antarctic Site Inventory has identified nesting shags: the cliffside colonies near Almirante Brown Station, Paradise Bay (NW); Hannah Point, Livingston Island (SH); Jougla Point, Port Lockroy, Wiencke Is. (NW); Petermann Island (SW); and the Orne Islands (NW).

Shag nests in the vicinity of the Almirante Brown Station declined 50%, from 100 to 49, in the 1994–2000 period. Shag nests at the Orne Islands visitor site declined from fifteen nests in November 1994 to zero in December 1999. However, for Petermann Island and Jougla Point, the null hypothesis that the negative slopes of the log-transformed data were the result of chance alone could not be rejected. Declines at the other sites were either highly significant (Almirante Brown, $P < .001$, $r = .9786$, 5 df; Orne Islands, $P < .001$, $r = .9765$, 4 df) or significant (Hannah Point, $P < .05$, $r = .7422$, 6 df). (Naveen, et. al, 2000b)

The Almirante Brown and Orne Islands colonies are either inaccessible to tourists or receive few tourist visits (Naveen: 1997a, 1999). This suggests that human disturbance is an unlikely cause of such declines. In December 1999 at the Orne Islands site, which has a northwestern-to-southwestern exposure to the Gerlache Strait, one-meter-deep snow was noted on the shags' nesting ledges. At the other three sites (Petermann Island, Jougla Point, Hannah Point), the shag population now may have stabilized or slightly increased since the decline from 1994–1995 levels.

Collectively, the declines observed over seven seasons at different sites throughout the Peninsula suggest that blue-eyed shag numbers should be further monitored. These declines may be indicative of some underlying environmental change affecting shag nest success.

9. Southern giant petrels. Four Inventory study sites — Hannah Point (SH), Penguin Island (SH), the Aitcho Islands (SH), and Turret Point (SH) — contain easily accessible colonies of southern giant petrel (*Macronectes giganteus*). The Inventory has begun annual, site-wide censuses of this species at the first three of these sites, but it is too early to suggest any population trends. However, there is considerable concern regarding potential disturbances to these easily accessible assemblages (Naveen: 1997a, 1997b, 1999). Extreme care is necessary because nesting southern giant petrels are easily pushed off of their eggs during the nesting season, and eggs easily may be predated by skuas. Once an egg is lost, southern giant petrels are unable to relay and breed successfully that season (Emslie, 1996). This species's breeding cycle spans the entire length of each tourism season: A single egg is laid in early November, the incubation period lasts for approximately sixty days (until January), and each season's cohort of chicks — if they survive — will not fledge until 100-130 days after hatching (March and later).

Future assessment and monitoring

Inventory experience suggests a number of concerns regarding the assessment and monitoring of Peninsula visitor sites, and possibilities for refining and improving such efforts in the future.

1. Data comparability. As noted above, the *CEMP Standard Methods for Monitoring Studies* (Scientific Committee for the Conservation of Antarctic Marine Living Resources, 1997) require penguin nest counts achieved during the peak of egg-laying each season, and chick censuses during the subsequent peak of chick-crèching. Inventory-related publications (Naveen: 1996, 1997a, 1999; Naveen, et. al, 2000a) routinely reference historic penguin nest and chick censuses that have been compiled in Woehler (1993) and SCAR (1996). However, it is important to emphasize the difficulty in using much of the historic data to assess population trends.

Clearly, the compilations are valuable sources of information about penguin distribution and often reflect more detailed work being done at particular locations. But extreme care in using these data is urged.

Historic censuses may not be comparable because they were made at various times and in varying fashions, and not necessarily in accordance with the *CEMP Standard Methods for Monitoring Studies* (Scientific Committee for the Conservation of Antarctic Marine Living Resources, 1997). The only filter consistently applied to these compiled data relates to the exactitude of the counts themselves (i.e. whether they represent actual nest counts or estimates with varying degrees of accuracy).

Regarding some of the historic censuses, only the year is listed for a particular nest or chick count. In other instances, it is unclear at which point

the census occurred within a particular breeding season. In other cases, where specific dates are ascribed to penguin nest or chick censuses (or where dates may be gleaned from primary source material), it is unclear how close the censuses were to either the peak of egg-laying or chick-crèching in that particular breeding season.

For future monitoring efforts, reliance on the *CEMP Standard Methods* will ensure that collected data are fully comparable with data collected by the Inventory or by other long-term Peninsula projects using the same, standard procedures. In turn, this enables a greater confidence in assessing and describing trends that may be suggested by such comparisons.

2. Focused effort at key sites. Clearly, it is both economically and physically impossible to monitor a large number of visitor sites. However, given the developing baselines of data and information about Peninsula tourism sites, it should be possible to monitor a few, select sites. Again, as noted, it would be important to identify the kinds of cumulative impacts potentially resulting from multiple tourism visits and, if feasible, to list and rank the relative importance site characteristics most likely to determine the nature and severity of cumulative effects. (Benninghoff and Bonner, 1985; Abbott and Benninghoff, 1990; SCAR, 1996)

Relevant factors in this selection might usefully include: geography and visitation patterns; diversity of flora and fauna; and a site's particular sensitivity to potential environmental disturbances. To enable comparisons, it may be prudent to select tourism sites with a close proximity to related and ongoing, long-term Peninsula studies.

3. Other potentially relevant variables. Future assessment and monitoring efforts likely require a consideration of other potentially important factors; for example, climate change and prey distribution and availability. This is bolstered by changes the Inventory has detected in breeding blue-eyed shag populations that have minimal visitor traffic.

Analyzing these other factors will enable a better understanding of whether any detected changes are naturally occurring, produced perhaps by human activities, or result from other direct, consequential, synergistic, and cumulative effects. (Benninghoff and Bonner, 1985; Abbott and Benninghoff, 1990; SCAR, 1996)

4. Additional research needs, analyses. To reiterate: the *CEMP Standard Methods* mandate that nest censuses be achieved as near as possible to the peak of egg-laying, and chick censuses as near as possible to the peak of chick-crèching. However, given that Inventory site visits occur opportunistically, this is not always possible. Consequently, to

ensure that Inventory censuses may be used for determinations of breeding success/productivity, annual survival, and recruitment, correlation studies are being considered to establish how close censuses occur to the respective peaks of egg-laying and chick-crèching, respectively.

Accurate breeding chronologies at key tourism sites will enable comparisons to the visitation chronology of tourists, perhaps to determine how the timing of visits relates to times within each breeding cycle when eggs or chicks are most vulnerable to disturbance. Determining accurate breeding chronologies at key tourism sites will enable comparisons, suggested above, with results obtained at nearby locations to ascertain whether detected changes are area-wide trends or site-specific aberrations.

While the effort continues to photodocument flora on a site-by-site basis, the Inventory has not yet instituted floral degradation studies at sites with abundant and easily accessible patches of lichens and mosses.

5. Improved site-visit reporting. There are a number of ways that site-visit reporting by tour operators may be improved. There continues to be reporting of sites that cannot be identified precisely as to actual location. Of the 165 Peninsula sites listed in the NSF/OPP compilations, eighteen refer to broad geographic features or areas known to contain other regularly visited sites: Coronation Island; Laurie Island; Signy Island; Elephant Island; Deception Is.; Fildes Peninsula; King George Is.; Martel Inlet; Maxwell Bay; Charlotte Bay; Errera Channel, small peak; Melchior Islands; Paradise Bay; James Ross Island; Prince Gustav Channel; Seymour Island; Danger Islands; and Argentine Islands. (Naveen: 1997a, 1999)

For purposes of analyses by the Inventory, landings data from eight sites (four pairs of two) have been combined because they appear to refer to the same location (Baily Head and Rancho Point; Damoy Point and Dorian Bay; Georges Point and Rongé Island; and Port Lockroy and Jouglia Point. In the Port Lockroy vicinity tourists are now visiting the recently restored hut on Goudier Island, which is a separate visitor site from nearby Jouglia Point. (Naveen: 1997a, 1999)

6. Additional data. With respect to analyzing potential environmental impacts from Antarctic Peninsula tourism activity, some additional data sets may be useful.

One set involves the exact dates and timings of zodiac landings. Presumably, such data may be gleaned from site-visit reports now being submitted, but as yet such data are not compiled by NSF/OPP. These data would enable the previously noted, potentially useful, comparison of breeding chronologies and visitation chronologies.

Further, noting that the International Association of Antarctic Tour Operators strives to coordinate itineraries so “no more than 100 people are ashore at any one time in any one place” (IAATO, 1991), it may be useful to know how many 100-passenger groups comprise a single zodiac landing. This raises the matter of Antarctic expedition vessels carrying more than 100 passengers on a single Antarctic departure, and which may or may not be IAATO members. To the extent these vessels report a landing, it may involve a landing with more than one, 100-passenger group going ashore, and thus equate to a number of landings tallied by smaller capacity vessels.

Also, there exists no compilation of data reflecting yacht visits to Antarctic Peninsula visitor sites, or the number of yacht passengers visiting particular sites. IAATO has encouraged yacht operators to join its association, but as yet no coordinated mechanism exists to obtain potentially relevant visitation data from the yachting portion of the Antarctic tourism industry.

Finally, as new types of activities are added to the tourism experience in the Antarctic Peninsula, it also would be helpful if site visit reports and subsequent NSF/OPP compilations precisely noted which new activities are undertaken, where these activities take place, and how many visitors partake in them.

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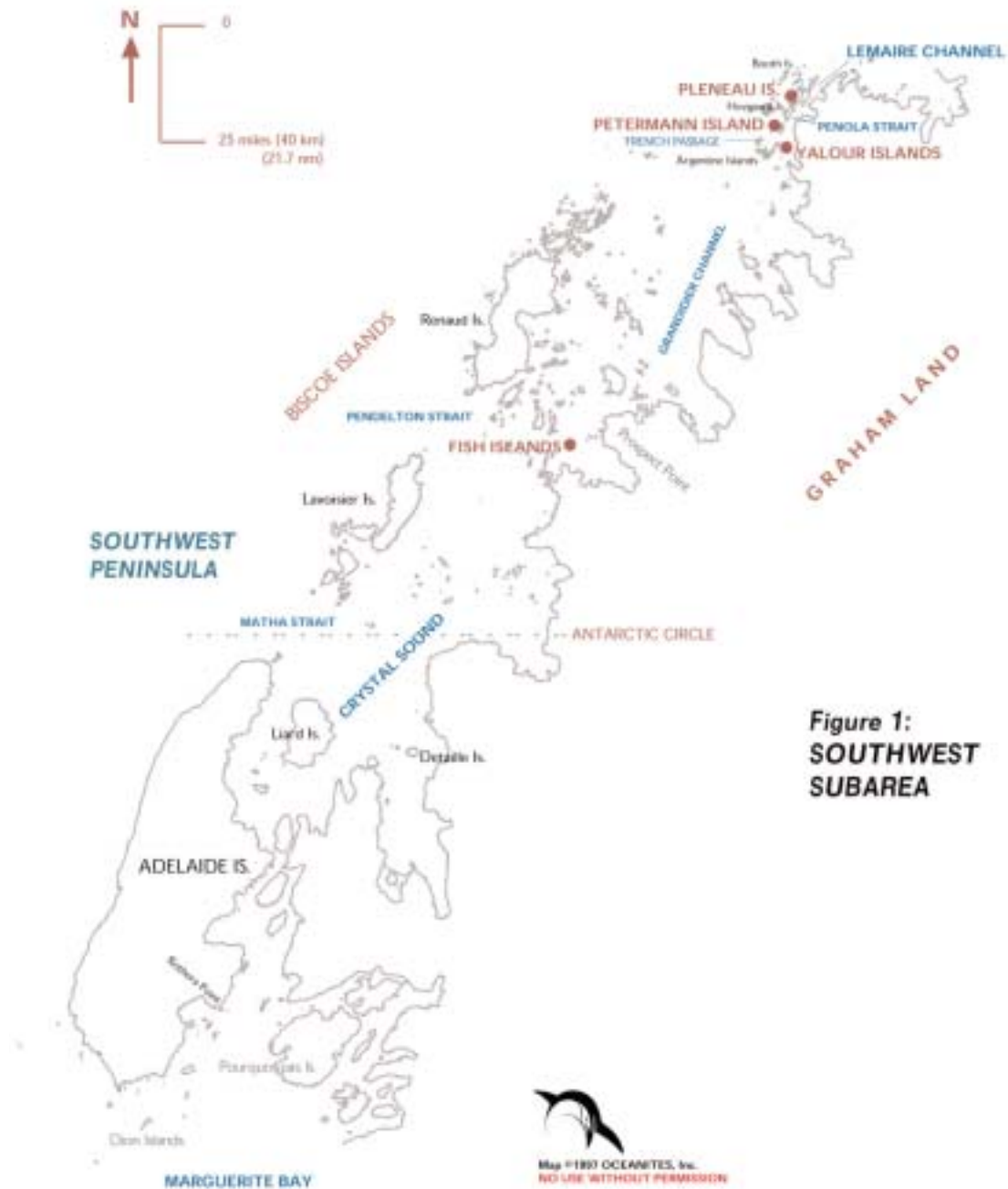


Figure 1:
SOUTHWEST
SUBAREA



Figure 2:
SO. SHETLANDS
SUBAREA
and parts of
NORTHEAST
and
NORTHWEST
SUBAREAS

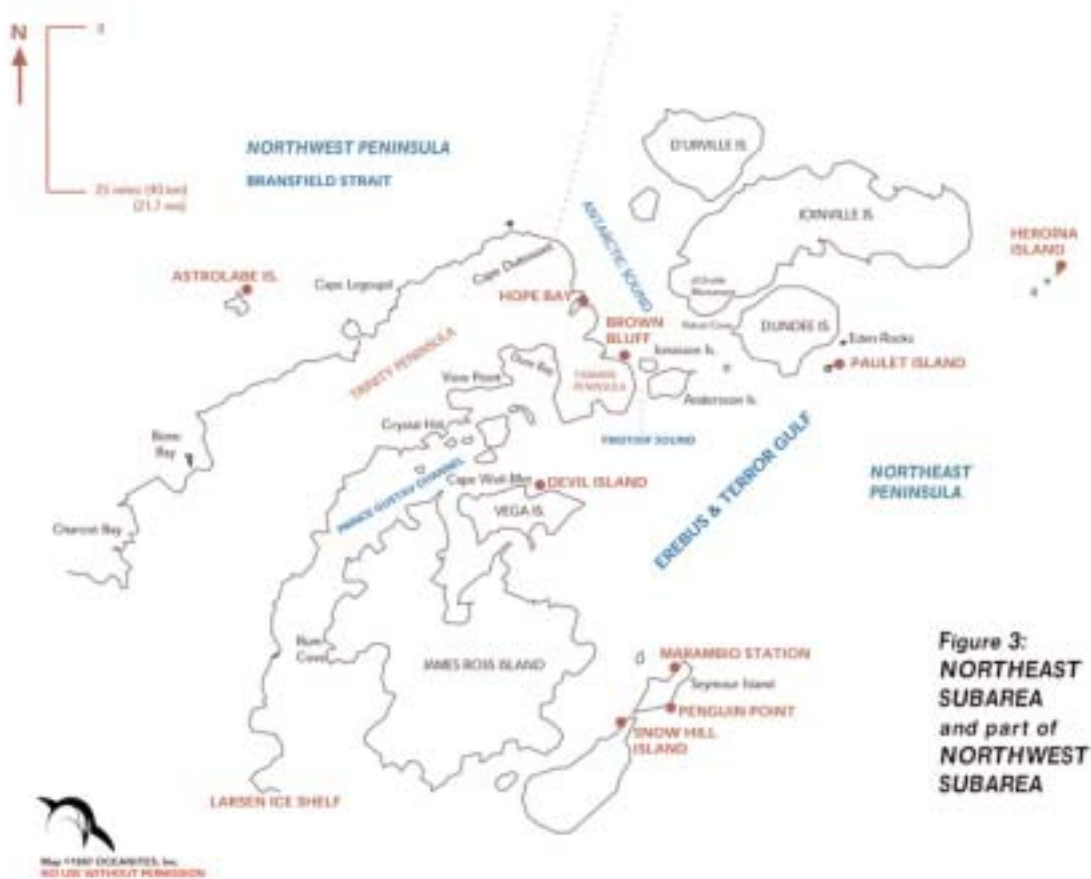


Figure 3:
NORTHEAST
SUBAREA
 and part of
NORTHWEST
SUBAREA

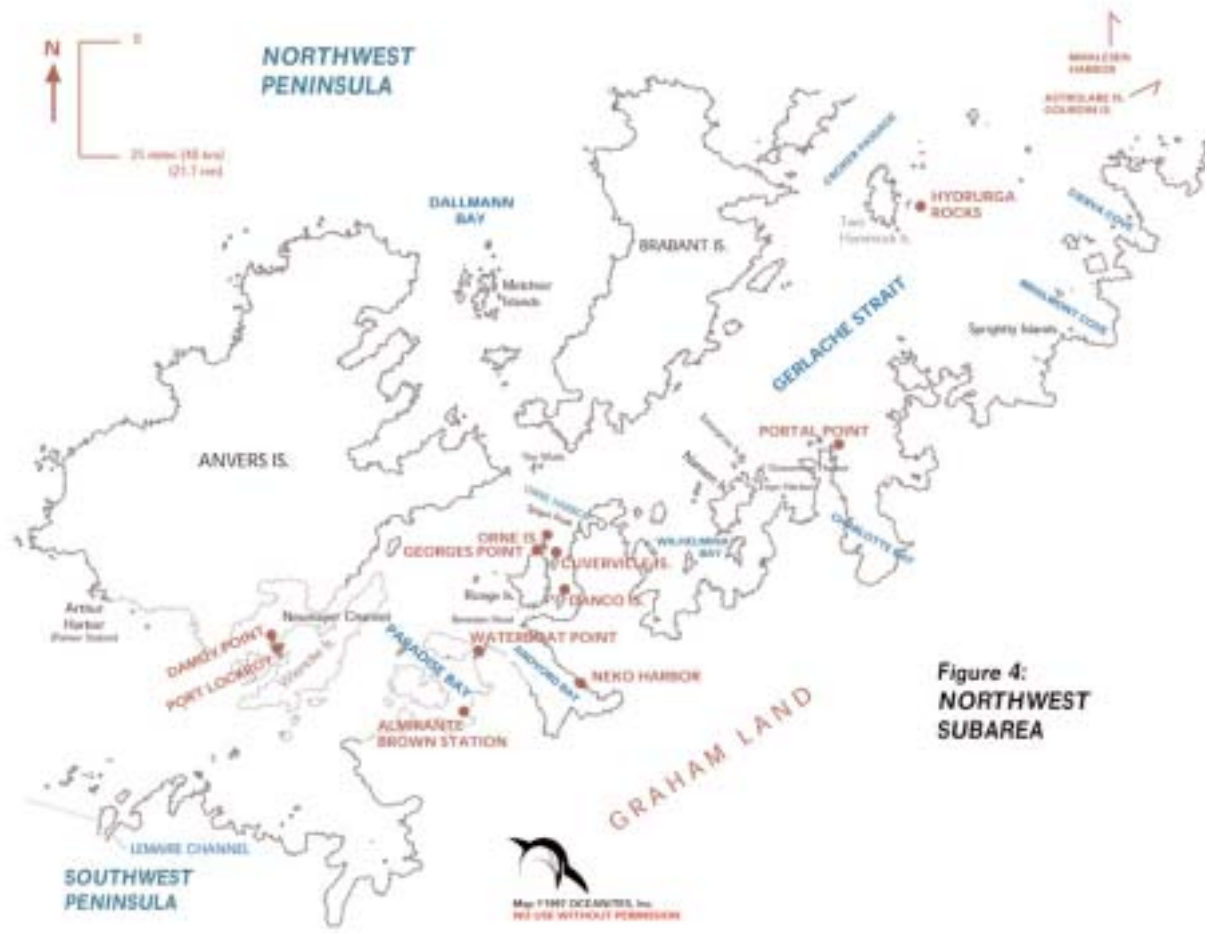


Figure 4:
NORTHWEST
SUBAREA