



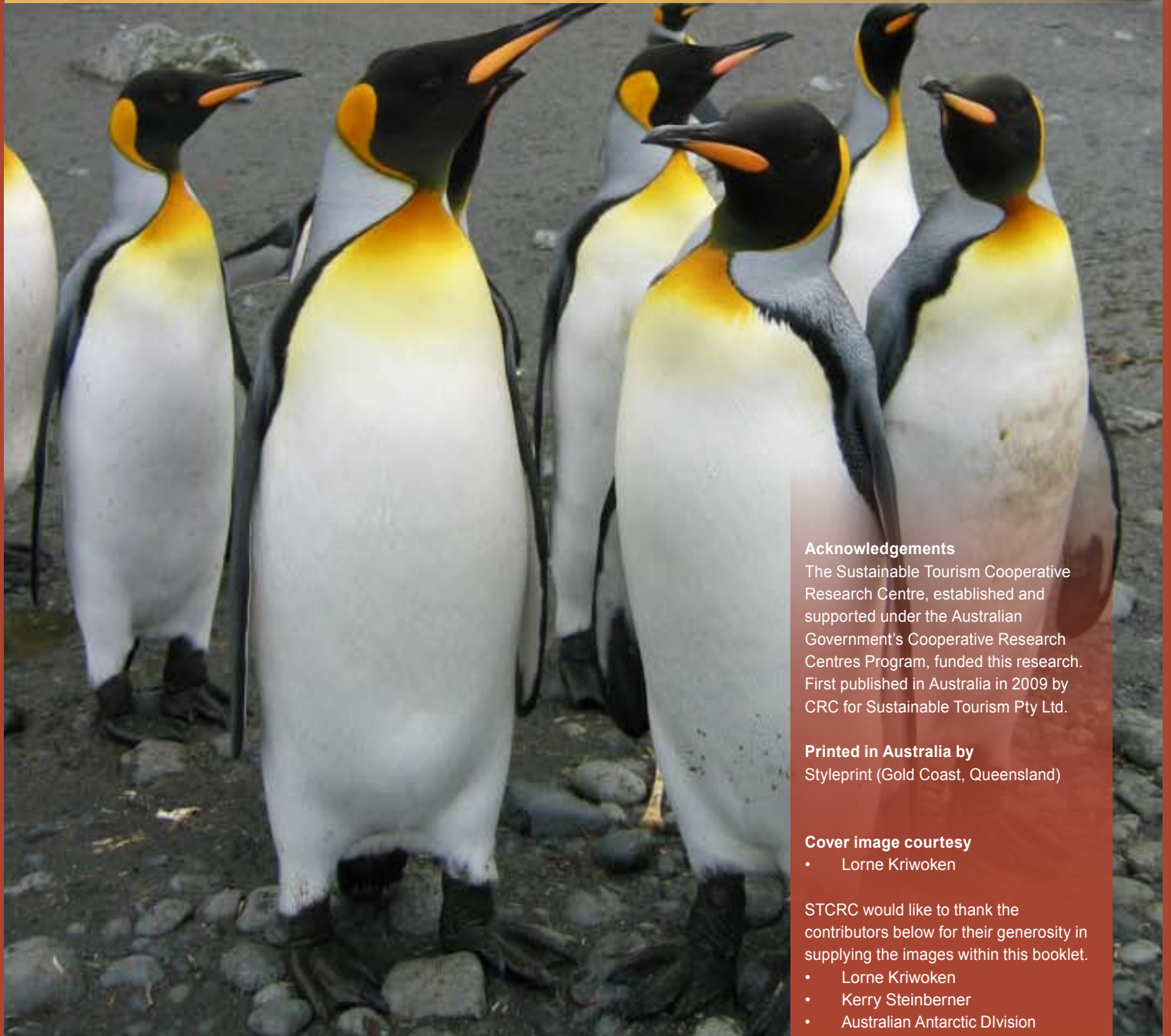
# Australian ANTARCTIC & Sub-ANTARCTIC Tourism

TOWARDS A SUSTAINABLE INDUSTRY





# *Australian Antarctic and Sub-Antarctic Tourism*



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- Lorne Kriwoken
- Kerry Steinberner
- Australian Antarctic Division

## Sustainable Tourism Cooperative Research Centre



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### CONTENTS

Australian Antarctic Tourism Research Snapshot.....	2
Aim of the Research.....	3
Australian Antarctic Tourism Overview.....	4
Snapshot One: Emerging Issues of Australian Antarctic Tourism: Legal and Policy Dimensions.....	6
Snapshot Two: Polar Pathways: Exploring Hobart's Antarctic and Southern Ocean Connection .....	8
Snapshot Three: Minimum Approach Distance Guidelines for Royal Penguins, Macquarie Island, Australia .....	9
Snapshot Four: Behaviour and Breeding Success of Gentoo Penguins in Areas of Low and High Human Activity, Macquarie Island, Australia .....	10
Snapshot Five: Penguin Responses to Pedestrian Activity for Best Practice Management on Macquarie Island, Australia.....	11
Snapshot Six: Investigating the Variation in Penguin Responses to Pedestrian Activity on Sub-Antarctic Macquarie Island, Australia .....	14
Snapshot Seven: Emerging Issues of Macquarie Island and Heard Island and McDonalia.....	15
Snapshot Eight: Extreme Tourism on Macquarie Island, Australia .....	17

Sustainable Tourism Cooperative Research Centre (STCRC) is established under the Australian Government's Cooperative Research Centres Program. STCRC is Australia's largest dedicated tourism research organisation, with over \$187 million invested in tourism research programs, commercialisation and education since 1997. The aim of STCRC research is to underpin the development of a dynamic, internationally competitive and sustainable tourism industry. STCRC is a not-for-profit company owned by its industry, government and university partners.

STCRC falls under the Commonwealth CRC program, which aims to turn Australia's research and innovations into successful new products, services and technologies, making our industries more efficient, productive and competitive.

The program emphasises the importance of collaboration between business and researchers to maximise the benefits of research through an enhanced process of utilisation, commercialisation and technology transfer.

#### STCRC's objectives are to enhance:

- the contribution of long-term scientific and technological research and innovation to Australia's sustainable economic and social development
- the transfer of research outputs into outcomes of economic, environmental or social benefit to Australia
- the value of graduate researchers to Australia
- collaboration among researchers, between researchers and industry or other users
- efficiency in the use of intellectual and other research outcomes.

# Australian ANTARCTIC & Sub-ANTARCTIC Tourism

## RESEARCH SNAPSHOT

### Australian Antarctic Tourism Research Snapshot

This document profiles key Sustainable Tourism Cooperative Research Centre (STCRC) research in the field of Antarctic and sub-Antarctic tourism and the protection of the region's wildlife. Celebrated as two of the greatest natural wonders of the world, both Macquarie Island, Heard Island and McDonald Islands, Australia's only sub-Antarctic island groups, were granted World Heritage status on 3 December 1997. These island groups exhibit outstanding universal values, which are administered by the Australian government.

*“The Antarctic has no peer as a wilderness. The planet's southern extremity is the nearest thing to a pristine environment. Australia and the other Antarctic Treaty nations have pledged to protect its intrinsic and scientific values. Despite the vastness of the continent, and its harsh climate, the Antarctic environment is very vulnerable to human impact. Without controls, those who come to visit this wilderness as tourists, scientists or in support roles, may damage the very values that attract them.”*

Australian Antarctic Division, [www.aad.gov.au](http://www.aad.gov.au)

Australia is committed to the comprehensive protection of the Antarctic environment. In 1991, Australia and the other nations of the Antarctic Treaty met in Madrid to sign a historic pact to conserve the Antarctic environment, taking in Antarctica and the surrounding Southern Ocean, south of latitude 60°S. The 'Madrid Protocol' (Protocol on Environmental Protection to the Antarctic Treaty) came into force in 1998.

*This publication has been developed with the visitor, service provider, planning agency and tour operator in mind—bringing together summaries, statistics, key findings and recommendations in an easily accessible format.*

### The Research

Antarctica is a growing international tourist destination and is marketed as a unique nature-based experience. This project researched and developed Australia's Antarctic and sub-Antarctic tourism opportunities by:

- assessing multi-jurisdictional legal, administrative and environmental requirements for Australian operators in Antarctica
- researching the role, significance and vulnerability of wildlife tourism in the development of the Antarctic tourism product
- developing a multimedia virtual tour of Tasmania's Antarctic and Southern Ocean sites.

The project addresses the scarcity of information in this specialist market to shape the future of the tourism product currently offered.

*“The future presents a number of significant challenges to the successful management of our parks and protected areas. A key element of our response as a sector must be to build our knowledge base, and to share that knowledge across national and international boundaries. Research is the cornerstone of the knowledge building process.”*

David Clarke, Chief Executive Officer, Parks Forum



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## Aim of the Research

The purpose of the research was to further develop Australia's Antarctic and sub-Antarctic tourism opportunities. A multimedia virtual tour of Tasmania's Antarctic and Southern Ocean sites, Polar Pathways, was delivered as a key output of this project. The project also assessed the multi-jurisdictional, legal, administrative and environmental complexity of the existing Antarctic tourism industry has made recommendations on streamlining permit requirements while assessing quota limits placed on landing sites. The project also assessed the role of wildlife tourism and the vulnerability and resilience of selected Antarctic and sub-Antarctic wildlife. This research is particularly important given the high profile of wildlife generally and the role it plays in managing and marketing Antarctic tourism. Research results will be used to assist in operational guidelines for wildlife viewing for tourists and operators visiting Antarctica and sub-Antarctica.

## Interest Groups

The research has relevance to a broad range of industry and government stakeholders and those seeking a greater understanding of the concepts and fundamentals of tourism and protected area management. It is a useful reference document and resource for those working in protected area management.

### The following audiences will find this research especially beneficial:

- environmental, state and national park government agencies
- protected area managers
- tourism operators who are wishing to improve their business, or seek new business opportunities
- academic and education institutions and students.

## Using the Research

### The research is a particularly useful tool for the following:

- understanding the important relationship between protected areas, tourism and animal and plant species
- growing the knowledge base of tourism and protected area issues in the sub-Antarctic and Antarctic regions
- understanding the management implications for human-wildlife interactions in this remote region
- providing an insight into the interface between visitor use and protected area management in regions facing increased visitor growth.



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# Australian ANTARCTIC & Sub-ANTARCTIC Tourism

## OVERVIEW

### Australian Antarctic Tourism Overview

The national Antarctic programs of many nations have been active in the Antarctic region for many years. These programs generally conduct research and logistical activities critical to protecting the region. Non-government expeditions (primarily tourist ships) visit the Antarctic region and date back to the late 1960s.<sup>1</sup> Since the late 1980s, there has been rapid growth in visitor activity in the Antarctic region and increased activity in the sub-Antarctic. This has led to the development of a wide range and variety of tourism and adventure activities. Companies provide mountaineering, skiing, hiking, kayaking, SCUBA diving and opportunities for overnight stays on the continent.

The Australian Government recognises the legitimacy of tourism in Antarctica and sub-Antarctica provided they are conducted in an ecologically sustainable manner and are socially responsible. Tourist operators have reporting obligations, site guidelines and requirements for environmental impact assessment. Australia has not supported land-based tourism infrastructure in the Australian Antarctic Territory nor on its sub-Antarctic islands. Tourist operators must ensure that their operations have no more than a minor or transitory impact. For this reason, it is essential that applied research on the legal, administrative and environmental requirements of Antarctic and sub-Antarctic tourism is undertaken to ensure a sustainable industry.

Up until recently the majority of Antarctic tourists visited over the austral summer aboard small expedition style ships carrying 50 to 100 passengers. As the number of tourists increase so does the size and capacity of ships. Some large commercial tourist ships now carry over 3,000 passengers and crew. This poses new challenges relating to the ability of these ships to operate safely in Antarctic conditions. An additional trend is the diversification of activities offered by tourism companies in a highly competitive market.

Over the past decade, tourist visits to Antarctica have doubled and tourist vessels have increased from around a dozen to almost 50.<sup>2</sup> According to the International Association of Antarctica Tour Operators (IAATO) the number of ship-based tourists visiting Antarctica itself grew from 6,704 in 1992–93 to just over 46,000 in 2007–08. The majority (37 per cent) were from the USA and the United Kingdom (16 per cent). These figures do not cover Macquarie Island, Heard Island and McDonald Islands, under Australian jurisdiction and part of the Australian Antarctic Tourism 'experience'.

<sup>1</sup> <http://www.aad.gov.au/default.asp?casid=1983>

<sup>2</sup> International Association of Antarctica Tour Operators 2008



Field camp, Macquarie Island



# Australian ANTARCTIC & Sub-ANTARCTIC Tourism

TOWARDS A SUSTAINABLE INDUSTRY

## Snapshot One: Emerging Issues of Australian Antarctic Tourism: Legal and Policy Dimensions

Murray Johnson and Lorne Kriwoken

### *Objectives of Study*

Australia has consistently worked with Antarctic Treaty Consultative Parties (ATCP) with the aim of achieving integrated management of Antarctic tourism. The Antarctic Treaty Consultative Meeting (ATCM) is held every year and is hosted by the Consultative Parties according to the alphabetical order of their English names.

In response to emerging tourism issues, Australia has developed a tourism policy and argued for the implementation of schemes for industry accreditation and onboard observers, an Antarctic shipping code and site specific visitor guidelines. Australia has also sought to establish ATCP policy on the development of land-based non-government infrastructure.

The objective of the study was to consider the emerging issues of Australian Antarctic tourism, through a critique of its legal and policy approach. An introduction of Australia's legal and policy framework precedes the analysis of increasing tourism activity, technological developments and land-based tourism facilities. This was followed by an examination of non-members of the International Association of Antarctica Tour Operators (IAATO) that ran tourism companies or vessels from third-party states. The study concludes with an outline of how Australia can adopt suitable legal and policy directions for tourism within the Antarctic Treaty System (ATS).

### *Key Findings*

Australia is well positioned to meet the emerging tourism issues given its history of active participation in the ATS. Australia would do well to utilise ATS institutions as a means of progressing regulatory and policy directions, thereby minimising potential concerns arising from perceptions of unilateral responses to tourism issues.







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The Australian legal regime should also be amended to allow for the progressive inclusion of ATCM decisions and recommendations. Australia's policy does not aim to more effectively apply domestic legislation nor set limits on tourism activity, technology development or land-based infrastructure development. Policy refinement is necessary to better respond to such emerging issues.

Increasing tourism operations by non-IAATO members threatens Australia's policy reliance on industry self-regulation and will prove difficult for Australian policy makers to ignore, particularly in light of the potential resource implications. It is anticipated that Australia may be expected to take a more active regulatory role when assessing non-IAATO operator proposals. Consideration should be given to incorporating IAATO operating standards and procedures into the Australian legal framework. Australia should also collaborate with ATCPs to establish the future ATS context of self-regulation.

## Recommendations

Any significant increase in the operation of tourism companies or vessels from third party states would demand refinement to Australia's legal and policy framework. ATCM efforts to close third party regulatory loopholes relate to schemes for tourism operator accreditation and onboard observers, as well as an Antarctic shipping code. ATCP consensus has not yet been reached on the framework or regulatory status of accreditation and there remains a need for ATS policy discussion of the associated implications. Australia should seek to ensure that the resultant accreditation scheme is compatible with domestic legislation. The Australian regime for inspections would benefit by amendments that provide for cooperative and educational onboard observers, including recognition of ATCM endorsed observers. It could be further enhanced to account for the substantial insights gained from recent ATS reviews of Antarctic shipping codes. Australian legislation should account for ATCM recommendations, as well as IMO resolutions and guidelines related to Antarctic shipping. The assessment of third party tourism trends highlights the need for Australia to respond by extending its policy effort beyond party states and into a more global context. Whilst Australia has made effective policy realisation through ATS cooperative institutions, there looms a need to strengthen coalitions with third party states.

## Reference

Johnson, M and Kriwoken, L 2007. Emerging Issues of Australian Antarctic Tourism: Legal and Policy Dimensions, chapter 7, pp. 85–99, in Kriwoken, L, Jabour, J and Hemmings, AD (eds), Looking South: Australia's Antarctic Agenda, Federation Press, Sydney, NSW, Australia.



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# Australian ANTARCTIC & Sub-ANTARCTIC Tourism

## TOWARDS A SUSTAINABLE INDUSTRY

### Snapshot Two: Polar Pathways: Exploring Hobart's Antarctic and Southern Ocean Connection

Lorne Kriwoken and John Williamson

#### Objectives of Study

Antarctic Tasmania (Department of Economic Development) has been actively promoting Hobart as an Antarctic Gateway. The Polar Pathways tourism product consists of 19 sites for self-guided walking in Hobart's central business district and 11 sites comprising a self-guiding driving tour including locations ranging from Mt Wellington to the Huon Valley. The product is supported by a DL self-guided walking/driving brochure, initial training for commercial guides employed by existing walking tour businesses and linkages with the Tasmanian Museum and Art Gallery, particularly its *Islands to Ice* exhibition. An analysis of tourism experience suggested that a Polar Pathways website and Polar Pathways podcasts would further enhance the experience.

#### Methodology

A working group was formed with representatives, funding or in-kind support from the following organisations: Antarctic Tasmania, Sustainable Tourism Cooperative Research Centre, University of Tasmania, Tasmanian Museum and Art Gallery, Australian Antarctic Division, State Library of Tasmania, National Archives of Australia and the National Library of Australia. Tweezy New Media were commissioned to develop the Polar Pathways: Explore Tasmania's Antarctic Heritage website:

<http://www.polarpathways.info/index.php>

#### Key Findings

A virtual tour of Tasmania's Antarctic heritage was developed. A multimedia presentation viewed on a high speed broadband Internet connection supports a Flash-based version and features a slide show with an accompanying narration for each of the 30 sites of the Polar Pathways tour. An HTML website is made available for those with a slower or dial-up Internet connection. The HTML version features text based information with clickable thumbnail images for each of the 30 sites of the Polar Pathways tour. The website provides four options: (1) a downloadable Polar Pathways brochure; (2) text notes that support the Polar Pathways sites and explorers as a PDF or HTML text; (3) Polar Pathways podcasts accessed by copying and pasting the following URL into an RSS Reader or preferred podcast program <http://www.polarpathways.info/audio.xml>; and (4) MP3 audio narration files for all 30 Polar Pathway sites.

#### Recommendations

The website is an important development in the Polar Pathways tourism experience and enhances Hobart's positioning as a Gateway to Antarctica. The website provides: a number of Polar Pathways links in Hobart and throughout Australia; links to further Antarctic information and resources; links to events, festivals and exhibitions, including the Antarctic Tasmanian Midwinter Festival; and information on important Antarctic explorers.

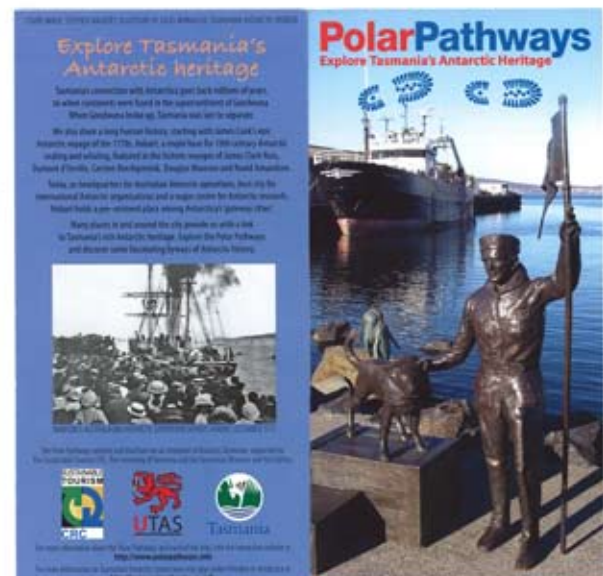


Figure 1: Front and back covers of Polar Pathways brochure



## Snapshot Three: Minimum Approach Distance Guidelines for Royal Penguins, Macquarie Island, Australia

Nick Holmes, Melissa Giese and Lorne Kriwoken

### Objectives of Study

Minimum approach distance guidelines are common tools to maintain a buffer between breeding seabirds and human activity, with the goal of mitigating potentially harmful impacts from these interactions. Penguin colonies are popular wildlife tourism destinations, particularly in many sub-Antarctic and Antarctic locations where tourism has been steadily increasing. Royal penguins (*Eudyptes schlegelii*) are endemic to Macquarie Island and subject to human activity from the Australian Antarctic Program, management programs from the Tasmanian Parks and Wildlife Service and commercial tourism. The overall aim of the study was to assess the suitability of the 5 metre minimum approach guideline for incubating Royal penguins and to consider implications for management of human-penguin interactions for both tourism and government operations on Macquarie Island.

### Methodology

Field work on Macquarie Island was conducted between Green Gorge and Red River. Only edge-nesting penguins were selected for experiments, as these individuals were exposed to the greatest potential disturbance from pedestrians. An experimental design was employed to measure the heart rate and behaviour of Royal penguins in response to a single pedestrian visit using the current recommended approach distance of 5 metres for visitors.

### Key Findings

Penguins showed increased heart rate (1.23 times average resting heart rate) and vigilance (six-fold increase), suggested to be a precursor to a fight or flight response, however, no penguins fled their nests. These responses were significantly greater than observed during sub-Antarctic skua overflights, suggesting incubating Royal penguins viewed a single pedestrian at 5 metres as a greater threat than a predator overflight. Single persons using the current minimum approach guideline when visiting incubating Royal penguins appear unlikely to elicit responses considered greater than minor or transitory, consistent with activities that are considered acceptable by current management arrangements on Macquarie Island.

### Recommendations

Applying this guideline requires caution because the cumulative impacts of visitation are unknown and greater responses may occur with larger group sizes or during different breeding phases. Minimum approach distance guidelines should be based on the separation distance necessary to allow animals to undertake normal activity, rather than on the distance people can approach wildlife before the animals flee.

### Reference

Holmes, N, Giese, M and Kriwoken, L, 2005 Testing the minimum approach distance guidelines for incubating Royal penguins (*Eudyptes schlegelii*), *Biological Conservation*, Volume 126, Number 3, December, pp. 339–350.

### Snapshot Four: Behaviour and Breeding Success of Gentoo Penguins in Areas of Low and High Human Activity, Macquarie Island, Antarctica

Nick Holmes, Melissa Giese, Helen Achurch, S Robinson and Lorne Kriwoken

#### Objectives of Study

A key factor influencing wildlife responses to human activity is the degree to which animals have been previously exposed to human stimuli. On Australia's sub-Antarctic Macquarie Island, Gentoo penguins (*Pygoscelis papua*) breed in areas of high and low human activity (on and off station respectively). The study investigated the behaviour and breeding success of Gentoo penguins on and off station.

#### Methodology

The behaviour and breeding success of Gentoo penguins on and off station were investigated by comparing the behavioural responses of guarding Gentoos before, during and after exposure to standardised pedestrian approaches. An observational study was employed to determine how human activity may have contributed to within-season breeding success in light of other environmental and site variables. The area of high human activity (on station) was defined as the area encompassing the Australian Antarctic Program (AAP) station. Areas of low human activity (off station) were those outside AAP station limits and all other parts of the island.

#### Key Findings

Behavioural responses to pedestrian visitation by Gentoos off station were significantly stronger than those of birds breeding on station. No relationship was found between pedestrian activity and breeding success off station. Breeding success was positively related to colony size and negatively related to the activity of other penguins, the number of nearby southern elephant seal (*Mirounga leonine*) harems and the location of colonies within short grassland. On station breeding success was amongst the highest recorded for that season.

#### Recommendations

A key implication from the behavioural responses recorded during the study is that responses can be site-specific, with previous exposure to human activity influencing how penguins at different breeding locations may react. Consequently, transferring results from human-wildlife interaction studies at different sites, even from those conducted at the same breeding location, may produce misleading management actions. Greater caution may be warranted when visiting wildlife populations without a history of frequent exposure to activity as they may in fact be more sensitive. Consideration of habituation is particularly relevant for the management of Antarctic tourism. Concentrating visitation may be a valid management option rather than exposing a greater number of sites to the effects of human activity. For wildlife exposed to regular human activity, habituation should not be considered a certainty. The site specific nature of habituation suggests it may not occur for all situations where penguins are exposed to regular human activity. Managers should not consider that wildlife populations breeding near areas of high human activity will eventually learn to cope with such exposure without experiencing negative consequences.

#### Reference

Holmes, N, Giese, M, Achurch, H, Robinson, S. and Kriwoken, L, 2006. Behaviour and Breeding Success of Gentoo Penguins (*Pygoscelis papua*) in areas of low and high human activity, Polar Biology, Volume 29, Number 5, April, pp. 399–412.



Gentoo penguins and Macquarie Island station

## Snapshot Five: Penguin Responses to Pedestrian Activity for Best Practice Management on Macquarie Island, Australia

Nick Holmes, Melissa Giese and Lorne Kriwoken

### Objectives of Study

This study investigated the variation in responses to pedestrian activity by King (*Aptenodytes patagonicus*), Gentoo (*Pygoscelis papua*) and Royal (*Eudyptes schlegeli*) penguins. The aim was to produce management oriented information both for commercial tourism in the sub-Antarctic and Antarctic, and for Antarctic Treaty national operations. A series of experimental and observational studies were employed to quantify aspects of physiology, behaviour and reproductive success of sub-Antarctic penguins exposed to pedestrian activity—the most common form of human activity on Macquarie Island. We investigated key aspects of penguin ecology likely to yield information valuable to management, including (1) the efficacy of current minimum approach distance guidelines for visitation to penguins, (2) the effect of visitor group size on penguin responses to pedestrian activity, (3) the role of habituation in penguin responses to pedestrian activity, (4) the phase of breeding / moult during which penguins are most sensitive to pedestrian activity, and (5) comparative responses to human activity between the three species examined.

### Methodology

A series of experimental and observational studies was employed to quantify aspects of physiology, behaviour and reproductive success of sub-Antarctic penguins. Experiments followed a simple, repeatable methodology to allow the responses of penguins to be examined in light of key variables considered to influence their responses to people and allowed sufficient sample sizes to be obtained. We aimed to gain as much experimental control as possible, by conducting experiments during a specific weather and time window, and kept pedestrian jacket colour (red) constant. All experiments followed a before (pre-approach), during (approach) and after (post-approach) format, allowing for repeated measures analyses of responses. No humans were present during the pre and post approach stages. Post-approach were split to identify when behaviour (and heart rate) were comparable to pre-approach recordings. Behavioural analyses were undertaken using The Observer 5.0 (Noldus Information Technology, 2002). In addition to manipulative experiments, an observational study was also undertaken to examine the breeding success of Gentoo penguins breeding in areas of high and low human activity, relative to other environmental factors likely to influence chick production, using a simple linear (regression) model.

### Recommendations

#### Testing the 5 metre minimum approach distance guideline

Incubating Royal penguins displayed significant increases in vigilance and heart rate when exposed to a single person approaching to 5 metres, however, no penguins fled the nest. These responses typified a preparedness to flee, similar to a flight-or-fight response, and were significantly stronger than during predator overflights or aggressive interactions with skuas, suggesting penguins perceived a single person visiting the nest as a greater threat than the naturally occurring stimuli tested. The responses observed during visitation can be described as minor or transitory. Nevertheless, the context provided by the relative response of penguins to natural versus human stimuli demonstrated that using the 5 metre guideline still warrants a reasonable level of caution.

#### How does visitor group size influence response?

Groups of five people elicited significantly higher rates (frequency and duration) of vigilance from guarding Gentoo penguins than single person visits, suggesting that penguins associated a higher level of perceived risk with larger visitor groups. Wildlife managers could control this level of perceived risk by either (a) reducing visitor group sizes, or (b) increasing minimum approach distances for larger groups of people approaching penguins. However, it remains unclear what represents a greater interruption to breeding birds: one visit by five people at once, or five separate visits by a single person. Further research opportunities also exist to determine at what set-back distance a group of five people would elicit the same level of response as that from a single person at 5 metres.

#### Habituation and the effect of previous exposure to human activity

When presented with the same pedestrian stimulus, guarding Gentoo penguins breeding away from station limits showed significantly stronger responses than counterparts breeding within station limits, who were exposed to considerably higher levels of pedestrian

### Snapshot Five: Penguin Responses to Pedestrian Activity for Best Practice Management on Macquarie Island, Australia (cont.)

activity, plus vehicle movements. This result demonstrated the site-specific nature of responses to human activity, and emphasised the importance of previous exposure when considering how best to manage visitation to penguin colonies. The responses of penguins regularly exposed to visitation should not be considered typical of those irregularly exposed, as the latter may in fact be more sensitive. While evidence of habituation was observed in this context on Macquarie Island, the proximate mechanisms leading to such a response are not well understood. As such, habituation should not be considered an inevitable outcome for all species regularly exposed to higher levels of human activity and therefore, should not be used as a goal of wildlife management without significant caution.

Despite greater behavioural sensitivity observed among Gentoo penguins with limited prior exposure to human activity a simple linear model of colony reproductive success found that for these birds low levels of pedestrian activity had no significant relationship to breeding success when compared to other environmental and site variables. Reproductive success had a significant positive relationship with colony size, and significant negative relationship when the colony was situated in short grassland located near colonies of other penguin species, and was located close to Southern elephant seal (*Mirounga leonina*) harems. There may be some advantage for Gentoos breeding on-station, possibly due to reduced predator activity or food supply for predators (both giant petrels *Macronectes spp.*) and sub-Antarctic skuas (*Catharacta lonnbergi*) within station limits, although caution is required given the low number of on-station colonies tested. Determining the effect of human activity on the land-based predators of penguins remains an important avenue of investigation.

#### The role of breeding phase

Incubating and moulting penguins responded at the greatest distances to a standard pedestrian stimulus, with their behaviour affected for up to 15 minutes after the visit. Reducing potentially harmful effects of human activity during the more sensitive periods of incubation and moult can be achieved by minimising visitation, or by promoting greater set-back distances to birds during these phases. Determining the effect of human activity on seabirds during key pre-laying activities of nest prospecting and recruitment remains an important direction for research.

Figure 2: Field work, Macquarie Island





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## Comparing species responses

When guarding King, Gentoo and Royal penguins were exposed to the same human approach stimulus, only Gentoos significantly altered their behavioural pattern after the stimulus was removed, suggesting that Gentoos on Macquarie Island are more sensitive to human activity than either Kings or Royals. Gentoos were also more likely to perform some ritualised behaviours (i.e. low threat / display behaviour), however, the only recorded incidence of abandoning a chick was recorded in King penguins, suggesting that caution should always be exercised, regardless of species. Results from this study also suggested that greater efficacy of self-regulated visits can be achieved through identification of behaviours likely to indicate a change in the natural activity of each species being observed, including vigilance.

## Application of results to best practice human–wildlife interactions

Direct comparisons of the potential impacts from government expeditions and tourism on wildlife in the region are not straightforward, given the characteristics of human–interactions from each group differ widely, and hence, wildlife will respond differently. On Macquarie Island, away from the station, interactions with wildlife from government expeditioners can be classified as low intensity and frequency, while on-station, interactions are relatively high intensity and frequency. In contrast, tourism on Macquarie Island is presently irregular in frequency but high in intensity for wildlife visited.

Specific management recommendations centre around the validity of the 5 metre approach distance guideline, and the various factors that influence its efficacy as a management tool. Under certain conditions (i.e. a single person approaching incubating Royal penguins once), approaches to 5 metres appear valid, as they result in behavioural changes that are minor and transitory, but key factors clearly influence their effectiveness. During more sensitive breeding phases of moult and incubation, greater set-back distances would also allow penguins to maintain a normal activity, and would reduce the likelihood of moulting birds flushing. These precautionary measures appear particularly warranted for Gentoo penguins, given their apparent higher sensitivity to visitation compared to Royal and King penguins on the island.

## Reference

Holmes, N, Giese, M and Kriwoken, L, 2007. Linking Variation in Penguin Responses to Pedestrian Activity for Best Practice Management on Macquarie Island. *Polarforschung*, 77(1), pp. 7–15.

Figure 3: Royal penguins, Macquarie Island



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### Snapshot Six: Investigating the Variation in Penguin Responses to Pedestrian Activity on Sub-Antarctic Macquarie Island

Nick Holmes, PhD thesis

#### Objective of the Study

As the number of people visiting the sub-Antarctic and Antarctic increase, so do incidences of human-wildlife interaction. In these regions, Antarctic Treaty Consultative Parties conduct and support scientific research and commercial tourism is increasing dramatically. At several locations, penguins can be exposed to considerable human activity, often during critical periods of breeding and moult. Consequently, there is a need for effective and timely management of human-wildlife interactions that reflect the high conservation value of these areas.

On sub-Antarctic Macquarie Island (54°30'S, 158°57'E)m, breeding penguins experience human interactions, most commonly in the form of pedestrian visits from government expeditioners or commercial tourists. A project was undertaken to investigate responses to pedestrian activity by King (*Aptenodytes patagonicus*), Gentoo (*Pygoscelis papua*) and Royal (*Eudyptes schlegeli*) penguins. The overall aim of the project was to produce management-oriented information for both government operations and commercial tourism on the island, and elsewhere in the region.

#### Methodology

Experimental and observational studies were employed to quantify aspects of the physiology, behaviour and reproductive success of the three penguin species when exposed to pedestrian activity. Experiments were designed to address the following key management issues: (1) the efficacy of current minimum approach distance guidelines; (2) the effect of visitor group size; (3) the role of habituation; (4) the sensitivity of penguins during different breeding phases; and (5) inter-species variation in responses.

#### Key Findings

Key results include: (a) a single pedestrian visit to 5 metres (the current minimum approach guideline) to incubating Royal penguins did not produce more than a minor or transitory impact on the birds, but did elicit a stronger response than either predator overflights or interactions with aggressive conspecifics; (b) guarding Gentoo penguin responses to human visitors increased in intensity with a larger visitor group size; (c) Gentoo penguins exposed to frequent, high levels of human activity appeared to have habituated to pedestrians, while Gentoos in areas of low human activity appeared sensitive to visitation, highlighting that habituation and previous exposure to human activity need to be considered when managing human-penguin interactions; (d) Royal penguins displayed elevated responses to visitation during incubation and moult, compared to guard and crèche, highlighting these breeding stages as more sensitive periods; and (e) Gentoo penguins showed the strongest reaction to visitation when compared to King and Royal penguins, highlighting inter-species differences in sensitivity to the stimuli examined.

#### Recommendations

By investigating how penguin responses to pedestrian activity vary, this project has produced valuable information for the management of human-penguin interactions on Macquarie Island, with application to other sub-Antarctic and Antarctic locations.

#### Reference

Holmes, N., 2006. Investigating the Variation in Penguin Responses to Pedestrian Activity on Sub-Antarctic Macquarie Island, Macquarie Island. PhD thesis, School of Geography and Environmental Studies, University of Tasmania, Hobart, Tasmania, Australia.





## Snapshot Seven: Emerging Issues of Macquarie Island and Heard Island and McDonald Islands

Lorne Kriwoken and Nick Holmes

### Objectives of Study

The aim of this study was to compare and contrast Macquarie Island and Heard Island and McDonald Islands (HIMI) and provide an analysis of the most important and emerging issues over the next decade. The study begins with a brief outline of early discovery, industry and science. This is followed by an overview of legislative, institutional and management arrangements, with particular attention given to World Heritage status. Emerging issues are then presented. The management, scale and impact of human activities are introduced, focusing on both science activities and commercial tourism. This is followed by an assessment of quarantine, disease, alien introduction issues, commercial fishing pressures and enforcement problems. The chapter concludes with a comparative analysis of emergent issues for both sub-Antarctic groups.

### Key Findings and Recommendations

Commercial tourism to both island groups is quite different. Macquarie is an integral stop off for Antarctic tourism expeditions heading south to the Ross Sea or the New Zealand sub-Antarctic islands. Tourism on Macquarie is generally considered well managed, and offers a representative experience of the island without significant impact. Presently, tourism is highly regulated and the numbers do not seem to adversely affect the flora or fauna. Management guidelines ensure that visitor numbers are limited and their on-shore activities tightly controlled. Their on-shore visits are for short periods only, yet the sense of isolation and remoteness of the location, and the rewarding views of large numbers of wildlife, appear to have a profound impact on visitors. Tourism to HIMI is quite different because it is not part of a regular itinerary to Antarctica and it is more geographically remote than Macquarie. It is likely that tourism will continue on a very small scale with occasional visits from operators offering a circumnavigation of Antarctica. Private yachts and mountaineering parties are likely to remain few in number and low in impact. The issue of quarantine, disease and alien introduction is a high priority issue for both Macquarie and HIMI. Strict measures are in place to prevent alien introductions and impact on the islands from expeditioners and tourists. Macquarie has been subject to a host of alien species and eradication is a top priority for managers. The cat eradication program is an excellent example of a long term, strategic undertaking by the Tasmanian Parks and Wildlife Service but the result has been an unforeseen explosion in rabbit populations, which are now having a devastating effect on the terrestrial ecosystem.

Figure 4 : Tourists arriving by Zodiac, Macquarie Island



# Australian ANTARCTIC & Sub-ANTARCTIC Tourism

## TOWARDS A SUSTAINABLE INDUSTRY

Heard Island is quite different for a number of reasons. It is an External Territory under Federal jurisdiction and does not suffer from Federal–State tensions in the same way that Macquarie does. This tension is presently manifest in the inability of the two jurisdictions to agree on responsibility for funding eradication programs. HIMI has limited numbers of alien species and therefore has a high conservation value. McDonald Islands has only recorded two landings by humans and represents, with Prince Edward Island, the only sub-Antarctic islands with no known alien species.

The final point relates to regional marine planning and possible boundary expansion. Australia's Oceans Policy has included Macquarie in the South-east Regional Marine Plan. This process has been a very useful exercise in data gathering and interpretation for large marine ecosystems. However, there are a few anomalies with respect to World Heritage area boundaries and recent designations of marine reserves. The Macquarie Island World Heritage area and the Australian Register of the National Estate only include waters out to 12 nautical miles, yet the Macquarie Island Marine Park includes some 16.2 million ha surrounding the island. Similarly, the HIMI World Heritage area and the Register only include the waters out to 12 nautical miles, yet the HIMI Marine Reserve covers 6.5 million ha. The examination of the possible extension of the World Heritage area boundaries to include the marine area from 12 to 200 nautical miles is warranted. At HIMI two significant plans have been recently released: the HIMI Fishery Plan and the HIMI Marine Reserve Management Plan. Only the Fishery Plan has been subject to a strategic environmental assessment (SEA). It might be prudent to instigate a regional marine planning process for HIMI to integrate these two plans and possibly subject the Marine Reserve Management Plan to the SEA process. A regional marine plan could integrate sectoral commercial fisheries interests and conservation requirements and would be binding on all Commonwealth agencies.

### Reference

Kriwoken, L and Holmes, N, 2007. Emerging Issues of Macquarie Island and Heard Island and McDonald Islands, chapter 11, pp. 149–164, in Kriwoken, L, Jabour, J and Hemmings, AD (eds), *Looking South: Australia's Antarctic Agenda*, Federation Press, Sydney, NSW, Australia.

*Figure 5: Researcher Lorne Kriwoken surrounded by King penguins, Macquarie Island*





# Australian ANTARCTIC & Sub-ANTARCTIC Tourism

## TOWARDS A SUSTAINABLE INDUSTRY

### Snapshot Eight: Extreme Tourism on Macquarie Island

Lorne Kriwoken, Claire Ellis and Nick Holmes

#### *Objectives of Study*

Australia's wild, wet and windy sub-Antarctic Macquarie Island is situated in the Southern Ocean three days sailing from the port of Hobart, Tasmania, Australia. This unique and hostile environment has an abundance of spectacular wildlife such as the elephant seal, endemic Royal penguin and albatross and also supports a distinct cold island tourism industry that uses expedition-style ships to allow visitors access to nature-based experiences. A description of the legal and administrative framework for managing tourism and a summary of the international significance of Macquarie Island as a World Heritage Area, are first introduced. The level of tourism is then examined by assessing the number of tourists, the reasons tourists visit and the type of product tourism operators provide. The types of impacts associated with wildlife tourism are discussed and the ability of the environment to cope with an increase in tourist numbers assessed. The study concludes by discussing the conditions that support sustainable cold water tourism on Macquarie Island, and argues that the harshness of the environment and the physical challenge of getting to the destination enhance the intensity of the experience for tourists. Tourism is undertaken in a very controlled manner and at present numbers do not seem to adversely affect the flora or fauna. The host community consists only of researchers and field staff and they play an important role in educating tourists whilst playing a strong advocacy role in planning and management.

#### *Key Findings and Recommendations*

Macquarie Island is a distinctive cold water tourist destination. The distance from Australia and New Zealand and the severe weather make any tourist visit a physical challenge. Yet this challenge, together with the island's natural values, contributes to its attraction. Presently, tourism is highly regulated and the numbers do not seem to adversely affect the flora or fauna. However, management guidelines ensure that visitor numbers are limited and their on-shore activities are tightly controlled. Tourists visit in groups on small-scale expedition-style cruise ships. Their on-shore visits are for short periods only, yet the sense of isolation and remoteness of the location, and the rewarding views of large numbers of wildlife, appear to have a profound impact on visitors.

Unlike many remote islands with small isolated host populations, researchers, field and support staff constitutes the host community of Macquarie Island. They are often dedicated and highly motivated to protect and conserve the island. They provide research and information that influences ongoing planning and management such as strict guidelines established for tourism visitation. The host community also plays an important role in the interpretation and education of tourists during visits.

As visitor numbers slowly increase, it is essential that the Tasmanian Parks and Wildlife Service support long term research on the impacts of tourist visits. It is also essential that natural resource managers continue to work closely with commercial tourist operators to ensure that the outstanding World Heritage values of Macquarie Island are not compromised. The results of long term impact monitoring will assist in determining whether the increase in tourist visits is sustainable on Macquarie Island.

#### **Reference**

Kriwoken, L, Ellis, C and Holmes, N, 2006. Macquarie Island, Australia, chapter 15, pp.193–203, in Baldacchino, G. (ed) *Extreme Tourism: Lessons from the World's Cold Water Islands*, Advances in Tourism Research Series, Elsevier, New York.



# Australian ANTARCTIC & Sub-ANTARCTIC Tourism

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*“The debate over the merits of Antarctic tourism echoes debates over other wilderness regions. Tourism has allowed many people who might not otherwise have the opportunity, to experience the wonders, and understand the importance, of Antarctica. Their experiences have led to a greater recognition in the wider community of the region’s importance to the world.”*

Australian Antarctic Division, [www.aad.gov.au](http://www.aad.gov.au)

A photograph of three penguins standing on a snowy beach. The penguins are in the foreground, facing slightly to the right. They have white bodies, black heads and necks, and distinctive red beaks. The background shows a rocky coastline with waves crashing against the shore under a cloudy sky. A yellow banner is overlaid on the top half of the image, containing the title text.

# *Australian Antarctic and Sub-Antarctic Tourism*



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