

UNIVERSITY OF CANTERBURY
GATEWAY ANTARCTICA

ANTARCTIC STUDIES GRADUATE CERTIFICATE 2000/001
RESEARCH PROJECT

ANTARCTIC SHIP-BORNE TOURISM:

An Analysis of the 'Measure of Compliance'
of Approvals, Management Plans, Tour Operator's EIA,
New Zealand Legislation
& the Guidelines
(Recommendation XVIII-1 of the Environmental Protocol to the
Antarctic Treaty) pertaining to tourists visiting the
Ross Sea Region, Antarctica

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Due Date : 02/03/01

Antarctic Ship-borne Tourism

'We cannot build a barrier around the Antarctic and keep tourists or the science community out. The Antarctic Treaty grants us all freedom of access to Antarctica. With that freedom comes a responsibility which we all share'.

INTRODUCTION

New Zealand is custodian of a large portion of the Antarctic continent, the Ross Sea region (Figure 1). The Ross Sea region contains some of the most spectacular scenery, wildlife, and historic sites to be found on the continent. New Zealand has a strong obligation to ensure that this region is governed in accordance with both the international requirements set out in the Antarctic Treaty System, and its own national sense of what is right for the Ross Sea region, and Antarctica as a whole.

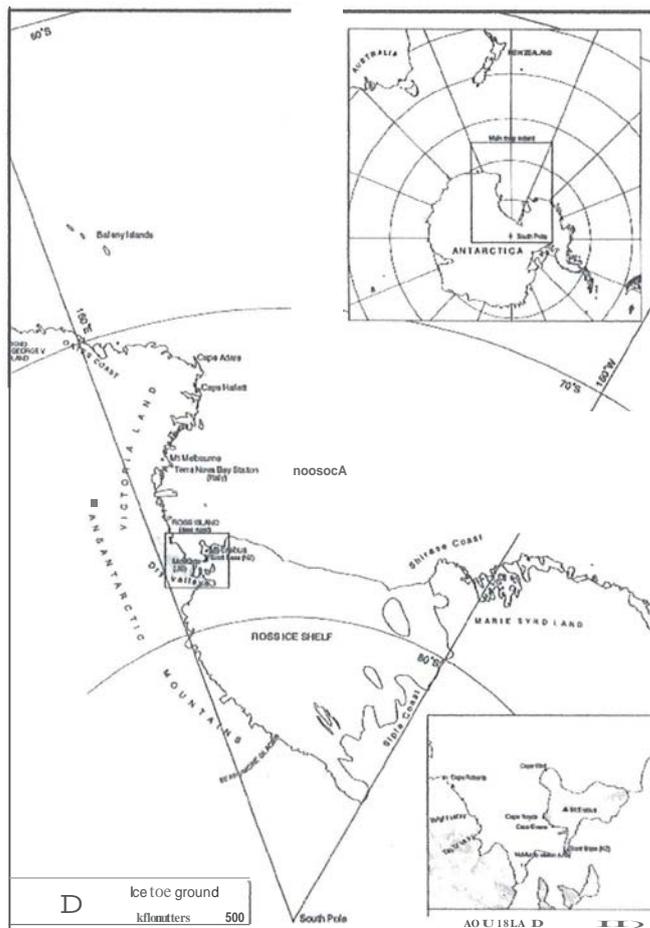


Figure 1: The Ross Sea Region [Source: Ross Sea Environmental Strategy, June, 1999]

This research paper offers an analysis of the 'measure of compliance' of approvals, management plans, tour operator's Environmental Impact Assessment, New Zealand legislation and the Guidelines (Recommendation XV111-1 of the Environmental Protocol to the Antarctic Treaty) pertaining to tourists visiting the Ross Sea Region, Antarctica. In order to facilitate these processes, pressures and impacts on the environment, and subsequent implications of incidences of partial and non-compliance of regulations will be examined throughout.

MANAGEMENT OF TOURISM IN THE ROSS SEA REGION - AN OVERVIEW

New Zealand has a number of management systems in place that contribute to the management of tourist activity in the Ross Sea region. Firstly, from a legal perspective, all people who visit the Ross Dependency must seek a Prime Ministerial approval from the Environmental Minister. In addition to this legislation, the Crimes Act applies in the Ross Dependency under New Zealand law and can be applied to specific criminal behaviour. A citizenship law also applies.

Whilst 13-14,000 ship-borne tourists visit Antarctica each year, most of whom go to the Antarctic Peninsula (Figure 2), the current visitor load to the Ross Sea region is relatively low. Despite this low visitation rate, careful management is required due to the tendency of tour operators to concentrate their activities in a few sensitive areas, for example, the historic huts and penguin colonies. As a consequence of this, relatively few visitors can generate pressures on the environment and therefore have a marked impact on the Antarctic environment in the Ross Sea region.

As a result of these pressures, and in accordance with the Antarctic Treaty and New Zealand's domestic legislation, the Antarctica (Environmental Protection) Act 1994, New Zealand has established some procedures for managing current tourism activities in the Ross Sea region.

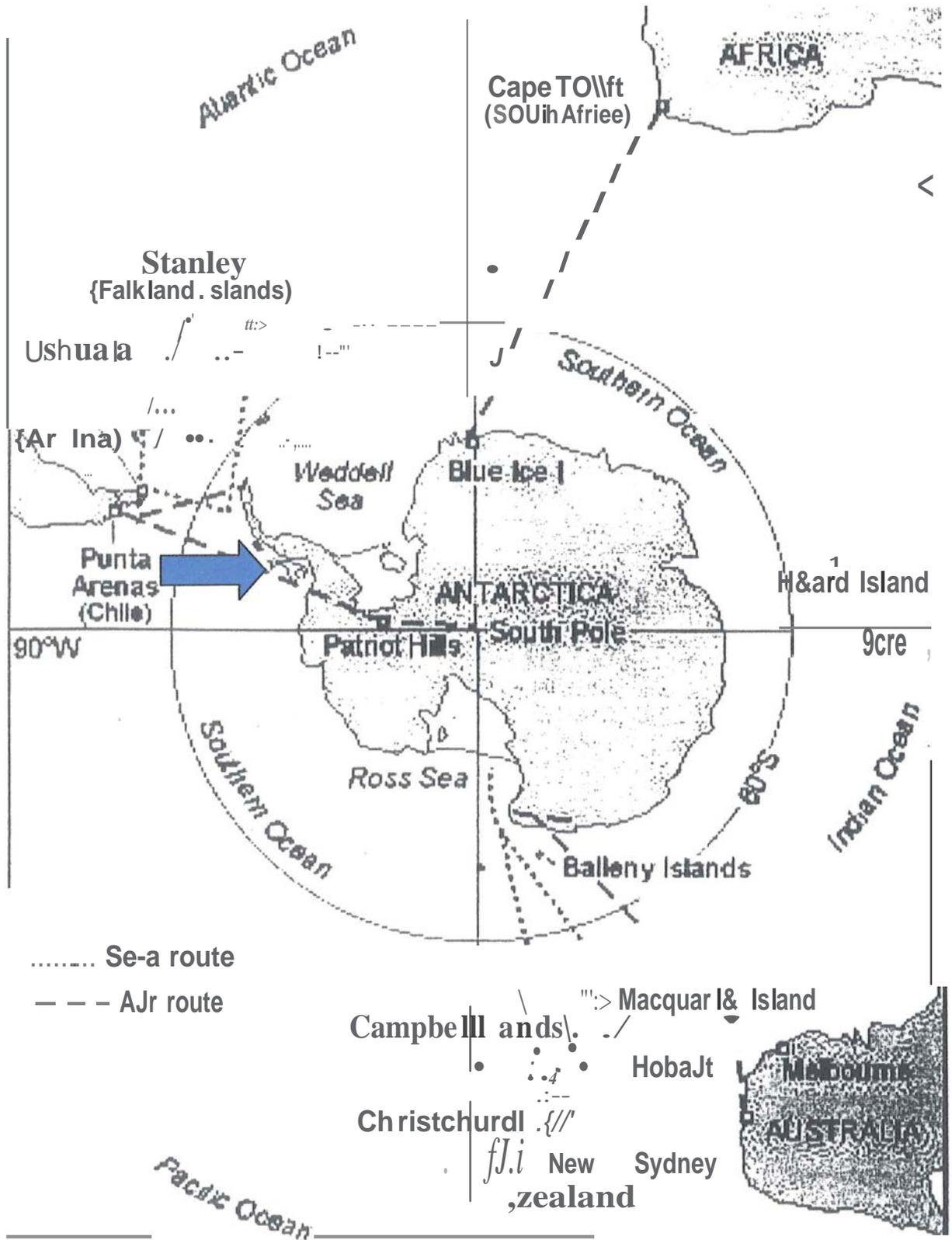


Figure 2: The Major Ship-borne & Airborne Tourist Routes to Antarctica [Source: Kriwoken & Routes, 2000]

New Zealand has prepared guidelines and procedures for visitors to the Ross Sea region, including the regulation stating that visitors require the permission of the Ministry of Foreign Affairs and Trade (MFAT) to visit Antarctica. Each proposed

activity is considered by the Environmental Assessment and Review Panel comprising of scientists and environmental experts, who in turn provide advice to the Ministry of Foreign Affairs and Trade on the potential and probable impacts arising from the specified activity. A determination is then sought from the Minister and, if appropriate, permission is granted.

Furthermore, in areas of special natural significance, specially protected areas have been established. Tour operators must abide by the regulations pertaining to these special areas. New Zealand is also currently involved in establishing the first marine park in Antarctica, around the Balleny Islands. In addition to this, and through the Antarctic Heritage Trust, there exists a management strategy to promote protection and preservation of historic huts in Antarctica to minimise the adverse effects of visitors.

At this point in time, it has been argued that 'Antarctic tour operators have sufficient controls in place to regulate tourist activities, and in fact, that the industry is self-regulating' (Landau, 2000, p. 24). It is also argued that the present tourism industry voluntarily enforces more strict visitation rules on its passengers than the guidelines set out in the Protocol (Appendix 1) (Landau, 2000). The Madrid Protocol, (second schedule article 12 'Functions of the Committee for Environmental Protection'), states that activities in Antarctica should be closely monitored, and that if there is a need to strengthen existing measures, or if there is a need for additional measures, the Committee should recommend accordingly. This paper also examines the claimed self-regulating nature of Antarctic tourism in the Ross Sea region.

RESEARCH OBJECTIVE

The objective of this research is to collate and analyse Antarctic tourist data provided by the New Zealand Ministry of Foreign Affairs and Trade (NZMFAT) in order to provide an informed perspective of the human impacts of tourism on the Antarctic environment within the Ross Sea region. It is hoped that such an analysis will provide input to NZMFAT for an Antarctic tourism policy. This objective has its roots embedded in present systems and future needs; whether these systems are sufficiently robust to accommodate the natural and uncontrolled growth in tourism numbers and changes in the types of tourism likely to take place. The question arising in most

theorists' minds is 'how would the present governance and management structures deal with the development of land-based tourism in the Ross Sea region with visitors arriving by air and landing on ice runways'. A number of policy issues would be generated from these potential developments that would most certainly render the continent wide open to a much larger market than the traditional ship-borne tourism and its honourable operators. It is to be noted here that there still remains no New Zealand policy on Antarctic tourism, despite the fact that New Zealand is the recognised custodian of the Ross Sea region. To set the context, the following section focuses on the responsibility of management in the Ross Sea region, and role of Antarctica New Zealand.

RESPONSIBILITY OF MANAGEMENT

Antarctica New Zealand is responsible for regulating tourism within the Ross Sea region. Whilst the majority of voyages are to the Antarctic Peninsula, it is important to note that the major factor controlling the scale of ship-borne tourism in the Ross Sea region is the presence and/or absence of large tour ships (i.e. those carrying in excess of 250 passengers). The presence of large tour ships in the Ross Sea region would indeed signal change, and therefore could act as an indicator of the 'change in scale' of ship-borne tourism. The possibility of this large-tour-ship-scenario eventuating in the Ross Sea region is certainly valid. Some would go further and argue that the possibility of large tour ships in the Ross Sea region is not only probable, but also inevitable. By contrast, the International Association of Antarctic Tour Operators (IAATO), argue that Antarctica will remain a specialised and relatively expensive niche destination offered by a limited number of experienced operators who deem to focus on educational voyages to areas of exceptional natural history and wilderness value. Most would agree that this would be the desired ongoing scenario for tourism in the Ross Sea region. On this note, New Zealand is in effect, adopting the 'precautionary principle' through its revolutionary initiative regarding the forthcoming State of the Environment Report for the Ross Sea region. This report, which highlights tourism as a formidable pressure, will be completed in 2001.

Nevertheless, potentially the most serious problems arise from the future need for 'tighter' regulation of Antarctic tourism. If a tour company is established and is a

non-party to the Antarctic Treaty, there is freedom for that company to act in whatever manner it pleases. It is not obligated legally to abide by any of the agreements within the Antarctic Treaty System or IAATO. Therefore, it might not have any regulation placed on its activities depending upon the domestic legislation or lack thereof. This is a potentially serious problem for the future management of the Ross Sea region.

M E T H O D O L O G Y

All current tourists to the Ross Sea region travel to the area by ship. Every ship must apply for a permit from the New Zealand Ministry of Foreign Affairs and Trade (NZMFAT), and upon return, each ship must lodge a 'site-visit' report to NZMFAT. In addition to this, each ship must carry an independent observer, referred to as a national representative, who is responsible for producing a voyage report to be submitted to NZMFAT within one month after disembarkation at the home port. Fifteen of these voyage reports, covering a six-year period from 1994 to 2000, will be analysed and aggregated for human impact effect with focus on:

- activities undertaken;
- subsequent 'degree of compliance';
- pressures exerted on the environment;
- impacts and cumulative impacts;

To inform this research, current literature on Antarctic tourism, New Zealand regulations, IAATO guidelines, and the guidelines encased in Recommendation XVIII-I of the Environmental Protocol to the Antarctic Treaty, have been reviewed.

A privacy agreement has been signed between the author of this paper and NZMFAT in order to protect the individual identities of the tour operators. At no time has the individual name of any tour operator been included, disclosed, or inferred in this report. Dates and passenger numbers have also not been included. The data analysed has been aggregated, rendering subsequent focus on the tour operators as that of a unit, rather than as individual components. As a result, this research is predominantly a form of qualitative discourse analysis. An electronic copy of this report has been forwarded to NZMFAT for approval in the first instance, prior to release to supervisors for marking.

RESULTS

In order to carry out the various activities, most ship-borne passengers are brought ashore by either zodiac or helicopter depending upon the site and clearance with local base managers. Visits to McMurdo and Scott Bases are permitted through relevant authorities. Visits to remote areas are only carried out with special care and organisation of passengers. Normally not more than 100 passengers are landed at any one time and typically remain ashore from approximately 1- 4 hours . Dividing passengers into two or three groups who are landed on rotational basis controls the impact of excessive numbers at sensitive sites, and this appears to be common practice . This minimises numbers ashore at any one time. It is required that there be at least one naturalist guide per every 20 passengers as specified in guidelines established by IAATO. It is considered good practice to forward to passengers and staff, via mail, copies of Recommendation XV111-1 prior to sailing, and this was carried out in most cases. In addition to this, passengers and staff are given a mandatory IAATO prepared slide briefing of Recommendation XV 111-1 prior to disembarkation in Antarctica . Crewmembers are briefed at the beginning of each season, and this is repeated whenever is necessary. Briefings , recaps and announcements are given prior to landings to minimise impacts, to assure that the landings are safely carried out, and to assure that the passengers have the correct clothing. The expedition leader normally takes a scouting party ashore before each landing either by helicopter or zodiac to determine if the landing is suitable and to provide an updated briefing to passengers prior to proceeding ashore. This occurred in all cases. This briefing most often detailed weather conditions, clothing recommendations, and landing conditions (i.e. terrain, walking distance, and length of time allowed ashore).

SHIP-BORNE TOURIST ACTIVITIES

Visitors to the Ross Sea region partake in visits to historical sites, research stations and areas of abundant wildlife . Landings at Cape Evans, Cape Royds, Cape Adare and Baia Terra Nova Station were found to be the most popular with the highest occurrence, although this was also a reflection of weather conditions and general receptivity of the research stations contacted. Locations visited for the purpose of visiting historic sites and monuments were:

- Waterboat Point, Paradise Harbour;

- Bransfield House, Port Lockroy (normally staff only);
- Cape Evans, Ross Island; and
- Cape Royds, Ross Island.

Waterboat Point

This is a popular station visit, and passengers' first opportunity to land on the Antarctic continent proper.

Bransfield House

At the request of the British Antarctic Survey (BAS), passengers are not landed here. However, a small number of staff is sometimes granted permission to visit.

Cape Evans

A popular tourist landing site, the numbers of passengers and staff in the historic zone about Cape Evans must remain at 40 or below. The numbers inside the hut must never exceed 12 persons at one time.

Cape Royds

Likewise, the numbers in this historic zone must never exceed that of 40 persons at one time. The Adelie penguins frequently use the southern side of the hut for access between Backdoor Bay and the rookery. Expedition Leaders needed to be cognisant of this and alter their way of accessing the hut to suit the Adelie penguins' trend, which most achieved. Passengers could be directed up to a holding area near the wannigan, and then sent down to the hut on a *one in, one out basis*. According to the data, this method is proven and works well.

SUBSEQUENT DEGREE OF COMPLIANCE & IMPLICATIONS OF PARTIAL AND NON-COMPLIANCE

The general degree of compliance of regulations was exemplary, as the comments below illustrate:

'... Captain and the Expedition Leader and staff displayed a conscientious approach to compliance ... this attitude was taken beyond the need to simply meet the formal requirements ... meant that the conservation ethic was established as part of the culture of the voyage and this attitude was readily seized and adopted by the passengers who in turn took great pride in compliance ... '

From the tourists point of view '...I was deeply impressed and reassured by the care taken to inform us about the need for care and the earnestness with which regulations were carried out.' 'They had invested considerable money and seasick time to see the Antarctic and had strong conservation ethics...they were particularly sensitive in reducing their impact to a minimum which is encouraging/rom my point a,{ view...'

'... the role of the representative or observer (as we were described on board) appeared to be well accepted by the crew and expedition staff Although never put to the test, I always felt confident that had either ... or myself objected to any aspect of compliance that might have been compromised or transgressed then our view or interpretation would have been acted on...'

The most serious breach of compliance with regulations was the removal of penguin bones and specimens by two members of a tour party. This case was dealt with following the correct procedures. There was also one case of food scraps and a metal can being thrown overboard, which was once again dealt with through the correct channels. Of some concern was the fact that a ship's Environmental Impact Assessment (EIA) was in draft version for two consecutive years in the case of one tour operation. In addition to this, the same EIA contained insufficient mapping detail for one of the frequently visited historic sites. This fact was considered particularly relevant due to the problems a helicopter encounters in landing on unmarked territory whilst attempting to avoid disturbance of wildlife. The importance and shortfalls of EIA and Antarctic tourism will be discussed in later section.

It was also noted that the inner door of Cape Evans was often left ajar, and that this hut was not always swept after visitors had left. In addition to this, crewmembers were noticed ashore inadequately clothed for Antarctic conditions. This action jeopardised the credibility of the crew, with the view of double standards being held. It was noted that the image of Cape Hallett was tarnished due to excessive rubbish in the area. This is a particularly valid point when one considers that observers recorded few penguins left in the Cape Hallett rookery. There also seems to be some issue with regard to regulations and rules for some operators not applying to others. This appears to be unfair practice, and has been commented on. Finally, there was an

issue regarding the use of a Jet Ski which was later classified as a small craft and therefore, allowable under present regulations . However, this may change after review of wording of regulations.

More general issues with regard to improving on issues of compliance were raised and are listed below:

COMPLIANCE ISSUES

1. Greater emphasis with briefings by the National Reps. of the ship's crew and passengers on the definition and requirements of protected areas. i.e. the need to avoid them. This action to be carried out by the EARP, MFAT & ANZ.
2. Portable toilet facilities should be taken for landings in the Dry Valleys or other isolated protected areas. This action to be carried out by the tour operator.
3. Passengers recommended keeping at least 10 metres away from moulting penguins, as they are likely to be very sensitive to human interference . Scientific study is currently being undertaken on this. To be 'actioned' by EARP and Antarctica New Zealand.
4. Footbath system needs to be reviewed. Water needs to be changed during landings and embarking and an alternative found to the bleach currently being used.

CONFORMITY WITH MANAGEMENT PLANS (BASES)

All activities carried out in close proximity to bases were conducted in accordance with rules set down by relevant governmental departments. All bases were either notified 72 hours in advance of arrival to request permission, or were actively involved in attempting to notify bases. Scott Base was not always easy to contact 72 hours in advance due to inadequate radio coverage.

COMPLIANCE WITH APPROVALS

Permits Issued

Permits to visit Specially Protected Area's were issued by the National Science Foundation (NSF).

Approvals to visit Scott Base or Ross Sea Historic Huts

These approvals were issued by Antarctica New Zealand and/or NZMFAT, and Pennits to visit all SPA's are nonnally issued by NSF, as above.

Ministerial Directions Issued

None issued in data provided.

COMPLIANCE WITH MANAGEMENT PLANS

Antarctic Specially Managed Areas

'... at Cape Evans it was noted that fresh helicopter marks indicated that a helicopter had recently landed inside the SPA ... in contravention to the management plan. '

In addition to this, limits of 40 people at one time were allowed in these protected areas under the management plans.

Some breaches of compliance with this plan were reported:

'... entry to the area is possible at many areas and two of the periodic head counts made totalled over 40 (44, 51) ... one passenger reported a similar count of over 40 to me... ' (Cape Evans).

'...similarly, numbers inside the main living room o.f Scott's Hut exceeded 12 on one occasion... it is clear that at large landing areas with historic sites... there is little difficulty in having people spread out...the same should be the case at Cape Evans which is of much interest beyond the ASPA 18...improved visitation well within acceptable limits should be easily possible there'.

This exceeding of the allowable number was due to several factors:

- Passengers arriving at the tide crack in relatively large numbers;
- Passengers understandable wish to prioritise their visit to the ASPA and hut environs and lack of understanding of natural attractions elsewhere;

- Reluctance of many passengers to move on (despite urging) after visiting the hut and environs which are large and full of historic interest, especially when weather conditions are pleasant. This made those outside the area wait a long time, get cold and hence impatient;
- Difficulty in controlling numbers in such a large area even with assistance from staff;
- Some passengers mistaking the boundaries to the area as marking the area outside it as a no-go zone;
- Changing ice conditions and tide crack difficulties created some distractions for myself and key staff, in order to maintain safe passenger movement and return them to the ship.

Management practice was obviously lacking in these instances, as otherwise these issues would have been factored in. It needs to be recommended that visitors can safely go outside ASPA 18 (Cape Evans) in order to reduce congestion. Also, management policy does need to be 'tightened' with regard to human safety and changing ice conditions; there should be no question of priority when it comes to safety of people, versus the environment.

Sites of Special Scientific Interest

None were entered into.

COMPLIANCE WITH NEW ZEALAND LEGISLATION

With regard to the Marine Mammals Protection Act, specific whale watching activities must be carried out in the Ross Dependency or in New Zealand waters. There were numerous examples of staff and ship's officers being unaware of this legislation.

COMPLIANCE WITH ANTARCTIC TREATY RECOMMENDATION XV111-1

It is not possible for the representatives to report on full compliance with this recommendation as the tour operator completes aspects of this recommendation after the cruise. However, normal 'good practice' involves the staff and crewmembers being delegated as responsible for collecting all information required for reporting under Recommendation XV111-1. Therefore, one sensible recommendation that was

put forward, was to remove national representatives requirement to report on operator's activities under Recommendation :XVIII-1. One comment summed up the general attitude towards Recommendation :XVIII-1:

'...with regard to compliance with Recommendation XVIII-I, the conservation ethic became a universal attitude, in a way I had not previously seen, so there was never any question of breaches of Recommendation XVIII-I ... '

PRESSURES EXERTED ON THE ENVIRONMENT IN THE ROSS DEPENDENCY

An environmental impact is the result of an environmental component being exposed to an output from an activity. An output could be an emission, or it could be the creation of noise or the presence of people. Environmental components include biological, physical and 'non-material' components. Impacts are the result of exposure of an environmental component to an output (De Poorter, 2000). Three examples illustrating the process whereby impacts are the result of exposure of an environmental component to an output, are the effect of noise on nesting skuas; the disturbance of soils by vehicle traffic, and; the trampling of moss by humans on foot. These issues are covered in greater detail under the theme of impacts and cumulative impacts below.

IMPACTS AND CUMULATIVE IMPACTS

IMPACTS ON MAMMALS

Many tour operators are trying hard to stay abreast of the latest research with regard to mammals. ANARE has prepared a video on giving penguins their space, and this video was shown in many cases. This advocates keeping a minimum distance of 10 m rather than the accepted 5 metres. *'...passengers appeared to pick this up and generally gave the birds; more space than last year ... '*

Potential for impact resulting from interaction resulting with marine mammals and seabirds foraging at sea was mentioned. It was stated that this could be minimised by careful navigation of the ship, helicopters and zodiacs at sea to maintain a conservative distance. The question was posed; what of high activity resulting in wildlife retreat from normal breeding areas?

IMPACTS ON FLORA FAUNA & ECOLOGICAL PROCESSES

In most cases, the likely impacts on the flora, fauna and ecological processes can be estimated as being minor or transitory, with possible impacts being any of the following: disturbance of wildlife; trampling of vegetation; potential for transferring species from one site to another; disruption during breeding cycles; interference with historical sites or monuments, ongoing scientific activities and station life. However, on properly managed/organised landings with experienced staff, none of the above mentioned impacts occurred. There was one report of evidence of impacts on fragile plant communities as described:

'... the EIA noted the potential for direct and cumulative impacts on fragile plant communities ashore ... cumulative impacts are occurring on moss plants near the Canada Glacier and beside melt streams originating from the glacier ... I was first in the party to these areas (200m south of the southern point of the SSSJ) and noted that trampling of moss and algae had already occurred.. ' .

'...but despite the cumulative impact here, a blanket prohibition of _____ use of the site is not justified ... impact is already occurring from government-funded science and associated logistics... ' .

One of the most significant potential negative impacts was listed as being the uncontrolled disturbance of breeding seabird or penguin colonies

IMPACTS ON ICE, WATER, AIR OR SURFACE QUALITY

The limited emissions from ship, zodiac and helicopter operations were normally rapidly dispersed and cause less than a minor and transitory impact. The impacts of trampling snow and ice from walking and helicopter activities were negligible. However, in most cases, visitors were encouraged to make one path with shared footprints.

IMPACTS ON THE HERITAGE, WILDERNESS AND/OR AESTHETIC VALUE

The fact that positive impacts are listed as passengers gaining a comprehensive understanding towards Antarctic preservation and conservation does have some merit, as the Antarctic tourist does get to visually experience the promotion of science and the importance of Antarctica as a wilderness and an intact ecosystem first hand. However, the statement of negative impacts being listed as none/minimal/transitory is not valid when one considers the standard definition of wilderness. Under the United States Wilderness Act, 1964, wilderness is defined as 'an area where the earth and its community of life are untrammelled by man, where man himself is the visitor that does not remain'.

IMPACTS OF WASTE MANAGEMENT

Wastes in the form of oily mixtures are stored in the vessels holding tanks. No discharge from these tanks is allowed in the Antarctic Treaty area. Other oil and noxious liquids are stored in sealed containers and are returned with the vessel for correct disposal in the final port. Sewage is macerated, treated with bacteria and stored in holding tanks to be discharged in open water beyond the twelve-mile limit from any land, pack ice or shelf ice. No discharge of sewage takes place below 60 degrees South. Food wastes are stored on board for disposal either in port or in open water north of 60 degrees South. All poultry products, including eggshells, are stored in separate containers, securely sealed and protected, to be disposed of correctly when the vessel returns to port. No poultry waste was discharged from vessels south of 60 degrees south. Other waste products such as broken glass, paper, metal, batteries and plastic were stored on board until the ships returned to port and correct disposal could be achieved. Potentially, waste could be generated if an emergency situation renders passengers ashore for any extended length of time. It would be hoped that wastes, including human waste would be returned to the vessel.

CUMULATIVE IMPACTS

A cumulative impact is the impact of combined past, present, and reasonably foreseeable activities. These activities may occur over space and time (IUCN, 1996). De Poorter (2000, p. 20) argues that non-recognition or exclusion of consideration of cumulative impacts in environmental management will lead to 'destruction by insignificant increments'. There was no acknowledgement of cumulative impacts

occurring as a result of visitor activities. This will be discussed further in the following section.

DISCUSSION

ACTIVITIES

Baia Terra Nova research station was most definitely considered the 'tourists' lighthouse, as the following statements verify:

... the New Zealand information package for passengers was distributed immediately prior to our arrival in the Ross Sea ... good opportunity to place a 'New Zealand' brand on activities from that point ... it was well received but the Antarctica New Zealand material compared poorly with the material provided to passengers by the Italian Programme ... '

'... we arrived off the Italian Base ... received a warm welcome in spite of the inconvenient timing ... the reaction of the passengers was a clear illustration of the goodwill and PR benefits of such visits ... stark contrast to the passengers attitude towards the US after what was seen as a rather heavy handed (and unnecessary) refusal to allow ... to use an obviously unused ice channel'.

CUMULATIVE IMPACTS

There is potential for cumulative impact as a result of repeat tourist visits and/or from a combination of commercial fishing and governmental scientific and logistical activities. Possible impacts on the physical environment include: temporary or permanent alterations on landing beaches; wearing footpaths/soil compaction and increases in wind and/or water erosion; damage to centuries old geomorphologic features; chemical contamination, e.g. exhausts/fuel spills/wastes; litter; snow/ice patterns change, and; air quality change (De Poorter, 2000). Possible impacts on terrestrial biota include damage through trampling or driving of vehicles (vegetation and associated fauna); damage through compacting soil/erosion/alteration of waterflow; chemical contamination of vegetation and fresh water, and; alien species. Possible impacts on the marine environment include damage to benthic communities and substrate due to anchoring, fuel/oil leaks, and illegal dumping of sewage and/or waste; disturbance of marine mammals (ships and small craft), and; disturbance of other biota with regard to fuel spills and 'worst case scenarios' of ship accidents.

Possible impacts on land breeding fauna (penguins, flying birds, seals) include : changes in species composition; changes in abundance, local and regional; changes in population structure; changes in local distribution patterns (location and boundaries of colony); changes in behaviour (resulting from disturbance) or physiology (may not be 'visible'); alien species, and; pathogens (alien or endemic) (De Poorter, 2000, p. 21).

Long term monitoring programmes and systems are needed to address these issues. For example, with regard to widely-accepted research on the impacts of human presence on Adelie penguins, it is undecided and no common consensus can be reached. Whilst some studies detect no population changes, some detect extreme population changes with a single observer on a walkway used by the penguins invoking an average detour of 700 metres for returning birds, for 11, 934 birds over 10 hours. This detour amounted to a total 835 extra kilometres being walked by the penguins (Wilson *et al*, 1991 in De Poorter, 2000, p. 22).

De Poorter (2000, p. 22) also argues that an absence of population effects does not mean that there has not been disturbance, and subsequent impact at the individual level in response to human interference or visitation. In addition to this, an absence in behavioural change does not mean there has not been a physiological change in individuals. Human-induced stress on the penguins is often revealed through increased heart rates when no visual behavioural changes appear to be taking place (DePoorter, 2000).

In addition to these impacts on the natural environment, tourism impacts on the non-material values, such as the aesthetic or wilderness value, and the existence value. The existence value is the satisfaction derived from 'knowing that outstanding natural and cultural landscapes have been protected and exist as physical and conceptual spaces where all forms of life...are held sacred' (IUCN internal draft 2000). The benefit of this concept is that those who never set foot on the continent per se, which is in direct opposition to the philosophy of tourism, can appreciate existence value.

ENVIRONMENTAL IMPACT ASSESSMENT

It is also important to discuss the issue of Environmental Impact Assessment, considering the IAATO and Antarctica New Zealand regulations actively enforcing

this issue, were not always adhered to in the strictest sense. There is the possibility that a Consultative Party may not have sufficient legislation in place to address Environmental Impact Assessments or the companies' operations. With regard to Environmental Impact Assessment, it requires that 'one has first determined that the activity is in principle acceptable on other grounds' (Hemmings, 2000, p. 9). This could be perceived as a dangerous assertion in the Antarctic environment, as implicit in this rapid process is the exclusion of questions that must be asked and value judgements that must be made, prior to the formulation of the Environmental Impact Assessment. The following questions arise: the question of whether tourism is ethically acceptable; whether it serves any useful purpose, and not just to those with a fiscal interest; an accurate appraisal of the social and political costs; and whether tourism is a desired activity in the Antarctic context in the first instance (Hemmings, 2001). Hemmings (2001) argues that in Antarctica, we have a fragile system of international governance that lacks the social and public policy context within which Environmental Impact Assessment exists elsewhere in the world.

Furthermore, Environmental Impact Assessment simply evaluates impacts from single projects or expeditions. It is rarely good at assessing the cumulative impacts. In addition to this, it does not ask public policy questions about alternatives and the desirability or non-desirability of a proposal, as does the New Zealand Resource Management process under the Resource Management Act, 1991, for example.

FUTURE TRENDS

Denise Landau (2000, p. 15), the Executive Secretary of IAATO, argues that we cannot barricade the Antarctic as tourism is a legitimate activity and that the most we can do is look at best 'practices with a view to ensuring that all visitors, whether they are tourists, scientists or field personnel, proceed in a responsible fashion'. Certainly, the results of this paper appear to echo her comments with regard to responsibility when one considers the transgressions of best practice occurring over the past five years; they are relatively minor and small in number. However, these results may be misleading when one considers the actual numbers of tourists visiting the Ross Sea region and the status of the tour operator's affiliation to IAATO.

As has been stated, at present, most tourist activities are ship based and occur in the Antarctic Peninsula. In the Peninsula during the 1999/2000 season, 13,368 tourist visitors (IAATO and non-IAATO) landed at least once. By contrast, there were 771 tourists active in the Ross Sea region. It is anticipated that approximately 14,000 tourist visitors will land in the Antarctic Peninsula in the 2000/2001 season and 718 tourists will land in the Ross Sea region. Therefore, at present, the Ross Sea region is experiencing 5 percent of the Antarctic tourist market, and the majority of the tourism occurring is traditional tourism by vessel with small boat-zodiac landings, and some complimentary helicopter use. According to Landau (2000), small ships are not huge money-makers, and whilst it is hoped that small ship tourism will continue to be the mainstay of Ross Sea region tourism due to the more manageable, safe and appropriate nature of the tourism activities, a complacent management ethic and futile hopes are not going to prevent the 'bite of the capitalistic bullet'. It has been forecasted that the 2001/2002 season will see the return of two very large European tourist vessels in the Ross Sea region, and the relatively high incidence of private yachts venturing into this area cannot be overlooked.

The Antarctic Treaty has limitations, just as IAATO and Antarctica New Zealand have limitations, if individual companies decide to not adhere to their standard operating procedures, bylaws and mission statement. With new companies and new scenarios in the future, IAATO will need to adapt or forfeit its role as the self-acclaimed, self-regulating tourism conglomerate of the Antarctic Ocean. The relevance of the Antarctic Ocean is to be noted here, due to the fact that most members of IAATO are ship-borne tourist operators. The leading air-borne tourist operation in Antarctica has recently withdrawn its long-standing membership from IAATO. This is to be viewed with some concern when one considers the implications of this action in the light of increased interest in air-borne tourism to the Antarctic, combined with the fact that development in new technology will ultimately make access easier, particularly air access. For example, had we asked Amundsen or Scott what scenarios there might be 80 years hence in the Antarctic, would they have considered skydiving at the South Pole?

Furthermore, the attitude of IAATO is somewhat complacent, somewhat contradictory, and possibly naïve when one considers the organisation's stance on self-regulation reflected in the following statement:

'...IAATO has proven up until now that we can self-regulate to a degree and is committed to doing so ... creating onerous regulations isn't necessarily going to stop any of these activities (tourism)... and you cannot have observers or representatives on every 'street' corner ... supporting the idea of self-regulation seems far more sensible' (Landau, 2000, p. 18).

CONCLUSION

Peter Winder (2000, p. 38), General Manager of Industry Strategy for Tourism New Zealand, argues that the tourism debate and the ongoing degree of compliance with regulations are very much debates about philosophy; debates about the values people have. Antarctic tourism operators today could be categorised as a group of extremely committed environmentalists who have turned a personal passion and serious attachment to Antarctica into a business.

The results of this research indicate the levels of compliance with regulations and guidelines to be high, and most transgressions of a minor nature. But one could postulate that Antarctic tourism would ultimately become more corporate as 'larger' businesses become involved. It has been argued that one of the first indicators of this trend will be the prevalence of larger ships in the Ross Sea region. Larger ships necessitate large investment. In the extremely short Antarctic tourist season, these ships will 'push hard' to get returns on their investments. One wonders whether full compliance of regulations and IAATO guidelines will feature in their management plans and budget forecasts. 'The door is open; the door is wide open!' (Winder, 2000, p. 38).

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