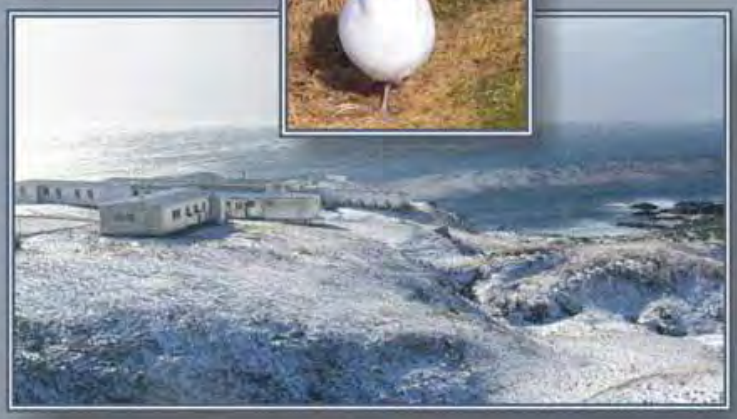
Prince Edward Islands Management Plan

VERSION 0.2



Prepared for:
Department of Environmental Affairs
Directorate: Antarctica and Islands

Prepared by:
DST-NRF Centre of Excellence
for Invasion Biology
Stellenbosch University
Private Bag X1
Matieland 7602

2010

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DEFINITIONS

Alien species	An introduced species that does not naturally occur in the area (in this case, a species that is not native to the Prince Edward Islands)
Alien invasive species	Species introduced deliberately or unintentionally outside their natural habitats where they have the ability to establish themselves, invade, outcompete native species or take over the new environments
Biodiversity	The variability among living organisms from all sources including, *inter alia*, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part; this includes diversity within species, between species and of ecosystems (Convention on Biological Diversity)
Biological samples	All animal and plant organisms or specimens, soil, water and geological material
Biosecurity	Threats to biosecurity are those matters or activities which, individually or collectively, may constitute a biological risk to the ecological welfare or to the well-being of humans, animals or plants of a country (Convention on Biological Diversity)
Bird strike	Collision of flying birds with overhead structures, lines and buildings, often resulting on injury or death of the bird
Black water	Sewage
Boot-washing	The 'ceremony' during which passengers intending to visit the islands have their shoes, personal gear and equipment cleaned and inspected to ensure that all gear making landfall is propagule-free; this event has become a routine or 'tradition' on the voyage to the Prince Edward Islands and is a critical quarantine measure
Braai	Barbecue
Emergency	A situation in which human life is actually or potentially in danger, or in which environmental harm may be caused through lack of response
Expeditioner	Any person travelling to the PEIs who may disembark at the islands (includes personnel of Helicopter Company, and any ship crew or ship-based researchers who may go ashore)
Grey water	Waste water from all household sources other than toilets, i.e. kitchen sinks, baths and showers
Group Leader	Person in charge of a particular team of people visiting the PEIs, e.g. leader of a science programme, Helicopter Captain, leader of a construction team
Overwintering team	The team of about ten to fifteen people that spends a year on Marion Island
Propagule	Any organism or structure with the capacity to give rise to a new organism through sexual or asexual (vegetative) reproduction or growth; this includes seeds, eggs, spores, and any part of the body capable of independent growth if detached from the parent; typically does not include micro-organisms and their propagules
Pulses	Edible seeds such as lentils, beans and peas; seeds in this group are easily sprouted and may grow if disposed of carelessly
Relief	The annual voyage and period on Marion Island when a new over-wintering team arrives at the island, the outgoing team departs from the island and the base supplies are replenished; additional researchers and maintenance personnel also spend the relief period on the island
Seabird	Those birds which obtain some of their food from the sea, excluding the intertidal zone (Seals, Seabirds and Shorebirds in South Africa)
Sharps	Medical waste sharps including contaminated and uncontaminated sharp objects such as hypodermic needles, scalpels and broken glassware; this also includes all syringes
Skivvy	Kitchen or cleaning assistant designated for a particular day/week/fortnight at the Marion Island base
Slop	Kitchen waste including waste food and drinks, cooking scraps etc. For the purposes of this MP, and particularly for disease control, slop is strictly divided into (a) poultry, meat and fish-related slop which is frozen for return to South Africa, and (b) all other slop which is disposed

	of into the sea at night
Specimen	Any living or dead animal, plant or other organism; and any propagule or part of an animal, plant or other organism capable of propagation or reproduction or in any way transferring genetic traits; and any derivative of any animal, plant or other organism
Velcro	Closure based on a hook and eye system and often used to fasten clothing and shoes

ABBREVIATIONS

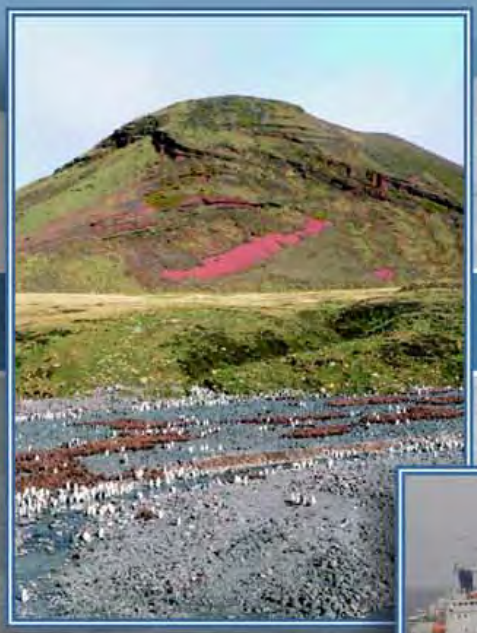
ACAP	Agreement on the Conservation of Albatrosses and Petrels
BMP	Biodiversity Management Plan
CCAMLR	Convention on the Conservation of Antarctic Marine Living Resources
C·I·B	DST-NRF Centre of Excellence for Invasion Biology, Stellenbosch University
D: SO&AS	Directorate: Southern Oceans and Antarctic Support
DCO	Departmental Coordinating Officer
DEA	Department of Environmental Affairs (was DEAT, Department of Environmental Affairs and Tourism, until 2010)
D: IEA	Directorate: Integrated Environmental Authorisations
DST	Department of Science and Technology
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EEZ	Exclusive Economic Zone
EL	Expedition Leader
EMI	Environmental Management Inspector
HWC	Heritage Western Cape
IUCN	International Union for the Conservation of Nature
Minister	Minister of Environmental Affairs
MPA	Marine Protected Area
NDPW	National Department of Public Works
NEMA	National Environmental Management Act (No. 107 of 1998)
NEMBA	National Environmental Management: Biodiversity Act (No. 10 of 2004)
NEM-ICM	National Environmental Management Integrated Coastal Management Act (Act No. 24 of 2008)
NEMPAA	National Environmental Management: Protected Areas Act (No. 57 of 2003)
nm	nautical miles
NNR	National Nuclear Regulator
NRF	National Research Foundation
PEIs	Prince Edward Islands
PEIAC	Prince Edward Islands Advisory Committee
PEIMP	Prince Edward Islands Management Plan
SA	South Africa
SANAE	South African National Antarctic Expedition
SANAP	South African National Antarctic Programme
SAWS	South African Weather Service
TL	Team Leader

ACKNOWLEDGEMENTS

We thank the following people for their advice and assistance: Marthán Bester (Mammal Research Institute, University of Pretoria), Shahn Bisschop (Faculty of Veterinary Science, University of Pretoria), Jan Boelhouwers (University of Uppsala), John Britton (CHC Helicopters), Jaco Boshoff (Iziko Museums of Cape Town), John Cooper (Animal Demography Unit, University of Cape Town and DST-NRF Centre of Excellence for Invasion Biology, Stellenbosch University), Geoff Cowan (Department of Environmental Affairs), Nico de Bruyn (Mammal Research Institute, University of Pretoria), Marius Diemont (Marine and Coastal Management), Adriaan Dreyer (Department of Environmental Affairs), Truuske Gerdes (Onderstepoort Veterinary Institute, University of Pretoria), Niek Gremmen (DataAnalyseEcologie), David Hall (Smit Amandla Marine), Christine Hänel, Carol Jacobs (Department of Environmental Affairs), Antonieta Jerardino (Heritage Western Cape), Raina Kutranov (Department of Engineering and Technology management, University of Pretoria), Mary Leslie (South African Heritage Resources Agency), Paul Lochner (CSIR Environmentek), Giel Louw (National Department of Public Works), Marion 62 over-wintering team, Ian Meiklejohn (Department of Geography, Geoinformatics & Meteorology, University of Pretoria), Patrick Morant (CSIR Environmentek), Inge-Marie Petzer (Faculty of Veterinary Science, University of Pretoria), Peter Ryan (DST-NRF Centre of Excellence, Percy FitzPatrick Institute, University of Pretoria), Valdon Smith (Department of Botany and Zoology, Stellenbosch University), André Stroebel (CHC Helicopters), Henry Valentine (Department of Environmental Affairs), and all the staff of the DST-NRF Centre of Excellence for Invasion Biology at Stellenbosch University.

PART ONE: FRAMEWORK OF THE PEIMP

Chapter 1: Introduction



PRINCE EDWARD ISLANDS MANAGEMENT PLAN

Chapter 1

C·I·B
DST-NRF Centre of Excellence for Invasion Biology

Chapter 1

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PART ONE : FRAMEWORK OF THE PEIMP

1. Introduction

1.1 Authorisations

This document is hereby internally accepted and authorized as providing a Management Plan for the Prince Edward Islands, as required under section 39(2) of the National Environmental Management: Protected Areas Act, 2003.

_____ Date: _____
Name
Position

_____ Date: _____
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Position

_____ Date: _____
Name
Position

Recommended to Department of Environmental Affairs

_____ Date: _____
Ms Edna Molewa
Minister: Department of Environmental Affairs (DEA)

1.2 Consultation

The first draft of this Management Plan (MP) was made available for download on the CIB website (*www.sun.ac.za/cib*) and was circulated to Interested and Affected Parties for comment.

An outline of the draft MP was presented at a public participation workshop on 11 November 2005 in Stellenbosch. The public participation period ended on 18 November 2005.

Further consultation towards the final draft of the MP was held in 2010 with the Directorate: Southern Oceans and Antarctic Support, the Directorate: Integrated Environmental Authorisations the Chief Directorate: Biodiversity and Heritage of the Department of Environmental Affairs.

1.3 Purpose and Vision

The Prince Edward Islands (PEIs) have the highest level of protection afforded to any natural area under South African law. The islands were declared a Special Nature Reserve in 1995, to protect the islands' ecosystems because of their 'highly sensitive, outstanding' nature (National Environmental Management: Protected Areas Act (NEMPAA), 2003, Section 18 (2)(a)). In terms of NEMPAA, the PEIs are reserved primarily for scientific research and environmental monitoring (Section 18 (2)(b)). The boundary and status of the nature reserve cannot be altered except by a resolution of the National Assembly (Section 19).

NEMPAA provides for the protection and conservation of ecologically viable areas that are representative of South Africa's biological diversity and its natural landscapes and seascapes. The general purpose of a Special Nature Reserve is to protect highly sensitive, outstanding ecosystems, species, geological or physical features in the area, and to make the area primarily available for scientific research or environmental monitoring (Section 18). NEMPAA seeks to promote sustainable utilisation of protected areas for the benefit of people, in a manner that will preserve the ecological character of such areas and, where appropriate, promote participation by local communities (Section 2).

The specific objectives of the Prince Edward Islands Special Nature Reserve are to:

- Ensure the protection, survival and biological diversity of the islands' indigenous plant and animal species;
- Maintain the integrity and healthy functioning of the total ecosystem;
- Maintain diversity at every level, including the islands' biological, species and genetic diversity as well as the ecological processes;
- Protect geological and geomorphologic features, natural landscapes and wilderness attributes.

The South African National Antarctic Programme (SANAP) is managed jointly under the auspices of the Department of Environmental Affairs, Directorate: Southern Oceans and Antarctic Support and the Department of Science and Technology and National Research Foundation, the latter being responsible for science strategy, funding and implementation. The mission of SANAP is to increase understanding of the natural environment and life in the Antarctic and Southern Ocean through appropriate science and technology.

The strategic vision of SANAP, as it applies to the PEIs, is to support national sovereignty at the PEIs and to co-ordinate research activities, optimise and produce credible quality science and technology nationally and internationally, the utilization and conservation of natural resources and to further international relations in logistic, scientific and environmental issues pertaining to the Antarctic and sub-Antarctic regions.

Chapter 1

1.4 Spatial Extent of the Special Nature Reserve, and Expansion Strategy

The PEIs comprise Marion Island (situate latitude 46° 53' S, longitude 37° 45' E) and Prince Edward Island (situate latitude 46° 36' S, longitude 37° 57' E). Marion Island has an area of approximately 290 km^2 and has about 72 km of coastline. Its highest peak is 1230 m above sea level. Prince Edward Island, 19 km to the NE of Marion, is approximately 45 km^2 in area and its highest peak is about 672 m above sea level. This management plan applies to the Prince Edward Islands Special Nature Reserve, which covers both islands inland of the low water mark.

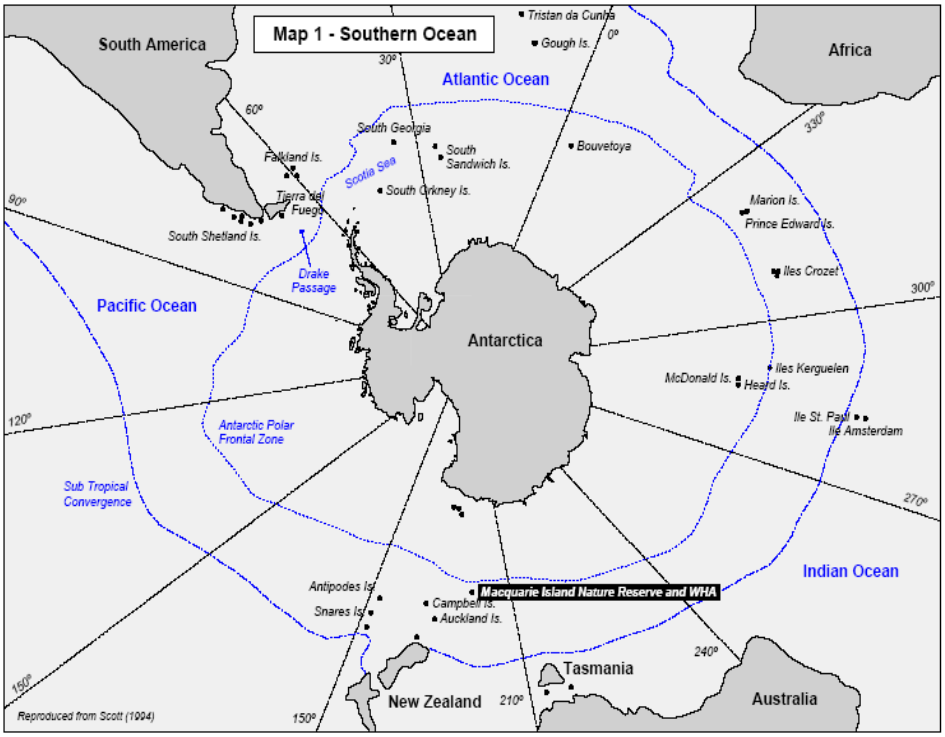
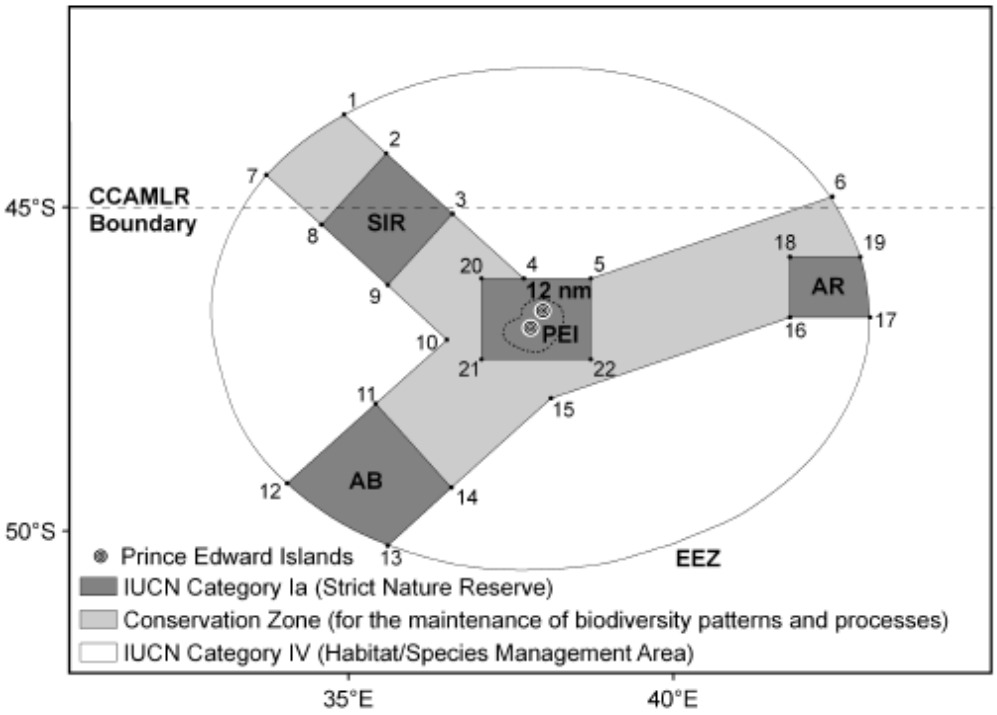


Figure 1-1. Location of the Prince Edward Islands in the Southern Ocean[1]

The islands are situated approximately 2180 km SE of Cape Town and about 1770 km SSE of Port Elizabeth. Their nearest neighbour in the Southern Ocean is Île aux Cochons of the Crozet Island Group, about 950 km to the east. Expansion of the terrestrial area of the reserve is thus impossible. However, the marine environment of the islands is inadequately protected from human-mediated pressures. South Africa was working towards the proclamation of large Marine Protected Area around the islands. This encompassed territorial waters and at least some parts of the Exclusive Economic Zone (EEZ), extending out to 200 nautical miles (Government Notice 421 and 422 of 2009; Lombard et al. 2007). The first stage in this process has been the declaration of territorial waters (to 12 nm) as a no-fishing zone as of 2005. The Prince Edward Island Marine Protected Area was formally declared in April 2013.

[1] Map taken from: de Villers, M.S., Cooper, J., Carmichael, N., Glass, J.P., Liddle, G.M., McIvor, E., Micol, T. & Roberts, R. 2006. Conservation management at Southern Ocean Islands: towards the development of best-practice guidelines. *Polarforschung* 75 (2-3): 113-131.



Key to Zones. The central block shows the 12 nm Sanctuary Zone, the three outer blocks represent Restricted Zones at the Southwest Indian Ridge (SIR), Africana ii Rise (AR) and Abyss (AB). The lightly shaded areas represent Controlled Zones.

Figure 1-2. Proposed boundaries of the Prince Edward Islands Marine Protected Area[2]

1.5 Description of this document

1.5.1 Overview of the previous MP

The first Prince Edward Islands Management Plan was published by the Department of Environmental Affairs and Tourism (DEAT) in 1996[3], in response to the 1995 proclamation of the islands as a Special Nature Reserve. Although regular review and modification of the MP was envisaged at the time of its publication, this update of the plan is the first to be completed since 1996.

Since that time, the domestic and international political and legal context has changed fundamentally, and South Africa now has an advanced set of laws governing environmental management and conservation. New environmental institutions, regulations, conservation practices and scientific advances have changed the setting in which biodiversity is managed.

[2] Map adapted from: Lombard, A.T., Reyers, B., Schonegevel, L.Y., Cooper, J, Smith-Adao, L.B., Nel, D.C., Froneman, P.W., Ansorge, I.J., Bester, M.N., Tosh, C.A., Strauss, T., Akkers, T., Gon, O., Leslie, R.W. & Chown, S.L. 2007. Conserving pattern and process in the Southern Ocean: designing a Marine Protected Area for the Prince Edward Islands. Antarctic Science 19 (1): 39–54.

[3] DEAT 1996. Prince Edward Islands Management Plan. Compiled by the Prince Edward Islands Management Plan Working Group and issued by DEAT Directorate Antarctica and Islands. ISBN 0-621-17584-6. Pretoria, South Africa.

1.5.2 Purpose and scope of this MP

The purpose of this MP is to ensure the ongoing protection and conservation of the PEIs by providing a comprehensive set of provisions for management. The MP provides both background information and detailed guidance on environmental practice on the islands and should therefore be read by every visitor to the islands.

The MP addresses both the core functions of island management (conservation and scientific research) and the support services (logistics associated with visits to the islands and provisioning, maintenance etc.), as well as all operations on the mainland which affect the islands.

1.5.3 General approach

The updated MP has a very different structure to the previous management plan. The approach used is based on the principles set out in the ISO 14001 Environmental Management Systems Standards series. The standards require that an organisation aims to minimise harmful effects on the environment caused by its activities, and to achieve continual improvement in environmental performance.

In practice, this means creating and using the feedback loops necessary to ensure ongoing learning and adaptive management. This can be achieved through rigorous implementation of the provisions of the MP, regular review and auditing, updating the MP in response to review results, and refining the instructions and protocols used by personnel. Key principles of the ISO 14001 approach are shown in Figure 1-1.

ISO 14001 requires an environmental policy to be in existence within the organisation, fully supported by senior management. In the case of government, this policy is set by national legislation and international commitments. These policies set the direction for the content and scope of the MP.

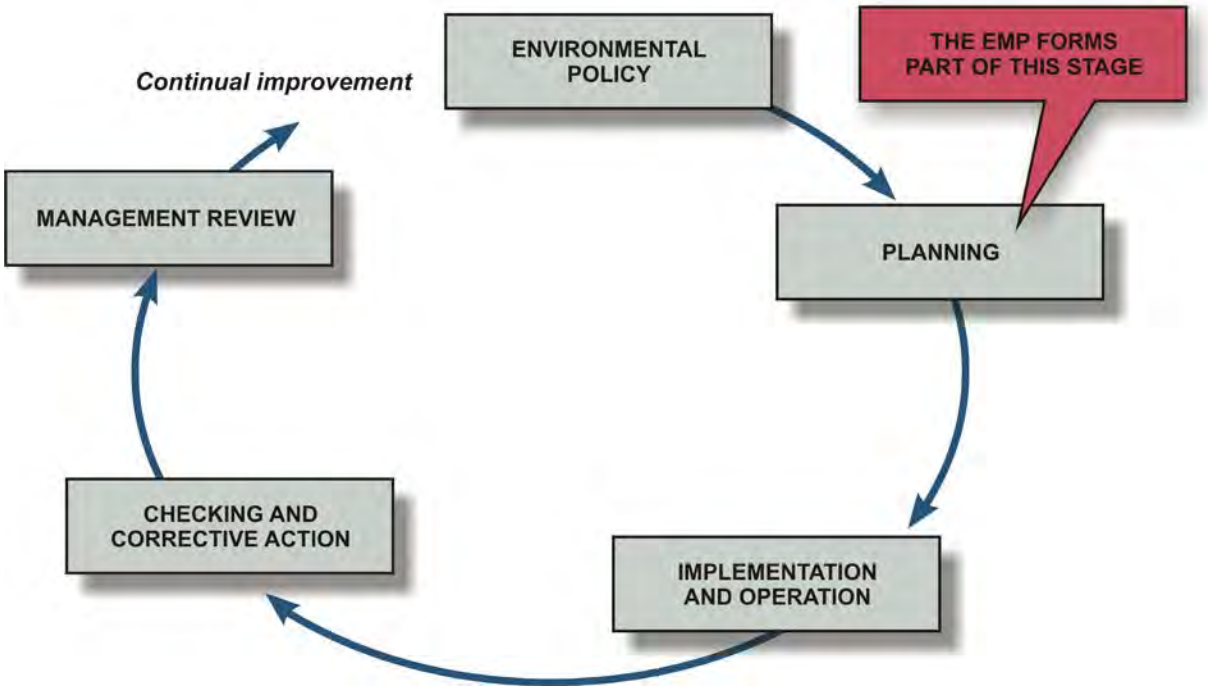


Figure 1-3. Summary of the ISO 14001 process for Environmental Management Systems

1.5.4 Structure

This document is divided into three parts. Part 1 describes the framework within which the MP was developed. It contains an introduction to the MP (Chapter 1), a policy framework (Chapter 2) and a description of the legal status of the PEIs in South African and international law (Chapter 3).

Part 2 contains the strategic plan for the Special Nature Reserve. It sets out in detail the provisions for environmental management of the islands, addressing administration (Chapter 4), biodiversity conservation (Chapter 5), historical conservation (Chapter 6) and waste management (Chapter 7). Each chapter in Part 2 consists of a legal and policy review followed by tables containing the environmental goals, objectives, targets, management actions, monitoring requirements, and remedial actions required to achieve efficient and effective management of the islands. The aim of the detailed tables is to explain and make clear the management methods and specific responsibilities of individuals and groups. Boxes are used throughout the text to carry specific sets of recommendations or guidelines. References are made throughout to supporting documents that can be referred to for additional information that is not required in the body of the management plan, but is nonetheless necessary reading for those involved in island management.

Part 3 of the MP provides costing for the strategic plan and includes a current budget and estimation of additional future costs.

The eleven items that have been identified for inclusion in management plans according to the Act[4] are addressed in this PEIMP as follows:

- Authorizations (1.1);
- Consultation (1.2);
- Purpose and Vision (1.3);
- Expansion Strategy (1.4);
- Policy Framework (Chapter 2);
- Legal Status (Chapter 3);
- Strategic Plan (Part 2, Chapters 4-7);
- Access (4.6) and Facilities (4.9);
- Zoning Plan (4.7);
- Concept Development Plan (4.10);
- Costing (Part 3).

1.5.5 Contributors

The MP was prepared by the DST-NRF Centre of Excellence for Invasion Biology at Stellenbosch University, with major contributions by Professor Steven Chown, Ms Sarah Davies, Ms Leonie Joubert and Dr Marienne de Villiers.

[4] Cowan, G.I. & Mpongoma, N. 2010. Guidelines for the development of a management plan for a protected area in terms of the National Environmental Management: Protected Areas Act (edited draft). Unpublished document; Department of Environmental Affairs, South Africa.

PART ONE: FRAMEWORK OF THE PEIMP

Chapter 2: Policy framework

PRINCE EDWARD ISLANDS
MANAGEMENT PLAN

Chapter 2

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Chapter 2

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2. *Policy Framework*

2.1 Policy context: Conservation significance of the Prince Edward Islands

The Prince Edward Islands are the most southerly part of South Africa's official territory, and its only overseas possession. The islands and their surrounding waters provide moulting and breeding grounds for millions of top predators, provide feeding grounds for seabirds, seals and migrating cetaceans, and support a commercially exploited fish population. The species and ecosystems of the islands are in many ways unique[1,2] and represent one of the few such systems globally. The relatively simple terrestrial ecosystems are ideal for studying ecosystem processes and their responses to environmental change. The situation of the Prince Edward Islands in the Southern Ocean makes them a valuable platform for the measurement of atmospheric and ocean variables necessary for a broader understanding of global climate change, as well as for weather prediction. Thus it is fitting that the islands should enjoy substantial protection through their status as a Special Nature Reserve.

There are, however, substantial threats to the conservation of the islands. Most significant among these are the effects of alien species that are already on the island, and the risks of introducing additional species. Not only are invasive alien species capable of causing the local extinction of species (and their global extinction if they are endemic), but they are also able to have massive effects on local ecosystem functioning. Moreover, alien species in the form of diseases can also have devastating effects on species that are of conservation concern. Other threats include pollution of the marine inshore and terrestrial environments and disturbance of wildlife and significant sites. Less obvious problems, and those more difficult to resolve locally, are climate change-related ecosystem changes and the effects of long-line fishing.

The overarching goal of the policies described below is to efficiently and effectively manage and protect the biodiversity and landscapes of the Prince Edward Islands Special Nature Reserve, whilst encouraging and facilitating valid scientific research.

2.2 Policies

2.2.1 Access

The access policy aims to limit and control entry to the Prince Edward Islands Special Nature Reserve to legitimate scientific research, conservation and management activities, and the recording of news events or educational or scientific programmes. This limitation and control is consistent with the high level of protection afforded the reserve under South African law. The access policy also authorises and regulates the number of expeditioners to the islands. The smaller of the two islands in the group, Prince Edward Island has some of the least disturbed sub-Antarctic floral and faunal communities on earth and thus has the highest level of protection in terms of access. For further details regarding the access policy, refer to Chapter 4, section 4.6.

2.2.2 Zonation

The Prince Edward Islands Special Nature Reserve has been demarcated into five zones where various activities may take place in order to achieve the goals of the reserve's Management Plan and to afford maximum protection

[1] Chown, S.L. & Froneman, P.W. (eds). (2008) The Prince Edward Archipelago: Land-Sea Interactions in a Changing Ecosystem. Sun Media, Stellenbosch.

[2] Terauds, A., Cooper, J., Chown, S.L. & Ryan, P.R. 2010. Marion and Prince Edward. South Africa's Southern Islands. Sun Press, Stellenbosch. ISBN 978-1-920338-42-8.

to species, ecosystems, natural features and historic sites. Access to these zones is according to permit conditions set by Department of Environmental Affairs' Chief Directorate: Ocean Conservation. For more details about this policy, refer to the zoning plan (Chapter 4, section 4.2.2).

2.2.3 Reserve expansion

Department of Environmental Affairs' Directorate: Southern Oceans and Antarctic Support supports South Africa's initiative to proclaim a Marine Protected Area, encompassing the territorial waters and at least some parts of the Exclusive Economic Zone around the islands, and extending out to 200 nm from their shores. For more information, refer to Chapter 1, section 1.4.

2.2.4 Wilderness aesthetic

The Prince Edward Islands are the most southerly and remote part of South Africa, and also the part of the country which has been least impacted by human development. The islands, especially Prince Edward Island, have nearly pristine wilderness landscapes with few signs of human occupation or disturbance, and their landscapes and faunal communities are aesthetically exceptional. The wilderness aesthetic of the islands shall be monitored, protected and maintained through appropriate access (Chapter 4, section 4.6), zoning (Chapter 4, section 4.2.2), development (Chapter 4, section 4.10) and pollution (Chapter 5, section 5.4 and Chapter 7) controls. These controls shall be maximally applied in Zones 3-5.

2.2.5 Sustainable resource use

In keeping with its Special Nature Reserve status, the primary uses of the natural resources of the Prince Edward Islands are research and education. In the course of these activities, the use of resources shall take account of:

- The interests and needs of present and future generations;
- Environmental impacts related to resource exploitation;
- The carrying capacity of the environment and concerns for the maintenance of biodiversity;
- The potential for pursuing alternative activities with lesser environmental impacts.

2.2.6 International cooperation

The Department of Environmental Affairs shall ensure that, in matters which involve the Prince Edward Islands, South Africa acts in accordance with national environmental policy in dealing with international treaties and agreements, and that environmental considerations are included in all international negotiations that will affect the islands. Requirements arising from international environmental agreements and obligations shall be met. There shall be cooperation on internationally shared environmental concerns. Due care shall be taken to adopt appropriate measures to prevent trans-boundary environmental harm.

2.2.7 Environmental health and safety

The environmental health and safety policy of the South African National Antarctic Programme is followed at the Prince Edward Islands Special Nature Reserve. This is that the maintenance of a South African presence at the Prince Edward Islands shall have no permanent negative consequence on this environment; that every expeditioner to the islands shall, as far as possible, have safe and healthy working conditions in a clean environment; and that safety considerations shall take preference over all other activities.

Due to the isolated location of the Prince Edward Islands, responsibility for search and rescue lies with the Departmental Coordinating Officer during annual relief periods and with the overwintering Team Leader at all other times. The Department of Environmental Affairs shall provide advice and backup as needed.

2.2.8 Adventure/recreation activities

The South African National Antarctic Programme (SANAP) policy regarding adventure/recreation activities is followed at the Prince Edward Islands. Accordingly, all adventure/recreation activities by participants in or stakeholders of SANAP or Department of Environmental Affairs are prohibited, which do not form part of the SANAP duties and/or responsibilities and are therefore not permissible in terms of SANAP / Department of Environmental Affairs service delivery. For Marion Island a single exception is made: viz. a maximum of four, seven day walks around the island over a one-year period for team members to enable them to benefit from and be educated about the pristine environment of the island.

2.2.9 Operations management

In keeping with the Special Nature Reserve status of the Prince Edward Islands, development at the islands shall be kept to a minimum and shall be restricted to Zones 1 and 2. However, where development is deemed necessary in these zones, an operational development plan shall be drafted, and the environmental impact assessment process as required by national legislation shall be completed before an environmental authorisation for the development is issued. If authorisation is granted, development must proceed according to an Environmental Management Plan.

The following principles guide operations management for the reserve:

- Negative impacts on ecosystems and loss of biological diversity will be avoided or at the least minimised and remedied;
- Pollution and degradation of the environment will be avoided or at the least minimised and remedied;
- Disturbance of archaeological/historical/cultural sites or artefacts will be avoided or at the least minimised and remedied;
- A risk-averse and cautious approach will be applied, taking into account the limits of current knowledge about the consequences of decisions and actions;
- Responsibility for the environmental health and safety consequences of a policy, programme, project, product, process, service or activity exists throughout its life cycle;
- The environmental impacts of activities, including disadvantages and benefits, must be considered, assessed and evaluated, and decisions must be taken accordingly;
- Decisions must be taken in an open and transparent manner, and access to information must be provided in accordance with legislation;
- The costs of remedying negative environmental effects and of preventing, controlling or minimising further effects must be paid for by those responsible for harming the environment;
- Operations management practices shall be reviewed and improved on a regular basis, through external audits and with reference to international 'best practice'.

Where development is deemed necessary, the Department of Environmental Affairs adopts the following strategy for mitigating the impacts on biodiversity, in accordance with Environmental Impact Assessment Regulations:

- *Operational Management Plan*. The Operational Management Plan (OMP) must detail the operational criteria that apply to any proposed development or activity (e.g. the minimum requirements with regards to the management and control of waste, water, energy, guiding etc.) and must be agreed to by senior management. The OMP is used as the foundation on which the inspecting and auditing of the activity/activities is undertaken. An independent Environmental Control Officer (ECO) must be appointed to oversee compliance and must compile an inspection checklist and an audit checklist.
- *Environmental Impact Assessment.* If development, decommissioning or alteration of infrastructure is proposed for the PEIs, then an EIA must be conducted by a suitably qualified independent consultant.

The EIA must comparatively assess all potential sites for the activity, the proposed scale and type of development to take place, and potential impacts from the development as well as from activities that shall take place on site. The EIA must propose suitable mitigation measures. The EIA process must be managed and reviewed by a suitably qualified internal person, and forwarded to the competent authority for approval prior to being submitted to the DEA Directorate: Integrated Environmental Authorisations for a Record of Decision.

- *Environmental Management Plan.* To ensure that the mitigation measures identified in the EIA are implemented, the EIA Consultants must compile an Environmental Management Plan (EMP) for the construction contractors for any and all developments. Where the development or activity is of a non-permanent nature, then the Consultants must be required to contextualize the Operational Management Plan to ensure it is appropriate (e.g. includes suitable rehabilitation measures for the landscape). A suitably qualified internal person must approve the contents of the EMP prior to the issuing of a tender. The EMP must form part of the tender documentation.
- *Enforcement.* The duties of the ECO include ensuring enforcement and compliance with the EMP, OMP, Codes of Conduct, Legislation, and all other applicable norms and standards. The ECO must submit audit reports to the Department of Environmental Affairs once a month and/or at completion of the project.

2.2.10 Waste management

The main principle of the waste management policy for the Prince Edward Islands Special Nature Reserve is to ensure a waste-free and healthy environment. The objectives of the waste and sewage disposal policy are:

- To ensure that activities at the Prince Edward Islands do not lead to unnecessary, unsightly or irreversible pollution, marring of the environment, or to the build up of waste or debris on the islands;
- To reduce the amount of waste which is introduced to, produced at or disposed of on or around the Prince Edward Islands as far as possible;
- To consider the following in the planning and execution of activities: waste storage, disposal and removal from the Prince Edward Islands as well as recycling and source reduction.

In general, waste generated at the Prince Edward Islands must be disposed of in a way which does not modify or endanger the natural ecosystems or species. Therefore on Marion Island, non-biodegradable and non-burnable waste is returned to South Africa and disposed of at a permitted waste site in accordance with South African integrated waste management policy and legislation. No waste may be disposed of on Prince Edward Islands. Refer to Chapter 7 for further details on waste management practices.

2.2.11 Fuel spill management

Major fuel spills at the Prince Edward Islands are likely to be a serious prospect because of the abundance of wildlife on the islands, the isolation of the islands, and the severe weather and sea conditions. Any deliberate discharge of fuels from vessels or from the Marion Island research base or field huts is thus prohibited, and every reasonable effort shall be made to prevent accidental spills. In the event of a spill occurring, the situation shall be managed and the impacts minimised and contained as far as possible, such that ecosystem functioning and species populations are returned to normal as soon as possible. Guiding principles are to:

- Maintain the supply vessel, research base and field huts and associated waste systems so that the risks of spills are minimised or eliminated;
- Take due care during refuelling activities at the islands;
- Maintain fuel storage facilities and pipelines to a high standard;
- Develop monitoring systems to detect the occurrence of and mitigate the impact of fuel spills;

- Develop, regularly review, and implement fuel spill contingency plans;
- Ensure readiness of personnel to respond appropriately and effectively to fuel spills;
- Minimise the spread of pollution within and between wildlife colonies;
- Prohibit the return of affected individual animals to the mainland, and the release of rehabilitated individuals to the islands (to prevent the transfer of diseases);
- Establish synergistic relationships with relevant individuals and agencies to develop and implement the fuel spill management policy.

For details of implementation of this policy, refer to Chapter 5, section 5.4.

2.2.12 Biodiversity management

The principle of adaptive management of biodiversity is adopted for the Prince Edward Islands Special Nature Reserve, with the goal of securing ecosystem integrity.

Towards this goal, Furthermore, the Department of Environmental Affairs undertakes to ensure that environmental management at the Prince Edward Islands shall be integrated, since all elements of the environment are linked and interrelated. It shall take into account the effects of decisions on all aspects of the environment and all people in the environment by pursuing the selection of the best practicable environmental option.

Furthermore, the Directorate shall encourage, facilitate and conduct conservation management-orientated research, and seek the advice and assistance of stakeholders and other experts as needed. Participation by stakeholders shall be promoted through timely and full disclosure of relevant and appropriate information, and by providing feedback on the outcome of the process to stakeholders and demonstrating how their inputs have been considered in the decision-making process. In order to facilitate open and transparent management practices and scientifically informed decisions about research on and management of the Prince Edward Islands, all documentation shall be centralised and regularly updated.

2.2.13 Human disturbance management

Human activities at the Prince Edward Islands shall be managed so that they cause minimum adverse impacts on the fauna, flora and natural features of the islands.

- No person on the Prince Edward Islands or within 12 nautical miles of the coasts shall be allowed to wilfully destroy, harm, molest, interfere with or disrupt any native terrestrial or marine animal or plant, or native animal or plant community;
- The collecting of scientific specimens and the removal of alien biota are allowed by permit only (see Chapter 5, section 5.7);
- Persons ashore must adhere to the Prince Edward Islands Code of Conduct regarding Marine Mammals and Birds (Chapter 5, Box 5-3);
- The use of mechanised transport (particularly helicopters and boats) on and around the islands shall be strictly regulated and monitored; activities shall be timed to avoid periods when animals are confined to breeding colonies, so that disturbance is reduced;
- Aircraft operations must follow the Guidelines for the Use of Aircraft at the Prince Edward Islands (Chapter 5, Box 5-5), and vessels and boats must follow the International Association of Antarctic Tour Operators (IAATO) Marine Mammal Watching Guidelines;
- Light pollution at and near the islands must be managed so as to minimise the risk of bird strikes (Chapter 5, section 5.4).

2.2.14 Alien and invasive species management

Invasive alien species are one of the greatest threats to the biodiversity of the PEIs. Because of their impacts and the subsequent need for remediation, they impose a substantial economic burden on the management of the islands. The policy for the Prince Edward Island Special Nature Reserve is to prevent introductions of alien species to the islands as far as possible, and to control further spread of alien species on the islands. Where possible, alien species shall be eradicated and previously invaded sites be restored in order for these sites to resemble or form part of the functioning landscape and ecosystem. Control, eradication and restoration should be done without undue disturbance or damage to indigenous species and natural features. The aim of this policy is to minimise the impact of alien species on indigenous biodiversity and to maintain ecosystem integrity.

This will be achieved by:

- Developing a long-term strategy for the management of invasive alien species, by evaluating the current and projected future threat, by addressing organisational and infrastructural capacity, and by being informed by advances in invasion ecology;
- Anticipating and evaluating risks and pathways of invasion, and developing effective mechanisms to monitor, manage or mitigate these;
- Ensuring the development and implementation of integrated control strategies, so that both rapid response and long-term goals are achieved;
- Promoting and developing a coordinated research programme in order to develop a clearer understanding of the dynamics and impacts of alien species invasions;
- Developing awareness programmes to inform and educate expeditioners to the Prince Edward Islands on the consequences of invasive alien species.

For further details on the implementation of this policy, refer to Chapter 5, sections 5.2 and 5.3.

2.2.15 Wildlife disease management

Diseases can be introduced to animal colonies by means of natural migratory processes or by humans through contaminated food or gear, and can result in large scale mortalities. The policy for the Prince Edward Islands Special Nature Reserve is thus to minimise human-mediated introduction and spread of diseases amongst seal, seabird and shorebirds. Guiding principles are to:

- Maintain the natural fluxes of indigenous diseases as a component of biodiversity;
- Prevent the introduction and/or limit the impact of alien diseases;
- Minimise the human-mediated spread of disease within or between wildlife colonies or individuals at the Prince Edward Islands, and between animals at the Prince Edward Islands and animals elsewhere;
- Develop monitoring systems to prevent the introduction, detect the occurrence of and mitigate the impact of alien diseases;
- Support relevant research into wildlife diseases;
- Develop, regularly review, and implement disease contingency plans;
- Ensure readiness of personnel to respond appropriately and effectively to disease outbreaks;
- Prohibit the return of affected individual animals to the mainland, and the release of rehabilitated individuals to the Prince Edward Islands;
- Prohibit translocations or reintroductions of any animals to Marion Island or to Prince Edward Island, unless this is part of an approved management plan that has been subjected to a thorough risk assessment and environmental impact assessment procedure;
- Adhere to non-interference at the level of the individual animal, unless this benefits a population of conservation concern (the prevention and/or treatment of disease in individual animals may occur during capture or in captive confinement or to mitigate the effects of human induced disease events);

- Establish synergistic relationships with relevant individuals and agencies to develop and implement the disease management policy.

For further details on the implementation of this policy, refer to Chapter 5, section 5.5.

2.2.16 Site rehabilitation

Where there has been human-induced transformation or degradation of sites at the Prince Edward Islands, the Department of Environmental Affairs shall consider the rehabilitation of these sites so that their natural systems will, in the long term, return to a functional and sustainable state. (Examples of human-induced transformation include the invasion of vegetation communities by alien species, and changes in the chemical composition of soil through the accumulation of pollutants.) This will be achieved by:

- Identifying sites that require rehabilitation and ranking these according to their level of importance;
- Identifying the processes that have led to site degradation;
- Determining realistic goals for restoration;
- Developing methods and practical techniques to reverse or ameliorate the degradation, giving preference to natural rehabilitation where this is possible;
- Developing easily observable measures of success to monitor and assess progress;
- Adjusting procedures where necessary.

2.2.17 Protection of species of conservation concern

South Africa supports the International Union for Conservation of Nature's (IUCN) Species Survival Commission in its endeavours to prevent human-induced species extinctions. The Department of Environmental Affairs will therefore strive to prevent extinction of species at the Prince Edward Islands that are listed as globally or regionally threatened or Near Threatened by the IUCN. Furthermore, the Department undertakes to protect and conserve those species that are listed in the Policy for Seals, Seabirds and Shorebirds in South Africa and that breed, pass through or otherwise use the Prince Edward Islands or the territorial waters and the exclusive economic zone of the islands. This will be achieved by:

- Working with other conservation initiatives to secure and strengthen the future of such species over their historic distribution ranges – especially, fulfilling South Africa's commitments to the Agreement on the Conservation of Albatrosses and Petrels and the Convention on the Conservation of Antarctic Marine Living Resources (see Chapter 3);
- Putting in place appropriate monitoring and conservation efforts for threatened and Near Threatened species, and for other species for which no formal red-listing has been done but for which experts have recommended conservation action;
- Supporting research that involves accurate long-term monitoring of fauna and flora populations, including species that migrate through South African waters in the vicinity of the Prince Edward Islands, and supporting the monitoring of ecosystem changes that may affect these populations;
- Establishing a realistic prioritization framework in order to allocate resources sensibly and according to priorities;
- Implementing and regularly reviewing Biodiversity Management Plans for priority species;
- Taking into account IUCN listings during the permitting process for the removal of any organic or inorganic material or species for zoological and botanical gardens or other captive breeding facilities.

Note, however, that except in crucial instances for the survival of globally critically endangered species, management for system integrity and biodiversity shall take precedence over species management.

For further details on this policy, refer to Chapter 5, section 5.6.

2.2.18 Historical resource conservation

The historical resource management policy is to record and preserve sites and objects at the Prince Edward Islands Special Nature Reserve that have cultural, historical and palaeontological significance. This includes all artefacts associated with the 1948 annexation of the islands (including all things associated with that year). Historical resource management shall comprise:

- Identifying, describing and assessing historical sites and objects at the islands; priority should be given to a full survey of the historical sites and artefacts of Prince Edward Islands;
- Drafting of conservation management plans for specific historical resources that have high value, or are at risk, to ensure their management is in line with best practice;
- Seeking and facilitating cooperation with the South African Heritage Resources Agency, Heritage Western Cape, Iziko Museums and other stakeholders and specialists;
- Only authorising historical, archaeological and palaeontological research at the Prince Edwards Islands when this research does not adversely affect natural ecosystems and/or biota;
- Maintain the norms and standards and procedures of the profession in historical research and conservation;
- When planning activities such as developments, take into account and mitigate for negative impacts on historical sites and objects;
- Develop and interpret historical resources so that they contribute to awareness and education.

For details on the implementation of this policy, refer to Chapter 6.

2.2.19 Research[3]

The species and ecosystems of the Prince Edward Islands are in many ways unique and represent one of the few such systems globally. The islands and surrounding ocean have been the focus of a substantial scientific literature over more than 50 years – from a scientific perspective, few South African sites have enjoyed this much research attention. There is much value to be gained from the remarkable knowledge base that has been accrued, the scientific insights derived from this work, the potential for the islands to inform sub-Antarctic conservation policy and to provide the necessary understanding of natural processes and human influences in and around the islands, and the use of the islands as 'laboratories' for studying the responses of terrestrial and marine ecosystems to environmental change. Meteorological, biological and other monitoring activities provide important links to international programmes.

The Department of Environmental Affairs undertakes to encourage and facilitate high quality research to enhance our understanding of the natural environment and history of the Prince Edward Islands, and to contribute to regional and global conservation. Additionally, DEA aims to provide facilities and services for the continued support of scientific research, monitoring and management programmes at the islands. It undertakes to instil professionalism in the management of the research base and research activities. The policy serves to ensure that research is conducted so as to:

- Assure protection of natural ecosystems and mitigate against lasting changes in indigenous wildlife populations or community relationships;
- Ensure that wildlife populations and historic resources remain intact and unmodified;

[3] Chown, S.L. & Froneman, P.W. (eds). (2008) The Prince Edward Archipelago: Land-Sea Interactions in a Changing Ecosystem. Sun Media, Stellenbosch.

- Arrange, facilitate and support a programme of scientific research necessary for better management of the islands;
- Consider likely impacts of research work and describe mitigating measures;
- Ensure that research on animals is conducted humanely (see policy on animal experimentation);
- Avoid conflict with essential management operations;
- Prohibit the collection of specimens except where this is specifically approved and justified as part of scientific research or necessary for management purposes;
- Carry out the NEMBA risk assessment before issuing permits for any organisms or samples to be returned to South Africa.

Furthermore, the Department of Environmental Affairs supports the vision and mission of the Antarctic Research Strategy for South Africa (ARESSA). The vision of ARESSA is to create a demographically balanced Antarctic research programme that strives for global competitiveness, links to other African countries and interdisciplinary research. ARESSA's mission is:

- To develop a national research programme that will produce maximum human capital, innovation and economic growth;
- To increase competitiveness within the context of globalisation;
- To rapidly balance the demographics of researchers, staff and students;
- To create a coordinated interactive effort towards public visibility.

For further details on implementation of the research policy, refer to Chapter 5, section 5.7.

2.2.20 Animal experimentation

Research on vertebrate animals at the Prince Edward Islands shall be guided by the South Africa Medical Research Council's ethics policy on animal experimentation, i.e.:

- The moral dilemma posed by the use of sentient organisms (i.e. organisms with a sensory nervous system) for research, teaching and testing is recognised;
- Support is only given to studies which promise to contribute to the understanding of biology and environmental principles and to the acquisition of knowledge that can reasonably be expected to benefit humans, animals or the environment;
- Animals may only be used when the researcher's best efforts to find a non-sentient alternative have been unsuccessful;
- Optimal standards of animal health and care must be observed to provide good quality results that enhance credibility and reproducibility;
- The "Three R" principles of "Replacement, Reduction and Refinement" must be adhered to in the planning and conduct of animal studies. This implies using the most humane methods on the smallest number of animals that will permit valid scientific information to be acquired;
- The importance of maintaining public confidence in the mechanisms and processes used to ensure necessary humane and humane animal use is recognised;
- Laboratory animals are protected by law in South Africa and their use for education, testing and research must be justified.

In addition, the impact of research on the physical, biological and spatial environment shall be taken into account.

2.2.21 Environmental awareness and education

The Department of Environmental Affairs recognises that general environmental awareness among expeditioners to the Prince Edward Islands, and personnel involved with the management of the Special Nature Reserve, is

imperative for the conservation of the islands. It also recognises that on a broader front, education of the general public of South Africa about the Prince Edward Islands can play an important role in furthering an ethic for sustainable environmental practices. Through its environmental awareness and education policy, Department of Environmental Affairs undertakes to:

- Promote the value of the Prince Edward Islands as a part of the world's natural and historical heritage of regional and global significance;
- Raise public awareness, appreciation and support for the reserve and its role in the Southern Ocean as far as possible through exhibitions, books, popular and scientific articles and other means;
- Promote the use of the reserve as a 'living laboratory' to emerging researchers, while allowing access specifically to previously marginalized people;
- Encourage emerging and established researchers to engage in and contribute towards environmental management issues;
- Enhance the experience of expeditioners to the reserve through environmental interpretation and education;
- Educate expeditioners to the reserve about environmental issues at the islands, so that expeditioners are committed and enabled to contribute to the islands' conservation;
- Build environmental management capacity within Directorate: Southern Oceans and Antarctic Support;
- Integrate environmental education into all training of personnel involved with the South African National Antarctic Programme; and enhance environmental literacy of personnel.

For more information on the implementation of this policy, refer to Chapter 5, section 4.5.

2.2.22 Filming

The Department of Environmental Affairs acknowledges that the public of South Africa must have an opportunity to experience the special attributes of the Prince Edward Islands through a public awareness programme. However, the filming policy must coincide with the aims of a Special Nature Reserve and the management policies of the Prince Edward Islands. Filming will therefore only be allowed under very specific conditions and must be well motivated according to the management objectives of the islands. Refer to Chapter 4 (section 4.8) for the comprehensive filming policy.

Chapter 3: Legal framework

Chapter 3

C·I·B
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3. Legal status

The Prince Edward Islands (PEIs) were formally declared and annexed as part of the Union (now Republic) of South Africa under the Prince Edward Islands Act (No. 43 of 1948). They were declared a Special Nature Reserve in 1995, in terms of the Environment Conservation Act (No. 73 of 1989). The spatial extent of the PEI Special Nature Reserve is described in Chapter 1 (1.4 Spatial Extent of the Special Nature Reserve, and Expansion Strategy). The islands are South Africa's only remote territory and, for the purposes of administering the laws of South Africa, they are considered to be part of the Cape Town magisterial district.

The primary aims for the management of the PEIs are set out here, according to the statutory requirements of the National Environmental Management Act, 1998 (No. 107 of 1998, referred to hereafter as NEMA) and its subsequent amendments, as well as the National Environmental Management: Protected Areas Act, 2003 (No. 57 of 2003, referred to hereafter as NEMPAA) and the National Environmental Management: Biodiversity Act, 2004 (No. 10 of 2004, referred to hereafter as NEMBA). Reference is also made to the National Environmental Management: Waste Act (No. 59 of 2008) and the Integrated Coastal Management Act (No. 24 of 2008).

This MP, as required under Section 11(2) of NEMA, is built upon these objectives, with the aim of protecting the islands' biological diversity and ecological integrity. It sets out the legal, regulatory and practical framework for management of the islands. Through the effective implementation of this MP, it is hoped that the natural values and features of the islands will be perpetuated while valuable scientific research is conducted.

3.1 Objectives for the management of the PEIs

The objectives toward which the PEIs are managed include:

- To ensure the long-term survival and maintenance of biological diversity, including genetic diversity, species diversity and the diversity of ecological processes;
- To minimise human interference with natural processes and the destruction or degradation of natural and historic features and objects;
- To encourage activities aimed at restoring and rehabilitating damage due to local human activities;
- To encourage research that will contribute to understanding effects of human-induced changes, including long term climate change;
- To encourage research and monitoring aimed at the conservation and management of the fauna and flora of the PEIs;
- To ensure that South Africa meets its obligations to, and the provisions of, all international agreements and conventions to which it is a signatory;
- To seek cooperation with all parties interested in the conservation of the Southern Ocean and its islands;
- To create an awareness of the value and fragility of the islands' ecosystems;
- To secure a favourable conservation status of species occurring naturally at the islands;
- To allow scientific research not in conflict with these objectives;
- To apply a risk-averse and cautious approach, taking into account the limits of current knowledge and the consequences of decisions and actions.

3.2 South African legislation

The Prince Edward Islands are afforded several degrees of protection under laws pertaining to the conservation of South Africa's natural and historical heritage.

3.2.1 South African Constitution

The Constitution of the Republic of South Africa Act (No. 108 of 1996) states that everyone has the right to have the environment protected for the benefit of present and future generations. This must be done through reasonable legislative and other measures that prevent pollution and ecological degradation, promote conservation and secure ecologically sustainable development and use of natural resources (Section 24 (b)) while promoting justifiable economic and social development.

3.2.2 National Environmental Management Act (NEMA)

NEMA is the 'umbrella' law governing the environmental management of the Prince Edward Islands. NEMA requires that management of the islands should comply with the principles of co-operative environmental governance as set out in the Act. The PEIs must be managed according to the national environmental management principles as set out in Section 2 of NEMA, along with the objectives of integrated environmental management (Section 24), duty of care (Section 28) and the environmental management co-operation agreements in Section 35.

3.2.3 Environmental Impact Assessment Regulations and Listed Activities

Since 1997, developments that could result in significant environmental pollution or degradation are required to go through a rigorous assessment of their possible effects through the Environmental Impact Assessment (EIA) process. The Second Amendment of NEMA (No. 8 of 2004) repeals all the provisions of the largely repealed and outdated Environment Conservation Act (No. 73 of 1989), which used to control the EIA process. The amendment provides for other assessment tools, such as Basic Assessments and Strategic Environmental Assessments, to be used where appropriate.

In 2006, new EIA regulations were adopted in terms of NEMA (Government Notice No. R. 385 of 2006). The aim of these regulations is to streamline decision-making about applications for developments and to provide for an environmental process that is more flexible to project-specific requirements. These regulations and the notices listing activities were amended and updated in 2010.

In terms of section 24 of NEMA, activities that may not commence without environmental authorisation from the relevant authority and which require either Basic Assessment or Scoping and EIA are listed in terms of the amended NEMA EIA Regulations (Government Gazette No. 33306, 18 June 2010) and which came into effect on 02 August 2010.

3.2.4 National Environmental Management: Protected Areas Act (NEMPAA)

This law upholds the status of Special Nature Reserve given to the PEIs by the now largely-repealed Environment Conservation Act, 1989 (No. 73 of 1989), Section 18. NEMPAA provides for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes. It requires the adherence to national norms and standards applicable to their protection and requires intergovernmental co-operation and public consultation in matters concerning the islands as protected areas.

The land areas of Marion and Prince Edward Islands above the low water mark enjoy the status of a Special Nature Reserve because of the 'highly sensitive, outstanding' nature of the ecosystem (Section 18 (2)(a)). This is the highest level of environmental protection afforded under South African legislation. The protection extends to the air space above the reserve to a level of 2 500 feet above the highest point of the reserve (Section 47 (1)), i.e. Mascarin Peak on Marion Island at 1231 m above sea level.

As a Special Nature Reserve, the PEIs are reserved primarily for scientific research and environmental monitoring (Section 18 (2)(b)). This status may not be withdrawn or the boundaries altered except by resolution of the National Assembly (Section 19).

However, the extent of the Special Nature Reserve only includes land above the low water mark of both Marion and Prince Edward Islands, according to a declaration of the area as a Special Nature Reserve by the Minister in November 1995. The PEI Management Authority and this Management Plan (MP) have no jurisdiction over the waters seaward of the low water mark. All activities taking place in the ocean within 200 nm of the low water mark of the islands are under the jurisdiction of the Department of Environmental Affairs, as of 1 April 2010, all fishing activities are administered by the Department of Agriculture, Forestry and Fisheries. However, in order to protect the coastal (intertidal) and terrestrial environments, this management plan contains recommendations and requirements that extend seaward of the low water mark. These requirements must be adhered to until such time as the marine environment is effectively protected.

The Minister has declared a Marine Protected Area around the PEIs (April 2013) under the Marine Living Resources Act (No. 18 of 1998). The provisions of NEMPAA and its amendments will therefore apply to the management of this marine area.

3.2.5 National Environmental Management: Protected Areas Act Regulations for the Proper Administration of Special Nature Reserves, National Parks and World Heritage Sites

The Regulations for the Proper Administration of Special Nature Reserves, National Parks and World Heritage Sites (Government Regulation No. R 1061 of 2005) promulgated under Section 2 of NEMPAA apply to the PEI Special Nature Reserve. Should the marine protected area around the PEIs come into effect, then the regulations will also apply to the marine protected area.

Authorised officials are exempt from these regulations when they are performing their duties or exercising their powers. A person is also exempt from the regulations pertaining to prohibited activities in the PEIs if he/she is (Regulation 38):

- Performing obligations as an employee, agent or contractor of Prince Edward Islands Management Authority or to achieve the purposes of the regulations;
- Fulfilling duties as an authorised official.

3.2.6 National Environmental Management: Biodiversity Act (NEMBA)

NEMBA provides for the management and conservation of the islands as part of South Africa's biodiversity estate. Any policies or regulations dictating the management of the islands must be in line with the National Biodiversity Framework (Section 48(2)(a)).

3.2.7 Species Listed Under NEMBA

Draft regulations relating to alien species and listed invasive species have been published in terms of Section 97(1)(b), (c), (f) and (h) of NEMBA (Government Notice No. R. 347 of 2009). Included are a list of exempted

species, a list of prohibited alien species and a list of invasive species. Refer to Chapter 5, Table 5-1, for those listed species that occur at the PEIs.

In terms of Section 100 of NEMBA, regulations relating to listed threatened or protected species have also been published (Government Notice No. R. 152 of 2007).

3.2.8 National Environmental Management: Waste Act

This Act (No. 59 of 2008) regulates waste management so that health and the environment are protected. It does this by providing measures to prevent pollution and ecological degradation and to secure ecologically sustainable development. It also makes provision for institutional arrangements and planning matters, national norms and standards for regulating the waste management, and specific waste management measures. The Act provides for the licensing and control of waste management activities, the remediation of contaminated land, and a national waste information system. It also addresses compliance and enforcement.

Under Section 19(1), a list of waste management activities have been published that have, or are likely to have, a detrimental effect on the environment (Government Notice No. R. 409 of 2009).

3.2.9 National Environmental Management: Integrated Coastal Management Act

This Act (No. 24 of 2008) establishes a system of integrated coastal and estuarine management in South Africa in order to encourage the conservation of the coastal environment, sustain the natural attributes of coastal landscapes and seascapes, and ensure that development and the use of natural resources within the coastal zone is ecologically sustainable and socially and economically justifiable. It defines rights and duties in relation to coastal areas and determines the responsibilities of organs of state in relation to coastal areas. Furthermore, it prohibits incineration at sea and controls dumping at sea, pollution in the coastal zone, inappropriate development of the coastal environment and other adverse effects on the coastal environment. The Act also gives effect to South Africa's international obligations in relation to coastal matters.

3.2.10 Policy on the Management of Seals, Seabirds and Shorebirds

The Sea Birds and Seals Protection Act (No. 46 of 1973) governs the management of seals and seabirds within the jurisdiction of South Africa. New legislative amendments will be informed by the Policy on the Management of Seals, Seabirds and Shorebirds (Government Gazette No. R. 1717 of 2007). In this context, seabird refers to all those birds which obtain some of their food from the sea, as opposed to from the intertidal zone.

The general principles of this policy have been included in this Management Plan; these speak directly to the management and conservation of the seals, seabirds and shorebirds which breed, pass through or otherwise use the PEIs or the waters within 200 nm of the high-water mark (namely the territorial waters and the exclusive economic zone). The policy also provides for a coastal zone which extends as far inland and out to sea as is necessary for the conservation and sustainable non-consumptive use of these species. Thus the policy applies to all seals, seabirds or shorebirds breeding in South Africa's coastal zone, or that pass through the 200 nm radius and coastal zone or that use these areas for non-breeding purposes. This includes all species that breed on or pass within 200 nm of the Prince Edward Islands.

The primary objective of this policy is the conservation of these species in South Africa and its waters. The policy prohibits the killing, capture or wilful disturbance of seals and seabirds in this territory. The policy also prohibits the damaging of seabird eggs or collecting of eggs or guano unless permitted by the Minister.

3.2.11 Maritime Zones Act

All sea within a distance of 12 nm (where one nm is equivalent to 1 852 metres) of the low water mark of both islands (Section 4 (1)), constitutes the territorial waters of South Africa (this includes the sea bed and the subsoil (Section 1 (xi). Therefore, all these waters, and the airspace above them, are subject to all laws, including common laws, of the Republic. Furthermore, all sea falling between the 12 nm boundary of the territorial waters and within a 200 nm radius of the low water mark is the exclusive economic zone (EEZ, formerly the fishing zone) of South Africa (Section 7 (1)). All the laws pertaining to territorial waters apply to the EEZ. The Maritime Zones Act also applies to the PEI (Section 14 (1)).

3.2.12 National Heritage Resources Act

All heritage resources on the PEIs are protected by the National Heritage Resources Act (No 25 of 1999). This includes structures over 60 years old, historical and archaeological sites and artefacts (including shipwrecks), graves, palaeontological sites and fossils and meteorites. Heritage resources also include the intangible heritage and cultural landscapes associated with such sites. Artefacts and sites dating back to before the 1948 annexation and those associated with the annexation itself have high historical value.

3.2.13 List of national legislation applicable to the PEIs

The following legislation (as amended) applies.

A. Main Acts
- Sea-shore Act (No. 21 of 1935);
- Prince Edward Islands Act (No. 43 of 1948);
- Sea Birds and Seals Protection Act (No. 46 of 1973);
- Dumping at Sea Control Act (No. 73 of 1980);
- Environment Conservation Act (No. 73 of 1989);
- Maritime Zones Act (No. 15 of 1994);
- Constitution of the Republic of South Africa Act (No. 108 of 1996);
- Antarctic Treaties Act (No. 60 of 1996);
- Marine Living Resources Act (No. 18 of 1998);
- National Environmental Management Act (No. 107 of 1998);
- National Heritage Resources Act (No. 25 of 1999);
- National Environmental Management: Protected Areas Act (No. 57 of 2003);
- National Environmental Management: Biodiversity Act (No. 10 of 2004);
- National Environmental Management: Air Quality Act (No. 39 of 2004);
- National Environmental Management: Integrated Coastal Management Act (No. 24 of 2008);
- National Environmental Management: Waste Act (No. 59 of 2008).

B. Other Acts
- South African Citizenship Act (No. 44 of 1949);
- Hazardous Substances Act (No. 15 of 1973);
- Carriage of Goods by Sea Act (No. 1 of 1986);
- Marine Pollution Act (No. 2 of 1986);
- Municipal Structures Act (No. 117 of 1998);
- National Nuclear Regulator Act (No. 47 of 1999);
- National Energy Regulator Act (No. 40 of 2004);

3.3 International conventions

South Africa is a signatory to several internationally ratified agreements pertaining to biodiversity and its protection, many of which specifically address the sub-Antarctic and Antarctic environments. Section 5 of NEMBA gives effect to those agreements to which the State is bound. Therefore the South African government has the following obligations with regard to the PEIs.

3.3.1 Convention on Wetlands of International Importance (Ramsar Convention)

The PEIs were designated a Ramsar Wetland of International Importance in 2007 – the first Ramsar site in the sub-Antarctic. The Ramsar Convention aims at 'wise use' of wetlands, defined as 'the maintenance of their ecological character, achieved through the implementation of ecosystem approaches, within the context of sustainable development'. The Ramsar Site consists of the whole of the terrestrial areas of the islands of Marion and Prince Edward, along with a 500-m-wide intertidal and kelp-bed zone around each island.

3.3.2 Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR)

CCAMLR, of which South Africa is a signatory, came into force in 1982 as part of the Antarctic Treaty System. The aim of the Convention is to conserve the marine life of the Southern Ocean, where the PEIs are located. Conservation measures adopted by CCAMLR are based on scientific advice and this requires the collection of large quantities of information and the development of appropriate scientific and analytical techniques. The Convention establishes a Commission to manage marine living resources. Members of the Commission are involved in fishing and/or scientific research in the Southern Ocean. These activities are coordinated and regulated by the Commission and a Scientific Committee, to fulfil Members' obligations under the Convention. South Africa is represented on the Commission and the Committee.

3.3.3 Bonn Convention: Agreement on the Conservation of Albatrosses and Petrels (ACAP)

ACAP, a multilateral agreement to which South Africa is a party, was negotiated under the Convention on the Conservation of Migratory Species of Wild Animals (CMS, or Bonn Convention) and came into force in 2004. ACAP seeks to conserve albatrosses and petrels by coordinating international activity to mitigate known threats to populations of these seabirds. It aims to stop or reverse albatross and petrel population declines by coordinating action between Range States to mitigate known threats. To this end, the agreement includes an Action Plan that describes a number of conservation measures which Parties should implement. These include research and monitoring, reducing incidental mortality in fisheries, eradicating non-native species at breeding sites and reducing disturbance, habitat loss and pollution.

3.3.4 List of international conventions applicable to the PEIs

- African Convention on the Conservation of Nature and Natural Resources (Algiers Convention);
- Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea;
- Antarctic Treaty:
    - Protocol on Environmental Protection to the Antarctic Treaty;
- Basel Convention (control of trans-boundary movements of hazardous wastes and disposals);
- Bonn Convention - Convention on the Conservation of Migratory Species (CMS):
    - Agreement on the Conservation of Albatrosses and Petrels (ACAP);
    - Biosafety Protocol;

- Convention for the Conservation of Antarctic Seals (CCAS);
- Convention on Biological Diversity (CBD);
- Convention on International Trade in Endangered Species (CITES);
- Convention on Prevention of Dumping of Waste from Ships and Aircraft;
- Convention on the Prevention of Marine Pollution by Dumping Wastes and Other Matters (London Convention);
- Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR);
- Convention on Wetlands of International Importance (Ramsar Convention);
- International Convention for the Prevention of Pollution from Ships, 1973 (MARPOL);
- International Code for the Security of Ships and Port Facilities (ISPS);
- International Convention for the Regulation of Whaling (ICRW);
- International Plan of Action for Reducing Incidental Catch of Seabirds in Longline Fisheries of the Food and Agriculture Organization of the United Nations (FAO IPOA-Seabirds);
- Kyoto Protocol to the United Nations Framework Convention on Climate Change;
- Montreal Protocol - Protocol for the Protection of the Ozone Layer Ratified;
- Paris Convention on Prevention of Marine Pollution from Land-based Sources;
- United Nations Convention on the Law of the Sea (UNCLOS);
- United Nations Framework Convention on Climate Change (UNFCCC).

PART TWO: PEIMP STRATEGIC PLAN

Chapter 4: Administration

PRINCE EDWARD ISLANDS MANAGEMENT PLAN

Chapter 4

C·I·B
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PART TWO : STRATEGIC PLAN

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Relevant legislation

- National Environmental Management Act (No. 107 of 1998) (NEMA)
- National Environmental Management: Protected Areas Act (No. 57 of 2003) (NEMPAA)
- National Environmental Management: Protected Areas Act Regulations for the Proper Administration of Special Nature Reserves, National Parks and World Heritage Sites (No. R 1061 of 2005) (NEMPAA Regulations)
- National Environmental Management: Biodiversity Act (No. 10 of 2004) (NEMBA)
- National Environmental Management Regulations (No. R 385 of 2006) (EIA Regulations)
- Prince Edward Islands Act (No. 43 of 1948)
- Marine Living Resources Act (No 18 of 1998)

The objective of this chapter is to provide the level of management necessary to achieve the stated objectives of legislation, policy and the Prince Edward Islands Management Plan (PEIMP).

The management of the Prince Edward Islands (PEIs) is governed by NEMA, NEMPAA and NEMBA, among others. NEMBA addresses biodiversity protection, management and monitoring on the islands, while NEMPAA and its regulations set out requirements and precise mechanisms for management of Special Nature Reserves.

The Department of Environmental Affairs, DEA (until 2010, the Department of Environmental Affairs and Tourism, DEAT), the custodian of the PEIs, is responsible for the management of the islands in accordance with legislation and the PEIMP.

In terms of NEMPAA, the Prince Edward Islands Management Authority is the legal instrument for managing the islands. The Minister of DEA is by default the Management Authority, but this responsibility is assigned (under NEMPAA Section 38 (1)) to the DEA Chief Directorate: Ocean Conservation, which is responsible for the overall management of the South African National Antarctic Programme (SANAP), including the Prince Edward Islands and associated logistic operations. The Director: Southern Ocean and Antarctic Support (D: SO&AS) within the Ocean Conservation Chief Directorate manages the PEIs according to the conservation, management and development principles laid out in all national legislation, but specifically in NEMPAA and the regulations promulgated in terms of NEMPAA.

NEMPAA (Section 38 (4)) requires that 'marine and terrestrial protected areas with common boundaries must be managed as an integrated protected area by a single management authority'. Should a marine protected area around the PEIs come into effect, then certain provisions of NEMPAA (No. 31 of 2004) will also apply to the management of the marine protected area.

Chapter 4

4.1 Institutional arrangements

As the management authority, DEA is responsible for conservation management at the islands, including the issuing of permits and the identification of key research areas that need to be addressed to inform conservation management. DEA may interact with experts or organizations in specialist areas. For example, DEA may interact with the South African Heritage Resources Agency and Heritage Western Cape regarding historical artefacts and archaeological sites on the PEIs.

D: SO&AS is responsible for the logistic aspects of all operations at the PEIs. The National Department of Public Works (NDPW) is responsible for maintenance and construction activities at the islands, carried out under the supervision of D: SO&AS

The Department of Science and Technology (DST) in consultation with DEA sets the research strategy for SANAP. The strategy is administered by the National Research Foundation (NRF) which is responsible for, inter alia, the coordination and evaluation of research proposals and completed research and the allocation of research funding. SANAP is also closely aligned to the objectives for Antarctic research set out by the Scientific Committee for Antarctic Research (SCAR), and these are communicated to the South African community by the South African National Committee for SCAR (SANC for SCAR).

In addition to SANAP projects, DEA conducts, participates in and authorises research and monitoring on the PEIs in line with the Department's strategic plan and objectives, which support and further the objectives and vision of this Management Plan.

The South African Weather Service (SAWS) undertakes meteorological observations (surface and upper air) at Marion Island and archives the data.

Figure 4-1 illustrates the institutional arrangements for the management of the PEIs, and the chain of command during annual relief voyages is illustrated in Figure 4-2.

4.1.1 Environmental Management: Prince Edward Islands Management Authority

As the Prince Edward Islands Management Authority, the Department of Environmental Affairs (D: SO&AS) is responsible for:

- Managing the PEIs, including implementation of the PEIMP;
- Issuing permits/exemptions for access and activities, issuing protected area notices, imposing conditions on activities regulated by NEMPAA, and drafting internal rules;
- Recording decisions, proceedings, correspondence, permits/exemptions, reports and publications;
- Implementing and maintaining an efficient and accessible information management system;
- Controlling and eradicating invasive alien organisms;
- Facilitating cooperative governance by harmonising the PEIMP with other management plans and national and international documents and agreements.

A. Conservation and management of the islands

DEA must manage the PEIs exclusively for the purpose for which it was declared and in accordance with this PEIMP, NEMA, NEMBA, NEMPAA, and any other applicable legislation (NEMPAA, Section 40). DEA may amend this PEIMP by agreement with the Minister, or may enter into an agreement with another organ of state, individual

or other party in order to co-manage the PEIs or to regulate human activities there (NEMPAA Section 42). In accordance with the prescribed norms and standards, DEA may make rules for the proper administration of the area that are consistent with NEMPAA and with the PEIMP (NEMPAA Section 52). These conditions are binding on everyone who visits the islands.

B. Evaluation of research proposals and outcomes

In addition to its responsibilities as the conservation and management authority for the island, DEA reviews proposals for research to be carried out on the islands in terms of their conservation management and logistic implications. DEA also evaluates the related work plans submitted in advance of the annual relief voyage, in terms of their potential impacts on the conservation and management of the islands. Initial recommendations regarding predicted impacts must be reviewed and followed up when research progress reports are submitted to DEA following the relief voyage. DEA must determine whether the anticipated impacts or other, unforeseen impacts took place and the severity of the impacts. This evaluation should be a standard item on the agenda of PEIs Management Authority meetings and must inform the evaluation of future research proposals.

DEA may identify high-priority research projects that are required to provide information useful for management purposes (e.g. control and eradication options for invasive species; long-term impacts of paths; biodiversity monitoring). If approved, calls for research proposals to address the high priority issues can be made by DST-NRF, and applications reviewed by DST-NRF in consultation with DEA.

C. Evaluation of reports

DEA also reviews all reports by Environmental Control Officers, Chief Scientists, the Departmental Coordinating Officer and all Group Leaders, towards continual improvement of environmental conservation and management at the islands.

D. Issuing of access and special use permits

DEA has full management powers and is the permitting authority for the islands. This enables DEA to evaluate the potential environmental impacts of all proposed activities, whether scientific, management, logistic, maintenance, construction or filming, and to coordinate and prioritise their accomplishment. The permitting function of DEA is a particularly important responsibility when applied to Prince Edward Island, which, if it is to remain in its nearly pristine state, must be protected from undue human influence and carefully monitored.

The NEMPAA regulations (Section 35) allow DEA as the management authority to determine activities for which special use permits are required. DEA's internal rules for the PEI special nature reserve must list the activities and conditions covered by such permits. Templates for key forms relating to the permitting function of DEA are available (Appendix, section 2).

E. Zoning of the islands

DEA will regularly update the zoning map of the islands and maintain a list and map of zones. DEA will be responsible for making changes to the boundaries of and activities allowed in the management zones, for issuing entry permits/exemptions to the various zones and for imposing conditions on visitors to the management zones. The management zones and the activities permitted in each zone are described in Section 4.7.

F. Environmental impact assessment and management

DEA must adhere to the legally prescribed NEMA Environmental Impact Assessment (EIA) Regulations for any listed activities on these islands, draft any necessary rehabilitation plans, report on bulk fuel spillage and wildlife disease outbreaks, and advise the Director-General on quantities of fish to be taken for research purposes. The EIA process used on the islands must be in compliance with the general objectives of integrated environmental

management (NEMA, Chapter 5), the requirements for environmental authorisation of activities (NEMA, Section 24(2)(b)) and the prescribed procedures for the investigation, assessment and communication of potential environmental impacts in the regulations under NEMA, Section 24(5).

G. Protected area notices

DEA may issue a protected area notice (a written notification or internal rule) under which any area in the Special Nature Reserve may be designated as an area in which one or more otherwise prohibited activities may take place (NEMPAA Regulations, Section 23), as well as specify the times at which these activities may take place. The protected area notice must be displayed prominently in and around the designated area. A protected area notice may impose conditions in relation to the listed activities, and may vary or revoke a previous protected area notice.

H. Advisory committees

According to Section 50 of the NEMPAA regulations, DEA may establish one or more advisory committees in respect of the Special Nature Reserve. In establishing an Advisory Committee DEA must invite nominations from affected parties or persons for membership consideration, ensure that this invitation reaches all affected parties and prescribe the minimum requirements and other criteria which will be taken into consideration when deciding who will be appointed to the Advisory Committee. The invitation to submit nominations must specify the method of submission and a date by which such nominations are to reach DEA.

DEA must, after considering any nominations submitted by affected parties, appoint members to the Advisory Committee, provided that appointments are based on demonstrated real interest by the nominated person in respect of the Special Nature Reserve (NEMPAA Regulations, Section 53). At least one DEA representative must serve *ex officio* on the Advisory Committee. South Africa-based members of relevant structures of the Agreement on the Conservation of Albatrosses and Petrels, Commission for the Conservation of Antarctic Marine Living Resources, Scientific Committee on Antarctic Research, Antarctic Treaty Consultative Meeting, Committee for Environmental Protection and International Union for Conservation of Nature (especially its Antarctic Advisory Committee) could usefully be co-opted onto advisory committees. The Advisory Committee or committees should be chaired by a Committee member who is not an employee of the four major state entities involved in activities at the islands, i.e. the Department of Environmental Affairs, the Department of Science and Technology, the National Research Foundation and, the National Department of Public Works. The chair should also not be an employee of a contractor rendering logistic services to the Department.

DEA must define the mandate of any Advisory Committee in writing. This includes the terms of reference, the method of communicating advice, the acceptance and rejection of advice, the appointment and removal of Committee members and the support to be provided, together with any remuneration payable and its terms. A member of an Advisory Committee can be appointed for any period, as determined by DEA, but not exceeding three years (NEMPAA Regulations, Section 55). DEA has the right to co-opt the necessary expertise onto advisory committees.

The main ~~A~~dvisory Committee should meet a minimum of twice a year, with at least one of these meetings being held sufficiently in advance of the annual relief voyage to allow for review of work plans (the latter described in SANAP 3 form, Appendix, 2.6) by the PEIAC and issue of entry permits by DEA.

General advisory committees that are not specifically linked to a Special Nature Reserve may also be appointed, in which case DEA must invite submissions from duly qualified and interested persons in accordance with the specified mandate of the particular Advisory Committee.

I. Implementation and review of the PEIMP

The requirements of management plans are described in Section 41 of NEMPAA. According to Section 41, the objective of a management plan is to ensure the protection, conservation and management of a protected area in accordance with the Act and the purpose for which it was declared.

In addition to the requirements of Section 41, DEA must have due regard for terms and conditions for conducting activities, prohibited activities, threats arising from activities, equitable access in respect of such activities and the sense of place, which must be defined in the PEIMP. DEA must also have due regard for and seek to integrate and harmonise management plans with the requirements of NEMPAA and, where applicable, with plans in terms of other national legislation (NEMPAA Regulations, Section 57). A comprehensive review and revision of the PEIMP is required every four years (NEMA, Section 11(2)).

When revising the PEIMP in future, DEA must have due regard for (NEMPAA Regulations, Section 57 (2)):

- Terms and conditions for conducting activities;
- Prohibited activities;
- An assessment of the activities and an evaluation of material threats arising from these;
- An assessment of equitable access in respect of such activities;
- The ability of such activity to attract visitors (in this case, only in terms of researchers, authorised officials and legitimate education/news personnel);
- A sense of place.

The PEIMP must adhere to the format and guidelines set by the Minister (NEMPAA Regulations, Section 57 (3)).

J. Revenue requirements

When determining the revenue requirements on which to base its licence or permit fees, DEA must take into account the need to recover the costs of contracted-in professional services, overheads, operational and maintenance costs, cost of capital not financed through any grant, subsidy or donation, and provide for the replacement, refurbishment and extension of facilities. DEA must also ensure that there are adequate systems for monitoring such costs (NEMPAA Regulations, Section 59 (1)).

K. Internal rules

DEA may make rules for the proper administration of the Special Nature Reserve in addition to the provisions of the PEIMP. When doing so, DEA must consider the impact of these rules on the provisions of the PEIMP as well as the environmental, social and financial effect of the rules on the environment (NEMPAA Regulations, Section 56).

DEA may determine activities in Special Nature Reserves for which special use permits are required, and may impose permit conditions it deems appropriate from time to time, including but not limited to, the imposition of fees for issue of special use permits.

When DEA draws up internal rules for the PEIs, these must include (NEMPAA Regulations, Section 35):

- A list of activities for which a permit is required;
- Conditions pertaining to such permit for each activity;
- Fees, if any, to be paid for such a permit.

All persons within the Special Nature Reserve shall comply with all internal rules issued by D: SO&AS or an authorised official. No one may hinder or obstruct D: SO&AS or authorised official in the execution of their duties or violate, refuse or fail to obey or comply with any prohibition, request or instruction imposed by the regulations or by D: SO&AS or authorised official.

No-one other than an authorised official acting under the specific authority of DEA may take a firearm, dangerous weapon, explosive, trap or poison into the Special Nature Reserve. Where an authorised official does so, it must be according to the access provisions of Section 46 of the NEMPAA and the firearm provisions of NEMPAA regulations (Section 44 (1)). An authorised person may discharge a firearm within the Special Nature Reserve where that person is authorised by DEA to do so (including for the collection of specimens for scientific purposes) or to give a distress signal (NEMPAA Regulations, Section 44 (2)).

An authorised government official may at all reasonable times enter the Special Nature Reserve to undertake an inspection, investigation or test which may be necessary for its mandate. Where this involves entering Prince Edward Island, DEA must commit the reason for authorising the official's entry to the zone to writing and assure itself that the potential benefits outweigh the need to limit visits to the island.

L. Performance and monitoring

According to NEMA Section 16, the D: SO&AS must, within four months of the end of each financial year, report to the Director-General of DEA on how it has implemented and performed in relation to the PEIMP (NEMA, Section 16). NEMPAA provides for the Minister to prescribe:

- Norms and standards for the achievement of any of the objectives of the Act, including for the management and development of protected areas;
- Indicators to measure compliance with those norms and standards;
- Reporting requirements for protected area management authorities (in Section 11).

The Minister may establish indicators for monitoring the management of the PEIs and the conservation of its biodiversity (NEMPAA, Section 43). The Minister may also appoint external Auditors to monitor DEA's compliance with the overall objectives of the PEIMP.

According to Section 49, the Minister must designate monitoring mechanisms and set indicators to determine the conservation status of various components of South Africa's biodiversity and any negative and positive trends affecting the conservation status of the various components. The Minister may require any person, organisation or organ of state involved in monitoring to report regularly to him/her on the results measured against the predetermined indicators. Specific indicators and reporting formats are not specified in NEMA.

The DEA Directorate: Integrated Environmental Authorisations will monitor compliance and audit all issues pertaining to the conservation management of the PEIs, and will be represented on the PEIAC.

This PEIMP is the starting point for the development of performance and state of the environment indicators for the islands by identifying the management goals, objectives, actions and targets and monitoring mechanisms that are necessary for effective and efficient management of the islands and their biodiversity estate. The PEIMP also sets out a management framework of responsibilities and reporting schedules. Further development of performance or state of the environment indicators is outside the scope of this PEIMP.

M. Management of boundary areas adjacent to the PEIs

According to Section 38 of NEMPAA, marine and terrestrial protected areas with common boundaries must be managed as an integrated protected area by a single authority. In light of this requirement, and the fact that the Prince Edward Islands Marine Protected Area has been declared (April 2013), the PEIMP makes the following provisions:

- The PEIMP will apply up to the low water mark of Marion and Prince Edward Islands;
- The Marine Protected Area's boundary and management policies will apply;
- No vessel, other than the permitted supply ship and its ancillary craft, may come within 500 m of the coastline of Marion or Prince Edward Island;
- No unauthorised aircraft may approach within 500 m of either island or may fly over either island at an altitude of less than 2500 feet;
- No vessel may discharge ballast water, bilge water, slop, fuel, oil or waste, including poultry or poultry-derived products, within 12 nm of either island.

N. Termination of mandate

If DEA i.e. D: SO&AS fails in its duties in terms of the PEIMP, or is under-performing in the management of the area or its biodiversity, the Minister must notify DEA in writing of this failure or underperformance and direct DEA (D: SO&AS) to take corrective steps within a specified time period. If these steps are not achieved, the Minister may terminate DEA (D: SO&AS's) mandate and assign it to another organ of state (Section 44).

4.1.2 Environmental management: Other

A. Directorate: Integrated Environmental Authorisations (D: IEA)

This directorate within DEA is responsible for the implementation of NEMA and the EIA Regulations, and other environmental management tools, for South Africa. In terms of the PEI, the role of D: IEA encompasses the administration of the EIA process and decision-making on proposed listed activities. D: IEA will monitor compliance and audit all issues pertaining to the conservation management of the PEIs. D: IEA's mandate will be to coordinate and ensure continuity in the conservation management of the islands, to facilitate the training of Environmental Control Officers (ECOs) and to liaise, where necessary, with the Overwintering (Team) ECO on Marion Island.

B. Environmental Management Inspectors (EMIs)

Under the National Environmental Management Amendment Act (No. 46 of 2003) the Minister may appoint or designate any staff member of DEA or any other organ of state as an EMI. The Minister may, at any time, withdraw an EMI designation. The functions of EMIs are to monitor and enforce compliance with laws within their jurisdiction, and investigate any act or omission where there is reasonable suspicion that it might constitute an offence or breach in terms of laws or permits. The EMI must carry out his/her duties and exercise his/her powers in accordance with any instructions issued by the Minister and must exercise his/her powers in a way that minimises any damage to or loss or deterioration of any premises or thing.

Should an EMI visit the PEI or the premises of D: SO&AS, he/she must be allowed access to all personnel, documents, reports and records or and other material or specimens. The EMI may remove specimens, articles or other substances which, on reasonable suspicion, may have been used in committing an offence in terms of the applicable laws or breaching a term or condition of a permit. He/she may take photographs or audio-visual recordings of anything or any person that is relevant to an investigation. An EMI must provide a receipt for any documentation or specimens removed in terms of this Act and return these again within a reasonable period or at the conclusion of any relevant criminal proceedings.

In addition to the powers set out here, an EMI has all the powers assigned to a police official who is not a commissioned officer (Sections 2, 5, 7 and 8 of the Criminal Procedure Act, 1977).

4.1.3 Research

The research activities of SANAP are the responsibility of DST and NRF. They set strategy for research in the broader Antarctic and sub-Antarctic regions in which South Africa has an interest. They coordinate applications for funding, the provision of funding and research reporting. Island-based personnel that are attached to SANAP-approved research projects are appointed by DEA. DEA has its own Research Chief Directorate which may in addition authorise projects within the PEIs, either by its own staff or external institutions.

A wide variety of research institutions are involved at the PEIs. These include South African universities, museums, and other government and parastatal organisations and science councils.

4.1.4 Weather recording

The South African Weather Service (SAWS) provides the equipment and staff required to collect both ground-based and upper air meteorological information at Marion Island. This information is returned to SAWS and is archived by them.

4.1.5 Logistics

A. General operations

D: SO&AS is responsible for logistic operations at the islands. These include supplying and provisioning the Marion Island base and field huts, the annual relief voyage and appointment of staff on the overwintering team. This Directorate is also responsible for managing the government stores at Cape Town and Pretoria (used by both DEA and NDPW), appointing waste management contractors, and appointing pest control contractors who inspect and supply bait stations and traps on the supply vessel and at the stores.

B. Maintenance

NDPW is responsible for maintenance of the infrastructure at Marion Island. They typically send staff with the annual relief and train the Diesel Mechanic who is responsible for maintenance of the infrastructure over the year.

C. Supply vessel

The regular supply vessel to the Prince Edward Islands is the *SA Agulhas II*, which also operates between Cape Town and SANAP's other bases on Gough Island (in the Tristan da Cunha group) and in Antarctica (SANAE IV). The *SA Agulhas II* is owned by DEA and is currently operated by Smit Amandla Marine under contract to DEA.

The supply vessel operator is responsible for running and maintaining the vessel to standards specified by D: SO&AS. Similar requirements should be applied to all vessels used at the islands. The vessel operator is bound by international and national waste management standards and must maintain up-to-date Rodent Free Certification at all times.

From time to time other government and chartered private supply vessels have been used to access the islands. In emergency situations, such as casualty evacuations, South African Navy vessels may visit the islands. Fishing vessels have also been used in the past to deliver parcels to Marion Island, to consult with the island's medical officer and to anchor (and previously fish) within territorial waters. Such activities may be allowed under exceptional circumstances with permission from DEA but will be subject to the strictest quarantine conditions.

E. Port Authority

Lexshell 44 General Trading (Pty) Ltd, trading as The Victoria and Alfred Waterfront, is responsible for the wharf (East Pier, V&A Waterfont, Cape Town) used by the *SA Agulhas II*. This includes responsibility for waste management, security, maintenance, lighting and other infrastructure.

F. Helicopter support

There is no airstrip on the PEIs, and most transport of personnel and cargo between ship and shore is by helicopter. SANAP's current helicopter service provider is Starlight Aviation. During relief voyages, air support is provided by a dedicated helicopter crew of pilots and technical personnel. Typically, two helicopters are used, with the type varying on particular logistic needs at the island.

4.1.6 Department of International Relations and Coordination

The Department of International Relations and Coordination plays a political role in the fulfilment of international commitments to the applicable international treaties, conventions, etc (see Chapter 3).

Figure 4-1. Organogram showing key players in management of the PEIs

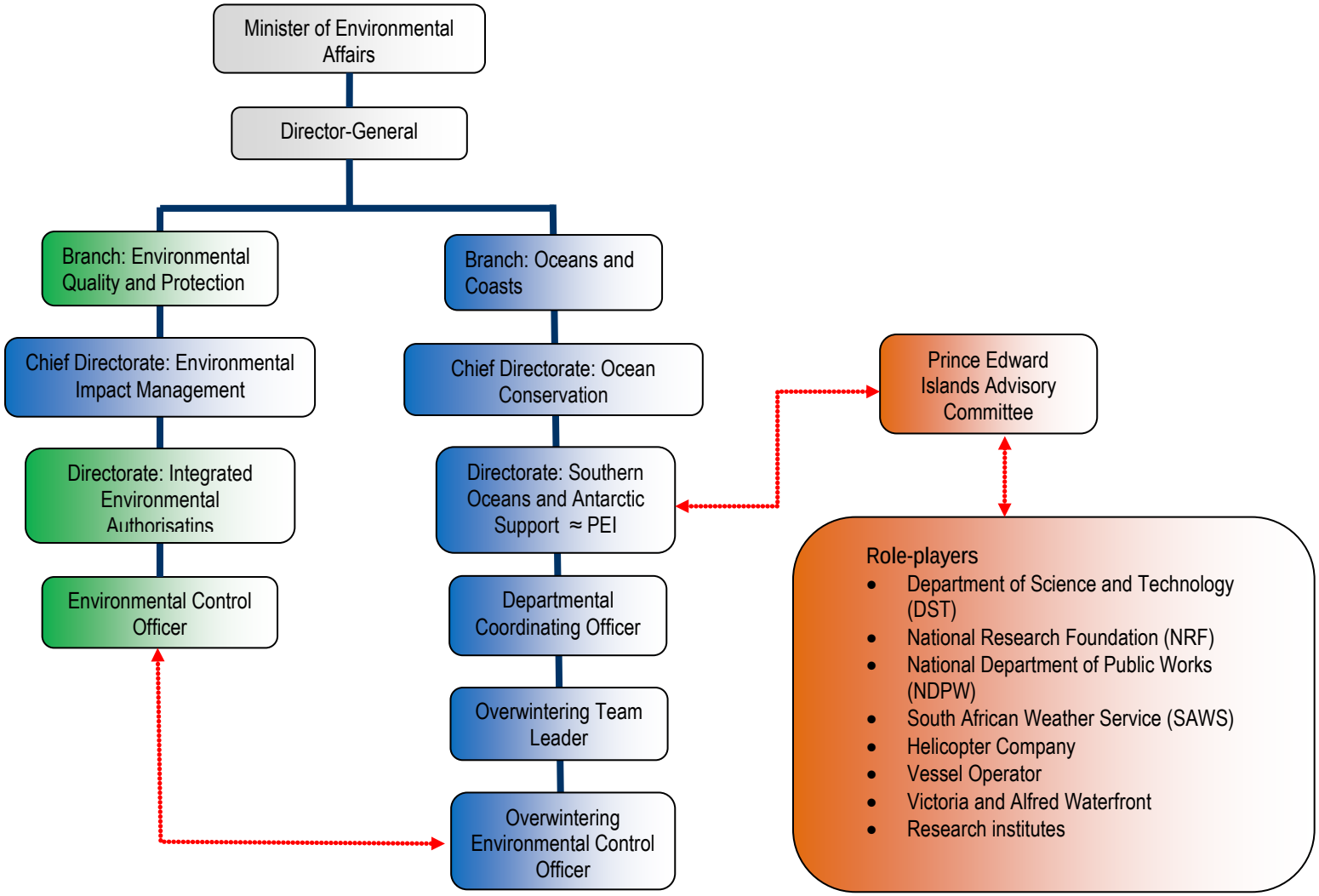
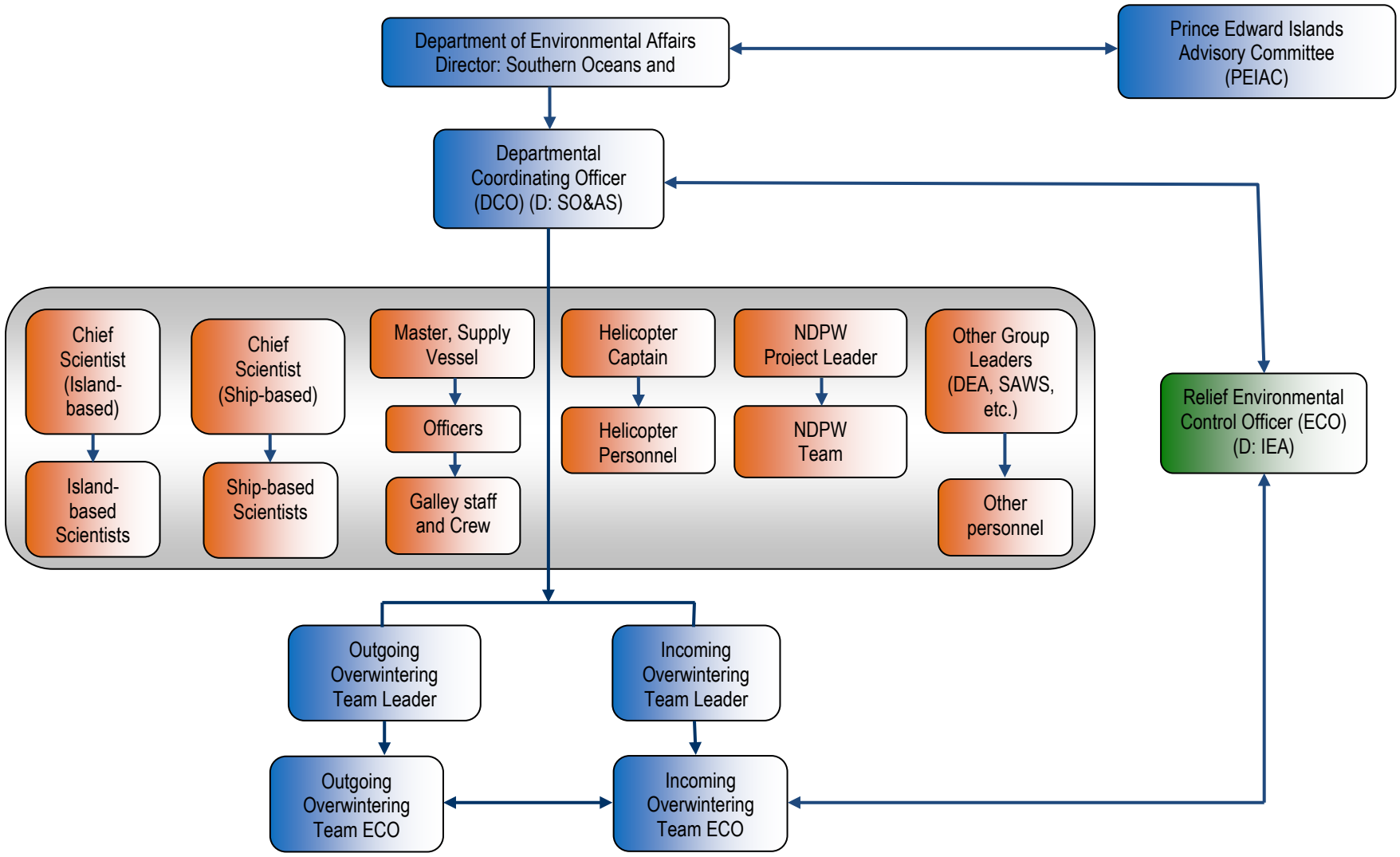


Figure 4-2. Organogram showing chain of command during relief periods at the PEI



4.2 Documentation and record keeping

In order to facilitate open and transparent management practices and scientifically informed decisions about research on and management of the PEIs, all documentation must be centralised and regularly updated.

4.2.1 PEI information access

D: SO&AS must ensure that all documentation pertaining to the administration and scientific research of the PEIs is available in keeping with national legislation. D: SO&AS will adopt a set of processes, in conjunction with the Department of Science and Technology and with the National Research Foundation which will ensure that all documentation pertaining to the administration and scientific research of the PEIs is secured.

Documentation to be secured includes the following:

- All applicable decisions made by DEA, DST etc.;
- All correspondence between tiers of management, logistics and scientists;
- PEIAC meeting minutes;
- PEIMP and related SANAP documentation;
- All scientific papers and unpublished reports concerning the PEIs and/or its biota;
- All audiovisual and other material (e.g. informative CDs) concerning the PEIs and/or its biota;
- All reports by the DCO, ECO and Chief Scientist, and related correspondence;
- All reports from students and scientists to Group Leaders and Chief Scientists;
- All disciplinary documentation;
- All permit applications, issued permits, and the reasons for denial of permits;
- All relevant popular articles, including books, magazines, press clippings and monthly newsletters produced by the team members;
- All maps, charts, building plans, etc.;
- All inventories (e.g. museum collection).

Documentation should be stored and archived in such a way that it is readily accessible electronically to all interested and affected parties, bearing in mind that some information may be confidential or embargoed for a given period. Such access is required by the Promotion of Access to Information Act (Act 2 of 2000), and is in keeping with the spirit of the Antarctic Treaty.

A. Scientific information

Copies of scientific papers and unpublished reports including researchers' progress reports must be archived by DEA within two months of being received. In the case of peer-reviewed publications, the final publication must be submitted by the relevant researchers, if possible in both paper and electronic format (e.g. Portable Document Format - PDF).

B. Management records and reports

Copies of all finalised reports and meeting minutes must be filed by DEA within two months of being received. In the case of peer-reviewed publications, the final publication must be submitted, if possible in both paper and electronic format (e.g. Portable Document Format - PDF).

C. Management plans, reviews and audits

Copies of all management plans, amendments, reviews, audits and other reports must be archived electronically and in hard copy. The information should be made readily available (as appropriate) to team members, the PEIAC and all others who have a genuine interest in the conservation management of the islands.

D. Marion Island base library

Electronic and hard copies of pertinent available information should be made accessible at the Marion Island base. The information should be updated annually at a minimum, but more regularly should the electronic communication facilities improve.

4.2.2 Protected areas register

The Minister maintains a register of all protected areas (NEMPAA, Section 10). NEMPAA regulations require that DAI submits an annual report to the Minister, detailing the protected area under its control. This must be done within three months of the end of the financial year and according to a prescribed format (NEMPAA Regulations, Section 3).

4.2.3 Data collection

Before the end of June each year, DEA must report to the Minister on all biological resources used during the preceding financial year (NEMPAA Regulations, Section 7). This must include:

- The number of licences, permits and agreements granted or entered into in respect of the use of biological resources;
- A description of the biological resources used;
- Quantities of biological resources harvested;
- Income generated by the harvesting of biological resources;
- Conservation status of the biological resources being exploited.

4.3 Environmental roles and responsibilities

DEA is assigned by the Minister to oversee the management of the PEIs. D: SO&AS coordinates the provision of all facilities and logistic support for personnel working on the PEIs. DEA appoints all staff to the islands, with the exception of meteorological observers (appointed by SAWS), the Diesel Mechanic (NDPW appointee) and certain research personnel who may be appointed by other institutions (e.g. universities). D: SO&AS appoints a Team ECO and Team Leader to the overwintering team, and designates a Chief Scientist and Departmental Coordinating Officer during the annual relief period.

4.3.1 Environmental Control Officers (ECOs)

Full descriptions of the duties and responsibilities of all personnel below are available (Appendix, section 3).

A. Relief ECO

D: IEA will designate a Relief ECO and/or a suitably trained and deputised *ad hoc* ECO to accompany all relief and/or *ad hoc* voyages to the islands. The functions of this ECO are to monitor compliance with and audit the implementation of the PEIMP. If necessary, this will be done in liaison with D: IEA. The ECO must be familiar with the islands and their conservation needs and must be thoroughly familiar both with the spirit and the provisions of the PEIMP. This ECO will submit a report to D: SO&AS within 30 days after the completion of the voyage.

B. Team ECO

A full-time Team ECO will be appointed to the over-wintering team by D: SO&AS ~~DAI~~, in consultation with D: IEA. The Team ECO is responsible for all conservation issues at the PEI during the over-wintering period, operates from the Marion Island base and reports through the Team Leader (TL) to D: SO&AS on a monthly basis throughout the year on all conservation matters. D: SO&AS will ensure that these reports are circulated to D: IEA and the PEIAC for input. The responses of D: IEA and PEIAC to the issues that are raised must be conveyed by D: SO&AS to the TL and Team ECO. The duties of the Team ECO include ensuring that the PEIMP is implemented on the island, implementing and monitoring many of the actions described in the PEIMP and working closely with the TL to deal with environmental emergency situations, waste spills or disease outbreak. The Team ECO will also conduct conservation management-orientated research and monitoring, as required and approved by D: SO&AS.

In the case of an emergency situation where the provisions in the PEIMP could not be adhered to, the Team ECO or TL must notify D: SO&AS in writing within 24 hours. It is also the responsibility of the ECO and TL to ensure that the policies of the PEIMP are complied with and that all infringements are reported promptly to the D: SO&AS.

The Team ECO must be familiar with all the provisions of the PEIMP and is trained by D: IEA in the implementation thereof. Supplementary training by the relevant experts may be required for particular projects or tasks. The team ECO must show a good grasp of the relevant issues before being formally appointed or departing for the PEIs.

During an annual relief, there are two Team ECOs present at the Marion Island research base. During this period the outgoing Team ECO will retain the senior position until his or her authority is officially transferred to the incoming Team ECO at the formal handing-over ceremony towards the end of the relief period.

C. Project ECO

The D: IEA may designate a Project ECO for all special projects at the islands, such as construction and decommissioning, to oversee all issues related to environmental management. The Project ECO will accompany all associated voyages to the PEIs. This ECO must be familiar with the islands and their conservation needs and must be thoroughly familiar both with the spirit and the provisions of the PEIMP, as well as any other environmental authorisations, environmental management plans or related conditions that apply. This person is trained by D: IEA.

The position of Project ECO must not be assigned to a person (other than the relief ECO) who is already appointed to another task or job description on the voyage or the construction process. The Project ECO liaises closely with the DCO and Team ECO and submits voyage reports within 30 days of the end of the voyage to D: SO&AS for comment. In between voyages, the Team ECO reports on these activities in the monthly reports to D: SO&AS.

D. *Ad Hoc* ECO

D: IEA may designate *Ad hoc* ECOs at any time to assist the Relief, Project and/or Team ECOs in performing their duties during any voyages to the PEI. Such *Ad hoc* ECOs must be suitably qualified. They will report directly to the Relief, Team or Project ECO at all times and, where deputised to do so, may act on behalf of these ECOs.

4.3.2 Team Leader (TL)

The TL must be familiar with all the provisions of the PEIMP and is the final enforcement officer on the islands during the over-wintering period, except with regard to conservation / environmental management decisions,

which lie with the Team ECO. The TL's duty is to ensure that all visitors comply with the conditions of their permits and that the activities of persons visiting or stationed on the islands are controlled. It is also the TL's responsibility, in conjunction with the Team ECO, to ensure that the policies of the PEIMP are complied with and that all infringements are reported promptly to D: SO&AS and D: IEA.

During an annual relief, there are two TLs present at the Marion Island research base. During this period, the outgoing TL will retain the senior position until his/her authority is officially transferred to the incoming TL at the formal handing-over ceremony towards the end of the relief period.

4.3.3 Departmental Coordinating Officer (DCO)

The DCO is responsible for the coordination of all activities during relief and other voyages to the PEIs and is the final decision-making authority at the islands during these visits. However, decisions pertaining to the management of the islands, or which might be in conflict with the provisions of D: SO&AS must be taken in consultation with the ECO on the island, except in the case of emergencies. In the case of emergencies, a written record of the decision taken, actions implemented and final outcome is sufficient and must be submitted to D: SO&AS within 48 hours.

4.3.4 Chief Scientist

Two Chief Scientist appointments are typically made on relief voyages, though during other scientific visits only one appointment might be made. The Ship- and Shore-based Chief Scientists are responsible for coordinating scientific activities at the islands and aboard ship, apportioning laboratory space and hut usage as appropriate and liaising with scientists and other staff to ensure smooth running of the research. They are also responsible for liaising with the DCO and ECO to ensure that the provisions of D: SO&AS are adhered to during the conduct of research, and/or that any potential problems are dealt with in a timely fashion.

4.4 Support services

All services provided in support of the core activities on the islands should be consistent with the management objectives and should not hamper or inhibit actions necessary for the management of the PEIs. Facilities on the islands need to be properly maintained and serviced without undue impacts on the environment and biodiversity of the islands. D: SO&AS will coordinate a series of planning committees to ensure that all essential tasks are coordinated and harmonised, and that visits to the islands are effective. A summary of final arrangements must be forwarded to the PEIAC and D: IEA for comment. The PEIAC and D: IEA will then advise D: SO&AS on measures or conditions to ensure that activities are consistent with the management objectives of the islands.

4.5 Awareness raising, training and capacity building

4.5.1 Awareness raising: Visitors to the PEIs

General awareness among visitors to the PEIs is imperative for the conservation and management of the islands. Since the transfer and introduction of alien species is one of the major threats to the islands, every person visiting the islands must:

- Have read the PEIMP prior to landing at the PEIs;
- Be aware of how alien species are transported, introduced and established; and
- Be aware of how they modify the composition and functioning of ecosystems;
- Have signed the Conservation Certificate (see Section A below);
- Have read the Gear Checks Document (see Section A below).

D: SO&AS must ensure that appropriate training and education is provided for all persons who are involved with the PEIs. Information contained in such programmes must be up to date, appropriate and thorough. Training and education must be given sufficiently in advance of departure for or arrival at the islands that the necessary quarantine measures can be fully implemented.

Personnel in South Africa or visiting the PEIs who require training include:

- All DEA personnel involved in logistical and support matters;
- All NDPW personnel involved in logistical and on-the-ground construction and maintenance;
- All ECOs;
- Over-wintering team members;
- All personnel involved in the annual relief voyage to the PEIs, including researchers, scientists, field assistants, support personnel (e.g. chefs and medical personnel);
- All news/media personnel;
- All personnel involved in any other voyage to the PEIs;
- All personnel associated with the charter helicopter company,
- All personnel on the supply vessel, including officers, crew and galley staff.

Training must be aimed at fostering a sense of responsibility for and ownership of the PEIs, thereby stimulating cooperation on all waste management and conservation measures. A friendly and amicable disposition by people responsible for education results in greater cooperation from those being required to adhere to quarantine measures. While it is impossible to dictate the attitude of such personnel, it would help if they were made aware of this issue. An aloof or authoritarian approach to training may alienate the people being educated. Lack of cooperation from all personnel will ultimately undermine the quarantine and conservation targets required to meet the objectives of the PEIMP.

A. Pre-voyage educational material

All personnel must be provided with a suite of educational material when they accept their appointment to DEA. Prior to packing of both personal effects and official (government, university, etc.) supplies for the voyage, the SANAP Gear Checks Document must be issued to all personnel (Appendix, 1.6). This material must explain in a brief but clear and visual manner the types of plant and animal propagules which personnel must be aware of when packing for the islands. It must also explain the unique nature of the islands and how alien species threaten this ecology. All personnel will sign a Conservation Certificate (Appendix, 2.2) stating that they have read and understood the PEIMP and that they will comply with all quarantine measures and permit requirements.

B. Onboard seminar

An onboard seminar in the form of an educational video, DVD or a talk by the ECO on board must be given to all officers, crew and galley staff on the supply vessel prior to departure. It must explain in a clear and visual manner the unique nature of the islands, how alien species were introduced, the existing alien species on Marion Island and how they have degraded the system as well as detailed information on the quarantine measures. All non-crew personnel gaining passage to the PEIs on board the supply vessel will attend the seminar once the vessel is underway but more than 48 hours prior to arrival at the PEIs.

C. Educational posters

Educational posters must be drawn up and displayed in all D: SO&AS and NDPW stores, on board the supply vessel and around the Marion Island base.

D. Museum

The museum at Marion Island will be used to educate all expeditioners about the nature of historical artefacts and sites, where they are located and the legal basis for their conservation. Artefacts relating to the history of the Prince Edward Islands will be housed, conserved and displayed at the museum, unless it is deemed necessary to transport them to an institute in South Africa. Advice on curation will be obtained from Heritage Western Cape and/or Iziko Museums, and D: SO&AS will provide appropriate storage and display facilities at the island. The collection will be maintained by designated personnel.

4.5.2 Awareness raising: General Public

In collaboration with DST and NRF, D: SO&AS should ensure that the value of the Prince Edward Islands is communicated to the general public through appropriate media interactions and exhibits, and the production of popular articles, books, web-based items and documentary features.

4.5.3 Training

A. Libraries and reference collections

Libraries containing educational and scientific documentation must be established within the D: SO&AS Cape Town offices and at the Marion Island base. Overwintering team members must be able to access literature and specimen collections to assist with identifying new alien species and managing existing ones.

B. Updating of educational training and material

As knowledge regarding the PEIs ecosystem advances or changes, so the education and related material used to train everyone visiting the PEIs must be updated, at least every four years when the PEIMP is updated.

C. ECO training

D: SO&AS, in consultation with D: IEA, must ensure that suitably qualified and/or trained ECOs are appointed. D: IEA must ensure that these ECOs are *au fait* with the principles of the PEIMP, the unique natural environment of the islands, issues regarding alien species, quarantine measures and emergency response procedures, e.g. responses to fuel spills or wildlife disease outbreaks. Experts may be called in to assist with training in specialist areas, e.g. alien plant control.

D. Overwintering team member training

D: SO&AS must ensure that the two-week training course offered to the overwintering team is given sufficiently in advance of their departure so that the applicable quarantine measures may be implemented.

Team training must include appropriately structured courses in understanding and using the PEIMP, the conservation and management status of the island, threats to the ecosystem and mitigation measures, first aid and survival training, emergency oil spill and other pollution clean-up procedures and avian and mammalian disease outbreak management.

Given that the overwintering team is responsible for on-the-ground management of the PEIs, their training should equip them to do so in a manner which is in keeping with the high conservation status of the islands.

E. Team Leader training

D: SO&AS must give thorough instruction to all TLs about the conservation and logistical management of the Marion Island research base prior to departure. Standards for training must be drawn up against which the TL training can be tested.

F. Support personnel training

All support personnel visiting the PEIs must be trained through contact with brochures, seminars and posters. This includes all personnel associated with aircraft operations, ship's personnel, DEA, SAWS and NDPW, scientists and field assistants.

4.5.4 Capacity building

Trainee *Ad hoc* ECOs may be sent to the island on a regular basis, to create a larger pool of skilled, experienced ECOs to draw from.

4.6 Access

4.6.1 Scientific and management access

In terms of Section 45 (1, 2 and 3) of NEMPAA, no-one may enter, reside in or perform any activity within the boundaries of the PEIs except officials appointed by the Minister to monitor the biodiversity or its conservation in the reserve, or to implement the PEIMP, or law enforcement officers on official duty. However in terms of the Act D: SO&AS may issue permits allowing entry to:

- Scientists engaged in legitimate research;
- Persons engaged in the conservation of the reserve or its biodiversity;
- Persons recording a news event that occurred in the reserve, or an educational or scientific programme;
- Management authority members on official matters; or
- Officers of state performing official duties.

Anyone granted access to the PEIs may only access areas predetermined by DEA and according to times set by DEA (NEMPAA Regulations, Section 8). DEA may also close the Special Nature Reserve if this is necessary or desirable for the proper management of the reserve.

4.6.2 Tourist and non-study visits to Marion Island

Section 45 of NEMPAA prohibits tourist, recreational or any other kind of visit that is not directly related to the management and protection of the PEIs, or the production of news, educational or scientific programmes. Even the latter are subject to the stringent conditions described in this Management Plan, in keeping with the elevated level of protection applied to the PEI Special Nature Reserve.

4.6.3 Shore leave

The rigorous access conditions of NEMPAA (described under 4.8.1 above) no longer provide for the 'shore leave' previously granted to ship-based personnel. The only conditions under which ship-based personnel are allowed onto Marion Island are when their purpose there is directly related to the logistical, conservation management and research requirements of the PEIs, or is related to activities that raise general awareness of the value of the islands, as agreed to by the relief and team ECOs and DCO. Such access is controlled by and conditional upon the same criteria applying to all other access requests and permit conditions.

4.6.4 Visitor numbers

Daily access to Marion Island is limited to numbers determined by the DCO or TL, and overnight access is limited to the 80 beds available in the Marion Island base. Access (daily and overnight) to Prince Edward Island is limited to one visit every fourth year, for a maximum of 10 people and a maximum duration of eight days.

4.6.5 Points of entry and exit

No one may enter or leave the PEIs by any point other than the official entry/exit points without the permission of D: SO&AS (NEMPAA Regulations, Section 10). Because of the logistical complications regarding access to the PEIs, the official access points on Marion Island are Boulders Beach (boat access) and the helipads (helicopter access) at the research base. For Prince Edward Island, access points are Cave Bay (boat and helicopter access) and Kent Crater (helicopter access).

4.6.6 Proof of entry

All permits issued to individuals granted access to the PEIs must be given to the Relief ECO, with copies for the DCO and TL prior to departure for the PEIs.

4.6.7 Offences, evictions and penalties

NEMPAA regulations (Section 61-64) address the matter of offences, evictions and penalties to be applied to anyone who fails to comply with national legislation, NEMPAA regulations, the provisions of the PEIMP and D: SO&AS.

These regulations allow DEA to evict persons who fail to comply with the above provisions or act in a way which 'substantially offends' another person.

Furthermore, anyone who contravenes or fails to comply with a provision of NEMPAA regulations, the conditions of their permit or any prohibition, instruction, rule or order issued under these regulations is guilty of an offence. Upon conviction, such a person will be liable to imprisonment (for a period not exceeding five years) or to a fine or to both (NEMPAA Regulations, Section 64).

4.6.8 Aims and objectives of the access policy

The access policy aims to limit and control entry to the PEIs to *bona fide* scientific research, management research and activities and news, science or educational programming. This limitation and control is consistent with the high level of protection afforded the islands under South African law. The access policy will also authorise and regulate the number of visitors to the islands. The smaller of the two islands in the group, Prince Edward Island has been given the highest level of protection (designated Zone 5 Protected Area, see Section 4.7), thereby protecting and conserving its ecological viability as a relatively undisturbed representative of a sector of South Africa's biological diversity and natural landscapes (Protected Areas Act, Section 17 (*a*)).

BOX 4-1. EMERGENCY PROCEDURES ON MARION AND PRINCE EDWARD ISLANDS

When faced with an emergency situation, where human life is threatened, a written record of the decision taken, the actions implemented, and the final outcome must be submitted by the DCO or TL to D: SO&AS within 48 hours.

The ECO, TL or DCO can give permission for essential personnel to assist with management of the emergency until such a time as a written emergency permit can be issued. In cases where persons request emergency access to Marion Island, the DCO, ECO or TL must explain the conservation status of the PEIs, quarantine measures and other PEI-specific procedures, guidelines and codes of conduct prior to agreeing to grant access. Acceptance of these procedures is a condition of access.

In the case of emergency, persons landing on the island must be quarantined in an appropriate closed area with screened windows and double doors where they will change their clothing and shoes before entering any other facilities or exiting the building. Discarded clothing must be inspected and cleaned and all propagules destroyed in the quarantine room.

Any such persons who remain on the PEIs for more than three days must read and become familiar with the contents of the PEIMP. If translation is required, D: SO&AS will be responsible for providing this. Evacuation procedures of these persons must follow the required quarantine procedures.

The site of emergency or emergency landing must be monitored for environmental damage or introduced alien species for a full year or for as long as is deemed necessary by the ECO.

Goal 4-1. Limit and manage access to the Prince Edward Islands					
Objectives	Target	Actions	Monitoring	Responsibility	Remedial action
Control and manage access to the PEIs through a permitting system that adheres to South African and D: SO&AS policy	Legitimate scientific and non-scientific access	**Only issue permits allowing access to *bona fide* scientists** for SANAP-approved projects, **legitimate maintenance and support personnel** who are necessary for the conduct of any authorised research and/or management activity on the PEIs, **or for news or educational reporting**	Review permit applications and projects annually and/or as needed	Action: D: SO&AS Monitoring: PEIAC	Withdraw incorrectly issued permits and deny further access to the applicants
Control and manage access to the PEIs through a permitting system that adheres to South African and D: SO&AS policy	Restrict access by personnel who do not meet the criteria set out by SA and PEIMP policies	Under normal circumstances, **do not issue a permit** allowing access **to someone who has not complied** with one or more condition stipulated on a previous permit, or has not provided D: SO&AS with a report on a previous visit	Review personnel reports and associated correspondence	Action: D: SO&AS Monitoring: None	Deny further access or withdraw existing access until the non-adherence has been rectified (e.g. report submitted)
Control and manage access to the PEIs through a permitting system that adheres to South African and D: SO&AS policy	Flexibility in permit stipulations to favour the correct and appropriate management of the PEIs	D: SO&AS may **stipulate conditions of entry** in order to fulfil the objectives of the PEIMP and/or to enhance the safety of the permit holder	Monitor at permit application stage and after	Action: D: SO&AS Monitoring: PEIAC	Additional conditions may be imposed at any time, provided that they are communicated in writing to the permit holder

Goal 4-1. Limit and manage access to the Prince Edward Islands					
Objectives	Target	Actions	Monitoring	Responsibility	Remedial action
Control and manage access to the PEIs through a permitting system that adheres to SA and D: SO&AS policy	No tourists or tourist vessels/aircraft to contravene requirements of national legislation and the PEIMP	Vessels or aircraft permitted by DEA for **tourist trips not allowed** to approach to **within 500 m of the PEI's low water mark**; **Aircraft not permitted** to fly at an altitude of **less than 2 500 feet**	Monitor continuously while vessel/aircraft is in vicinity of the PEIs	Action: Ship's master; aircraft pilot Monitoring: DCO/TL; ECO	Immediately report any breaches of policy to D: SO&AS; Require vessel/aircraft to withdraw; Minister may withdraw permit for tourist trip
Allow emergency access to the PEIs	Additional personnel may enter the PEIs in an emergency	DCO/TL may **allow access during an emergency**	Monitor throughout operation	Action: DCO/TL Monitoring: D: SO&AS	If, upon review, the situation is not found to be a legitimate emergency, require additional personnel to leave the island immediately
Allow emergency access to the PEIs	Non-legitimate personnel may remain on the PEIs during an emergency	Within 24 hours of access during an emergency, **D: SO&AS may issue an Emergency Permit** for the duration of the emergency	Monitor throughout the duration of the emergency	Action: D: SO&AS Monitoring: DCO/TL, ECO, Medic, D: SO&AS	If, upon review, the situation is not found to be a legitimate emergency, do not issue an Emergency Permit , or withdraw the permit
Manage access to the management zones on the PEIs		See Section 4.8.8			

4.7 Zoning plan

The PEIs have been demarcated into areas where various activities may take place in order to achieve the goals of the PEIMP and to afford maximum protection to species, ecosystems, natural features and historic sites. Five zones are provided for in the PEIMP. The features of each zone are mapped in Figures 4-3 and 4-4 and the allowed activities within each zone are outlined below.

4.7.1 Zone 1: Service Zone

This zone includes the area occupied by the old and new bases, and a perimeter extending 10 m beyond the outermost buildings and masts. Zone 1 includes the fuel transfer line, Gentoo Lake and Transvaal Cove, but excludes Boulders Beach (which falls within Zone 2). In order to allow for centralised and appropriate support and administration of the PEIs in Zone 1, while minimising impact to other zones, the following shall apply:

- Permits automatically include entry to Zone 1 and restrict all personnel to this zone unless permit conditions allow otherwise;
- Access to Zone 1 for re-supply and logistical purposes is allowed across the beach at Transvaal Cove or by means of the crane at Gunners Point or the helipad at the Marion Island base;
- Accommodation and administration are centralised and restricted to this single high-traffic area, with the exception of the field huts;
- Under normal circumstances, daily access to this zone is limited to numbers determined by the DCO or TL;
- Overnight access in Zone 1 is limited to the 80 beds available in the operational base;
- All historical sites, certain colonies of breeding birds and seals and certain geomorphological features in the zone are excluded from development or disturbance and are afforded Zone 4 protection (see point D below);
- Open fires are only allowed in the designated braai area at the base and must be under controlled conditions to prevent ash pollution.

Zone 1 allows for the construction, removal, alteration and/or placement of buildings, facilities and scientific/meteorological equipment necessary to conduct approved research and management programmes, to house support staff and provide support facilities for personnel working in the other management zones. Listed activities may only be carried out under an environmental authorisation issued by D: IEA (NEMPAA Regulations). The EIA process, as required by national legislation, must be completed before an environmental authorisation can be issued:

- D: IEA has a Standard Operating Procedure outlining EIA requirements and can advise on these or any other appropriate environmental management tool requirements in respect of all listed activities at the PEIs;
- D: IEA will review applications received and issue the relevant environmental authorisation, if approved;
- D: SO&AS may decide to exclude any area within the boundaries of the Service Zone from development or disturbance where it is thought necessary to protect wildlife or historic or geomorphological sites of special significance.

4.7.2 Zone 2: Natural Zone

Zone 2 is the area bounded by the northern shore of Ship's Cove, the peak of Junior's Kop and its entire crater lake, the fault south of Trypot Beach and the coastline of this sector, including Boulders Beach. This zone forms the buffer between Zones 1 and 3. The sites of the field huts and a 50 m wide buffer around each hut are also part of Zone 2.

Should any of the huts be removed, their areas and environs will be re-zoned as Zone 3 once the required clean-up and rehabilitation activities have been completed. Any further replacement of field huts must use the existing footprint with no deviations unless a new site is fully investigated using the appropriate environmental management tool.

Zone 2 provides for the following:

- Permits with Zone 2 access allow limited free walking in this zone provided that the conditions of the PEIMP are adhered to;
- All impacts in this zone will be carefully monitored and reported on annually, jointly by the incoming and outgoing Team ECOs, in conjunction with any other ECOs;
- Monitoring must be ongoing, but particularly stringent during relief periods or any other high-traffic times;
- Boulders Beach may remain accessible for the viewing of seals, even during sensitive breeding time, as long as the minimum approach distance of 15 m is respected;
- No open fires are allowed at any of the field hut Zone 2 buffer areas, to avoid ash pollution;
- No camping is allowed in this zone without a special permit from D: SO&AS, except for reasons beyond the control of a field worker (e.g. being unable to reach base or huts by nightfall);
- All historical sites, certain colonies of breeding birds and seals and certain geomorphological features in the zone are excluded from development or disturbance and are afforded Zone 4 protection (see point D below).

There are currently nine field huts on Marion Island:

- Kildalkey Bay (46°57.288 S; 37°51.198 E);
- Water Tunnel Stream (46°57.726 S; 37°44.926 E);
- Grey-headed Albatross Ridge (46°57.715 S; 37°42.514 E);
- Rook's Bay (46°58.015 S; 37°39.601 E);
- Swartkop Point (46°55.465 S; 37°35.735 E);
- Mixed Pickle Cove (46°52.331 S; 37°38.336 E);
- Cape Davis (46°49.700 S; 37°42.517 E);
- Repetto's Hill (46°50.303 S; 37°45.204 E);
- Katedraalkrans (46°53.807 S; 37°46.503 E).

4.7.3 Zone 3: Wilderness Zone

The remainder of Marion Island, with the exception of Zone 4 sites, is demarcated as Zone 3 in accordance with the high degree of protection afforded the islands. In order to preserve the natural resources and the character of the environment in Zone 3 while making the area available for scientific research, the following will apply:

- Entry is restricted to people whose permits allow access to Zone 3;

- Access to this zone will be open to personnel conducting *bona fide* research, rehabilitation, management or waste activities which are approved by D: SO&AS;
- No general access to this zone is available to members of the relief and management teams;
- Permits may allow team personnel a maximum of four recreational walks of seven days each around the island annually; research personnel with Zone 3 permits may request D: SO&AS to allow non-research staff to accompany them on field work to provide assistance and to minimise safety risks;
- All hut sites lie within Zone 3, but a 50 m circumference around them will be considered Zone 2 in order to provide for the servicing of hut sites;
- No open fires may be lit in Zone 3, except in case of emergency (e.g. for the disposal of carcasses in the event of a disease outbreak);
- No camping is allowed in this zone without permission from D: SO&AS, except for reasons beyond the control of a field worker (e.g. being unable to reach base or huts by nightfall);
- No permanent structures are permitted in this zone (but tents, path markers and site markers are allowed in this zone if authorised by D: SO&AS);
- All waste and sewage disposal policies will be maximally applied in this area;
- All historical sites, certain colonies of breeding birds and seals and certain geomorphological features in the zone are excluded from development or disturbance and are afforded Zone 4 protection (see point D below).

D: SO&AS may demarcate new Zone 2 areas within Zone 3 to allow for the construction of new field huts, however, construction is only allowed in the event that the EIA process is followed.

4.7.4 Zone 4: Limited Access Zone

All areas and sites potentially sensitive to human interference are demarcated as Zone 4 areas for heightened protection. These include all historical sites, sensitive geomorphological features such as lava tunnels, breeding colonies of gentoo penguins, Crozet shags and southern giant petrels (note that the sites used by these birds for breeding are not fixed and may change over time), wandering albatross demographic study colonies and the grey-headed albatross colony at Grey-headed Albatross Ridge. The ECO may request D: SO&AS to declare an area as a temporary Zone 4 for conservation or disease control purposes. After obtaining input from the PEIAC, D: SO&AS may approve such temporary zonation. The precise area, reason and timeframe for the temporary rezoning must be declared.

Entry to these areas will only be for:

- Researchers associated with SANAP-approved projects and with *bona fide* research requirements in those areas;
- DCO, TL, ECOs and support personnel where their job requires accessing this zone;
- Emergency personnel in cases of emergency.

In order to maintain additional protection and minimise human impact in such areas, the following will apply to all areas demarcated as Zone 4 areas:

- Entry is restricted to people with permits allowing access to Zone 4;
- All waste and sewage disposal policies will be maximally applied in this area;
- No development or establishment of structures, either temporary or permanent, will be allowed in Zone 4 areas (but tents, path markers and site markers are allowed in this zone if authorised by D: SO&AS);

- Visits to Zone 4 areas will be specified by the type of zone (e.g. wandering albatross study colonies) and by activity (e.g. banding wandering albatrosses), and permits will specify numbers of people that have access per permit;
- Applications for access to Zone 4 sites will be reviewed annually, according to scientific merit, by D: SO&AS and the PEIAC;
- No open fires may be lit in Zone 4, except in case of emergency (e.g. for the disposal of carcasses in the event of a disease outbreak);
- No camping is allowed in this zone without special permission from D: SO&AS, except for reasons beyond the control of a field worker (e.g. being unable to reach base or huts by nightfall).

Colonies and features are surrounded by a buffer zone of varying widths according to the species or feature. People may not exceed the following approach distances:

- All gentoo penguin and southern giant petrel colonies during the breeding season – 100 m;
- All wandering albatross demographic study colonies (except for the coastal path from the fault to Archway, which skirts the Macaroni Bay study colony) – 100 m;
- Grey-headed albatross colony at Grey-headed Albatross Ridge (except when traversing the route from Santa Rosa Valley to Rooks Bay) – 200 m;
- All Crozet shag colonies during the breeding season – 100 m;
- All historical sites – 2 m;
- All lava tunnels and tubes – 20 m;
- Any other sites which merit incorporation from time to time, where the approach distance will be set according to the unique nature of the site;
- Approach within these minimum distances will be allowed for certain activities (e.g. population census) that will be specified in the permit conditions by D: SO&AS.

4.7.5 Zone 5: Protected Area (Prince Edward Island)

The entire Prince Edward Island is Zone 5. Permits allowing entry into Zone 5 will only be granted for one visit every fourth year for a maximum of ten people and for a maximum duration of eight days. The applicant must show that the need to visit the island outweighs D: SO&AS' mandate to keep human impact on the island to an absolute minimum. This visit restriction must, however, allow flexibility for valid scientific and/or conservation management issues (such as bird surveys or control of an outbreak of alien species), emergency purposes or to allow South Africa to meet its international obligations, e.g. under CCAMLR and ACAP. Non-routine visits must thus be very strongly motivated in terms of valid scientific and/or conservation management concerns and must be approved in advance by D: SO&AS.

All visits must be accompanied by the ECO or his/her designate, who must have ultimate responsibility as to what is allowed to take place ashore. This person will have the duty to search for alien plants, signs of unauthorised landings, etc. The ECO must report to D: SO&AS within 30 days of the end of the voyage.

In order to provide Prince Edward Island with the highest conservation status, the following will apply:

- Entry is restricted to people holding a permit allowing access to Zone 5;
- All access to Prince Edward Island is prohibited except on the authorisation of D: SO&AS, and is restricted to people carrying out special programmes approved by D: SO&AS;
- D: SO&AS may issue/endorse permits to allow access to Zone 5, and access to Zone 5 may also be withdrawn;

- D: SO&AS will provide appropriate access for the purpose of monitoring the conservation status of species at the island;
- Emergency Permits will be approved by D: SO&AS in emergency situations;
- Zone 5 access will be provided for the duration of each visit and not for the duration of a project or management activity;
- Applications will be reviewed annually, according to scientific merit, by D: SO&AS and the PEIAC;
- No development or establishment of structures, either temporary or permanent, will be allowed in this zone (but tents, path markers and site markers are allowed in this zone if approved by D: SO&AS);
- All waste management, transport operation, access and quarantine measures will be maximally applied in Zone 5;
- No open fires may be lit on Prince Edward Island, except in case of emergency (e.g. for the disposal of carcasses in the event of a disease outbreak);
- Bird breeding colonies, lava tunnels and historical sites in Zone 5 have the same level of protection as Zone 4 on Marion Island; all visitors to Zone 5 area must adhere to the minimum approach distances that apply to these colonies/sites, and access to these colonies/sites is prohibited without a permit allowing for Zone 4 and 5 access;
- Approach within these minimum distances will be allowed for certain activities (e.g. population census) if permission is granted by D: SO&AS;
- Helicopter landing is limited to two sites: Cave Bay and Kent Crater;
- Landing by boat is only allowed at Cave Bay (except in case of emergency);
- Launching of any craft destined for Prince Edward Island may only be from the supply vessel (i.e. not from Marion Island), unless in case of emergency where no other option is available;
- Deployment of helicopters and boats between Marion Island and Prince Edward Island must always be interjected with a stop on the supply vessel for implementation of cleaning and quarantine measures;
- Camping on Prince Edward Island is limited to Kent Crater and Cave Bay; D: SO&AS must place a marker at each site and record their GPS coordinates and the Expedition Leader (EL) must ensure sites are checked at each visit for damage or alien species;
- All visits will adhere to an all-in, all-out policy, where the entire party will arrive and depart together and in a single drop-off and collection operation;
- All clothing, footwear and camping equipment to be used on the island must be new;
- All scientific equipment must be demonstrated to be free of propagules and where practicable, to have been sterilized prior to shipping.

Figure 4-3. Map of management zones on Marion Island

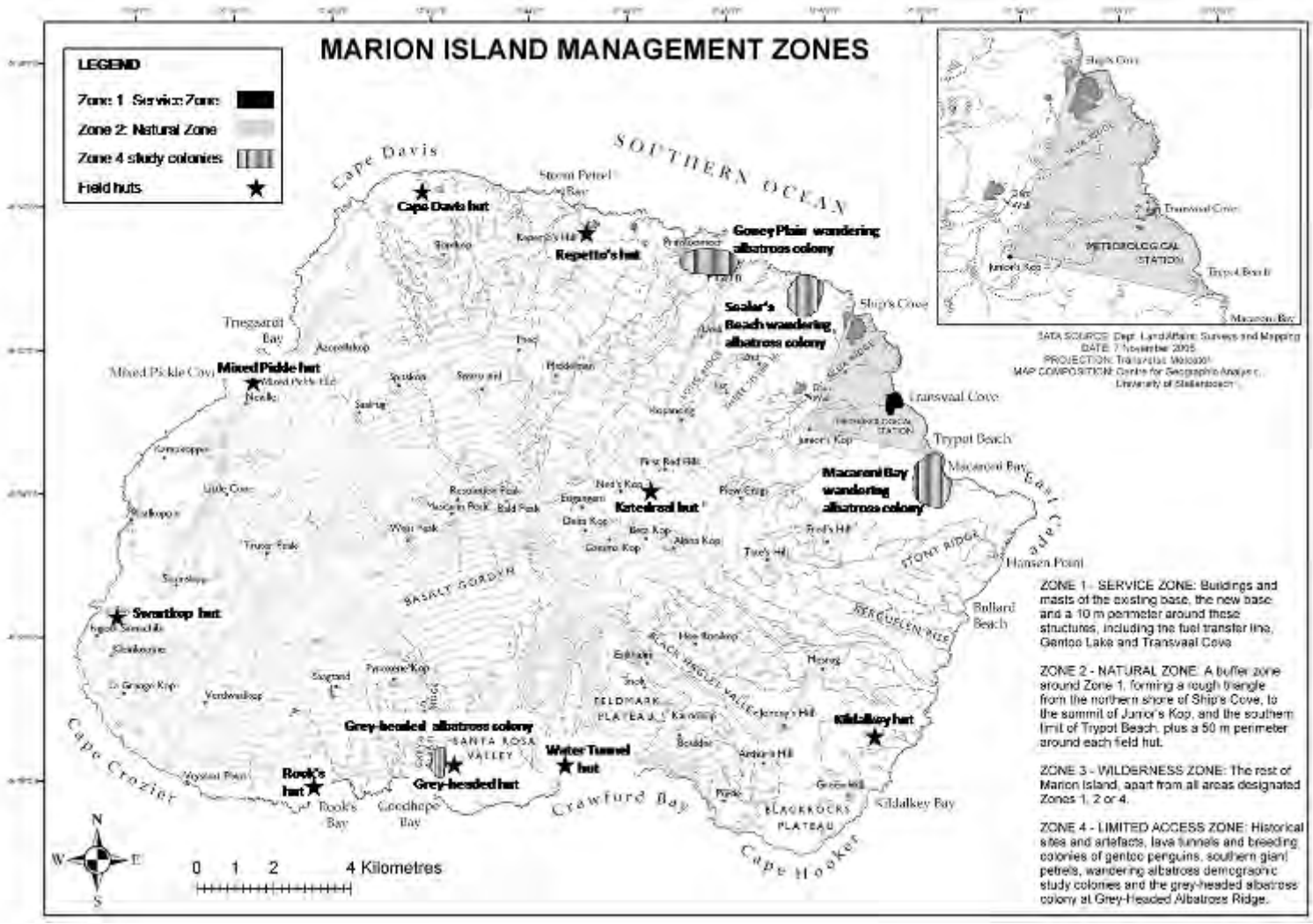
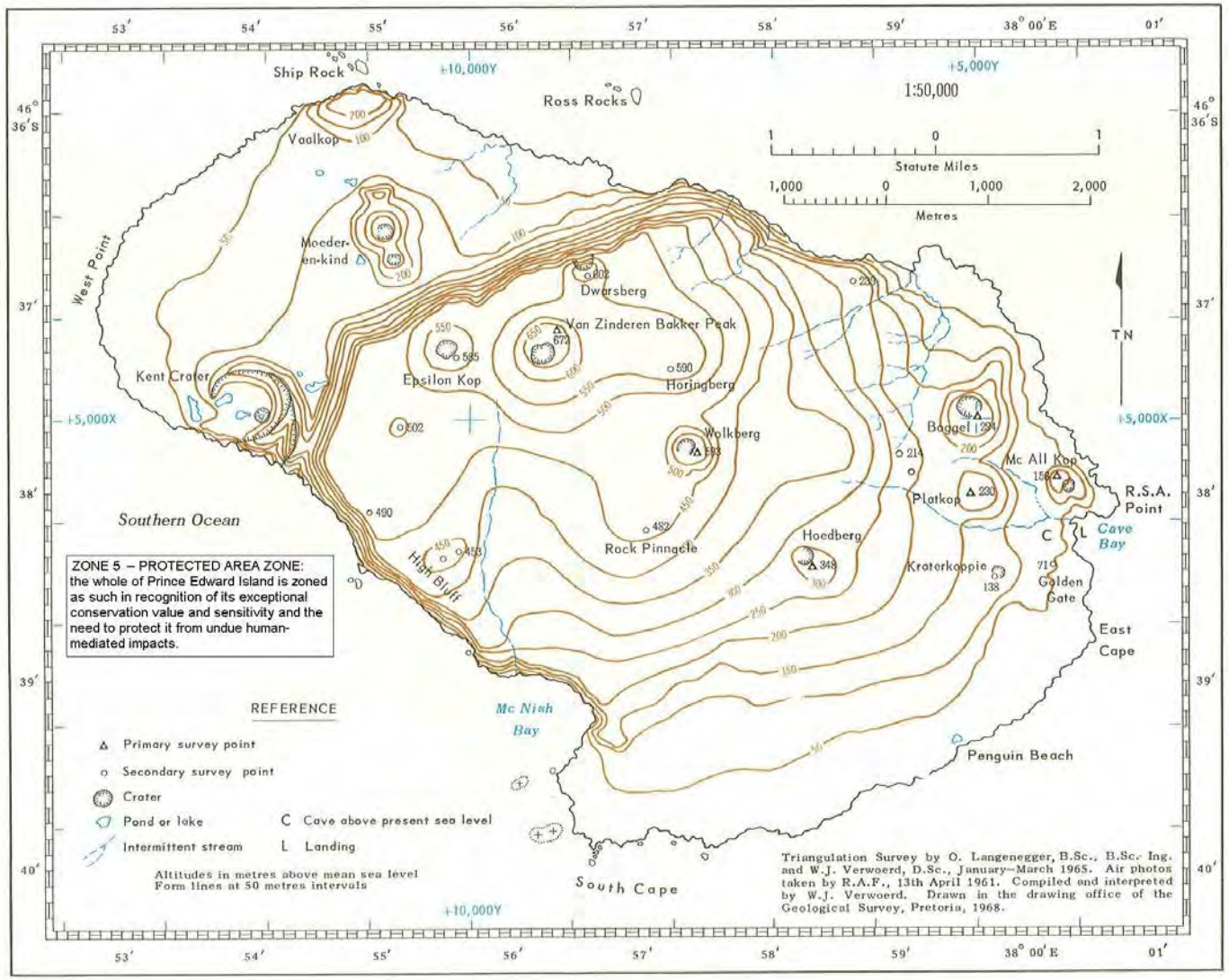


Figure 4-4. Map of Prince Edward Island (Zone 5)



Goal 4-2. Control and manage access to management zones within the Prince Edward Islands					
Objectives	Target	Actions	Monitoring	**Responsibility**	Remedial action
Allow access to management zones according to their conservation status	Clarity regarding the Zoning Plan for the islands	D: SO&AS to **provide a Zoning Plan and map(s)** for the PEIs in the PEIMP	Review Zoning Plan as part of 5-yearly review of the PEIMP	Action: D: SO&AS; Minister Monitoring: PEIAC	Instruct D: SO&AS to include a Zoning Plan in the PEIMP
Allow access to management zones according to their conservation status	Regular review of management zones	**Rezoning proposals to be considered** by the D: SO&AS as necessary, **and areas rezoned accordingly**	Consider proposed re-zonings	Action: D: SO&AS; Minister Monitoring: PEIAC	If zoning changes are made without adequate consideration, bring this to the attention of the Minister who should instruct the D: SO&AS to rectify the situation
Allow access to management zones according to their conservation status	Access to Zones 2-4 controlled by permit system	**Permits to exclude entry to Zones 2-4 unless** the **permit conditions allow** entry into one or more of these zones for a specified period of time	Annually, review the number of permits issued for each zone; monitor movement around the island	Action: D: SO&AS Monitoring: D: SO&AS; ECO	If permits allowing access to Zones 2-4 are issued without adequate consideration, bring this to the attention of the Minister who should instruct D: SO&AS to rectify the situation
Allow access to management zones according to their conservation status	Only authorised access to Zones 2-4; minimal disturbance of these areas	**Ensure full compliance** with permit conditions by all visitors	Monitor movements of all visitors around the island	Action: All visitors Monitoring: DCO/TL; ECO	Report permit violations to DCO/TL or ECO; Request unauthorised persons in Zones 2-4 to return immediately to a zone for which they are permitted; Fully investigate all permit violations which are to be followed up by the DCO/TL or ECO and reported to DAI, which may revoke permits

Goal 4-2. Control and manage access to management zones within the Prince Edward Islands					
Objectives	Target	Actions	Monitoring	Responsibility	Remedial action
Allow access to management zones according to their conservation status	Highest level of control over access to Prince Edward Island (Zone 5)	**All access to Prince Edward Island** (Zone 5) **prohibited except on the authorisation of D: SO&AS**	Review permit applications annually	Action: D: SO&AS Monitoring: PEIAC	If a permit application does not meet with the criteria for *bona fide* research, management or support purposes, disallow Zone 5 access
Allow access to management zones according to their conservation status	No contravention or relaxation of permit limits for Prince Edward Island (Zone 5)	**Permits for Prince Edward Island issued by D: SO&AS for only one visit every second year, by up to ten people, for a maximum of eight days;** Onus is on permit **applicant to show need for the visit** outweighs the need to keep human impact to a minimum	D: SO&AS to review permit applications and strictly apply the limitations for the frequency and duration of visits, and the number of visitors	Action: D: SO&AS; applicant Monitoring: PEIAC	Do not issue a permit if application is inapplicable to research on or conservation of the island; Withdraw permit if research or conduct is found to be inappropriate; Immediately remove anyone found on the island after the stipulated period of their permit or without a permit; Report infringements to D: SO&AS; penalties may be imposed as per NEMA
Maintain strict protocol during visits to Prince Edward Island	Efficient chain of command during visits to Prince Edward Island	D: SO&AS will **appoint an Expedition Leader** (EL) to oversee the visit **to Prince Edward Island**	Review appointee prior to departure of vessel; review performance after return from expedition	Action: D: SO&AS Monitoring: D: SO&AS; DCO; ECO	Do not approve the expedition until the EL has been appointed
Maintain strict protocol during visits to Prince Edward Island	Minimum disturbance of the environment during expeditions to Prince Edward Island (Zone 5)	EL to: ensure that **pre-arranged activities and areas** are **adhered to**; **have veto power** on decisions on the island; **have the power to cancel or terminate the visit**	EL to provide a detailed report of the expedition within 30 days of end of voyage; report to include an estimation of impacts and extent to which objectives were achieved	Action: EL Monitoring: D: SO&AS ~~DAI~~; ECO	Demand that all reports are submitted; Launch an investigation if it is found that any expedition members or the EL have failed to comply with the permit and performance requirements of the expedition

Goal 4-2. Control and manage access to management zones within the Prince Edward Islands					
Objectives	Target	Actions	Monitoring	Responsibility	Remedial action
Maintain strict protocol during visits to Prince Edward Island	Minimum disturbance of sensitive species / sites during expeditions to Prince Edward Island (Zone 5)	At Prince Edward Island, visitors must **adhere to the minimum approach distances for Zone 4** colonies/sites	Monitor throughout visit to Zone 5; report in full to D: SO&AS on areas visited	Action: All expedition members Monitoring: EL, DCO, ECO, D: SO&AS	Personnel within the approach distances of Zone 4 colonies/sites sites must immediately retreat to the minimum distance; Failure to comply will be reported and punitive measures taken at discretion of D: SO&AS

4.7.6 Visits to Prince Edward Island

Prince Edward Island enjoys an elevated protection status under the PEIMP because of its fragile ecosystems and its role as a reference site that is almost completely untransformed. Human impact on this environment must therefore be kept to an absolute minimum. Because of the high protection status of Prince Edward Island visits are strictly controlled by means of the Protected Area (Zone 5) Zoning. No persons are allowed to visit Prince Edward Island unless specifically permitted by DEA to do so. All available resources, including domestic facilities and search and rescue services, are devoted to the conduct of official scientific and conservation activities.

No person on Prince Edward or within 12 nautical miles of the coast will be allowed to wilfully destroy, harm, molest, interfere with or disrupt any native terrestrial or marine animal or plant, or native animal or plant community. The collecting of scientific specimens and the removal of alien biota are allowed by permit only.

4.8 Filming policy

4.8.1 Filming criteria, permitting and logistical requirements

The PEIs were proclaimed as a Special Nature Reserve with the primary aim of conserving the unique ecosystem for all the people of South Africa and the scientific community at large. However, the PEIMP acknowledges that the public of South Africa must have an opportunity to experience the special attributes of the islands through a public awareness programme. Filming (for the purposes of the PEIMP, this term encompasses filming, videotaping and photography) will, however, only be allowed on Marion Island and under very specific conditions and in terms of the SANAP filming policy (Appendix, 1.5).

NEMPAA provides for filming in a Special Nature Reserve in so far as it allows access for the purpose of recording a news event that occurred in the reserve, or an educational or scientific programme (Section 45 (3)). The NEMPAA regulations allow for filming and simultaneous transmitting of photographic images by the use of a webcam or other image recording or transmitting devices. However this may only be done subject to the issue of a Filming Permit by D: SO&AS, to which certain conditions may be attached. D: SO&AS may also require the payment of appropriate fees (NEMPAA Regulations, Section 20).

All permit applications for filming (both commercial and non-commercial) in the Special Nature Reserve must be well motivated according to the management objectives of the islands, the NEMPAA requirements and the public's need to know. Once permits are issued, such activities must be in compliance with all permit requirements, the PEIMP and any other stipulations which D: SO&AS considers it necessary to impose. D: SO&AS may draw up additional internal rules pertaining to filming, videotaping and photography. These must be consistent with all national legislation, including South Africa copyright law.

D: SO&AS may take a decision to implement an additional tariff structure to recover costs of the voyage, accommodating film crews and the cost of guides as required. This costing will be measured against the type of production (i.e. commercial ventures) and its educational value. D: SO&AS may choose to waiver such fees where the filming is to the benefit of the island and public awareness.

4.8.2 Application restrictions and criteria

- Filming applicants must apply to D: SO&AS for approval in a timely fashion;
- Filming will only be allowed on Marion Island;
- Media visits will not be allowed in Zone 4 on Marion Island
- Filming will not be allowed on Prince Edward Island (Zone 5);
- Film crew personnel must comply with all applicable national legislation and additional conditions imposed by D: SO&AS;
- Filming must comply with the objectives and policy of the PEIMP;
- If the proposed filming operations involve any listed activities, the EIA process as required by national legislation must be completed and the required environmental authorisation issued before commencing with the activity;
- Filming will be restricted to relief voyages where space is available to accommodate the film crew and its equipment;
- Only one film crew with a maximum of three persons will be accommodated at any given time;
- Film crew personnel must familiarise themselves with the PEIMP and associated documentation, adhere to the procedures described in the SANAP Gear Checks document and sign the Conservation Certificate;

- Film crews will only be allowed access to Zones 1 and 2 of Marion Island; any requests for filming in Zone 3 of the island must be well motivated and will be subject to intense scrutiny from D: SO&AS;
- Approval of filming activities will be on condition that a film crew is accompanied and guided by a D: IEA approved ECO who is knowledgeable about the island and the prevailing conditions on the islands; the costs for the ECO will be for the account of the film crew;
- Certain shoots may not be appropriate due to ethical or safety reasons, or because of the ecological sensitivity of the area to be filmed in;
- Applicants are urged not to make unreasonable requests, given that biodiversity conservation in the Special Nature Reserve comes first and foremost;
- The availability of facilities such as the voyage helicopter, is restricted and film crews will only be accommodated if there is space available in the helicopter during the normal relief activities; any needs to use the helicopter or ship outside the normal activities must be approved in advance and will be for the costs of the film crew;
- D: SO&AS reserves the right to reject any request;
- DEA should be provided with copies of filming products, for archiving purposes.

4.8.3 Logistic arrangements

Film crews must ensure that they know what the logistical challenges are for visiting Marion Island. The film crew will be responsible for its own logistical arrangements within the broader logistics of a relief voyage. The crew must ensure that their equipment is packaged in the correct way, is delivered at the holding facilities of DEA in time and that their equipment is appropriate for conditions on the island.

A. Insurance

The onus lies with the media house to ensure that it is adequately insured. The use of areas under the control of DEA will be entirely at the risk of the media house. DEA cannot be held liable for any claims, accidents, injuries or loss, etc. arising from such use.

B. Damages

The costs for any damages caused by the operations of the film crew or their equipment will be recovered from the film company. Any damages caused to the environment must be rehabilitated to the satisfaction of the ECO(s) on Marion Island and D: SO&AS.

C. Indemnity

Members from film crews have to complete indemnity forms before visiting Marion Island. This indemnity will be applicable to all activities related to the media operation.

D. Contact person

A DEA contact person will be allocated to a media crew requiring assistance. This contact person will oversee the media operations and make the necessary arrangements for the duration of the stay of the crew.

E. Use of aircraft and vessels

Any approved filming operations requiring the use of aircraft or marine vessel must adhere strictly to D: SO&AS' Vehicle, Boat and Aircraft Use procedures included in this PEIMP (Chapter 5, section 5.3).

F. Supervision of film crews

All film crew and related personnel must be familiar with the provisions of this management plan. Filming in Zones 4 and 5 is prohibited. Absolutely no excursions may be made beyond Zone 1 without the ECO present at all times. All film crew activities must comply with permit conditions, especially those specifying zone access. The ECO must ensure that the film crew are familiar with the provisions of the PEIMP, particularly the zoning plan, and that they sign the Conservation Certificate (Appendix, 2.2) before departure for the islands.

Filming activities may require the presence of SANAP personnel and researchers. Such activities are regarded as supplementary to their core responsibility and will be accommodated only at the discretion of the relevant Group Leaders and Principal Investigators.

4.9 Facilities

4.9.1 Old Base

As far as possible, the impact of human erected structures on Marion Island in recent years has been limited to the station and to the various field huts. From 1948 until 2010, the base was located at Transvaal Cove on Marion Island. It comprised a permanent meteorological station, administration complex, five laboratories, store rooms, two helipads and a hanger for one helicopter, bulk fuel storage facilities, a power shack and emergency power shack (Fig. 4-3).

The administration complex consisted of sleeping quarters comprising 32 rooms, each able to accommodate two people, a recreation room, gymnasium, kitchen and dining facilities, ablution and laundry facilities. A medical surgery and store were located within the main administration complex. Various store rooms were located throughout the base as were five laboratories and a hut which accommodated scientific equipment for the research groups working on the island. All buildings were connected by metal or wooden catwalks and were well distributed to give adequate access to all facilities and to minimise the risk of accidental fire destroying the base completely. Most of the older buildings were constructed of wooden panels consisting of two outer layers of plywood and a central layer of fibre glass insulation. All the weather-exposed panels were covered with aluminium corrugated sheets and building materials were fire-proofed. Some of the new sleeping quarters and upper-air building were constructed of insulated panels, consisting of two outer layers of Chromadek material and a centre layer of polyurethane foam insulation.

4.9.2 New Base

For over sixty years, housing and support facilities were provided by the old base at Transvaal Cove. However, the buildings deteriorated over time due to the harsh environment and by the 2000s, several structures had degraded to such an extent that they were classified as unserviceable. DEA thus initiated the replacement of the old base and the construction of an adjacent new, much larger facility began in 2003 (Figure 4-5). This was completed in 2010. The old base, with the exception of historical artefacts in its vicinity, will be decommissioned and removed.

The new base consolidates the functions of the old one, is substantially larger and is likely to eventually allow better control of potential invasions by alien species. The total structural coverage is 8406 m^2, of which just over half is by buildings that house the functional accommodation requirements. The rest of the area comprises covered grids, access grids, covered walkways and bridges made of mild galvanised steel.

The base consists of modular units that are a combination of polyester resin skins reinforced with glass fibre, cladding a balsa wood core. The structure is founded on stainless steel pipes knocked through the mire for up to 7-m onto black lava bedrock. The base units include a science centre, living centre, accommodation blocks,

recreation area and technical centre. There is also an operations room, helipad, cargo handling area and helicopter hangar.

The science centre has three laboratories (wet, dry and analytical), dry room, isotope room, offices, library, conference room and workshop. The living centre has a dining area that accommodates 40 people, and a kitchen with separate washing up area, freezer/cold rooms, pantry and bulk store room. There is also a lounge, bar, games room and enclosed braai area. There are sleeping quarters and ablution facilities for 80 people. Untreated sewage is contained in a holding tank prior to direct discharge into the sea. Kitchen waste is discharged in the same way but is first macerated. The recreational area has a gymnasium, steam rooms and Jacuzzi. The technical centre includes offices, maintenance and technical stores, work area, power generation room with three diesel generator engines, boiler room, electrical controller room, electrical store and waste and compaction room. The technical centre also houses a computer room, balloon room and store for the South African Weather Service.

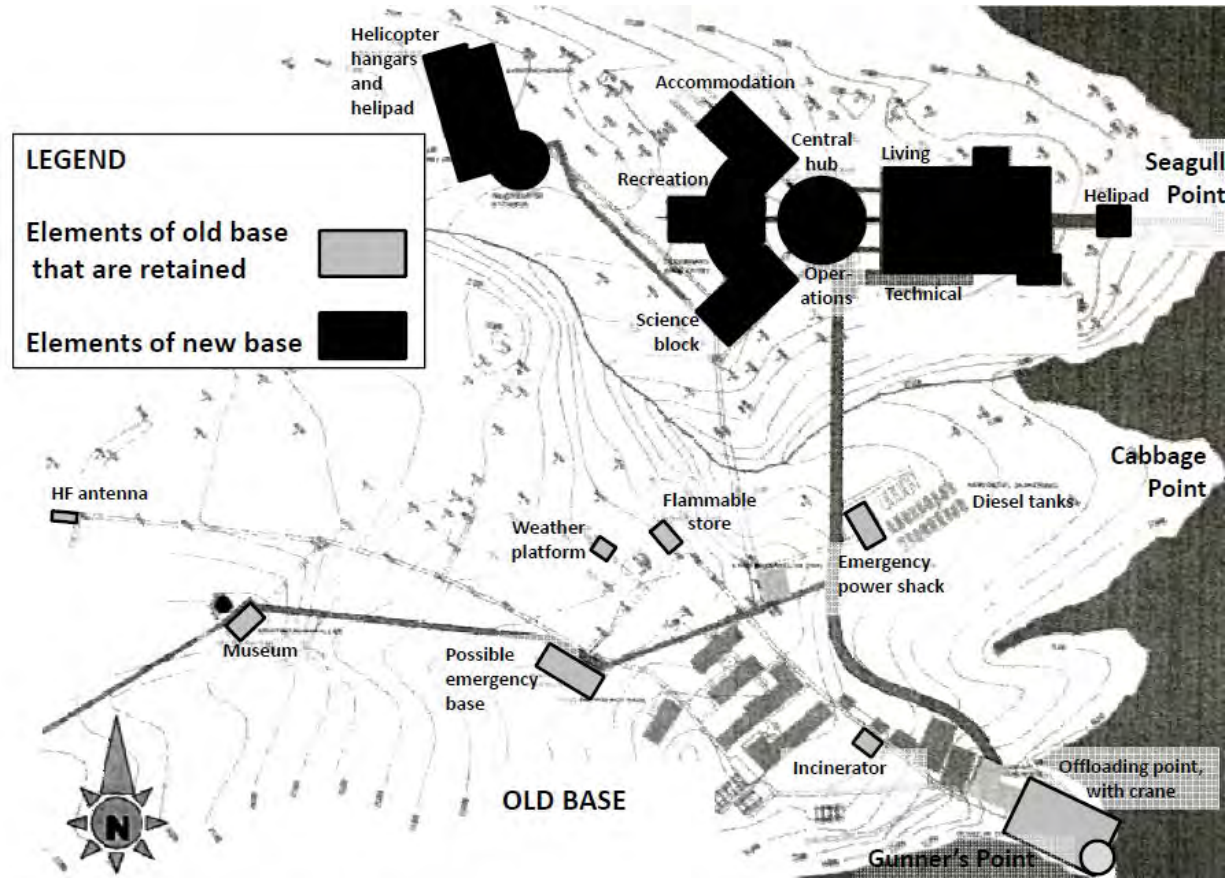
External facilities that used to form part of the old base and that have been retained include a crane at Gunners Point, satellite dome, emergency base (converted entomology laboratory), museum (converted mammal laboratory), closed incinerator (converted gymnasium) and emergency generation facility (previously the power shack). Other external facilities include double-shell, elevated diesel bunkering tanks with a total storage capacity of 240,000 litres, and 4 water storage tanks with a capacity of 5,000 litres each.

4.9.3 Other Infrastructure

Water is supplied to the base and external facilities via a pipeline from a nearby dam on the Van den Boogaard River. The dam can store approximately 500 m^3 and has an inflow rate of 20-30 l/s. Lower down on the river is a small building (nicknamed the “Hydroshack”) and associated elements from an abandoned hydroelectric scheme dating back to 1981. This will be decommissioned along with the old base.

There are nine four-bed huts around the island and these are used for research field work. Eight huts are located along the coastline at, or near, Kildalkey Bay, Water Tunnel stream, Grey-headed Albatross Ridge, Rook’s Bay, Swartkop Point, Mixed Pickle Cove, Cape Davis and Repetto's Hill. One hut is located inland at Katedraalkrans at about 750 m above sea level. The current set of huts was installed in 2007. Huts rest on raised metal grids and comprise a main section with a sleeping and kitchen area, linked to a separate pantry section.

Figure 4.5. Infrastructure at Marion Island base (adapted from Environomics 2002[1])



[1] Environomics 2002. Report on the Scoping Study for the Proposed New Base Facility at Marion Island. Environomics, unpublished report, pp. 113 + appendices.

4.10 Concept development plan

In keeping with the Special Nature Reserve status of the PEIs, development at the islands is kept to a minimum and is restricted to Zones 1 and 2. The infrastructure of the operational base is new or has recently been upgraded, and no further development of new or existing infrastructure is planned in the foreseeable future.

The unused infrastructure of the old base, however, has deteriorated over time and must be decommissioned and removed from Marion Island as soon as possible. Environmental conditions on Marion Island are severe and the condition of the base, particularly the top structure, will worsen. The subsequent release of materials into the environment will cause pollution and pose a threat to wildlife. The presence of derelict structures will be contrary to the wilderness aesthetic that is associated with a Special Nature Reserve, and such structures will provide a haven for mice.

The EIA process as required by national legislation must be completed before an environmental authorisation(s) for any listed activities pertaining to the decommissioning can be issued. This process should take into account the potential environmental impacts of the decommissioning, e.g. introduction of alien organisms, habitat disturbance, pollution, interference with wildlife, damage to and removal of historical/cultural objects/sites and disruption of science programmes. Mitigation measures to offset these impacts should be fully explored. Rehabilitation of the site post-decommissioning should also be considered. The implications of the decommissioning have been outlined in a preliminary report commissioned by D: SO&AS (Appendix, 1.1).

PART TWO: PEIMP STRATEGIC PLAN

Chapter 5: Biodiversity conservation

PRINCE EDWARD ISLANDS
MANAGEMENT PLAN

Chapter 5

C·I·B
DST-NRF Centre of Excellence for Invasion Biology

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Relevant legislation

- National Environmental Management Act (No. 107 of 1998) (NEMA)
- National Environmental Management: Protected Areas Act (No. 57 of 2003) (NEMPAA)
- National Environmental Management: Protected Areas Act Regulations for the Proper Administration of Special Nature Reserves, National Parks and World Heritage Sites (No. R 1061 of 2005) (NEMPAA Regulations)
- National Environmental Management: Biodiversity Act (No. 10 of 2004) (NEMBA)
- National Environmental Management Integrated Coastal Management Act (Act No. 24 of 2008) ICM Act))
- Prince Edward Islands Act (No. 43 of 1948)
- Sea Birds and Seals Protection Act (No. 46 of 1973) (outgoing)
- Dumping at Sea Control Act (No. 73 of 1980)
- Marine Living Resources Act (No. 18 of 1998)
- Maritime Zones Act (No. 15 of 1994)
- Hazardous Substances Act (No. 15 of 1973)
- Carriage of Goods by Sea Act (No. 1 of 1986)

5.1 General provisions

The indigenous species of the Prince Edward Islands (PEIs) form a unique collection of plants and animals adapted to conditions in the sub-Antarctic. This assemblage is the result of dispersal mechanisms, community interactions and environmental conditions unique to this remote part of the Southern Ocean. However, human activities since the discovery of the islands have altered ecological processes and indigenous plant and animal populations.

The State must, through its organs and associated institutions, act as the trustee of the Prince Edward Islands Special Nature Reserve (Section 3). This concept is further emphasised and reinforced in the ICM Act section 11 and 12 as the PEIs forms part of coastal public property. The Department of Environmental Affairs (DEA) acts as the Management Authority of the Special Nature Reserve. This Prince Edward Islands Management Plan (PEIMP) is aimed at halting the trend of negative human-induced changes at the PEIs as far as possible by using South African legislation, policy and regulatory frameworks to promote the sustainable management of the biodiversity of the islands. Specific policies drawn from current legislation, policy documents and previous decisions of the Prince Edward Islands Management Committee are outlined below.

5.1.1 Biodiversity management

Many of the species on and around the PEIs are rare and/or endemic and are hence may be given the status of threatened or in need of protection. According to the National Environmental Management: Biodiversity Act (NEMBA), the Minister may list:

- *Ecosystems* as critically endangered, endangered, vulnerable or protected (Section 52);
- *Processes or activities* in a listed ecosystem as threatening processes or activities requiring prior authorisation from the Minister (Section 53 and NEMA Section 24(2)(*b*));

- *Species* in need of protection as either critically endangered, endangered, vulnerable or protected (Section 56);
- *Activities involving listed species* as restricted activities, these activities can then be restricted through a permitting system (Section 57).

5.1.2 Rules of conduct

The regulations prepared in terms of National Environmental Management: Protected Areas Act (NEMPAA) (Section 86 (1)) identify prohibited and restricted activities in a Special Nature Reserve that require permits. Officials of DEA and other authorised officials are exempt from these rules when performing official duties (Section 38).

A. Activities requiring a permit

Under the NEMPAA regulations, the following activities at the PEIs require a permit or permission from DEA:

- Filming and simultaneous transmitting of photographic images by the use of a webcam or other image recording or transmitting device (Section 20);
- Conducting of tours (Section 20);
- Conducting of any kind of competition (Section 20);
- Selling or hiring of goods or the offering of goods for sale or hire (Section 20);
- Providing of, or the offering to provide, any service for a fee or reward (Section 20);
- Conducting of speed trials (Section 20);
- Conducting of research (Section 20 and Section 34 (1));
- Undertaking an activity of any kind for the purpose of fund raising, personal gain or making a profit (Section 20);
- Holding any organised or special event, including sporting or cultural events (Section 20);
- Using visual imaging of animals for purposes of any virtual hunting or other such activity Section 20);
- Using or causing to be used, any loud speaker or similar device or other noisy equipment (Section 22);
- Constructing or erecting any booth, marquee or other structure (Section 22);
- Organising or causing to be organised or attending or participating in any public meeting, demonstration or gathering (Section 22);
- Bio-prospecting, which may be against the payment of a fee as determined by DEA (Section 60);
- Using or undertaking an activity in a water area or any part thereof in the PEIs (Section 25);
- Launching or using of vessels on any fresh water body in the PEIs (Section 25);
- Removing geological or archaeological samples (Section 39) (See Historical Conservation) or biological samples (this includes all shipwreck material, flotsam and jetsam) (Section 45) or otherwise interfering with the substrate.

In addition, the following activities are prohibited at the PEIs unless permission has been granted by DEA:

- Bathing, swimming or diving;
- Water skiing (Section 29);
- Rock climbing (Section 30);
- Parachuting or abseiling (Section 30);
- Using a hang glider or any other kind of glider (Section 30);
- Hot air ballooning (Section 30);
- Flying model planes or gliders (Section 30);
- Sand boarding (Section 30);
- Operating any motorised vehicle (Section 30);

- Camping;
- Interfering with, putting into operation, damaging, climbing on or boarding any property of or equipment used by DEA or its agents (Section 36);
- Interfering with, misusing or damaging any building, signage, pier, landing stage, raft, buoy or other facility or structure provided or erected by DEA (Section 37);
- Constructing an impoundment or weir on any river or river bed (Section 39);
- Abstracting water from any impoundment or weir on any river or in any river bed (by means of a pump, pipes, gravitation or any other means) (Section 39).

Prior written permission is required from DEA before anyone may remove any (Section 39):

- Soil, rock, mineral or similar material;
- Wood, mulch or other dead vegetation;
- Fossil, archaeological remains or cultural artefacts;
- Ritual or spiritual remains;
- Coral or shells;
- A shipwreck, flotsam or jetsam.

Similarly prior written permission is required from DEA before anyone may dig or intentionally disturb any (Section 39):

- Soil or similar material;
- Wood, mulch, peat or other dead vegetation or animal;
- Fossil, shell midden, archaeological remains or palaeontological specimens or meteorites;
- Any marine components;
- Any object or material that is or was used for any ritual, spiritual or other practice.

In terms of pollution control, no one may:

- Deposit any litter, mineral or industrial waste (Section 40);
- Deposit, discharge or leave any noxious, smelly, offensive or polluting substance, matter or thing;
- Deposit or leave any offal, dead species or specimen or dung;
- Deposit, except in any receptacle provided for litter, any domestic garbage;
- Pollute any water in a river, spring, pan, well, borehole, groundwater, dam, reservoir or lake (Section 41);
- Remove any sand, soil or stones from a water area (Section 42);
- Deposit, dump or throw sand, soil, stones or other material of any kind in a water area (Section 42);
- Construct any retaining wall or weir in a water area (Section 42).

A permit or prior written consent is required from DEA for the following (Section 4):

- Introducing any species or specimen, or part thereof to the PEIs;
- Engaging in any restricted activity;
- Intentionally disturbing any species or specimen;
- Feeding any species or specimen;
- Using any recording of the sound of a species or specimen or the imagery or scent of a species or specimen to attract animals;
- Removing any wood, sand, gravel, stone, sea shell, guano or other material;

- Cutting, damaging, removing, destroying or possessing any plant or any part thereof, including dry wood or firewood;
- Intentionally causing pollution, deface cultural heritage resources, harm or kill to any individual or population of any protected species;
- Significantly alter or change the sense of place or any environmental, cultural or spiritual values;
- Remove or be in possession of a cultural artefact;
- Open or close the mouth of a tidal lagoon or a tidal river within the PEIs.

B. General prohibitions

According to NEMPAA (Section 43) no-one may:

- Unlawfully occupy, move into, inhabit or use any existing land, building or structure;
- Damage any property of DEA;
- Light an open fire, unless it is properly contained in a fireplace or container made available by DEA;
- Place, throw, dump or let out any refuse, rubbish, used containers, effluent, toilet waste or any objectionable matter;
- Intentionally or negligently cause a fire or discard any burning object in any place where it may set fire to any other object;
- Carry on any agricultural or gardening activities without the prior written approval of DEA;
- Attach any name, letter, figure, symbol, mark, picture, sign or notice to any natural feature or otherwise damage it;
- Intentionally or negligently cause any damage to any object of geological, archaeological, historical, ethnological, oceanographic, educational or other scientific interest;
- At any time play any radio, compact disc player, music system, musical instrument or in any way cause noise in a manner that is likely to disturb any species or specimen or other person;
- Behave in an offensive, improper, indecent or disorderly manner.

C. Restrictions regarding listed threatened or protected species and specimens

Written authorisation from DEA is required for the following restricted activities in respect of threatened or protected species listed by national regulation or international agreements and conventions (Section 45). The requirements of this Management Plan extend these restricted activities to non-listed, non-threatened and non-protected species and specimens:

- Hunting, catching, capturing or killing any living specimen (including searching, pursuing, driving, lying in wait, luring, alluring, discharging a missile or injuring with intent to hunt, catch, capture or kill any such specimen);
- Gathering, collecting or plucking specimens;
- Picking parts of, or cutting, chopping off, uprooting, damaging or destroying specimens;
- Possessing or exercising physical control over specimens;
- Growing, breeding or in any other way propagating specimens or causing them to multiply;
- Conveying, moving or otherwise translocating specimens;
- Selling or otherwise trading in, buying, receiving, giving, donating or accepting specimens as a gift;
- In any way acquiring or disposing of any specimen.

D. Restrictions regarding listed alien and invasive species and specimens

The requirements of this Management Plan are in keeping with the Section 45 of the regulations, but impose stricter conditions (also see Section 5.1.2). Written authorisation is required for the following:

- Importing listed specimens into the PEIs;
- Possessing or exercising physical control over any specimen;
- Growing, breeding or in any other way propagating specimens or causing them to multiply;
- Conveying, moving or otherwise translocating specimens;
- Selling or otherwise trading in, buying, receiving, giving, donating or accepting specimens as a gift;
- In any way acquiring or disposing of any specimen.

5.2 Preventing introduction of alien and invasive species

Invasive alien species pose substantial risks to the plants, animals and ecosystems of the PEIs. They can cause local extinctions (and have done so in the past), are responsible for substantial changes to ecosystem functioning, and as a consequence of their actions and the need for remediation, regularly impose a substantial economic burden on the State. For a variety of reasons, but especially from the conservation and economic perspectives, it is therefore imperative that every effort be made to prevent any further accidental or deliberate introductions of alien species. The best way to reduce the rates and impacts of biological invasions is to prevent the introduction occurring in the first place, and to do so as far back along the introduction pathway as possible.

The most likely transport mechanisms or pathways for terrestrial and freshwater species are building materials, vehicles, food, equipment (such as water containers), wood, stores, field gear, clothing, and the personal effects of people arriving at the islands. Soils, fresh fruit and vegetables are known to be key vectors for pathogens and fungi.

Marine alien organisms are easily transported by vessels through the fouling of hulls and gear that is routinely left in the water, and possibly by accidental waste-water discharge. The discharging of ballast water in coastal areas is another likely route for the introduction of marine organisms and has been identified as a major route for introduction of species globally.

Strict quarantine measures are required to restrict these pathways and prevent any further alien species from establishing. The cost of strictly adhering to such measures is negligible compared with the cost of controlling or eradicating alien species once they have been introduced. Another underrated threat is that of avian and mammal disease. The risk of disease transmission to wildlife in the broader Antarctic region is a substantial concern[1]. Avian cholera is, for example, now having large impacts on many seabird colonies globally and has caused large-scale mortalities of Macaroni penguins at Marion Island[2].

Rodents are the single largest risk to the biosecurity of island ecosystems and are likely to cause local extinctions and substantial changes to ecosystem functioning. Their eradication is also extremely expensive and often difficult to achieve on large islands. House mice (*Mus musculus sensu lato*) are already established on Marion Island but not yet on Prince Edward Island. There are no rats on either island.

Management of the PEIs must therefore be geared towards the prevention of any further human-assisted introductions. Part of this process will involve distinguishing between natural and human-assisted introductions, as the former are part of the natural process and should be allowed to continue as it has done over the hundreds of thousands of years of these islands' history. Complicating the issue further is that natural processes can also contribute to the dispersal of invasive alien species. Birds are suspected of transferring the procumbent pearlwort

[1] Kerry, K.R. & Riddle, M.J. 2009. *Health of Antarctic Wildlife. A Challenge for Science and Policy*. Springer, Berlin.

[2] Cooper, J., Crawford, R.J.M., de Villiers, M.S., Dyer, B.M., Hofmeyr, G.J.G. & Jonker, A. 2009. Disease outbreaks among penguins at sub-Antarctic Marion Island: a conservation concern. *Marine Ornithology* 37: 193–196.

Sagina procumbens from Marion Island, where it was introduced by humans, to the less transformed Prince Edward Island 19 km away.

5.2.1 Requirements of NEMBA

Alien and invasive species pose significant threats to indigenous species and ecosystem functioning. Section 64 of NEMBA seeks to prevent the unauthorised introduction and spread of alien species and invasive species into ecosystems and habitats where they do not naturally occur and to manage and control alien species and invasive species to prevent or minimise harm to the environment and, in particular, biodiversity. NEMBA provides for the restriction of certain activities involving alien species through a permitting system (Section 65) and for some other activities regarding some alien species to be totally prohibited (Section 67).

NEMBA provides for the drafting of Biodiversity Management Plans (BMP), which must be submitted to the Minister for approval (NEMBA, Section 43) before they may be implemented by a person or organ of state appointed by the Minister. The BMPs may pertain to an ecosystem, an indigenous species or a migratory species. The drawing up, contents and implementation of BMPs must adhere to the principles as laid out in Sections 43 to 49 of NEMBA.

A. Listing of invasive alien species

If any alien species on the PEIs are listed as invasive according to Section 70 of NEMBA, the Management Plan must comply with that section of the law regarding restricted activities involving listed species, addressing the permitting system and duty of care relating to invasive species. The species shown in Table 5-1 are on List 3 (Government Gazette No. 32090, 3 April 2009). *Sagina procumbens* (procumbent pearlwort) and *Poa annua* (annual bluegrass) are also invasive on the island but are not on List 3. They are extremely widespread at the PEIs and there is little that can be done to control them.

Table 5-1. Species listed as invasive aliens for the Prince Edward Islands

Scientific name	Common name
Plants:	
Agrostis castellana	Bent grass
Agrostis gigantea	Black bent grass
Agrostis stolonifera	Creeping bent grass
Alopecurus geniculatus = *Alopecurus australis*	Marsh foxtail
Cerastium fontanum	Common mouse-ear chickweed
Elytrigia repens = *Agropyron repens*	Couch grass
Festuca rubra	Creeping red fescue
Luzula cf. *multiflora*	Woodrush
Poa pratensis	Kentucky bluegrass
Rumex acetosella	Sheep sorrel
Stellaria media	Common chickweed
Invertebrates:	
Porcellio scaber	Common woodlouse
Agrotis cf. *ipsilon*	Cutworm
Vertebrates:	
Mus musculus sensu lato	House mouse

B. Control and eradication of listed invasive species

Where alien or invasive species may harm the ecosystems or habitats in which they occur, they should be eradicated or subject to ongoing control measures. According to Section 75 of NEMBA, control and eradication programmes must include:

- A description of the parts of that land that are infested with such listed invasive species;
- An assessment of the extent of such infestation;
- A status report on the efficacy of previous control and eradication measures;
- Current measures to monitor, control and eradicate such invasive species;
- Measurable indicators of progress and success, and indications of when the control plan is to be completed;
- Information on biodiversity and damage to the environment.

The programme must be carried out using methods that are appropriate for the species concerned and the environment in which it occurs. Methods must be executed with caution and in a manner that causes the least possible harm to any naturally occurring species and must be directed at the offspring, propagating material and re-growth to prevent the species from re-establishing. If applicable, the appropriate environmental management tools should be employed.

A detailed invasive species control and eradication strategy for listed invasive and other problem species has been developed for the PEI[3] as required by NEMBA (Section 76). This includes a list and description of all listed invasive and problem species that occur on the islands, the parts of the islands that are infested with such species and an assessment of the extent of such infestations. This strategy must be updated every four years by DEA.. Reports must be submitted to the Minister regularly, detailing the status of listed alien species on the PEI (NEMBA, Section 77) and the efficacy of previous control and eradication measures. NEMBA Sections 87 and 88 address the permitting system with regard to alien and invasive species, including the issuing and cancellation of permits.

C. Genetically modified organisms

Genetically modified organisms are not allowed into the PEIs.

5.2.2 Quarantine measures

Quarantine measures are described in full in Goal 5-1. In addition, the following measures must be implemented with the strictest standards of compliance at the PEIs.

A. Banned items

The importation of plant, animal or other live/unprocessed organic material to the islands is prohibited. No plant, animal, soil or geological samples or specimens may be taken onto the islands. Banned items include:

- Fresh fruit or vegetables, whole or processed;
- Poultry products with bones;
- Fresh, non-irradiated eggs (with shells intact) ;
- Soil;
- Brewing kits;

[3] Chown, S.L. *et al*. 2010. Prince Edward Islands Alien and Invasive Species Eradication Plan. Unpublished report, University of Stellenbosch.

- Ornamental plants or any other pot plants or cut flowers;
- Cats, dogs or any other pets or domestic or wild animals;
- Dried mushrooms and sun-dried tomatoes;
- Mushroom growing kits;
- Wood that is untreated according with the International Standard for Phytosanitary Measures (ISPM 15).

Further quarantine provisions for Prince Edward Island prohibit the following from going ashore:

- Dried pulses and certain grains (peas, chick peas, lentils, beans, whole-grain rice and wheat with husks intact);
- Dried fruit (e.g. prunes, dates) with seeds that may be able to germinate;
- Energy bars containing/coated with whole seeds;
- Fresh bread and bread products, including cake (liable to carry moulds as fungal spores);
- Live yeast or products containing live yeasts;
- Yoghurt and other milk and cheese products containing live bacteria or fungi;
- Dried meat (e.g. biltong, droëwors) and processed meat not sealed in cans or plastic packets (e.g. loose sliced ham and bacon);
- Fresh meat of any description.

In addition, no live organisms may be transferred between Marion Island and Prince Edward Island.

Additional requirement for Prince Edward Island

In addition, all food supplies considered for use on Prince Edward Island must first be reviewed in terms of their ability to contain/carry fungi and bacteria and to germinate. The Environmental Control Officer appointed for the visit must view the packing list and approve (or not) the products to be purchased prior to packing in Cape Town. Any items on the banned list found ashore on Prince Edward Island must be immediately repacked, unopened, in sealed containers and not consumed ashore, and the offence reported in writing to DEA..

B. Supply vessel restrictions

No ornamental plants, cut flowers, organic decorations or any other pot plants or pets are allowed on to the supply vessel. Poultry products, including eggs, soups and stock cubes shall be irradiated before being loaded onto the ship and no galley waste may be discharged within 12 nautical miles of the islands.

C. Cross-contamination between Marion Island and Prince Edward Island

Movement between Marion and Prince Edward Islands must be minimised and no human-assisted genetic interchange between the two islands is allowed, requiring a total ban on the movement of organic non-food materials between the two islands (i.e. living material such as soil, rock, water samples, food and waste or any expedition equipment and clothing which are possible pathways for transfer of alien propagules).

D. Horticulture

No horticultural activity may be undertaken on the islands except for permitted research purposes. No plant propagules or sprouting material may be taken to the islands and every effort must be made to prevent their unintended transport to the islands. The sprouting of propagules that are routinely used as food, such as beans, lentils, and other pulses, is prohibited. No peat may be harvested or removed without a permit.

E. Minimum Velcro policy

Because of the threat of propagule transfer onto and around the PEIs, where possible Velcro should be used only where essential on issued gear and field gear. No Velcro is allowed on garments below knee level or on footwear.

Goal 5-1. To prevent the introduction of alien species and invasive species to the PEIs					
Objectives	Target	Actions	Monitoring	Responsibility	Remedial action
A. Policy					
Effectively enforce national policy and legislation on prevention of introductions	No new alien species introduced to the PEIs	**Prevent the importation of alien organisms or propagules** (vertebrates, invertebrates, plants, and other macroscopic organisms larger than 0.1 mm) to the PEIs; this includes propagule-bearing materials such as soil and water	Regularly monitor and strictly enforce quarantine measures during all voyages to the PEIs	Action: D: SO&AS; all expeditioners and crew Monitoring: ECO; DCO/TL	Contain and quarantine any propagules or propagule-bearing material found on board the supply vessel or on the islands, and immediately destroy through enclosed incineration
Effectively enforce national policy and legislation on prevention of introductions	No new alien micro-organisms introduced to the PEIs	**Limit the introduction of microscopic organisms** (< 0.1 mm)	Regularly monitor and strictly enforce quarantine measures during all voyages to the PEIs	Action: D: SO&AS all expeditioners and crew Monitoring: ECO	Contain and quarantine any propagules or high risk propagule-bearing material found on board the supply vessel or on the islands, or immediately destroy through enclosed incineration
Effectively enforce national policy and legislation on prevention of introductions	No new alien species introduced to the PEIs during or following an emergency situation	**In case of emergency, exercise due diligence** to prevent introduction and/or spread of introduced organisms or propagules on the PEIs; Follow the emergency procedure for the PEIs (Chapter 4, Box 4.1)	Monitor for alien organism transfer throughout emergency situations	Action: D: SO&AS (issuing of permits); ECO; Team Leader (TL) Monitoring: ECO; TL	Contain any banned organism allowed ashore during an emergency, to prevent introduction and spread of the organism or its parasites; Eradicate the organisms as soon as practicable.

Goal 5-1. To prevent the introduction of alien species and invasive species to the PEIs					
Objectives	Target	Actions	Monitoring	Responsibility	Remedial action
Effectively enforce national policy and legislation on prevention of introductions	No new alien propagules entering the PEIs during any construction or development processes	**Ensure that there is an Environmental Implementation and Management Plan (EIMP)** for all listed activities at the PEIs, as part of the environmental impact assessment decision-making process; This must include measures for prevention of propagule transfer and practical mitigation actions, and comply with the regulations published under NEMA	Check that an EIMP has been produced and meets legislated requirements; Enforce compliance and auditing	Action: D: SO&AS; EIA consultant Monitoring: D: IEA; D: SO&AS	Do not authorise activity if EIMP does not meet legislated requirements – activity may not proceed; If the EIMP is not implemented properly then require that the activity be halted and rehabilitation carried out; The activity may not continue until a new EIMP has been approved by D: IEA
Effectively enforce national policy and legislation on prevention of introductions	No new alien propagules entering the PEIs via tourist vessels operating in PEI waters	**Do not issue permits to tourist vessels** applying to visit the waters of the PEIs **unless the vessel operators agree to abide by the vessel quarantine measures** described under sections D and E of this table	Monitor and strictly enforce quarantine measures during tourist visits to PEI waters	Action: DEA Monitoring: D: SO&AS; D: IEA	If the tourist vessel contravenes the applicable quarantine measures, revoke permit and require vessel to withdraw from the territorial waters around the PEIs
B. Education					
Educate expeditioners to the PEIs about the importance of quarantine measures	Overwintering team members aware and alert for potential alien species	**Include instruction about quarantine measures** and their importance **in team training**	Ensure that all members of the overwintering team are familiar with and understand the importance of strict quarantine measures	Action: D: IEA Monitoring: TL; ECO	Provide additional information regarding correct quarantine procedures

Goal 5-1. To prevent the introduction of alien species and invasive species to the PEIs					
Objectives	Target	Actions	Monitoring	Responsibility	Remedial action
Educate expeditioners to the PEIs about the importance quarantine measures	Aircraft personnel and ship's crew aware and alert for potential alien species	**Issue aircraft personnel and ship's crew with printed information** on plants, propagules and insects they might find around the ship or in aircraft and boats	Check that all aircraft personnel and ship's crew have received the document and are familiar with quarantine measures	Action: D: IEA Monitoring: ECO	Provide additional copies of the document; Provide additional information about quarantine measures
Educate expeditioners to the PEIs about the importance quarantine measures	All expeditioners aware and alert for potential alien species	**Issue all expeditioners with the SANAP Gear Checks document** (Appendix, 1.6) in time for them to implement instructions during packing	Check that all expeditioners have received the document	Action: D: IEA Monitoring: DAI; ECO	Supply expeditioners with the document at the earliest opportunity
Educate expeditioners to the PEIs about the importance quarantine measures	All expeditioners and crew aware and alert for potential alien species	**Issue all expeditioners and crew with a brochure** explaining the risk associated with alien and invasive species, pathways and propagules to look out for	Ensure that all expeditioners are in possession of brochure and are familiar with its contents	Action: D: SO&AS Monitoring: ECO	Provide additional copies of the brochure
Educate expeditioners to the PEIs about the importance quarantine measures	All expeditioners and crew aware and alert for potential alien species	**Hold a seminar (attendance compulsory) during every voyage** explaining the importance of quarantine measures; all passengers, crew and contractors to attend	Maintain an attendance register	Action: ECO Monitoring: DCO	Immediately inform anyone not understanding the issues pertaining to conservation and the threats of alien species; Do not allow anyone who did not attend the seminar to disembark at the PEIs

Goal 5-1. To prevent the introduction of alien species and invasive species to the PEIs					
Objectives	Target	Actions	Monitoring	Responsibility	Remedial action
Educate expeditioners to the PEIs about the importance quarantine measures	All expeditioners able to access information on alien plant species	**Make available the CD, 'The Flora of Marion and Prince Edward Islands'** to all expeditioners	Ensure that all expeditioners are aware of and have access to the CD	Action: D: SO&AS Monitoring: ECO	Provide access to the CD
Ensure commitment from expeditioners to preventing propagules from reaching the PEIs	All expeditioners committed to minimising the risk of transferring propagules to the PEIs	**Sign a Conservation Certificate** (Appendix, 2.2) stating that the Management Plan has been read and understood and that equipment and personal baggage is propagule-free	Prior to embarkation, check that all expeditioners have signed the Conservation Certificate	Action: All expeditioners Monitoring: Group Leaders; ECO	Do not allow on board the vessel anyone who has not signed the declaration; Do not allow anyone who flouts the quarantine to return to the islands
Educate the relevant personnel about how to deal with discovered alien propagules	Personnel can deal effectively with alien propagules	**Ensure that ECO and TL know where to access** supplies of **fumigants, herbicides and insecticides** on vessel and at base, **and know how to use them safely**	Before departure, check that ECO and TL have the necessary knowledge	Action: D: IEA Monitoring: D: SO&AS; DCO	Re-iterate instructions on effective and safe use of these substances
Educate the relevant personnel about how to deal with discovered alien propagules	Overwintering team members able to respond appropriately to alien introductions	**Include instruction about contingency response** to new alien introductions **in team training**	Run through the contingency response plan in practice drills on the island	Action: D: IEA Monitoring: D: SO&AS; ECO	Provide additional information regarding correct contingency procedures

Goal 5-1. To prevent the introduction of alien species and invasive species to the PEIs					
Objectives	Target	Actions	Monitoring	Responsibility	Remedial action
C. Quarantine measures: DAI, NDPW, SAWS and helicopter company stores					
Prevent alien introductions from storage facilities of institutions involved in the PEIs	D: SO&AS stores free of propagules	**D: SO&AS to ensure that all its suppliers provide propagule-free products**	Perform unscheduled inspections of stores from four weeks prior to voyage and during all packing procedures; Conduct an independent audit of storage facilities and suppliers every two years	Action: D: SO&AS Monitoring: ECO; independent auditor	If a consignment is found to contain propagules, reject and replace the entire consignment; In extreme cases, a supplier's contract may be revoked
Prevent alien introductions from storage facilities of institutions involved in the PEIs	No birds, rodents, invertebrates or other propagules to enter stores	**Provide clean storage facilities which can be fully closed**; keep windows and doors closed at all times when not in use	Inspect integrity of store structure daily from four weeks prior to voyage and during all packing procedures	Action: D: SO&AS; NDPW; SAWS; Helicopter Company (store managers) Monitoring: ECO	Clean up or contain and remove any propagules or propagule-bearing material (e.g. bird droppings); Immediately investigate and repair any breaches of the facility (e.g. broken or loose windows), and step up rodent, bird and insect control measures until breach repaired
Prevent alien introductions from storage facilities of institutions involved in the PEIs	No plants growing in immediate vicinity of stores and other important packing areas	**Maintain plant-free stores and packing areas** (including those used for food, equipment and issue gear) by regular herbicide treatment	Conduct weekly inspections throughout the year and daily inspection from four weeks prior to voyage	Action: D: SO&AS; NDPW; SAWS; Helicopter Company (store managers) Monitoring: ECO	Immediately remove plants and treat area with herbicide

Goal 5-1. To prevent the introduction of alien species and invasive species to the PEIs					
Objectives	Target	Actions	Monitoring	Responsibility	Remedial action
Prevent alien introductions from storage facilities of institutions involved in the PEIs	No rubble in storage areas	**Keep storage areas free of rubble** (including disused, redundant and condemned equipment) at all times	Conduct weekly inspections throughout the year and daily inspections from four weeks prior to voyage	Action: D: SO&AS; NDPW; SAWS; Helicopter Company (store managers) Monitoring: ECO	Remove accumulated rubble immediately; If propagules are found, perform additional inspection and cleaning and/or fumigation
Prevent alien introductions from storage facilities of institutions involved in the PEIs	No propagules survive in storage areas, including vehicle (e.g. helicopter) storage areas	Regularly inspect , **clean** and (if necessary) fumigate all **storage areas; deploy traps** (rodents: poison bait stations, insects: light and sticky traps) **in and around stores** throughout year	Inspect storage areas monthly throughout year, and weekly during the last four weeks before the voyage	Action: D: SO&AS; NDPW; SAWS; Helicopter Company (store managers) Monitoring: ECO	If propagules found, clean stores and vehicles thoroughly, fumigate and be alert for re-occurrences; Increase number of traps deployed, spray weeds etc.; If infestation persists, inform D: SO&AS
Prevent alien introductions from storage facilities of institutions involved in the PEIs	Efficient and effective inspection of food during packing operations	**Pack and inspect food on waist-high benches in a clean, enclosed space**	Inspect food packing facilities and packing process at D: SO&AS stores when food is packed prior to voyage	Action: D: SO&AS (store manager) Monitoring: ECO	Inspect and repack food that was packed in inadequate facilities
Prevent alien introductions from storage facilities of institutions involved in the PEIs	D: SO&AS storage areas free of food waste to avoid attraction of insects and rodents	When food is packed, **clean up store daily** but also immediately clean up and remove from stores any food spilled during packing and loading, or any other food waste; **Empty** or remove **waste bins** at the end of each working day	Conduct daily inspections of food packing facilities and process when food is packed prior to voyage	Action: D: SO&AS (store manager) Monitoring: ECO	D: SO&AS to instruct store manager to clean store immediately and thoroughly

Goal 5-1. To prevent the introduction of alien species and invasive species to the PEIs					
Objectives	Target	Actions	Monitoring	Responsibility	Remedial action
Prevent alien introductions from storage facilities of institutions involved in the PEIs	No propagules in cargo, loading machinery and temporary lay down areas	**Inspect cargo** (including packaging materials), **loading machinery** (e.g. forklifts, trucks and cranes) **and temporary lay down areas**, checking for propagules and materials that could contain propagules	Inspect daily from four weeks prior to the voyage	Action: ECO Monitoring: D: SO&AS (Store manager)	If propagules or propagule-bearing material (e.g. soil) are found, remove contaminated articles from stores and clean entire store; Attempt to identify the source of the contamination; Undertake intensive inspections of cargo from the same source until departure
Prevent alien introductions from storage facilities of institutions involved in the PEIs	No propagules on or in containers	**Hot-wash all transport containers** before packing and storing under clean conditions; keep storage areas free of weeds, soil, litter and other waste	Inspect containers and storage sites monthly throughout year, and daily during the last four weeks prior to the voyage	Action: D: SO&AS; NDPW; SAWS (store managers) Monitoring: ECO	Move contaminated containers to a clean area before thoroughly cleaning and re-inspecting; Do not deploy containers until cleared by the ECO
Prevent alien introductions from storage facilities of institutions involved in the PEIs	No propagules in cargo boarding the supply vessel	**Store cargo in cleaned and/or fumigated sealable plastic or metal containers**; Phase out cage pallets	Conduct daily inspections of stored equipment from four weeks prior to voyage	Action: D: SO&AS; NDPW; SAWS (store managers) Monitoring: ECO	If containers have not been adequately sealed, cleaned or fumigated, do not allow them on board the supply vessel

Goal 5-1. To prevent the introduction of alien species and invasive species to the PEIs					
Objectives	Target	Actions	Monitoring	Responsibility	Remedial action
Prevent alien introductions from storage facilities of institutions involved in the PEIs	No transfer of propagules between Gough Island, Antarctica and the PEIs	**Set aside metal containers**, including orange D: SO&AS and blue NDPW containers, **for exclusive use on the PEI** (no containers used on the mainland, at SANAE or at Gough Island may be used at PEIs); **Clearly mark containers** according to their destination	Prior to loading of supply vessel for departure for PEI, check that containers are stored separately	Action: D: SO&AS; NDPW Monitoring: ECO	If Marion, Gough and SANAE containers are mixed up, inspect contents and, once certified clean, transfer to PEI container
C. Quarantine measures: Cargo and carry-on gear					
Prevent alien introductions via food supplies	No propagules introduced through food supply	**Do not order banned foods for the PEIs**; Food supplies may not contain fresh fruit or vegetables (whole or processed); fresh, non-irradiated eggs (with shells intact); poultry products with bones; brewing kits; dried mushrooms and sun-dried tomatoes; mushroom growing kits; dried meat products	Check food supply orders; Check when supplies are packaged at D: SO&AS stores; Check when supplies are used at the PEIs	Action: D: SO&AS Monitoring: ECO; all expeditioners	If any banned items are found on the 'shopping list' or in the supplies when packing, remove items from list/supplies; If items are discovered once on island, do not open items and return them to the vessel
Prevent alien introductions via food supplies	No propagules introduced via personal supplies	**Expeditioners not to pack banned food supplies** (listed above)	Monitor on an *ad hoc* basis while underway and at the islands	Action: All expeditioners Monitoring: All expeditioners; ECO	If items are found on the ship, dispose of these in an appropriate way; If items are discovered once on island, do not open the items and pack away for return to vessel

Goal 5-1. To prevent the introduction of alien species and invasive species to the PEIs					
Objectives	Target	Actions	Monitoring	Responsibility	Remedial action
Prevent alien introductions via carry-on gear	No propagules introduced via carry-on baggage (limited to personal gear and fragile equipment)	**Clean and inspect carry-on baggage;** **Pack in a closed, clean, propagule-free room**; If packing at night, ensure windows, doors and curtains are closed; Store baggage above floor level and continuously monitor until embarkation	Self-regulate	Action: All expeditioners Monitoring: All expeditioners	If propagules are found prior to embarking, unpack and ensure all gear is propagule-free, and clean if necessary; Undertake additional inspections of baggage from same source
Prevent alien introductions via cargo	No propagules introduced via equipment and personal gear in cargo	**Clean and inspect all equipment** (including oceanographic, biological and geological sampling equipment) **and personal gear** during packing and **prior to delivery** to D: SO&AS stores; **Do not take wooden field markers** to the PEIs (may harbour pests)	Thoroughly inspect equipment and personal gear packing areas at home institutions; repeat inspections prior to loading on vessel	Action: Group Leaders and all expeditioners Monitoring: Group Leaders, ECO	If propagules found prior to loading, report to ECO; Undertake additional inspections of cargo from same source; clean and fumigate if necessary; Group Leaders and their teams might not be allowed to return to PEIs; Do not accept wooden field markers for loading
Prevent alien introductions via cargo	No propagules introduced via equipment	**Seal (e.g. plastic-wrap) equipment after** but not before **cleaning** and/or fumigation	Inspect stored equipment daily from four weeks prior to voyage	Action: All expeditioners Monitoring: D: SO&AS (store manager); ECO	Do not allow loading of uninspected and unsealed equipment onto the vessel

Goal 5-1. To prevent the introduction of alien species and invasive species to the PEIs					
Objectives	Target	Actions	Monitoring	Responsibility	Remedial action
Prevent alien introductions via cargo	No propagules on or in gas cylinders, jerry cans or water containers	**Hot-wash all gas cylinders and jerry-cans**; **Treat water cans and other water processing equipment** (pipes, tanks, showers, etc.), with a medically approved biocide prior to re-use	Inspect all gas cylinders, jerry cans and water containers prior to loading onto vessel	Action: D: SO&AS; NDPW; SAWS (store managers); Group Leaders Monitoring: ECO	Items found with propagules are to be decommissioned until they have been cleaned and cleared for use by the ECO
Prevent alien introductions via cargo	No propagules introduced via construction material	**Certify construction materials free of propagules**; If possible, seal into containers before loading on vessel; Irradiate stone and premix cement prior to departure; Use of sand and soil is banned	Ensure that adequate sterilisation is undertaken and construction materials certified sterile	Action: NDPW or other construction manager Monitoring: D: SO&AS; ECO	If construction material is found to be non-sterile, harbouring propagules or uncertified, quarantine and return to South Africa
Prevent alien introductions via cargo	Detect any previously undetected propagules immediately prior to loading	**Inspect and clean all cargo, loading machinery and temporary lay down areas immediately prior to loading**; Re-inspect any cargo that is removed from the vessel prior to departure, before re-loading	Sign off verbally on final inspection after communication with ECO	Action: ECO D: SO&AS	If propagules or propagule-bearing material are found prior to loading, clean and undertake additional inspections of cargo from same source
Prevent alien introductions via cargo	All cargo destined for PEI delivered to D: SO&AS stores at least ten days prior to scheduled date of departure of vessel	**Deliver all cargo** (except carry-on baggage which is limited to personal gear and fragile equipment) to D: SO&AS stores **at least ten days prior to departure**; thereafter close the cargo area except for applications for late cargo	Inspect cargo ten days prior to scheduled date of departure	Action: Group Leaders; D: SO&AS Monitoring: D: SO&AS; ECO	Prevent late cargo from travelling to PEIs and remove from storage areas

Goal 5-1. To prevent the introduction of alien species and invasive species to the PEIs					
Objectives	Target	Actions	Monitoring	Responsibility	Remedial action
Prevent alien introductions via late cargo	No propagules in late cargo	**Only accept late cargo** (delivered after the ten day cut-off) **under exceptional circumstances**; **Pre-arrange quarantine inspection** in writing with D: SO&AS and ECO at least one month before departure; Provide a packing list	Check late cargo and once it is cleared, mark containers with colour-coded stickers	Action: D: SO&AS; Group Leaders Monitoring: D: SO&AS; ECO	Do not allow uninspected late cargo on board the supply vessel
Prevent alien introductions via late cargo	No propagules in late cargo	**Unload late cargo** flown to the supply vessel **in presence of ECO**	**ECO to** accompany and **open** and inspect cargo **in a secure room**	Action: DCO Monitoring: ECO	Contain and destroy any propagules found in the cargo before issuing cargo to Group Leader; Group Leader and team might not be allowed to return to PEIs
Prevent alien introductions via packaging material	No propagules in packaging material	**Use plastic and other recyclable, synthetic packaging** in preference to wood, cardboard and paper packaging	Inspect all packaging prior to departure and on unloading at PEIs	Action: D: SO&AS; NDPW; SAWS; all expeditioners Monitoring: ECO	Remove wood, paper and cardboard packaging prior to loading; If this is not practicable, then return cargo to vessel and remove packaging prior to offloading

Goal 5-1. To prevent the introduction of alien species and invasive species to the PEIs					
Objectives	Target	Actions	Monitoring	Responsibility	Remedial action
Prevent alien introductions via packaging material	No propagules in packaging material	If the use of wood packaging material is unavoidable, then **clean and certify wood according to ISPM 15 standards**[4]	Inspect ISPM 15 certification for all wooden packing material; Obtain a copy of certification	Action: D: SO&AS; NDPW; SAWS (store managers) and/or packaging contractor Monitoring: ECO	Reject, isolate and decommission all wooden packaging materials that are uncertified or are found to contain propagules; Review contract of packaging contractor
Prevent alien introductions via issue gear	No propagules on issue gear prior to allocation to expeditioners	**Ensure that new gear for issue** to expeditioners **does not contain Velcro;** phase out old gear that contains Velcro	Check all issue gear designs to ensure no Velcro is included; do not sign off on designs until Velcro removed	Action: D: SO&AS Monitoring: ECO; all expeditioners	Reject designs with Velcro; designs should replace Velcro below the knee with elastic or other appropriate closure
Prevent alien introductions via issue gear	No propagules on issue gear prior to allocation to expeditioners	**Ensure that issue gear** (including clothing) destined **for Marion Island is new or clean;** **Dry clean old gear** with an appropriate antiseptic treatment **and** thoroughly **clean Velco**	Inspect issue gear prior to allocation; Inspect all issue gear storage areas	Action: D: SO&AS; NDPW; SAWS (store managers) Monitoring: ECO	Return clothing and equipment that is dirty or contains propagules to the supplier and issue a new set of gear; Report inadequate storage methods to D: SO&AS ~~DAI~~

[4] In 2002 the FAO-based Interim Commission on Phytosanitary Measures adopted a global standard for treating wood packaging material: International Standard for Phytosanitary Measures No. 15 (ISPM 15), 'Guidelines for regulating wood packaging material in international trade'. The standard describes measures that significantly reduce the risk of pest spread in wood packaging materials and establishes a recognisable mark that identifies certified packaging (www.forestry-quarantine.org).

Goal 5-1. To prevent the introduction of alien species and invasive species to the PEIs					
Objectives	Target	Actions	Monitoring	Responsibility	Remedial action
Prevent alien introductions via issue gear	No propagules on issue gear after allocation to expeditioners	**Once allocated**, **vacuum pack gear** or seal in heavy duty plastic bags; **Pack** all sealed gear bags **into tog bags, clearly marked** with name tags, **and hold at stores** (expeditioners may not take this gear away)**;** **Transport gear directly to vessel;** **At stores and on vessel,** store gear bags off the ground in a clean, closed container or room	Inspect all allocated issue gear; Accompany gear to vessel; Inspect gear storage areas	Action: D: SO&AS; NDPW; SAWS (store managers) Monitoring: ECO	Return any gear that is taken home and request the issue of new gear; If storage facilities are inadequate, request use of alternative facilities
Prevent alien introductions via issue gear	No propagules on issue gear after allocation to expeditioners	**Issue Marion Island gear** to expeditioners once vessel is **two days out** from the mainland; **Issue Prince Edward Island gear two hours prior to departure** from vessel	Inspect issued gear for propagules	Action: ECO Monitoring: All expeditioners	Report opened or contaminated gear to ECO; immediately clean gear before re-issue
Prevent alien introductions via issue gear	No propagules on issue gear of expeditioners returning to Marion Island	Expeditioners who visit Marion Island regularly may re-use the same issue gear, but are to **return gear to D: SO&AS or NDPW stores for cleaning, vacuum packing and storage between voyages**	Ensure that all issued gear is returned to stores after a voyage within two working days of return to the mainland	Action: All expeditioners intending to return to Marion Island Monitoring: D: SO&AS; NDPW (store managers)	Only issue new gear to expeditioners who are returning to the PEIs once old gear has been returned

Goal 5-1. To prevent the introduction of alien species and invasive species to the PEIs					
Objectives	Target	Actions	Monitoring	Responsibility	Remedial action
Prevent alien introductions via issue gear	No propagules on issue gear of expeditioners returning to Marion Island	**Clearly mark gear for re-use** with name tags and issue to the correct person	Inspect gear during issuing and returning of gear to stores	Action: D: SO&AS; NDPW; SAWS (store managers) Monitoring: All expeditioners intending to return to Marion Island	If gear with incorrect name tag is issued, return to stores and request re-issue
D. Quarantine measures: Supply vessel					
Prevent alien introductions to the PEIs via galley and other ship supplies	No propagules entering vessel via galley and other ship supplies	**Inspect and certify clean all galley and ship supplies** before loading onto the vessel	Inspect supply storage areas on vessel weekly from four weeks prior to voyage until departure; Obtain a copy of certification before loading	Action: Supplier; Ship's Master Monitoring: Galley crew; ECO	Reject supplies if no certification provided; If propagules found prior to loading, report to ECO; Undertake additional inspections of cargo from same source; clean and fumigate; In extreme cases, supplier's contract may be revoked
Prevent alien introductions to the PEIs via galley and other ship supplies	No propagules entering vessel via galley and other ship supplies	**Hot wash and disinfect holds, galley, fridges and food storage areas** (including walkways between these areas) before loading and again before departure	Inspect all areas of the vessel before departure	Action: Ship's Master Monitoring: ECO	Perform additional inspections of affected area if any propagules found; Clean and/or fumigate and deploy and maintain additional traps

Goal 5-1. To prevent the introduction of alien species and invasive species to the PEIs					
Objectives	Target	Actions	Monitoring	Responsibility	Remedial action
Prevent alien introductions to the PEIs via galley and other ship supplies	No propagules entering supply vessel via galley supplies	Prior to loading, **obtain a phytosanitary certificate**[5] for all fresh fruit and vegetable produce for the vessel	Obtain a copy of the certificate before loading of produce on vessel; Carry out regular inspections and *ad hoc* observations of cleanliness and signs of pests in galley and food storage areas	Action: Vessel Operator Monitoring: ECO; galley staff	If no certificate is produced, reject supplies; If propagules are found, contain and hand to ECO; Identify the source and pathway of contamination and conduct a full inspection for further propagules; In extreme cases, the supplier's contract may be revoked
Prevent alien introductions to the PEIs via galley and other ship supplies	No propagules escaping the vessel galley and food stores	**Isolate all fresh fruit and vegetables** in a dedicated food storage area upon delivery of supplies to ship	Oversee delivery and storage of supplies; Regularly check that storage area is closed before departure and while underway	Action: Ship's Master Monitoring: Ship's Master; ECO	Immediately containerise food items found outside of the storage area using the appropriate means; Inspect area for propagules and clean and/or fumigate if necessary

[5] Issued by NDA inspector (Directorate: South African Agricultural Food, Quarantine and Inspection Services).

Goal 5-1. To prevent the introduction of alien species and invasive species to the PEIs					
Objectives	Target	Actions	Monitoring	Responsibility	Remedial action
Prevent alien introductions to the PEIs via galley and other ship supplies	No propagules released into the marine environment within 12 nm of the PEIs through discharging of galley waste	**Do not discharge old/left over/rotten food or slop into the marine environment within 12 nm of the PEIs**; Freeze waste for disposal when vessel is sufficiently far away from islands - this excludes uncooked meat and fish, and all cooked/uncooked poultry products (including eggs) which must be frozen and returned to the mainland for disposal (see Chapter 7)	Inspect galley waste management at all meal times, and inspect frozen food waste daily throughout voyage until waste can be legitimately discharged	Action: Ship's Master Monitoring: Galley staff; ECO or delegated person	Immediately collect unfrozen food waste, freeze it and clean up the area; If food waste is discharged within 12 nm of the PEIs, investigate fully and take disciplinary action if necessary
Prevent alien propagules from reaching the vessel	No propagules are brought onto the vessel	**Do not allow pot plants, pets, sawdust, braai wood, cut flowers, organic decorations or soil on the vessel**	Perform unscheduled checks of cabins, including those of crew and officers	Action: Ship's Master Monitoring: Ship's Master; ECO	Return vertebrate animals to port to offload; Kill invertebrates by freezing, vacuum pack plants and soil, and return to mainland
Prevent alien propagules from reaching the vessel	No pests attracted to helicopter hangar on vessel	**Do not store food in the helicopter hangar**	Helicopter personnel to inspect daily; ECO to check at random	Action: Helicopter personnel Monitoring: Helicopter Captain; ECO	If propagules are found, contain these and hand over to the ECO
Prevent alien propagules from reaching the vessel	No pests transferring from wharf to helicopter hangar on vessel	**Keep hangar doors closed** when hangar not in use; Do not open doors between dusk and dawn unless helicopter operations are in progress	Inspect at night once a month when in port and nightly in the week prior to departure for the PEIs	Action: Helicopter Captain; Ship's Master Monitoring: Ship's Master; ECO	Immediately close doors that are open when hangar is not in use; If propagules are found, contain these and hand over to the ECO

Goal 5-1. To prevent the introduction of alien species and invasive species to the PEIs					
Objectives	Target	Actions	Monitoring	Responsibility	Remedial action
Prevent alien propagules from reaching the vessel	No pests transferring from wharf to vessel	**Keep all doors** of vessel **closed at night**; **Deploy bait stations and night lights in vicinity of gang plank** for rodent prevention	Inspect vessel at night once a month when in port and nightly in the week prior to departure for the PEIs	Action: Ship's Master; pest control contractor Monitoring: Ship's Master; ECO	If any propagules are found, perform additional inspections of affected areas and deploy and maintain additional traps; In extreme cases, review the Vessel Operator's contract
Prevent alien propagules from reaching the vessel	No pests transferring from wharf to vessel	**Dock supply vessel away from food and grain terminals**	Record position of wharf in relation to potentially high risk areas such as grain and food terminals	Action: D: SO&AS; Vessel Operator Monitoring: ECO	Source a new berth if current berth found to be high risk
Prevent alien propagules from reaching the vessel	No rodents transferring from wharf to vessel	**Store waste skips** on the wharf **at least 50 m from the vessel**; Use skips with sealable lids; **Keep lids closed** when not in use during the day **or sealed** overnight; **Empty and clean** skips **regularly**	Inspect wharf weekly while vessel is in port and daily in the week prior to departure for the PEIs	Action: Port Operator Monitoring: Ship's Master; D: SO&AS; ECO	If standards of cleanliness on the wharf are not maintained, contact the Port Operator at the highest level necessary and motivate for improved practices
Prevent alien propagules from reaching the vessel	No rodents transferring from wharf to vessel	**Deploy** additional **bait stations on the wharf**, gangway and bollards in the vicinity of all refuse skips	Inspect wharf at night once a month while vessel is in port and nightly in the week prior to departure for the PEIs	Action: Port Operator Monitoring: ECO	If standards of cleanliness on the wharf are not maintained, contact the Port Operator at the highest level necessary and motivate for improved practices

Goal 5-1. To prevent the introduction of alien species and invasive species to the PEIs					
Objectives	Target	Actions	Monitoring	Responsibility	Remedial action
Prevent alien propagules from reaching the vessel	No rodents transferring from wharf to vessel	**Illuminate wharf** with bright lights from sunset to sunrise	Inspect wharf at night once a month while vessel is in port and nightly in the week prior to departure for the PEIs	Action: Port Operator Monitoring: ECO	If night-lighting on the wharf is not maintained, contact the Port Operator at the highest level necessary and motivate for improved practices
Prevent alien propagules from reaching the vessel	No rodents transferring from wharf to vessel	Identify and **procure** the most **effective rat guards**; **Deploy on mooring lines**, avoiding crossed lines; Do not take rat guards down before the morning of the day of departure	Check rat guards ten minutes after docking and each morning and evening while the vessel is in port; report to the senior officer of vessel daily regarding condition and deployment of guards	Action: Vessel Operator; pest control contractor Monitoring: Ship's Master; ECO	Deploy rat guards and/or replace damaged rat guards immediately
Prevent alien propagules from reaching the vessel	No plant propagules transferring from wharf to vessel	**Keep the wharf free of plants** by regular herbicide treatment of the area	Conduct weekly inspections throughout the year and daily inspection from four weeks prior to voyage	Action: D: SO&AS; Port Operator Monitoring: ECO	Immediately remove plants and treat area with herbicide
Ensure that no alien propagules survive on the vessel	Alien propagules are effectively dealt with	**Deploy and maintain** sufficient numbers of effective rodent and insect **traps** (rodent bait stations, insect light, sticky and surface traps) on board supply vessel, in high-risk areas (e.g. helicopter hangar, galley, mess)	Inspect traps weekly during stay in port, and daily during voyage; Regularly inspect holds for signs of dead and live rodents	Action: Pest control contractor Monitoring: Ship's Master; ECO	If propagules are found, capture and preserve for identification; Identify source and pathway of contamination and search for further propagules; Install or repair traps and fumigate if necessary; In extreme cases the contractor's contract may be reviewed

Goal 5-1. To prevent the introduction of alien species and invasive species to the PEIs					
Objectives	Target	Actions	Monitoring	Responsibility	Remedial action
Ensure that no alien propagules survive on the vessel	Alien propagules are effectively dealt with	**Ensure that there is sufficient supply of bait stations, fumigants, herbicides and insecticides** for prompt use in the event of a pest outbreak	Check supplies on board vessel	Action: Pest control contractor; D: SO&AS Monitoring: D: SO&AS; ECO	Replenish equipment and supplies at the earliest opportunity
Ensure that no alien propagules survive on the vessel	No pests present on vessel	**Maintain** Rat Free Certification and other **pest control certificates**	Obtain copies of certificates before departure	Action: Vessel Operator Monitoring: ECO	If Rat Free Certification is not up to date or if fumigation has not been performed in the two weeks prior to departure, rectify immediately even if departure is delayed
Ensure that no alien propagules survive on the vessel	No propagules in carry-on baggage during transit	**Hold boot-washing ceremony**, inspecting all outer gear, footwear, socks, bags and field gear for propagules and propagule-bearing materials[6]; Everyone who will disembark at PEIs to attend; Clean gear by vacuum, scrubbing and hot washing; Wash and disinfect soles and outers of all footwear; inspect inners	Maintain an attendance register; Check that gear is correctly inspected and cleaned	Action: ECO; All expeditioners Monitoring: ECO and volunteers (preferably representatives of main groups on board, e.g. overwintering team, researchers, NDPW, Helicopter Company)	Require expeditioners to clean item and to return it for inspection; Assist expeditioners if they are unsure of actions to be taken; Ensure that cleaning materials are available; Anyone who has not been signed off by the ECO will not be allowed to go ashore

[6] `Bags' includes camera, video, binocular and other field instrument bags and cases, back packs, day packs and sleeping bags. `Field gear` includes tripods, walking sticks and surveying or marker poles.

Goal 5-1. To prevent the introduction of alien species and invasive species to the PEIs					
Objectives	Target	Actions	Monitoring	Responsibility	Remedial action
Ensure that no alien propagules survive on the vessel	No propagules transferring from vessel hull to the PEIs	**Clean the supply vessel's hull of fouling organisms** between voyages to the PEIs and between voyages to the PEIs and other destinations	Inspect ship maintenance logs to ensure that the hull has been cleaned according to schedule	Action: Vessel Operator Monitoring: D: SO&AS with sign off by ECO	D: SO&AS to review Vessel Operator's contract
Ensure that no alien propagules survive on the vessel	No propagules transferring from vessel's ballast water to the marine environment of the PEIs	**Do not discharge ballast water within 200 nm of the islands**	Ensure that ballast water has not been exchanged	Action: Ship's Master Monitoring: DCO; ECO	Remind Vessel Operator that ballast water exchange is prohibited
Ensure that no alien propagules survive on the vessel	No propagule contamination *en route* to the PEIs	**Sail directly to PEIs**, avoiding detours to other locations; Ensure Ship's Master is aware of policy prior to departure	Ensure procedure is adhered to throughout journey	Action: Vessel Operator (Ship's Master); D: SO&AS Monitoring: DCO; ECO	If this protocol is breached for non-emergency purposes, file a report with D: SO&AS immediately; Vessel Operator's contract may be reviewed
Ensure that no alien propagules survive on the vessel	No propagules transferring from vessel gear to the PEIs	Before stowing gear after departure for PEIs, **hot wash and remove fouling from all mooring lines, anchor chains and other gear** routinely left in the water	Check that gear is clean before stowing away and again before deployment at the PEIs	Action: Ship's Master Monitoring: Ship's Master; ECO	Decommission any gear found to contain propagules until cleaned and the ECO clears it for use
Ensure that no alien propagules survive on the vessel	No propagules transferring from vessel gear to the PEIs	Before departure for PEIs, **clean survival gear** (wet suits, dry suits, survival suits and SCUBA gear) using hot water	Inspect survival gear before deployment at the PEIs	Action: Ship's Master Monitoring: ECO	Decommission any gear found to contain propagules, until cleaned and cleared for use

Goal 5-1. To prevent the introduction of alien species and invasive species to the PEIs					
Objectives	Target	Actions	Monitoring	Responsibility	Remedial action
Ensure that no alien propagules survive on the vessel	No propagules transferring from vessel to PEIs during cargo operations	**Hot wash and disinfect** all ship's **nets, slings and strops** before departure for PEIs	Inspect nets and slings prior to departure	Action: Ship's Master Monitoring: ECO	Decommission any gear found to contain propagules, until cleaned and cleared for use
Prevent alien introductions at the PEIs via supply vessel	No organisms transferring from vessel to Marion Island	**Do not anchor closer than 500 m from Marion Island**, except when pumping fuel or where written permission to anchor closer for scientific and management purposes has been granted by D: SO&AS; **Do not beach any vessel** at the island except in an emergency or where weather conditions make aircraft operations dangerous	Check distance offshore when anchored	Action: Ship's Master Monitoring: DCO; ECO	Communicate with Ship's Master as required, and ensure that vessel withdraws to the required minimum distance
Prevent alien introductions at the PEIs via supply vessel	No organisms transferring from ship to Prince Edward Island	**Do not anchor closer than 500 m from Prince Edward Island;** **Do not beach any vessel** at the island except in an emergency or where weather conditions make aircraft operations dangerous	Check distance offshore when anchored	Action: Ship's Master Monitoring: DCO; ECO	Communicate with Ship's Master as required, and ensure that vessel withdraws to the required minimum distance

Goal 5-1. To prevent the introduction of alien species and invasive species to the PEIs					
Objectives	Target	Actions	Monitoring	Responsibility	Remedial action
Prevent alien introductions at the PEIs via supply vessel	No propagules reach shore from ship during fuel transfer	**During fuel transfer, deploy ancillary craft** that are equipped with scoop nets, bags and jars of various sizes for catching and containing propagules; **Conduct visual inspections** for propagules (especially rodents and insects) from vessel's side and craft; Monitor the whole length and both ends of the fuel transfer line, as well as any point where the line passes close to the rocks of Gunner's Point	Before fuel transfer begins, ensure that observers are at their stations and equipment is in place for containing propagules	Action: Ship's Master Monitoring: DCO; ECO	If visual inspections not being fully implemented, implement immediately; Hand over all propagules to ECO
E. Quarantine measures: Vehicles					
Prevent propagules from reaching the PEIs via vehicles (marine, land and aircraft)	No propagules in or on helicopters or hangars	**Clean helicopter thoroughly prior to departure and again before deployment**, paying attention to areas where propagules or soil may lodge (skids, floor edges, holds; door hinges, window rubbers); Clean with the appropriate tools, e.g. high pressure hoses, biocides, vacuum cleaner	Inspect aircraft and hangars weekly from four weeks prior to scheduled date of departure; Inspect again before deployment at PEIs	Action: Helicopter Company Monitoring: ECO	If propagules are found at any stage prior to loading, fumigate, clean and re-inspect hangar and helicopters; Inform D: SO&AS and take advice on further action

Goal 5-1. To prevent the introduction of alien species and invasive species to the PEIs					
Objectives	Target	Actions	Monitoring	Responsibility	Remedial action
Prevent propagules from reaching the PEIs via vehicles (marine, land and aircraft)	No propagules in or on boats or boat storage areas	**Clean boats thoroughly prior to departure and again before deployment**; Run outboard motors in clean, fresh water; pay attention to areas where propagules or soil may be lodged (propellers, corners, holds, engine casings)	Inspect boats and storage areas weekly from four weeks prior to scheduled date of departure; Inspect again before deployment	Action: Ship's master; other boat owners/operators Monitoring: ECO	If propagules are found at any stage prior to loading, fumigate, clean and re-inspect store and boats; inform D: SO&AS and take advice on further action
Prevent propagules from reaching the PEIs via vehicles (marine, land and aircraft)	No propagules in or on vehicles	Once certified clean by the ECO, **keep helicopters and boats away from vegetated areas and transfer directly** from stores to vessel without stopovers	Inspect before loading to ensure that vehicles have not picked up dirt or propagules *en route* to the vessel	Action: Helicopter Company; Ship's Master; all other boat owners or operators Monitoring: ECO	If propagules are found at any stage prior to loading, fumigate, clean and re-inspect store and vehicles; Inform D: SO&AS and take advice on further action
Prevent propagules from reaching the PEIs via vehicles (marine, land and aircraft)	No propagules in or on vehicles	**Keep all auxiliary equipment and containers** used by helicopter or boat personnel (e.g. cupboards, tool boxes, forklifts, tractors) **clean** and propagule free; inspect and fumigate cupboards prior to transportation to the vessel	Inspect storage areas and vehicles weekly, from four weeks prior to scheduled date of departure	Action: Helicopter Company; Ship's Master; all other boat owners or operators Monitoring: ECO	If propagules are found at any stage prior to loading, fumigate, clean and re-inspect store and vehicles; inform D: SO&AS and take advice on further action
Prevent propagules from reaching the PEIs via vehicles (marine, land and aircraft)	No propagules in or on boats	**Decommission wooden craft** from use on the islands	Check before departure that no wooden craft are intended for deployment	Action: D: SO&AS; Vessel Operator Monitoring: ECO	If wooden craft are transported to the PEIs, leave these on the vessel and return them to the mainland unused

Goal 5-1. To prevent the introduction of alien species and invasive species to the PEIs					
Objectives	Target	Actions	Monitoring	Responsibility	Remedial action
F. Quarantine measures: Permitted tourist vessels operating in the waters surrounding the PEI					
Prevent propagules from reaching PEIs via tourist vessels	Tourist vessel operators adhere to the applicable quarantine measures (see D. above)	Before departure for the PEIs, **check that vessel has the necessary up-to-date pest certification and that vessel operator is familiar with** the applicable **quarantine measures** (see sections D and E of this table)	Check tourist vessel permits and Master's knowledge of quarantine measures	Action: DEA Monitoring: D: SO&AS	If vessel is not certified; request that necessary certification be obtained before departure, or that permit be withdrawn; Provide Vessel Operator with a copy of quarantine measures and explain these as necessary
Prevent propagules from reaching PEIs via tourist vessels	Tourist vessels remain far away enough from the islands to prevent most propagules from reaching shore	**Vessels not to approach closer than 500 m** of the low water mark of Marion Island or of Prince Edward Island	Observe tourist vessels operating in the vicinity of PEIs	Action: Tourist vessel's Master Monitoring: All expeditioners, especially DCO/TL and ECO	If vessel appears to be closer than 500 m, request vessel to withdraw and to report incident to D: SO&AS; Follow up with Vessel Operator and DEA
Prevent propagules from reaching PEIs via tourist vessels	Boats from tourist vessels remain far away enough from the islands to prevent most propagules from reaching shore	**Boats** from tourist vessels **not to approach closer than 500 m** of the PEIs low water mark	Observe tourist vessels operating in the vicinity of PEIs	Action: Tourist vessel's Master Monitoring: All expeditioners at PEIs, especially DCO/TL and ECO	If boat appears to be closer than 500 m, request vessel to withdraw and to report incident to D: SO&AS; Follow up with Vessel Operator and DEA

Goal 5-1. To prevent the introduction of alien species and invasive species to the PEIs					
Objectives	Target	Actions	Monitoring	Responsibility	Remedial action
Prevent propagules from reaching PEIs via tourist vessels	Tourist vessel operators adhere to the applicable quarantine measures (see D. above)	**Observe vessel activities** when it is in view at the PEIs; TL and ECO to report on activities in monthly reports	None	Action: All expeditioners at PEIs, especially DCO/TL and ECO	If the vessel is observed to contravene the applicable quarantine measures, request vessel to withdraw beyond the territorial waters of the PEIs and report immediately to D: SO&AS; Follow up with Vessel Operator and DEA
G: Quarantine measures: Marion Island					
Prevent newly introduced propagules from spreading from Marion Island base	No alien propagules surviving transfer from ship to shore	**Deploy snap traps** (hidden in bird-proof covers[7]) **in and around base before offloading** cargo and expeditioners	Ensure all traps are continuously deployed and maintained during cargo transfer	Action: TL Monitoring: ECO	Install or repair traps if these are not in place or are defective
Prevent newly introduced propagules from spreading from Marion Island base	No damage to natural vegetation (to reduce chance of alien plants establishing)	**Stay on platforms and catwalks** during landing and cargo transfer operations	Monitor during personnel and cargo transfer operations, and also throughout the year	Action: All expeditioners Monitoring: DCO/TL; ECO	Return to walkways immediately and monitor disturbed ground for signs of introduction of alien plants
Prevent newly introduced propagules from spreading from Marion Island base	No damage to natural vegetation (to reduce chance of alien plants establishing)	**Lower containers onto landing platforms** and not directly onto the ground	Monitor during cargo transfer operations	Action: Helicopter Captain Monitoring: DCO/TL; ECO	Remove containers as soon as possible from vegetation to a landing platform; Rehabilitate site if necessary, and monitor for establishment of alien plants

[7] Sheathbills, skuas and giant petrels will investigate and probably consume bait, and therefore need to be protected from access to bait.

Goal 5-1. To prevent the introduction of alien species and invasive species to the PEIs					
Objectives	Target	Actions	Monitoring	Responsibility	Remedial action
Prevent newly introduced propagules from spreading from Marion Island base	No propagules spreading from containers	**Land containers as close as possible to the base**	Monitor during cargo transfer operations	Action: Helicopter Captain Monitoring: DC/TL; ECO	Move containers to the base as soon as possible and before opening them
Prevent newly introduced propagules from spreading from Marion Island base	No propagules spreading from containers	Wherever possible, **open containers in a closed room** where snap traps and sticky traps are deployed	Monitor opening of all containers	Action: DCO/TL Monitoring: ECO	If container has been opened but not yet unpacked, close and transfer to a closed room before unpacking
Prevent newly introduced propagules from spreading from Marion Island base	No propagules spreading from containers	**ECO to be present when containers are op**ened; **Contain any alien propagules** that are found (keep bags, nets and jars on hand) and establish path of entry; **Report to** D: SO&AS within 30 days of voyage end or in next monthly report (if event occurs outside of annual relief)	Ensure that ECO is aware that containers are to be opened; Ensure that report is submitted if alien propagules are found	Action: ECO Monitoring: DCO/TL	If containers are opened in absence of ECO, close immediately and wait for ECO before proceeding; If discoveries of propagules are not reported, instruct ECO to submit report immediately
Prevent newly introduced propagules from spreading from Marion Island base	No propagules spreading from base	**Conduct frequent inspections** for alien propagules throughout deployment and retrieval of cargo	Ensure that regular inspections for alien propagules are conducted	Action: ECO Monitoring: DCO/TL	Instruct ECO to conduct more frequent inspections

Goal 5-1. To prevent the introduction of alien species and invasive species to the PEIs					
Objectives	Target	Actions	Monitoring	Responsibility	Remedial action
Prevent newly introduced propagules from spreading from Marion Island base	No propagules spreading during hut re-supply	Wherever possible, **transfer containers for huts directly from vessel to huts**; If containers are first transferred to base, do not place on vegetation; Before deployment of hut containers, inspect all containers and slings and nets and where appropriate, hose down container exteriors	Conduct regular inspections around huts	Action: Helicopter Captain; DCO Monitoring: ECO	Request that future deployment of huts be direct rather than via base, and report to D: SO&AS; Report discovery of new propagules to D: SO&AS
Prevent newly introduced propagules from spreading from Marion Island base	Alien propagules are effectively dealt with	**Ensure that there is sufficient supply of traps, fumigants, herbicides and insecticides** for dealing with alien propagules	Monitor quantity of substances at base	Action: D: SO&AS Monitoring: ECO; DCO/TL	Renew supplies at earliest opportunity
Prevent newly introduced propagules from spreading on Marion Island	Alien propagules are effectively dealt with	**Implement contingency plan** (see Goal 5-2A) in the case of the discovery of a severe new alien introduction; **Report** incident in full to D: SO&AS immediately upon discovery	Monitor progress during implementation of contingency plan	Action: ECO and DCO in consultation with D: SO&AS Monitoring: D: SO&AS; PEIAC	Monitor site of introduction and environs to determine success of contingency plan; If species persists, include in alien control and eradication plan (see Goal 5-2)
Prevent newly introduced propagules from spreading from Marion Island base	Prevent alien species escaping into the environment until/as old base is decommissioned	**Conduct a thorough inspection of old base once it is unoccupied** and before it is decommissioned; Sign-off inspection procedure; **Fumigate where necessary**	Inspect site of old base monthly	Action: ECO; TL Monitoring: ECO	Institute control/eradication programmes as necessary

Goal 5-1. To prevent the introduction of alien species and invasive species to the PEIs					
Objectives	Target	Actions	Monitoring	Responsibility	Remedial action
Prevent newly introduced propagules from spreading from Marion Island base	No propagules spreading during construction	**During construction, conduct regular inspections** of site for newly introduced propagules or spread of established alien species; **Take photographs of fixed locations** before and after each construction voyage; **Map** invaded areas; **Report monthly** to D: SO&AS	Consult with relevant experts about alien control and/or eradication	Action: ECO Monitoring: D: SO&AS; PEIAC	Institute control/eradication programmes as necessary
Prevent propagules from establishing in the Marion Island base	Prevent pests from thriving in the base	**Deploy rodent snap traps and insect light and sticky traps in the old and new bases**	Inspect snap traps daily, removing dead animals and resetting traps; Replace light and sticky traps as necessary	Action: All overwintering team members as instructed by TL Monitoring: ECO	Install or repair traps if these are not in place or are defective
Prevent propagules from establishing in the Marion Island base	Prevent pests from thriving in the base	**Report on any alien propagules that are discovered** in the old or new bases within 30 days of end of voyage (Relief ECO) or monthly (Team ECO)	None	Action: ECO	Provide instructions on how to proceed with elimination of pests
Prevent propagules from establishing in the Marion Island base	Prevent alien species from thriving in the base	**Conduct bi-annual** (prior to and after annual relief) **inspections of** all areas of **the base**, including living/dining/kitchen areas, laboratories, etc.; Sign off inspections; **Fumigate where necessary**	Ensure that bi-annual inspections signed off	Action: ECO with assistance from all team members Monitoring: TL; D: SO&AS	If inspection is not done, ensure that policy is complied with forthwith

Goal 5-1. To prevent the introduction of alien species and invasive species to the Prince Edward Islands					
Objectives	Target	Actions	Monitoring	Responsibility	Remedial action
H. Additional measures for Prince Edward Island (All quarantine measures applicable to Marion Island must be maximally applied to Prince Edward Island)					
Educate expeditioners to Prince Edward Island about the importance preventing alien introductions	Expeditioners to Prince Edward Island fully understand and appreciate need for additional quarantine regulations	When expedition to Prince Edward Island is approved, **provide all expeditioners with a list of quarantine measures** to be implemented; This document should **explain** the special nature of the island and **the need for extra-ordinary quarantine measures**	Ensure that all expeditioners have received, read and understood the document	Action: D: SO&AS Monitoring: Expedition Leader (EL); ECO	Distribute additional copies of the document; Elaborate on any points that were not understood
Prevent alien introductions to Prince Edward Island via expedition gear	Issue gear is new and propagule-free	**Only allocate issue gear** to expeditioners **if it is brand new**, clean and free of propagules	Inspect issue gear before it is allocated and upon allocation	Action: D: SO&AS (store manager) Monitoring: ECO; EL (before issue); expeditioners (upon issue)	Return clothing and equipment that is dirty or contains propagules to the supplier / D: SO&AS and obtain a new set of gear
Prevent alien introductions to Prince Edward Island via expedition gear	Issue gear of regular expeditioners is new and propagule-free	**Return old gear before receiving new gear for the next visit**	Ensure that old gear is returned before new gear is issued	Action: All expeditioners intending to return to the islands Monitoring: D: SO&AS (store manager)	If it is found that expeditioners have old gear which they intend to take to the island, remove this and replace with new gear

Goal 5-1. To prevent the introduction of alien species and invasive species to the Prince Edward Islands					
Objectives	Target	Actions	Monitoring	Responsibility	Remedial action
Prevent alien introductions to Prince Edward Island via expedition gear	Privately-owned protective clothing and equipment is new and/or propagule-free	**Ensure that privately-owned protective clothing** (including boots and socks) destined for Prince Edward Island **is brand new**; **Ensure that privately-owned clothing and equipment is clean** and free of propagules; **Ensure that wooden walking sticks are pre-treated** against pests	Inspect private gear before packing and storing	Action: All expeditioners Monitoring: ECO; EL	Return gear that is dirty or contains propagules to the owner and require that it be thoroughly cleaned before returning to stores for packing
Prevent the introduction of alien propagules to Prince Edward Island	Expedition food supply is free of propagules	**Do not take any banned foods to Prince Edward Island** (refer to section 5.1.2 B for list of banned substances for PEIs in general, and Prince Edward Island in particular)	Check supply orders; check packaging of supplies at D: SO&AS stores; check when supplies in use	Action: D: SO&AS; EL Monitoring: D: SO&AS; ECO; all expeditioners	If banned items are found on the 'shopping list' or in the supplies at packing stage, remove these from the list/supplies; If items are discovered once on island, do not open but pack away for return to vessel
Limit the spread of aliens on Prince Edward Island	Expeditioners are equipped to deal with newly introduced propagules	Provide EL with a supply of fumigants and traps	Before the vessel leaves for the PEIs, ensure that sufficient fumigants and traps have been provided	Action: D: SO&AS Monitoring: EL; ECO	If incorrect or insufficient supplies are received, request D: SO&AS to remedy before departure for PEIs; If alien invertebrates are found at camp site on island, use fumigants and traps accordingly

Goal 5-1. To prevent the introduction of alien species and invasive species to the Prince Edward Islands					
Objectives	Target	Actions	Monitoring	Responsibility	Remedial action
Prevent alien introductions to Prince Edward Island via expedition gear	Pack and treat gear so that it remains propagule-free	**Vacuum-pack allocated and private gear** once it has been declared propagule-free; **Irradiate** gear; **Pack gear bags into tog bags clearly marked** with name tags and destination (Prince Edward Island)	Inspect packaging for damage and check irradiation certification	Action: D: SO&AS (store manager) Monitoring: EL; ECO	Reject and replace gear that is in damaged packaging
Prevent alien introductions to Prince Edward Island via expedition gear	Store gear so that it remains propagule-free	**Hold allocated and privately owned gear** in a clean, closed room **at** D: SO&AS **stores**; do not allow expeditioners take this gear away	Inspect storage space; Ensure that no expeditioners take gear from stores	Action: D: SO&AS (store manager) Monitoring: ECO; EL	If storage space is unsatisfactory, move gear to a suitable space; Return any gear that has been removed from stores by expeditioners, and issue new gear
Prevent alien introductions to Prince Edward Island via expedition gear	Store gear so that it remains propagule-free	**Transport gear directly to vessel** and hand over to the ECO or EL; **Store gear** off the ground **in a clean, closed space** until issue	Ensure that gear is transported directly from stores to vessel; Inspect storage space	Action: D: SO&AS (store manager) Monitoring: ECO; EL	If storage space unsatisfactory, move gear to a suitable space
Prevent alien introductions to Prince Edward Island via expedition gear	Minimise chances of contamination of gear after issue to expeditioners	**Issue gear** to expeditioners **two hours prior to leaving the vessel** for Prince Edward Island	Ensure that gear is not issued too early	Action: ECO Monitoring: EL; DCO	Immediately clean any opened or contaminated gear and only re-issue once certified as clean by the ECO

Goal 5-1. To prevent the introduction of alien species and invasive species to the Prince Edward Islands					
Objectives	Target	Actions	Monitoring	Responsibility	Remedial action
Prevent alien introductions to Prince Edward Island via expedition gear	Minimise chances of contamination of gear after issue to expeditioners	After issue of gear and before leaving the vessel, **pack and dress in a clean, closed non-accommodation area**; Check fellow-expeditioners for propagules; Once dressed, **remain in isolation near the helideck** to avoid cross-contamination with other people on board	Once gear has been issued, ensure that expeditioners remain in packing/dressing area and move directly to helideck when ready	Action: All expeditioners Monitoring: EL; ECO	If expeditioners are found elsewhere on the vessel after gear has been issued, instruct them to return to packing/dressing area for thorough inspection of gear; only allow to proceed to island once gear declared clean by ECO
Prevent cross-contamination between Marion Island and Prince Edward Island	No transfer of propagules from Marion to Prince Edward	**Do not use gear on Prince Edward** that has been **issued for use on Marion**	Ensure that only gear issued for Prince Edward is taken to that island	Action: Expeditioners Monitoring: ECO	If Marion issue gear is discovered in baggage for Prince Edward, do not allow it to be transferred to Prince Edward
Prevent cross-contamination between Marion Island and Prince Edward Island	No transfer of propagules from Prince Edward to Marion	**On return from Prince Edward**, collect and **store all gear on the vessel**; do not allow this gear to be taken to Marion Island	Place returned gear in a closed container for the remainder of the voyage	Action: EL Monitoring: ECO	If Prince Edward gear reaches Marion Island, seal it in an airtight container and remove it from the island as soon as possible
Prevent cross-contamination between Marion Island and Prince Edward Island	No transfer of propagules between the two islands	**Deploy helicopters or boats directly from vessel** and do not allow transportation (helicopter and boat) directly between Marion and Prince Edward except in emergencies	Record all ship to shore transfers in ECO report and expedition report	Action: Ship's Master; Helicopter Captain; DCO Monitoring: ECO; EL	If pilot attempts to approach either island without the mandatory quarantine stop-off on the vessel, call off pilot immediately; Submit a full report to D: SO&AS

Goal 5-1. To prevent the introduction of alien species and invasive species to the Prince Edward Islands					
Objectives	Target	Actions	Monitoring	Responsibility	Remedial action
Prevent cross-contamination between Marion Island and Prince Edward Island	No transfer of propagules between the two islands	**Clean aircraft** on board the supply vessel **before and after flights to Prince Edward**, in addition to the regular quarantine measures applied on the supply vessel	Inspect (pre-and post-flights) aircraft interior, bodywork, wheels, skids and/or floats to ensure that the entire craft is propagule-free	Action: Helicopter Captain Monitoring: ECO	If an aircraft is found to harbour alien species, do not allow it to land on Prince Edward Island and instruct it to return to supply vessel for cleaning and rechecking; Only once the ECO is satisfied that the aircraft is free of propagules may it be redeployed; Report incidents to D: SO&AS
Limit the spread of aliens on Prince Edward Island	Limit risk of introduction of propagules to areas where monitoring is possible	**Limit landing to Cave Bay** (boat and helicopter) **and Kent Crater** (helicopter), except in emergencies	Ensure that landing occurs only at designated sites and record site locations in the expedition report	Action: Helicopter Captain; DCO Monitoring: ECO; EL	If landing occurs at other sites, report to DCO and D: SO&AS upon cessation of the operation; Document landing site for later inspections for alien species
Limit the spread of aliens on Prince Edward Island	Limit risk of introduction of propagules to areas where monitoring is possible	**Only camp at Kent Crater** on the west coast **and Cave Bay** on the east coast, except in emergencies	Ensure that camping occurs only at designated sites and record site locations in the expedition report	Action: All expeditioners Monitoring: EL; ECO	If camping occurs elsewhere, a full report must be made to D: SO&AS within a week of the end of the expedition

Goal 5-1. To prevent the introduction of alien species and invasive species to the Prince Edward Islands					
Objectives	Target	Actions	Monitoring	Responsibility	Remedial action
Limit the spread of aliens on Prince Edward Island	Prevent spread of introduced rodents	Upon arrival and before setting up camp, **deploy bird-protected rodent traps** (non-poison, snap type) in a circle around the off-loading and camping sites; Maintain traps throughout expedition; **Euthanise any live rodents** that are trapped and attempt to trace pathway of entry	Throughout stay on island, ensure that traps are deployed and maintained and that any live rodents are killed immediately	Action: All expeditioners Monitoring: ECO; EL	If traps have not been deployed on the island, do so promptly; If any trapped rodents escape, intensify trapping efforts; Report in full to D: SO&AS
Limit the spread of aliens on Prince Edward Island	Gain information on introduced rodents	Upon departure, collect and **return traps and dead rodents** to vessel; **Hand over carcasses** to ECO immediately upon return to vessel, and **report capture of any rodents** to D: SO&AS within 7 days of return to vessel	Freeze rodent carcasses on board vessel and ensure that they are transferred to DAI upon return to South Africa; Submit a full report to DAI within 30 days of end of voyage	Action: EL Monitoring: ECO; D: SO&AS	If traps are not taken off island, ensures that this is done during the following expedition; Consult with experts regarding a contingency plan to deal with rodent introduction

5.3 Control and eradication of alien and invasive species

Invasive alien species have had, and in many cases continue to have, substantial effects on species and on the structure and functioning of ecosystems at the PEIs. A small number (by comparison with elsewhere) of invasive alien species have established and spread on the islands. Because of their effects, steps must be taken to control and eradicate these species.

5.3.1 Provisions of NEMBA

- Section 75 (1) of NEMBA requires that all invasive species be controlled or eradicated from ecosystems through measures which are appropriate to the species and the ecosystem;
- For a species to be listed as invasive, the Minister must include it in a national list of invasive species which must be reviewed regularly (Section 70) (see Table 5-1);
- DEA (D: SO&AS) (as the Prince Edward Islands Management Authority) will, after a thorough inventory of invasive alien species on the PEIs, provide the Minister with an updated catalogue of species which the Minister must declare as listed invasives. These will then be treated according to Section 75 of the NEMBA;
- The Minister may also appoint a body of public servants to coordinate and implement the control and eradication of invasive species (Section 75 (5)).

5.3.2 Objectives

The objective of this section is to control further spread of and, where possible, eradicate all alien plants and animals on the islands. Where possible, this must be done without undue disturbance or damage to indigenous species and natural features. The objective is to:

- Eradicate all alien plants where possible, with the emphasis on species that are known to have the worst effects, and for which eradication is feasible;
- Understand and explain the ecological impact of alien plant populations on Marion Island and to make recommendations for their control;
- Quantify the ecological impact of the house mouse population on Marion Island and to make recommendations for its control;
- Quantify the ecological impact of introduced macro-invertebrates on Marion Island and make recommendations for their control;
- Ensure that all control and eradication methods used in these processes are ecologically safe and don't have a permanent negative impact on the islands and their species;
- Embark promptly on effective extermination programmes when new alien species are discovered;
- Ensure that all eradication methods are ecologically safe.

Goal 5-2. To control and/or eradicate alien and invasive species on the PEI					
Objectives	Target	Actions	Monitoring	Responsibility	Remedial action
A. Management actions					
Manage introduced and established alien species efficiently and effectively	Provisions of relevant legislation implemented (NEMBA Section 76)	**List and prioritise** all alien invasive species for control and eradication, (including mammals, vascular and non-vascular plants and invertebrates) and include list in this Management Plan; **Update list at four-yearly intervals** along with revision of Management Plan	Cross-check first annual report of D: SO&AS (after implementation of this PEIMP) with this PEIMP	Action: D: SO&AS (in consultation with experts) Monitoring: DEA; D: IEA; PEIAC	If list is not included, investigate this omission
Manage introduced and established alien species efficiently and effectively	Provisions of relevant legislation implemented (NEMBA Section 76)	**Commission four-yearly survey** of PEIs, in parallel with updating of PEIMP, to monitor spread of introduced species	Ensure survey is implemented every four years	Action: D: SO&AS Monitoring: D: IEA; PEIAC	If survey is not implemented, address cause (e.g. insufficient funding)
Manage introduced and established alien species efficiently and effectively	Provisions of relevant legislation implemented (NEMBA Section 76)	**Develop a** detailed **control and eradication strategy** for alien species on the PEIs, and append strategy to this Management Plan; **Review strategy at regular intervals**, incorporating findings of annual and four-yearly surveys for alien species	Cross-check first annual report of D: SO&AS (after implementation of this PEIMP), and findings of annual and four-yearly surveys of alien species, with this PEIMP	Action: D: SO&AS (in consultation with experts) Monitoring: DEA; D: IEA;PEIAC	If strategy is not appended, investigate this omission
Manage introduced and established alien species efficiently and effectively	Effective and efficient management of introduced species	**Prepare and implement contingency plans** for rapid response to alien species introductions	Cross-check D: SO&AS' annual reports with this PEIMP	Action: D: SO&AS Monitoring: D: IEA; PEIAC	If plans are not developed, address cause (e.g. insufficient funding); Update plans as necessary

Goal 5-2. To control and/or eradicate alien and invasive species on the PEI					
Objectives	Target	Actions	Monitoring	Responsibility	Remedial action
B. Preventing spread of alien species					
Prevent propagules from spreading within and between PEI habitats	Elimination of or reduction of spread of alien invasive species	**Implement the control and eradication strategy** for alien invasive species; **Report on progress** monthly and annually	Check that monthly ECO and annual D: SO&AS reports include description of progress	Action: D: SO&AS; ECO Monitoring: D: IEA; PEIAC	If progress is unsatisfactory, appoint an expert committee to give advice on how to improve
Prevent propagules from spreading within and between PEI habitats	Intact natural vegetation, reducing opportunities for spread of introduced species	**Keep natural vegetation and soil** as **undisturbed** as possible, particularly in high traffic areas around base and huts; **Restore degraded areas**	Inspect area around base weekly during annual relief / construction and monthly throughout year; inspect area around huts every two months	Action: All expeditioners, including helicopter pilots (minimise effects of helicopters); ECO (restoration) Monitoring: ECO	If undue disturbance occurs, eliminate source of disturbance, prevent access to the area and restore degraded areas as soon as possible and practical (e.g. after annual relief)
Prevent propagules spreading within and between PEI habitats	No further spread of alien species between management zones	Use labelled marker poles to **demarcate stands of alien** plants **and invertebrates** in Zones 1 and 2; Inform expeditioners as to locations of stands	Regularly inspect infested areas and adjust poles as necessary	Action: ECO Monitoring: ECO	Where stands are not marked or new stands are found, position markers and inform expeditioners accordingly; Reinforce education about these areas
Prevent propagules spreading within and between PEI habitats	No further spread of alien species between management zones	**Clean footwear** at designated areas **before leaving base; and upon return** from the field[8]; **Avoid areas infested** with alien species	Regularly inspect footwear for propagule bearing material	Action: All expeditioners Monitoring: All expeditioners; ECO; TL	If expeditioners do not clean boots or are found to walk through infested areas, establish reason (perhaps it was unavoidable); Raise awareness about this point

[8] It is a requirement of this EMP that the new research base have a dedicated wash room for the purposes of cleaning all outdoor gear, including that used around the base and that used in the field. This facility must allow hot washing and vacuuming of equipment with effluent being passed through a series of filters down to 0.1 mm in order to remove propagules and propagule-bearing material. Filters, vacuum bags and their contents must be disposed of by incineration.

Goal 5-2. To control and/or eradicate alien and invasive species on the PEI					
Objectives	Target	Actions	Monitoring	Responsibility	Remedial action
Prevent propagules spreading within and between PEI habitats	Prevent further spread of alien species across the PEIs	Between management zones, **clean equipment that has been in close contact with soil or plants**; between management zones where possible, otherwise take special care with field equipment in such areas; Wherever possible, **clean sampling equipment in infested areas** before moving elsewhere	Remain constantly vigilant when in the field	Action: All expeditioners Monitoring: All expeditioners; ECO	If equipment is not clean or is harbouring propagules, do not place it on the ground or vegetation in an area that is free of the alien species in question
Prevent propagules spreading within and between PEI habitats	Prevent further spread of alien species across the PEIs	Thoroughly and regularly **clean Velcro on gear and clothing** that is used in the field	Regularly inspect gear and equipment before leaving base and before moving between management zones	Action: All expeditioners Monitoring: All expeditioners, ECO	If propagules are discovered on Velcro after leaving base or a management zone, immediately remove and store propagules, and hand over to ECO at earliest opportunity
C. Tracking distribution of newly introduced and existing alien species					
Track establishment of newly introduced alien species	Early detection of newly established alien species in disturbed areas	**Regularly inspect disturbed areas for signs of newly introduced organisms**: Inspect area around **base** daily during annual relief and weekly throughout year; Inspect area around **huts** every two months	Check ECO monthly reports	Action: ECO with assistance from overwintering team Monitoring: D: SO&AS; PEIAC	Report new introductions or spread as soon as possible; Coordinate response to the introduction or spread using the appropriate contingency plan and with advice from D: SO&AS
Track establishment of newly introduced alien species	New introductions recorded and dealt with	**Document, identify and eradicate all newly introduced alien species**	Check ECO reports to ensure that newly introduced aliens have been dealt with effectively	Action: ECO Monitoring: D: SO&AS; PEIAC	If newly introduced species cannot be immediately eradicated, draw up and implement remedial action as soon as possible

Goal 5-2. To control and/or eradicate alien and invasive species on the PEI					
Objectives	Target	Actions	Monitoring	Responsibility	Remedial action
Track spread of established alien species	Extent of alien species known, thereby allowing for effective control	**List and map** all naturalised alien and invasive species; **Update** list and map **every four years**	Review list and map	Action: D: SO&AS and/or contractor Monitoring: DEIE; PEIAC	Initiate appropriate listing and mapping process as soon as possible
Track spread of established alien species	Extent of alien species known, thereby allowing for effective control	Before each relief voyage, **conduct an annual survey** around base, field huts and **in high traffic areas** to monitor existing alien species; **Report findings to** D: SO&AS	Check ECO annual report	Action: ECO Monitoring: D: SO&AS; D: IEA; PEIAC	If no survey is done, one must be initiated promptly and appropriately in accordance with D: SO&AS policy and national legislation; Incorporate findings in review of alien control and eradication strategy
Track spread of established alien species	Extent of alien species known, thereby allowing for effective control	Inspect **long-term monitoring sites** at required intervals as specified by D: SO&AS	Check ECO monthly reports	Action: ECO Monitoring: D: SO&AS; PEIAC	Incorporate findings in review of alien control and eradication strategy
Track spread of established alien species	Extent of alien species known, thereby allowing for effective control	**Conduct four-yearly survey of PE** to update listing and mapping of alien and invasive species; survey to be done in conjunction with review of this Management Plan	Monitor progress of four-yearly survey	Action: ECO; D: SO&AS and/or contractor Monitoring: D: SO&AS; D: IEA; PEIAC	If survey is not conducted, initiate appropriate survey process; Incorporate findings of survey in review of alien control and eradication strategy

5.4 Prevention and control of pollution at PEIs

Owing to the high conservation status of the PEI Special Nature Reserve, every effort must be made to protect the terrestrial and marine environment from pollution. DEA is required to manage all voyages to the PEIs, including all relief and construction voyages and research expeditions. DEA is thus also responsible for maintaining and managing the Marion Island research base and field huts and associated waste systems. This must be done in such a way that the risk of polluting events is reduced and, where possible, eliminated.

NEMA Section 28 requires that anyone who causes pollution or environmental degradation must take reasonable measures to prevent the pollution or degradation from occurring, continuing or recurring, and must minimise and rectify pollution or environmental degradation. As management authority of the Special Nature Reserve, DEA must develop comprehensive and environmentally sound contingency and rehabilitation plans for response to spills and accidental discharges of hazardous substances, including oil, diesel fuel, chemicals, sewage and all *forms* of waste. These plans must include prevention measures, response procedures and an equipment inventory.

Should a spill or event result in pollution or environmental degradation, it is D: SO&AS's responsibility to ensure that the situation is managed and the damage contained in such a way that the ecosystem functioning and species populations are returned to normal as soon as possible. This means that personnel present at the Marion Island research base must be trained to deal with pollution events and must have access to the required spill control and clean-up equipment. Additional clean-up teams and equipment based on the mainland must be available and prepared for rapid deployment to the PEIs in the event that a large pollution event occurs either on or in the vicinity of the islands.

Goal 5-3. To protect flora and fauna on and around the PEI from impacts of pollution					
Objectives	Target	Actions	Monitoring	Responsibility	Remedial action
Protect PEI environments (terrestrial and marine) from chemical, waste and physical pollution	Clear procedures available for dealing with pollution events	**Draw up contingency plans** to manage pollution events (oil, diesel fuel, chemicals, sewage, etc.) and the resulting damage to the environment	Monitor relevance of contingency plans on an ongoing basis; Perform an independent audit of systems every four years with update of the PEIMP	Action: D: SO&AS Monitoring: D: IEA; D: SO&AS (appoint independent auditors)	If contingency plans are not put in place or are not updated, require D: SO&AS to account for oversight and rectify
Protect PEI environments (terrestrial and marine) from chemical, waste and physical pollution	Prompt and effective clean-up and rehabilitation following polluting events	**Store and maintain adequate equipment and facilities on vessel, at Marion base and on the mainland** to contain and clean up spills (oil, diesel fuel, chemicals, sewage, etc.) and for rehabilitation of affected plants and animals	Regularly check and maintain equipment and facilities; Audit equipment stocks and condition annually; Conduct an independent audit of systems every four years with update of PEIMP	Action: D: SO&AS Monitoring: ECO (checks); D: SO&AS (appoint independent auditors)	Rectify any oversights in equipment and facilities at earliest opportunity
Protect PEI environments (terrestrial and marine) from chemical, waste and physical pollution	Knowledgeable personnel available to deal with pollution events	**Include disaster response as part of team training** for overwintering personnel	Assess team's knowledge and readiness on an ongoing basis; Conduct an independent audit of systems every four years with update of PEIMP	Action: D: IEA Monitoring: ECO; D: SO&AS (appoint independent auditors)	Provide additional training
Protect PEI environments (terrestrial and marine) from chemical, waste and physical pollution	Knowledgeable personnel available to deal with pollution events	**Ensure availability of trained personnel**, ready and available for rapid deployment if the need arises, **on vessel and on mainland**	Check in the run-up to each voyage that trained personnel will be available; Conduct an independent audit of systems every four years with update of PEIMP	Action: D: SO&AS; Vessel Operator Monitoring: D: SO&AS; Vessel Operator; independent auditors	If insufficient numbers of trained staff are available, train up additional personnel promptly

Goal 5-3. To protect flora and fauna on and around the PEI from impacts of pollution					
Objectives	Target	Actions	Monitoring	Responsibility	Remedial action
Protect PEI environments (terrestrial and marine) from chemical, waste and physical pollution	Contain impact of pollution event and initiate rehabilitation of species and ecosystems	**Initiate contingency and rehabilitation plans** in response to pollution events (this might include deployment of teams from mainland and provision of an incinerator for animal carcasses); **Report** on event, response and success of response	Monitor response and clean up and ensure that contingency procedures are followed and that response and rehabilitation are effective	Action: Responsible personnel (e.g. Ship's Master if pollution at sea; ECO with assistance from team members if pollution event happens outside of the annual relief) Monitoring: D: SO&AS; PEIAC	Where inadequate response and reporting occur, require a full investigation; Appropriate contractors to be brought in from South Africa to undertake remedial actions
Protect PEI environments (terrestrial and marine) from chemical, waste and physical pollution	Reduce risk of a polluting event	**Ensure that the supply vessel, base and all ancillary buildings** and equipment (including all oil, fuel, chemical and waste storage infrastructure) **are in good working order**	Conduct regular inventories and maintenance of equipment and facilities; report on and record (photographically if possible) evidence of deteriorating infrastructure and equipment	Action: D: SO&AS, Vessel Operator; NDPW, SAWS Monitoring: Ship's Master; Diesel Mechanic; TL; ECO	List equipment and maintenance required and obtain at earliest opportunity through D: SO&AS; Clarify reporting and response framework; Urgently mend or replace equipment as necessary
Protect PEI environments (terrestrial and marine) from chemical, waste and physical pollution	Reduce risk of a polluting event	**Ensure that all** fuel/oil/chemical **transport and storage procedures**, **and all waste management procedures, are maximally applied**	Conduct an annual audit of systems and procedures; Monitor throughout year	Action: D: SO&AS, Vessel Operator; NDPW, SAWS Monitoring: D: SO&AS (to appoint qualified auditor); Ship's Master; TL; all expeditioners (ongoing monitoring)	Where procedures are breached and/or pollution results, submit a full report to D: SO&AS; If consequences of breach/pollution are severe, launch an investigation

Goal 5-3. To protect flora and fauna on and around the PEI from impacts of pollution					
Objectives	Target	Actions	Monitoring	Responsibility	Remedial action
Protect PEI environments (terrestrial and marine) from chemical, waste and physical pollution	Initiate rapid response to signs of a pollution event	**Inspect environment** around base, field huts, high traffic areas, fuel transfer facilities and beaches **for signs of pollution** and report; Inspect throughout the year but especially during ship-to-shore fuel transfer and other high-risk activities	Check monthly and any other ECO reports and provide advice quickly when required	Action: ECO with assistance from all team members Monitoring: D: SO&AS	Review and improvement inspection procedures; In the event of a spill not being found in time or reported on adequately, launch investigation
Protect seals and birds at the PEIs from physical, chemical and light pollution	Documented records of pollution at the PEIs	**Comply with CCAMLR requirements for beach debris surveys**; **Report annually** on CCAMLR compliance	Check D: SO&AS annual reports for survey results	Action: ECO (surveys); D: SO&AS (reporting) Monitoring: PEIAC; DEA	If CCAMLR surveys are not conducted, require D: SO&AS to justify lack of action and initiate surveys as soon as possible
Protect seals and birds at the PEIs from physical, chemical and light pollution	Detection and removal of physical pollution where practicable	**Detect and remove physical pollution which may cause injury** to animals; If items are too large to remove, record position for removal during relief period; **Free entangled animals if safe and practicable** to do so; **Report** activities to D: SO&AS	Check monthly and any other ECO reports and provide advice quickly when required	Action: ECO with assistance from qualified personnel (if handling of animals is required) Monitoring: D: SO&AS	Coordinate removal of large items during relief period; Follow up if ECO does not report on pollution-related activities

Goal 5-3. To protect flora and fauna on and around the PEI from impacts of pollution					
Objectives	Target	Actions	Monitoring	Responsibility	Remedial action
Protect seals and birds at the PEIs from physical, chemical and light pollution	Detection and removal of chemical pollution where practicable	**Deal with oiled animals** according to the procedures in the contingency plan for dealing with pollution events; **Do not remove affected animals to South Africa** as the risk of introducing a disease outweighs the conservation value of the rehabilitation; Report in full to D: SO&AS as soon as possible	D: SO&AS to consider ECO's report and provide advice and assistance	Action: ECO with assistance from qualified personnel (if handling of animals is required) Monitoring: D: SO&AS	If the number of affected animals is too large to be dealt with by island personnel, seek assistance from other organizations, e.g. SANCCOB
Protect seals and birds at the PEIs from chemical, physical and light pollution	No bird strikes at or near base and huts due to light pollution	**At base and at huts, close blinds** at dusk or on misty days when lights are in use, **and switch off unnecessary lights**	At dusk or when weather is conducive for bird strikes, check that blinds are drawn and lights minimised	Action: All expeditioners Monitoring: DCO/TL; ECO	If bird strikes occur, immediately identify source of light, close blinds or switch off all lights in the affected area; Follow procedures (see below) for dealing with injured or dead birds
Protect seals and birds at the PEIs from chemical, physical and light pollution	No bird strikes at or near base and huts due to light pollution	Look into obtaining more efficient window blinds for the base and huts, and investigate alternative bird-scaring methods	Follow up on D: SO&AS' progress with investigation	Action: D: SO&AS Monitoring: ECO; PEIAC	Use an alternative method of screening windows (e.g. cover windows with thick black material); Test alternative bird-scaring methods

Goal 5-3. To protect flora and fauna on and around the PEI from impacts of pollution					
Objectives	Target	Actions	Monitoring	Responsibility	Remedial action
Protect seals and birds at the PEIs from chemical, physical and light pollution	No bird strikes at or near base due to light pollution	**At base, turn off all external lights** at dusk	At dusk, check that outside lights are off	Action: All expeditioners Monitoring: TL /DCO; ECO	If bird strikes occur, immediately identify source of light, close open blinds or switch off all lights in the affected area; Follow procedures (see below) for dealing with injured or dead birds
Protect seals and birds at the PEIs from chemical, physical and light pollution	No bird strikes on vessel due to light pollution	**On vessel, turn off all unnecessary external lights and close all blinds** at dusk when within 200 nm of the PEIs	At dusk, check that unnecessary outside lights are switched off	Action: All expeditioners and crew Monitoring: Ship's Master; DCO; ECO	If bird strikes occur, immediately identify source of light, close open blinds or switch off all lights in the affected area; Follow procedures (see below) for dealing with injured or dead birds; Do not take strike victims ashore
Protect seals and birds at the PEIs from chemical, physical and light pollution	Documented records of bird strikes at the PEIs	**Inspect** the area around the base and huts / deck of vessel **for injured or stunned birds and carcasses** after rainy or misty weather; **Record and report all bird strikes** (date, time, weather, place, source of light, number of each species, ring numbers if applicable, level of injury, etc.)	Check monthly and any other ECO reports and provide advice quickly when required	Action: ECO with assistance from other personnel Monitoring: D: SO&AS	If there are strikes involving large numbers of birds, or repeated strikes in the same area, investigate and address cause

Goal 5-3. To protect flora and fauna on and around the PEI from impacts of pollution					
Objectives	Target	Actions	Monitoring	Responsibility	Remedial action
Protect seals and birds at the PEIs from chemical, physical and light pollution	Efficient and humane treatment of bird strikes victims	**Hold stunned birds** in a quiet, dark and well-aerated place **and release after dark**; Leave injured birds for natural processes to occur; Dispose of carcasses at sea at night unless they can be used for research or sampling	Ensure that victims of bird strikes are dealt with appropriately	Action: ECO with assistance from birders Monitoring: All expeditioners; D: SO&AS	Ensure that personnel are briefed as to correct procedures and that these procedures are followed in future
Protect seals and birds at the PEIs from chemical, physical and light pollution	No introduction of disease through human-generated food waste	Do not feed poultry produce or waste to birds; Dispose of food slop after dark and vary time of disposal to avoid habituation of scavengers	Observe behaviour of expeditioners throughout the year but especially during the annual relief	Implementation: all expeditioners Monitoring: DCO/TL; ECO	Instruct anyone found feeding to desist immediately; Take disciplinary action if necessary

5.5 Prevention and control of outbreaks of disease among animals

Disease can be introduced to animal colonies by means of natural migratory processes or by humans through contaminated food or gear. Disease can result in large scale mortalities and should therefore be controlled. The policy at the PEIs is thus to minimise introductions of diseases to seal, seabird and shorebird populations. The return and release of rehabilitated individuals of indigenous species to the PEIs is strictly prohibited as these individuals may have been exposed to disease outside of the region.

5.5.1 Control of poultry, meat and dairy products and associated waste

Because of the threat of introducing avian disease, the following regulations apply regarding the use and disposal of poultry products, meat and dairy products.

A. Poultry

- Ensure that all poultry products are sourced from producers and abattoirs which are certified disease-free and which comply with export certification standards;
- Egg shells are high risk for disease transmission because of contamination by bird faecal matter, therefore no entire eggs may be transported to PEIs (replace with powdered or shell-free frozen products);
- Poultry products, including soups and stock cubes, must be irradiated prior to transport to the PEIs;
- No poultry products may be fed to any local birds;
- All poultry waste, including bones, must be frozen and returned to South Africa for disposal;
- All frozen chicken products, including shell-free egg, must be thawed in a container. Residue from defrosting must be disposed of with poultry waste products (i.e. frozen and returned to South Africa);
- Containers that have been used to thaw chicken must be thoroughly drained into the poultry bin and then be cleaned with bleach;
- During landing operations, no poultry produce, including eggs, from the supply vessel may be deposited seaward of the high-water mark;
- Uncooked chicken products (including bloody melt-water) must be treated as higher risk for disease transfer than cooked products, nevertheless strict control must also be maintained for cooked produce;
- UNDER NO CIRCUMSTANCES MAY ANY POULTRY PRODUCTS BE TAKEN TO PRINCE EDWARD ISLAND.

B. Meat

All frozen meat products must be thawed in the same way that chicken is thawed. Residue from defrosting must be frozen and returned to South Africa along with poultry waste products. Containers that have been used to thaw meat must be thoroughly drained into the poultry bin and then be cleaned with bleach.

C. Dairy

Due to the possibility of transmitting bovine tuberculosis and other contagious diseases through dairy products, only pasteurised and sterilised dairy products may be used on the supply vessel and transported to the PEIs.

Goal 5-4. To prevent and control outbreak of disease amongst birds and seals on and around the Prince Edward Islands					
Objectives	Target	Actions	Monitoring	Responsibility	Remedial action
A. Education					
Educate expeditioners to the PEIs about the risks of introducing diseases to wildlife	All expeditioners and crew aware of dangers of disease introduction	**Hold a seminar during every voyage** explaining the importance of quarantine measures; All crew, contractors and passengers to attend	Maintain an attendance register	Action: ECO (present seminar); all on board (attend) Monitoring: DCO	Immediately inform anyone that does not understand the issues pertaining disease introductions; Do not allow ashore anyone not attending the seminar
Educate expeditioners to the PEIs about the risks of introducing diseases to wildlife	Correct disposal of poultry products and associated waste water	**Train overwintering team, galley personnel and kitchen staff** in correct procedures for disposing of poultry, meat and fish waste, including waste water from defrosting meat products	Check that personnel are aware of the correct procedures	Action: DEIE; D: SO&AS; Vessel Operator Monitoring: ECO	Provide additional training if necessary
Educate expeditioners to the PEIs about the risks of introducing diseases to wildlife	Overwintering team members know correct procedures to follow in the event of a disease outbreak	Include in team training instruction about disease response procedures; Make disease contingency plans available to all team members	Assess team's knowledge and readiness on an ongoing basis	Action: D: IEA Monitoring: ECO; D: SO&AS	Provide additional training
B. Quarantine measures					

Goal 5-4. To prevent and control outbreak of disease amongst birds and seals on and around the Prince Edward Islands					
Objectives	Target	Actions	Monitoring	Responsibility	Remedial action
Prevent introduction of wildlife diseases to the PEIs through **cargo, vehicles or carry-on baggage**	No diseases introduced through cargo or vehicles (boats and helicopters)	**Keep all containers, storage facilities, cargo, helicopters, vessel and boats free of fouling by birds**; Where fouling is unavoidable (e.g. on vessel), clean soiled areas at least three days prior to arrival at the PEIs through hot-washing, high pressure hosing or appropriate biocide	Monitor stores for bird access throughout the year, but especially just prior to departure; Check vessel decks three days before arrival at the PEIs	Action: D: SO&AS; NDPW; SAWS (store managers); Vessel Operator; Helicopter Company Monitoring: Store managers; ECO	If fouling is discovered, clean up immediately using the appropriate means
Prevent introduction of wildlife diseases through **cargo, vehicles or carry-on baggage**	No diseases introduced to the PEIs via research equipment	**Clean all research equipment** (especially that used for bird research) during packing and prior to delivery to D: SO&AS stores	Thoroughly inspect equipment packing areas at home institutions; repeat inspections prior to loading and on board ship	Action: All expeditioners Monitoring: Group Leaders; ECO	If potentially disease-bearing material is found, report to ECO; Undertake additional inspections of cargo from same source and clean thoroughly; Group Leaders and their teams might not be allowed to return to the PEIs

Goal 5-4. To prevent and control outbreak of disease amongst birds and seals on and around the Prince Edward Islands					
Objectives	Target	Actions	Monitoring	Responsibility	Remedial action
Prevent introduction of wildlife diseases through **cargo, vehicles or carry-on baggage**	No diseases introduced via personal gear or carry-on baggage	**Ensure that baggage and gear** (including footwear, protective clothing, socks, walking sticks, camera, video and other field bags and field equipment) **is free of propagules** or propagules-bearing material; Clean by vacuum, scrubbing and hot washing, wash and disinfect soles and outers of all footwear and inspect and clean inners	Hold boot-washing ceremony (see Goal 5-1) to check all relevant gear; make available bleaching, vacuum and hot washing facilities and maintain an attendance register	Action: All expeditioners Monitoring: ECO, DCO/TL and volunteers	Require expeditioners to clean item and return it for inspection; Assist expeditioners who are unsure of procedures; Obtain appropriate cleaning material; Prohibit anyone who has not been signed off for the boot washing from going ashore
Prevent introduction of wildlife diseases through **cargo, vehicles or carry-on baggage**	No diseases introduced via expeditioners' footwear	**Investigate the biocidal efficacy of boot-washing solutions**	Monitor investigations into efficacy of boot-washing solutions	Action: D: SO&AS Monitoring: PEIAC	If relevant research is not being undertaken, find out why (e.g. lack of funding) and seek solution
Prevent introduction of wildlife diseases through **animal rehabilitation or research**	No release of animals at the PEIs that have been rehabilitated off-island	**Do not** transport to or **release** at the PEIs any **animals that have been rehabilitated off-island**	Check that no such animals are taken on board	Action: D: SO&AS; Ship's Master Monitoring: Ship's Master; DCO; ECO	Remove any such animals from the vessel; Take disciplinary action where necessary
Prevent introduction of wildlife diseases through **animal rehabilitation or research**	No illegal sampling, feeding or capture of seals and birds on the PEIs	**Only allow permit holders to hold** seals and birds **in captivity**, to **feed** wild seals and birds **and to possess** seal and bird **specimens;** Do not dispose of dead mice where birds are likely to find them	Monitor activities of expeditioners at the PEIs	Action: D: SO&AS Monitoring: ECO; all expeditioners	If illegal collection, feeding or captivity occurs, take disciplinary action; Persons responsible may be prevented from revisiting the PEIs

Goal 5-4. To prevent and control outbreak of disease amongst birds and seals on and around the Prince Edward Islands					
Objectives	Target	Actions	Monitoring	Responsibility	Remedial action
Prevent introduction of wildlife diseases through **animal rehabilitation or research**	Control and limit spread of disease between animal colonies on the PEIs	Where possible, **disinfect sampling equipment and protective clothing between use on individual animals and before moving between colonies**; Preferably clean equipment thoroughly at base between sampling, but otherwise at least clean in the field	Self-monitor when sampling; Group Leaders to instruct field workers regarding sampling protocols	Action: Research personnel Monitoring: Research personnel; Group Leaders; ECO; Chief Scientist	Where equipment is found to be soiled or not recently cleaned, withdraw it from the field and remove from sampling activities until thoroughly cleaned
Prevent introduction of wildlife diseases through **animal rehabilitation or research**	Control and limit spread of disease between animal colonies on the PEIs	**Where indications of disease are observed, discontinue sampling immediately and report** to ECO	Self-monitor when sampling	Action and monitoring: Research personnel	Ensure that sampling is discontinued as soon as an indication of disease is observed
Prevent introduction of avian diseases through **poultry products**[9]	Poultry meat at the PEIs is disease-free	**Source poultry meat from producers and abattoirs that are certified** disease-free and comply with export certification standards	Check certificates of suppliers	Action: D: SO&AS Monitoring: ECO	If meat is found to be uncertified or from a producer that a) does not comply with export standards or b) has a disease outbreak, withdraw meat from the supply chain; Returned meat to South Africa or incinerate

[9] Note: All waste management procedures for poultry-derived products must be fully implemented and monitored (See Chapter 7: Waste Management).

Goal 5-4. To prevent and control outbreak of disease amongst birds and seals on and around the Prince Edward Islands					
Objectives	Target	Actions	Monitoring	Responsibility	Remedial action
Prevent introduction of avian diseases through **poultry products**	Poultry-derived foodstuffs at the PEIs are disease-free	Before transport to the PEIs, **irradiate all poultry-derived foodstuffs** that are allowed at the islands	Monitor throughout year but especially during packing of food supplies and offloading at the PEIs	Action: D: SO&AS Monitoring: ECO; all expeditioners (especially kitchen personnel)	If any non-irradiated poultry product is found at the PEIs, collect and incinerate immediately or freeze for return to South Africa
Prevent introduction of avian diseases through **poultry products**	Prevent introduction of avian disease through egg shells	**Do not order products with egg shell** (only powdered or shell-free frozen egg products allowed)	Monitor throughout year but particularly during sourcing of food supplies	Action: D: SO&AS Monitoring: ECO; all expeditioners (especially kitchen personnel)	If any egg shells are found at the PEIs, collect and incinerate immediately or freeze for return to South Africa
Prevent introduction of avian diseases through **poultry products**	Secure supply chain for poultry products	**Only bring products in intact packaging ashore**; **Do not deposit** poultry-derived products **below the high-water mark**; Transport products directly to the base	Monitor throughout year but particularly during packing of food supplies and during offloading at base	Action: All expeditioners Monitoring: ECO; all expeditioners (especially kitchen personnel)	Collect products with broken packaging or products found seaward of the high water mark or outside of the supply chain in any way; Incinerate immediately or freeze for return to South Africa
Prevent introduction of avian diseases through **poultry products**	No avian diseases introduced via poultry products on the vessel	**Freeze poultry and meat-derived waste generated onboard** the vessel and return to South Africa; Do not dispose of such waste into the marine environment	Monitor throughout deployment of vessel to the PEIs	Action: Ship's Master Monitoring: ECO	If any such food is found to have been flushed into the marine environment, report in full to D: SO&AS; Vessel Operator's contract may be reviewed

Goal 5-4. To prevent and control outbreak of disease amongst birds and seals on and around the Prince Edward Islands					
Objectives	Target	Actions	Monitoring	Responsibility	Remedial action
Prevent introduction of mammal diseases through **dairy products**	No mammal diseases introduced via dairy products	**Only use pasteurised or sterilised** (UHT process) **dairy products** at the PEIs	Monitor throughout year but particularly during packing of supplies prior to departure of research vessel	Action D: SO&AS; Vessel Operator Monitoring: ECO; all expeditioners (especially kitchen personnel)	If unpasteurised or unsterilised products are found, collect and freeze with poultry waste for return to South Africa
C. Response to disease outbreaks[10]					
Quick and effective response to disease outbreaks	Procedures for response to disease outbreak clearly described	**Develop contingency plans** for avian or mammalian disease outbreaks	Monitor relevance of contingency plans on an ongoing basis; Perform independent audit of systems every four years with update of the PEIMP	Action: D: SO&AS Monitoring: DEIE; DAI to appoint independent auditors	If contingency plans are not put in place or are not updated, require that D: SO&AS account for oversight and rectify
Quick and effective response to disease outbreaks	Adequate supplies and equipment to effectively deal with a disease outbreak	**Provide adequate supplies** and equipment needed to deal with disease outbreaks	Audit supplies and equipment annually; Conduct an independent audit of systems every four years with update of PEIMP	Action: D: SO&AS Monitoring: ECO; D: SO&AS (appoint independent auditors)	Report any oversights in equipment, supplies and systems to D: SO&AS; D: SO&AS to provide at earliest opportunity

[10] Actions, targets, responsibilities and monitoring actions in the event of a disease outbreak among vertebrates are detailed in Box 5-2.

Goal 5-4. To prevent and control outbreak of disease amongst birds and seals on and around the Prince Edward Islands					
Objectives	Target	Actions	Monitoring	Responsibility	Remedial action
Quick and effective response to disease outbreaks	Team members follow correct in the event of a disease outbreak	**Initiate contingency plans** in response to any signs of wildlife disease (this might include deployment of teams from mainland and provision of an incinerator for animal carcasses where necessary); **Report** on event, response and success of response	Monitor response and clean-up and ensure that contingency procedures are followed and that response and rehabilitation are effective	Action: DCO/TL and ECO with assistance from team members; D: SO&AS (provide backup) Monitoring: D: SO&AS; PEIAC	Where inadequate response and reporting occur, require full investigation; Appropriate contractors to be brought in from South Africa to undertake remedial actions

BOX 5-1. ACTIONS IN THE EVENT OF A DISEASE OUTBREAK AMONG VERTEBRATES

Principles of response and implementation

The target of response to a disease outbreak is to contain or minimise the spread of the disease. The health and welfare of researchers and support personnel must be safeguarded throughout the intervention.

What is an outbreak?

An outbreak of disease among animal colonies on the PEIs will manifest as unusually large numbers of sick or dead animals. What constitutes 'unusually large' requires experience. Field operators should err on the side of caution when making this judgement. If many animals are found to be staggering, falling, lying prone or showing signs of distress, in the presence of dead animals, this should be regarded as 'unusual' and be judged as indicative of a disease outbreak.

Role of Directorate: Southern Oceans and Antarctic Support (D: SO&AS)

- A disease contingency plan must be drawn up, detailing management and control actions and reporting requirements. This must be audited every four years, and updated as necessary.
- Disease sampling kits containing all the equipment necessary to record an event of this nature must be provided. These must include equipment and protocols for examination, dissection, tissue collection, preservation and storage of samples for analysis along with instructions on safety procedures. Kits must be available at the research base and at all field huts.
- Disease cleansing kits must be provided. These should include biocides, disposable masks and overshoes, and plastic, sealable bins for storing and cleaning equipment at the site of the outbreak. Kits should also include dedicated washable outer clothing in three sizes, sturdy plastic gloves with long sleeves and waterproof overalls and jackets. Kits must be available at the research base and in all the field huts.
- If necessary, field incinerators must be provided and installed to deal with disposal of large numbers of infectious carcasses.

- If permission to enter specific management zones is requested for overwintering team members, D: SO&AS should evaluate the need for extra personnel at the site of the outbreak and if necessary, endorse their permits as required. The endorsed permits should be faxed to Marion Island as soon as possible. If additional permits are required for transportation of samples to the mainland, the ECO must be provided with these.
- In case of suspected disease outbreaks, D: SO&AS must provide advice and support in a timely fashion to the overwintering team (in particular the Environmental Control Officer (ECO), Team Leader (TL) and Field Coordinator – see overleaf). D: SO&AS should seek advice from the relevant experts where necessary.
- D: SO&AS must delegate an individual or group of individuals to handle the emergency; the group must include an official at D: SO&AS as the primary point of contact with the overwintering team on conservation matters.
- If the scale of the disease outbreak is such that the overwintering team is unable to deal with it, D: SO&AS should provide outside assistance as soon as possible.
- D: SO&AS must gather information on the likely causes of the outbreak and advise the ECO, TL and Field Coordinator of appropriate control measures.
- D: SO&AS must attempt to identify the disease and its pathway of introduction, and institute the appropriate additional precautionary quarantine measures.
- D: SO&AS must advise on post-event monitoring to be carried out by the overwintering team.

Role of Directorate: Integrated Environmental Authorisations

- During team training, D: IEA must ensure that overwintering team members - especially the TL, ECO and bird and seal researchers - are familiar with the disease contingency plan and know how to implement it.

Role of overwintering team members

The ECO, TL, Medical Officer and all bird and seal researchers must be familiar with the disease contingency plan. On discovery of an outbreak or suspected outbreak of disease:

- The outbreak must be reported to ECO and TL immediately.
- The TL must appoint a Field Coordinator for the duration of the outbreak.
- The Field Coordinator must instruct personnel on how to proceed and must coordinate the response. He/she must restrict access to the affected area to reduce the risk of spreading pathogens to uninfected wildlife colonies. Only authorised personnel may approach the affected area and handle animals.
- If additional personnel are required at the site of the outbreak, other members of the overwintering team may be asked to assist after discussion with D: SO&AS. Appropriately endorsed permits must be obtained from D: SO&AS at the earliest opportunity. If additional permits are required for transportation of samples to the mainland, the ECO must request these.
- Boots, outer gear clothing and field equipment used at the site of the disease should be stored at or near the site and should not be used at other sites. Personnel must clean their gear with biocides each time they enter the affected site. Once work at the disease site is complete, disposable protective garments must be removed at least 250 m from the affected area, sealed in plastic bin liners, returned to the base and sealed in a medical waste bag clearly marked 'contaminated medical waste' and returned to the mainland.
- Upon detection of the disease outbreak, observers should record the location (GPS coordinates if possible), affected species, estimated number of animals affected, estimated percentage of total colony affected (dead and ill), obvious symptoms, and estimated size of area affected. This information must be supplied to D: SO&AS ~~DAI~~ within 12 hours of detection of the disease outbreak. In addition, the following information must be recorded: names of all individuals present on site in the two weeks preceding the outbreak; all walking plans and deviations; weather conditions during the outbreak. Photographs or video must be taken. This information must be collated and included in the annual ECO report.
- The ECO, TL a D: SO&AS, the Field Coordinator should ensure that dead animals found some distance from the affected area are collected and where possible burned in accordance with the Policy on the Management of Seals, Seabirds and Shorebirds (refer to Chapter 3), or isolated from any nearby colonies and allowed to decompose naturally.
- Access to the affect area will be restricted until the Field Coordinator, in consultation with D: SO&AS declares the outbreak over.
- The overwintering team must carry out post-event monitoring as instructed by D: SO&AS.

5.6 Additional protection and management of marine mammals and birds

At least 28 species of seabirds breed on the Prince Edward Islands, and 14 of these are listed by IUCN as threatened or Near Threatened. This excludes the lesser sheathbill, which is a wader rather than a seabird, and is the islands' only terrestrial bird; the subspecies *Chionis minor marionensis* is endemic to the PEIs. Many of the seabird populations on the islands constitute a significant proportion of the global population of their species.

There are 15 to 30 species of oceanic birds which visit South Africa's waters and are at risk of being killed by long-line fisheries.

Three species of seal breed on the Prince Edward Islands. Conservation of these species is prioritised through minimising unnatural mortality and allowing for their increased production (see Government Gazette No. 26189, 26 March 2004). A number of species of whales and dolphins have been sighted in the waters of the PEIs.

A. Specific requirements

The Policy on the Management of Seals, Seabirds and Shorebirds (Government Gazette No. R. 1717, 2007) addresses the conservation of all seals, seabirds and shorebirds occurring on the PEIs or within a 200 nautical mile radius of the islands' high-water mark. In the policy, the term 'seabird' refers to all those birds which obtain some of their food from the sea, excluding the intertidal zone, and the lesser sheathbill is considered to be a shorebird.

The policy prohibits the killing, capture or wilful disturbance of seals, seabirds and shorebirds and the damaging or collecting of eggs or guano without a permit issued by the Minister. In the policy, the coastal zone is defined as extending as far inland and out to sea as is necessary for the conservation and sustainable non-consumptive use of these species. All seals, seabirds or shorebirds breeding in the coastal zone of the PEIs, or that pass through the 200 nm exclusive economic zone and coastal zone or that use these areas for non-breeding purposes, are subject to the laws of South Africa and fall under the jurisdiction of DAI (as the Management Authority). They are only subject to the provisions of this Management Plan once they make landfall on the PEIs.

B. Additional policy

Collection or destruction of eggs and nests is banned except where required for conservation management, or for scientific, educational, safety or health reasons. Utilisation, collection or disturbance of any bird eggs is prohibited.

Goal 5-5. To protect and manage marine mammals and birds at the PEIs *(all measures maximally applied at Prince Edward Island)*					
Objectives	Target	Actions	Monitoring	Responsibility	Remedial action
Protect marine mammals and birds at the PEIs from human interference	Wildlife is 'undomesticated' and does not rely on humans for food	**Do not feed animals** or otherwise encourage them to remain near the base or huts	Monitor throughout the year, but particularly during high activity times such as the annual relief period	Action: All expeditioners Monitoring: DCO/TL; ECO	If anyone is observed feeding or otherwise encouraging animals, order them to desist and take disciplinary action where applicable
Protect marine mammals and birds at the PEIs from human interference	No illegal feeding, sampling or capture of seals and seabirds	**Do not keep seals and seabirds in captivity, feed** wild seals and seabirds **or keep specimens** of seals or seabirds unless allowed permit conditions allow; Do not dispose of dead mice in such a way that birds are likely to find them	Monitor throughout the year, but particularly during high activity times such as the annual relief period	Action: All expeditioners Monitoring: DCO/TL; ECO	Report illegal collection or captivity or feeding; Disciplinary action may be taken and future applications to visit the PEIs may be refused
Protect marine mammals and birds at the PEIs from human interference	Minimise disturbance to wildlife by expeditioners to the PEIs	**Observe the code of conduct** regarding marine mammals and birds (see **Box 5-3**)	Monitor throughout the year, but particularly during high activity times such as the annual relief period	Action: All expeditioners Monitoring: All expeditioners; DCO/TL; ECO	Report unnecessary disturbance of animals; Disciplinary action may be taken and future applications to visit the PEIs may be refused
Protect marine mammals and birds at the PEIs from human interference	Minimise disturbance to wildlife by boats and helicopters	**Follow the guidelines for the use of aircraft** at the PEI (Box 5-5) **and IAATO's Marine Mammal Watching Guidelines** (Box 5-3)	Monitor during periods of high activity, e.g. annual relief and construction periods	Action: Helicopter Captain, Ship's Master Monitoring: DCO/TL; ECO; all expeditioners	Report unnecessary disturbance of animals; Disciplinary action may be taken and contract may be revised

Goal 5-5. To protect and manage marine mammals and birds at the PEIs *(all measures maximally applied at Prince Edward Island)*					
Objectives	Target	Actions	Monitoring	Responsibility	Remedial action
Protect marine mammals and birds at the PEIs from human interference	Ethical treatment of vertebrates in research	**Obtain ethical clearance from home institution and from SANAP**	When reviewing applications to visit the PEIs, check that ethical clearance documentation has been submitted and that SANAP ethics questionnaire has been completed	Action: Group Leaders of research programmes Monitoring: D: SO&AS; PEIAC	If ethical clearance has not been received or SANAP questionnaire has not been received or has been incompletely filled in, do not allow research project to proceed
Identify and address population declines of seal and bird species	Ongoing monitoring of seal and bird populations	Support research that involves accurate long-term monitoring of bird and seal populations, and monitoring of ecosystem changes that may affect these populations	None	Action: D: SO&AS	If monitoring of seal and bird populations ceases, attempt to address the cause; If cause of halt cannot be remedied, D: SO&AS to initiate own monitoring programmes
Identify and address population declines of seal and bird species	Declines in seal and bird populations are identified and addressed	**If large numbers of IUCN-listed species decline**, **establish** if **the cause** is off- or on-island; If off-island, **bring the situation to the attention of CCAMLR, ACAP** or other appropriate bodies; If on-island, **establish and implement appropriate remedial action**	Work closely research programmes that are involved in monitoring	Action: D: SO&AS with input from relevant experts Monitoring: D: SO&AS; PEIAC	If causes cannot be determined, seek help from outside the SANAP programme

BOX 5-2. CODE OF CONDUCT REGARDING MARINE MAMMALS AND BIRDS

In order to grant the animals of the PEIs the protection guaranteed under the various laws of the land, a code of conduct has been drawn up to regulate behaviour of expeditioners when encountering seals and birds on the islands, or marine mammals in the waters surrounding the islands.

Background

Many seals and birds appear to be fearless, or even 'tame' and are easily approached (e.g. elephant seals, and wandering albatrosses). Others, such as gentoo penguins, are prone to fright (and flight) when encountering humans. Some, such as skuas, are curious and learn quickly that human habitation often presents a source of food or nesting materials.

Any disturbance of these animals can interfere with the natural processes on the islands. Close approaches may put animals on the defensive, causing them to attempt to flee or attack. In both cases animals and humans may be injured as a result. Elephant seal bulls can crush pups inadvertently when defending their colonies and distressed penguins can trample their own eggs. Eggs, chicks or pups may be deserted by fleeing parents, leaving them vulnerable to predators. All animals are vulnerable to disturbance during the breeding season and when moulting. Even animals which appear outwardly unaffected may undergo harmful physiological changes or may be affected on the long term, e.g. may not return to the nest site in the next breeding season.

Guidelines for behaviour in the vicinity of seals and birds

The following rule applies to all expeditioners (this includes researchers, officials and other employees) visiting the PEI and to individuals and colonies of seals and birds on the island:

In general, the minimum approach distance for seals and breeding birds is 15 m. However, if someone is further than this distance from an animal and it reacts, then the person should withdraw if possible.

Exceptions to this rule of thumb are colonies of the following species:

- Gentoo penguins – 100 m approach distance;
- Southern giant petrels – 100 m approach distance;
- Wandering albatross demographic study colonies (Macaroni Bay, Sealer's Beach and Goney Plain) – 100 m approach distance;
- Grey-headed albatross colony at Grey-headed Albatross Ridge – 200 m approach distance;
- Crozet shag colonies – 100 m approach distance;
- Any fenced off or demarcated study sites – should be avoided and not entered.

No-one may harm breeding animals and seals by disturbing them through persistent attention. Wandering albatrosses outside the study colonies may be approached to within 15 m. Courting birds outside of study colonies may only be approached to within 50 m. Under no circumstances may expeditioners supply food to the animals or leave food on the beaches. In the event of curious animals approaching a human, the human should withdraw.

When operating boats or vessels in the vicinity of animals, the IAATO Marine Mammal Watching Guidelines[11] should be followed.

[11] IAATO (2007) International Association of Antarctic Tour Operators: Marine wildlife watching guidelines for vessel and zodiac operators. IAATO Secretariat, *http://www.iaato.org/docs/07_WildlifeWatchingGuidelines.pdf*.

5.7 Research

Scientific knowledge of the PEIs is essential in managing them effectively, in keeping with their natural and historical value. It provides the necessary understanding of natural processes and human influences in and around the islands. In the course of research, every effort should be made to ensure that wildlife populations and historic resources remain intact and unmodified and that research on animals is conducted humanely. An inventory of alien invasive species and the extent of their infestation are also required. Research must be directed specifically at how to control and eradicate alien species.

The research policy serves to ensure that scientific research is conducted in such a manner as to:

- Assure protection of the natural ecosystems and mitigate against lasting changes in indigenous wildlife populations or community relationships;
- Avoid conflict with essential management operations;
- Prohibit the collection of specimens except where this is specifically approved and justified as part of scientific research or necessary for management purposes;
- Arrange, facilitate and support a programme of scientific research necessary for better management of the islands.

5.7.1 Legal research requirements

Section 50 of NEMBA requires that the Minister promote research towards biodiversity conservation, including the sustainable use, protection and conservation of indigenous biological resources. Research on biodiversity conservation may include the collection and analysis of information about the conservation status of the various components of biodiversity, negative and positive trends affecting the conservation status of various components, and threatening processes or activities likely to impact on biodiversity conservation. Research may also include:

- The assessment of strategies and techniques for biodiversity conservation;
- The determination of biodiversity conservation needs and priorities;
- The sustainable use, protection and conservation of indigenous biological resources.

With regard to research and monitoring (NEMPAA Regulations, Section 34), anyone engaged in research or monitoring projects at the PEIs must:

- Submit a research project proposal to D: SO&AS in a format determined by D: SO&AS in consultation with DST and NRF;
- Submit copies of all reports and publications as a result of the research project to D: SO&AS within 30 days of their publication;
- Archive all data collected through the project in a formal repository, to allow long-term access to the data.

5.7.2 Ethics requirements for research on vertebrate animals

In South Africa, health related research conducted on human subjects and all research conducted on animals must be reviewed and approved by a local institutional research ethics committee before the research study is initiated. South African ethics committees receive guidance from the National Health Research Ethics Council, a statutory body established under the National Health Act No 61 of 2003. . The role of the Council is to promote and monitor compliance of South African ethics committees within relevant legislation and regulations, ethical guidelines and standards.

Researchers whose proposed research may impact on the welfare of vertebrates at the PEIs must obtain ethical clearance from their home institutions. The institution's ethics committee must also fill in SANAP's ethics questionnaire (Appendix, 1.3). This questionnaire represents the minimum ethical requirements for research on the Prince Edward Islands and is a supplement to the ethics committee's review process and guidelines. It is based on the National Code for the handling and Use of Animals in Research, Education, Diagnosis and Testing of Drugs and Related Substances in South Africa (1990).
Additionally, research conducted at the PEIs should be guided by the South Africa Medical Research Council's (MRC) ethics policy on animal experimentation, i.e.:

- The MRC recognises the moral dilemma posed by the use of sentient organisms (i.e. organisms with a sensory nervous system) for research, teaching and testing.
- It subscribes to the ethic of only supporting studies which promise to contribute to the understanding of biology and environmental principles and to the acquisition of knowledge that can reasonably be expected to benefit humans, animals or the environment.
- It insists that animals may only be used when the researcher's best efforts to find a non-sentient alternative have been unsuccessful.
- It requires optimal standards of animal health and care being observed to provide good quality results that enhance credibility and reproducibility.
- It requires the "Three R" principles of "Replacement, Reduction and Refinement" to be adhered to in the planning and conduct of animal studies. These uphold the principles and practice of using the most humane methods on the smallest number of animals that will permit valid scientific information to be acquired.
- It accepts that the use of animals in science critically depends on maintaining public confidence in the mechanisms and processes used to ensure necessary humane and humane animal use.
- It recognises that laboratory animals are protected by law in South Africa and their use for education, testing and research must be justified.

In addition, when assessing research proposals for the PEIs, the impact that the research could have on the physical, biological and spatial environment should be taken into account. All researchers undertaking research with bio-hazardous material that could potentially cause harm to humans, animals or the environment should familiarise themselves with appropriate bio-safety and containment procedures. Such research includes working with recombinant DNA techniques or genetically modified organisms, organisms that are pathogenic to humans and/or animals, radiation, and any research which may cause harm to the natural environment.

5.7.3 Research permits

See Chapter 4 (sections 4.6 and 4.7) for details regarding permits for access the PEIs and the management zones of the Special Nature Reserve.

Researchers wishing to work on vertebrates must specify in their permit applications the type of activity to be carried out (e.g. bird ringing), and the species and number of individuals to be handled. They must provide an estimation of the percentage of the island population of that species that is likely to be affected by the research.

Researchers wishing to take biological or other samples at the islands must specify in their permit applications the type and quantity of samples required. In the case of invertebrates and plants, they should provide an estimation of the percentage of the island population of that species that is likely to be affected by the research.

If hazardous substances are to be used, researchers must describe the type and quantity, and any storage, transport and disposal requirements.

If the proposed research is likely to impact individual animals or ecosystems negatively, documentation providing clearance from the researcher's home institution ethic's committee must be attached.

If field markers are to be used, these should be described (type and number) in the permit application.

If archaeological excavations or sampling are intended, a permit from the South African Heritage Resources Agency or Heritage Western Cape must be attached.

5.7.4 Promotion of management-oriented research and professional management of base

DEA must promote research to support management and conservation issues around the island, and must recommend such areas of research to DST for funding. Further steps must be taken to promote the professional management of the research base. In this regard, the following recommendations are made:

- Provide greater on-island management input;
- Encourage experienced researchers to participate in island-based research;
- Facilitate research by senior research staff on management issues;
- Increase frequency of voyages to encourage more senior scientists and personnel to visit the island and thus give enhanced supervision to management and research activities;
- Improve communication;
- Instil professionalism in management of base and research activities.

Goal 5-6. To protect and manage the biodiversity on and around the Prince Edward Islands through targeted multidisciplinary research					
Objectives	Target	Actions	Monitoring	Responsibility	Remedial action
Adaptive management of the biodiversity of the PEIs with the goal of securing the integrity of ecosystems	Informed conservation management of the island environment	**Encourage, facilitate and conduct conservation management-orientated research**	Evaluate proposals for research at the PEIs, and research products (e.g. scientific publications); Evaluate ECO reports	Action: DEA in partnership with the scientific community, other research agencies and DST-NRF Monitoring: D: SO&AS; DST-NRF; PEIAC	Identify research programmes over the next three years that meet the strategic goals for the PEIs; Analyse and redress gaps in research where possible
Adaptive management of the biodiversity of the PEIs with the goal of securing the integrity of ecosystems	Better management through improved understanding of the island environment	**All researchers**, in addition to producing papers for publication in scientific journals, **to provide management recommendations** where possible	Assess all reports and implement recommendations where appropriate	Action: All researchers Monitoring: DEA	Identify research programmes over the next three years that meet the strategic goals for the PEIs
Adaptive management of the biodiversity of the PEIs with the goal of securing the integrity of ecosystems	Informed conservation management of alien and invasive species	**Encourage, facilitate and conduct research on alien species** at the islands, including compiling and updating risk assessment	Evaluate proposals for research at the PEIs, and research products (e.g. scientific publications); Evaluate ECO reports	Action: DEA in partnership with the scientific community, other research agencies and DST-NRF Monitoring: DEA; DST-NRF; PEIAC	Identify research programmes over the next three years that meet the strategic goals for the PEIs; Analyse and redress gaps in research where possible
Adaptive management of the biodiversity of the PEIs with the goal of securing the integrity of ecosystems	Informed conservation management of wildlife populations	**Encourage, facilitate and conduct long-term monitoring of wildlife populations**, including species that migrate through South African waters in the vicinity of the PEIs; **Make data available** to CCAMLR, ACAP etc.	Evaluate proposals for research at the PEIs, and research products (e.g. scientific publications); Evaluate ECO reports	Action: DEA in partnership with the scientific community, other research agencies and DST-NRF Monitoring: DEA; DST-NRF; PEIAC	Identify research programmes over the next three years that meet the strategic goals for the PEIs; Analyse and redress gaps in research where possible

Goal 5-6. To protect and manage the biodiversity on and around the Prince Edward Islands through targeted multidisciplinary research					
Objectives	Target	Actions	Monitoring	Responsibility	Remedial action
Adaptive management of the biodiversity of the PEIs with the goal of securing the integrity of ecosystems	Informed conservation management of bird strikes	**Maintain a record of all bird strikes** on vessel and on PEIs (see Goal 5-3); Work in conjunction with bird researchers	Evaluate reports of ECO, Birders and Ship's Master	Action: ECO in partnership with bird researchers Monitoring: D: SO&AS; PEIAC	Institute management actions to reduce incidence of bird strikes, e.g. more efficient window blinds, or bird scaring devices
Adaptive management of the biodiversity of the PEIs with the goal of securing the integrity of ecosystems	Informed application of quarantine measures	**Encourage, facilitate and conduct research into the efficacy of quarantine measures;** In partnership with research institutions, identify newly-discovered alien propagules	Evaluate proposals for research at the PEIs, and research products (e.g. scientific publications); Evaluate ECO reports	Action: D: SO&AS in partnership with the scientific community, other research agencies and DST-NRF Monitoring: D: SO&AS; PEIAC	Institute management actions to improve efficacy of quarantine measures
Adaptive management of the biodiversity of the PEIs with the goal of securing the integrity of ecosystems	Effectively manage priority habitats, species and populations according to Biodiversity Management Plans (BMPs)	**Develop, implement and regularly review BMPs** for priority habitats, species and populations on the PEIs	Annual review of progress with development and implementation of BMPs	Action: D: SO&AS with input from experts Monitoring: PEIAC; DEA Minister	Instruct D: SO&AS to appoint relevant experts to draw up BMPs
Use existing expertise and solicit advice where required to enhance the management of the PEIs	Expert management, conservation and research	**Co-opt experts onto PEIAC** to provide advice and assistance as required; Experts could be individuals, or representatives of research institutions, international conservation bodies and state departments	Check that D: SO&AS' annual report includes a description of the composition and level of qualification of PEIAC members	Action: D: SO&AS Monitoring: PEIAC; DEA Minister	Reconsider who is appointed onto the PEIAC

Goal 5-6. To protect and manage the biodiversity on and around the Prince Edward Islands through targeted multidisciplinary research					
Objectives	Target	Actions	Monitoring	Responsibility	Remedial action
Use existing expertise and solicit advice where required to enhance the management of the PEIs	Centralised information system to facilitate conservation management	Establish a system to **secure all administrative and scientific documents**	Perform an annual audit of the document management system	Action: D: SO&AS Monitoring: D: SO&AS	Update system without delay
Use existing expertise and solicit advice where required to enhance the management of the PEIs	Centralised information system to facilitate conservation management	**Submit copies of research reports** and scientific findings (published and unpublished) **within 30 days** of finalising document	Perform an annual audit of research reports	Action: All researchers Monitoring: D: SO&AS	Follow up on researchers who have not submitted reports; If reports are still not forthcoming, permits will not be issued to researchers in the future

5.7.5 Collection and movement of biological and geological specimens and samples

The movement of all biological material, animal and plant specimens, soil, water and geological samples is subject to quarantine regulations upon entry to South Africa. It is the responsibility of the research worker or project supervisor to ensure that the necessary veterinary or quarantine control permits have been obtained prior to embarking for the islands. Copies of permits must be lodged with DEA prior to embarkation. Collections are not allowed without a valid permit and removal of collected specimens is subject to the possession of a valid collecting permit (see Section 13).

A. Legal requirements for moving biological material

The movement of or importation into South Africa of any species from the PEIs which is alien to mainland South Africa is restricted under NEMBA (Section 65 (1)). Issuing of such permits is subject to the species undergoing the risk assessment required under NEMBA (see Box 5-4).

The Minister and his/her delegate may refuse to issue a permit, or may issue it subject to conditions, or withdraw a permit. If a permit application is rejected, the Minister or his/her delegate must explain the decision in writing (NEMBA, Section 88).

B. Rules pertaining to research

No research may be conducted at the PEIs without a permit issued by DEA (NEMPAA Regulations, Section 20(g) and 34 (1)). DEA must submit an annual report to the Minister, listing the biological resources used during the preceding year, detailing (NEMPAA Regulations Section 7):

- The number of licences, permits and agreements granted or entered into;
- A description of the biological resources used;
- The quantities of biological resources harvested;
- Income generated by the harvesting of biological resources;
- The conservation status of the biological resources being exploited.

C. Additional policy

Removal of any organic or inorganic material or species for zoological and botanical gardens must comply with NEMBA, NEMPA and all issues pertaining to the status of the materials or species involved. IUCN listings must be taken into account during the permitting process. No species may be collected or transported for any purposes, including to zoological gardens, without a permit.

In the case of zoological gardens or other live-animal collections, before permits are issued the collectors must demonstrate that they have adequate storage facilities for the species in transit and adequate facilities for housing and breeding specimens. Collectors must also show how excess or non-breeding stock will be managed. Detailed educational advantages of the collection must be given, along with the manner in which these will be realised. Applicant's facilities must pass inspection by the African Association of Zoos and Aquaria (PAAZAB) and in the event of failed inspection, further requests for specimens will be denied.

BOX 5-3. NEMBA REGULATIONS ON ALIEN AND INVASIVE SPECIES: RISK ASSESSMENT FRAMEWORK

According to the Draft Alien and Invasive Species Regulations (Government Gazette No. 32090, 3 April 2009):

1. Species intended to be brought into South Africa, whether already present in the country or not, must go through a risk assessment. This risk assessment applies to species from the Prince Edward Islands, even though the islands fall within the Cape Town magisterial district.
2. There will be as species risk assessment to determine the potential invasiveness of the species that a proponent wishes to introduce into the country. This will be a phased process, beginning with an initial risk assessment and with the possibility of a comprehensive risk assessment.
3. There may also be a vector risk assessment for the species to determine the potential of the species to act as a vector of other invasive species.
4. There may be a pathway risk assessment for activities known to, or with high potential to, introduce invasive alien species.
5. A list of exempted species will be maintained. These species will be exempt from the species risk assessment but must be considered for a vector risk assessment. The list (currently provided in Notice 348 of the Government Gazette) will be maintained and regularly updated by the Central Co-ordinating Regulatory Office, and published in the Gazette.

Goal 5-7. To prevent illegal and unsustainable collection, transport and importation of organisms and samples from the PEI					
Objectives	Target	Actions	Monitoring	Responsibility	Remedial action
Prevent unsustainable and/or illegal off-take of organisms and biological or geological samples from the PEIs	No unauthorised collection or removal of organisms and samples	**Do not collect or remove any organisms or samples** from the PEIs **without** prior **authorisation** from D: SO&AS	Check all permits against samples (1) prior to embarkation, (2) prior to collection, (3) prior to re-embarkation and (4) upon arrival in South Africa	Action: All expeditioners Monitoring: Chief Scientist(s); ECO; DCO/TL	Confiscate illegal samples and place in quarantine; Destroy samples only after establishing whether they are required as evidence in a legal process or are listed or prohibited species
Understand the risks of the collection, transport and importation into South Africa of organisms and biological or geological samples from the PEIs	Known invasion and disease risks for all organisms and samples imported into mainland South Africa	**Carry out the NEMBA risk assessment** before issuing permits for any organisms or samples to be returned to South Africa (See Box 5-4)	When considering SANAP 3 forms before voyages, ensure that the necessary risk assessments have been completed	Action: D: SO&AS, in cooperation with experts Monitoring: PEIAC	Complete the necessary risk assessment before issuing permits

5.8 Vehicle, boat and aircraft use

The overarching policy regarding the use of any crafts in and on the PEIs is to limit disturbance to the environment. The use of mechanised transport on and around the islands must therefore be strictly regulated and monitored. Potential disturbance to wildlife will be at a maximum when animals are confined to breeding colonies or are moulting. Timing activities such as field hut re-supply to avoid these periods is essential to minimise any possible disturbance.

5.8.1 Aircraft

The Special Nature Reserve status includes 2 500 feet of air space above the highest point of the reserve (NEMPAA, Section 47 (1)); i.e. Mascarin Peak on Marion Island at 1231 m above sea level. No one may land or take off in an aircraft or hovercraft (Section 1 (1)) in the Reserve, except on or from a landing field designated by DEA, and with the permission of and on conditions determined by DEA. No one may fly over the PEIs at an altitude of less than 2 500 feet above the highest point unless they are using the airspace with the permission of and on conditions determined by DEA. Contravention or failing to comply with the aircraft restrictions of the PEIs is an offence and could result in penalties in terms of Section 89a. These stipulations do not apply in an emergency or to a person acting on the instructions of DEA (Section 47 (3 - 4)*(a – b)*). The Minister, acting with the concurrence of the Cabinet member responsible for civil aviation, may prescribe further reasonable restrictions on flying over protected areas.

5.8.2 Additional policy regarding aircraft, boats and vehicles

The use of motorised vehicles on the islands is strictly prohibited. Amphibious craft and boats may only land to re-supply the main facilities at the Marion Island base (access via Boulders Beach) and to deliver/collect personnel on expeditions to Prince Edward Island where helicopter access is prohibited by adverse weather conditions (access via Cave Bay). No other beaches may be accessed with amphibious craft or boats, except in case of emergency where air support is unable to reach the area, or if authorised by permit issued by DEA.

Boats may only be used according with the stipulations of this Management Plan, D: SO&AS and permit conditions. Pilots operating small boats must:

- Adhere to the IAATO marine wildlife watching guidelines[12] when operating in the vicinity of marine mammals;
- Only access land via the permitted beaches (Boulders Beach on Marion Island and Cave Bay on Prince Edward Island), unless in case of emergency;
- Respect approach distances of species and breeding colonies (see Box 5-3: Code of conduct regarding seals, seabirds and shorebirds);
- Attempt to achieve minimal impact and disturbance to the environment and the species present while landing, off/on-loading and departing the landing site;
- Ensure that all quarantine, waste and other conservation principles described in this document are upheld throughout the operation.

Aircraft may only be used according to the stipulations of NEMPAA, D: SO&AS and permit conditions. A pilot operating an aircraft at a height lower than 2 500 feet over the highest point of the Special Nature Reserve must:

[12] IAATO (2007) International Association of Antarctic Tour Operators: Marine wildlife watching guidelines for vessel and zodiac operators. IAATO Secretariat, *http://www.iaato.org/docs/07_WildlifeWatchingGuidelines.pdf*.

- Do so in accordance with the requirements of this PEIMP and with the permission of D: SO&AS;
- Do so in accordance with the modified Scientific Committee on Antarctic Research (SCAR) guidelines and recommendations for the operation of fixed and rotary wing aircraft (see Box 5-5), which will apply to all aircraft operations at the PEIs;
- If the aircraft is a helicopter, the pilot must adhere as far as possible to flight paths determined in this PEIMP (see Box 5-5: Guidelines for the use of aircraft at the Prince Edward Islands) and must not hover over the Special Nature Reserve other than as specified in the flight plan and in cases of emergency.

5.8.3 Search and seizure

According to NEMA Amendment Act (No. 46 of 2003), an Environmental Management Inspector has the power of search and seizure over vehicles, vessels and aircraft where they are being used to commit an offence or break the law or terms of a permit. Further details can be found in Section 31J of NEMA Amendment Act (No. 46 of 2003).

Goal 5-8. Minimise disturbance of flora and fauna on and around the PEI during operation of craft (includes boats and helicopters)					
Objectives	Target	Actions	Monitoring	Responsibility	Remedial action
A. Land-based vehicles					
Protection of PEI environment from disturbance by land-based vehicles	No land-based vehicles allowed at the PEIs	**Do not use land-based vehicles on the islands**, except for the forklift which may only be used on the catwalks of the base	Check cargo before all voyages	Action: D: SO&AS; NDPW; contractors Monitoring: DCO/TL; ECO	Confiscate vehicle(s)
B. Aircraft					
Protection of PEI environment from disturbance by aircraft	Aircraft personnel aware of issue of disturbance and familiar with the guidelines for use of aircraft at the PEIs	**Educate helicopter personnel** through pre-departure briefing and onboard seminar; Ensure helicopter personnel have access to this Management Plan, and the SCAR guidelines for use of aircraft	Monitor pilot's knowledge of guidelines throughout aircraft operations	Action: D: SO&AS; ECO Monitoring: Helicopter Captain; ECO	If helicopter personnel are unaware of or do not fully understand the guidelines, provide additional information
Protection of PEI environment from disturbance by aircraft	Aircraft personnel aware of issue of disturbance and familiar with the guidelines for use of aircraft at the PEIs	Prior to arrival at the islands, ensure that pilots possess and are familiar with **map of no fly zones and sensitive areas**	Monitor familiarity with no fly zones and sensitive areas throughout aircraft operations	Action: D: SO&AS; Helicopter Captain Monitoring: Helicopter Captain; ECO	If aircraft pilots are unfamiliar with sensitive areas and recommended flight paths, find cause and educate accordingly

Goal 5-8. Minimise disturbance of flora and fauna on and around the PEI during operation of craft (includes boats and helicopters)					
Objectives	Target	Actions	Monitoring	Responsibility	Remedial action
Protection of PEI environment from disturbance by aircraft	Use of aircraft limited to *bona fide* operations	**Only use aircraft for authorised activities** such as: re-supplying the base and field huts, waste removal, search and rescue, assisting with authorised research projects, management operations	Ensure that aircraft are not used unnecessarily and do not make unnecessary detours or sight-seeing trips	Action: DCO; Helicopter Captain Monitoring: DCO; ECO; Chief Scientist; all expeditioners	Instruct the aircraft to return to base immediately and issue a warning to pilot and occupants; Ensure that the ECO or designated person observes future flights; Helicopter Company's contract may be revoked
Protection of PEI environment from disturbance by aircraft	Full adherence to guidelines for the use of aircraft at the PEIs (Box 5-5)	**Adhere to the guidelines for the use of aircraft (Box 5-5)**	Ongoing monitoring during aircraft operations	Action: Helicopter Captain Monitoring: DCO; ECO; Chief Scientist; all expeditioners	Where animal disturbance is noted, a) find alternative flight paths or b) halt operations; In case of severe breaches, Helicopter Company's contract may be revoked
Protection of PEI environment from disturbance by aircraft	Minimal disturbance to environment and maximum safety during aircraft operations	**In case of adverse weather conditions** that make it difficult for pilots to safely adhere to the recommended flight paths, pilots, DCO and ECO to **discuss alternative flight paths or postpone flight operations** until weather conditions improve	Ongoing during aircraft operations	Action: DCO; ECO; Helicopter Captain Monitoring: DCO; ECO; Chief Scientist; all expeditioners	Where animal disturbance is noted, a) find alternative flight paths or b) halt operations; In case of severe breaches, helicopter company's contract may be revoked
C. Amphibious craft and boats					

Goal 5-8. Minimise disturbance of flora and fauna on and around the PEI during operation of craft (includes boats and helicopters)					
Objectives	Target	Actions	Monitoring	Responsibility	Remedial action
Protection of PEI environment from disturbance by amphibious craft and boats	Boat operators aware of issue of disturbance and are familiar with the guidelines for approaching wildlife	Educate boat operators through pre-departure briefing and onboard seminar; Ensure operators have access to a map showing permitted landing sites, and have a copy of IAATO's Marine Wildlife Watching Guidelines	Monitor boat operations near wildlife	Action: D: SO&AS; ECO Monitoring: ECO; all expeditioners	If boat operators are unaware of or do not fully understand the guidelines, provide additional information
Protection of PEI environment from disturbance by amphibious craft and boats	Minimal disturbance of the environment by amphibious craft and boats	Except for emergencies, **limit landing of authorised boats to Boulders Beach** at Marion Island and Cave Bay at Prince Edward Island	Monitor ship-to-shore journeys throughout duration of operations	Action: DCO; boat operator Monitoring: DCO; ECO; all expeditioners	Instruct boat to return to vessel immediately; Issue a warning to boat operator; in the case of contractors, contract may be revoked; Ensure that ECO or designated person monitors subsequent operations
Protection of PEI environment from disturbance by amphibious craft and boats	Minimal disturbance of the environment by amphibious craft and boats	**Do not allow unauthorised landing** by any amphibious craft and boats on any beaches of the PEIs except in case of emergency, where air support is unable to reach the area	Monitor throughout the year	Action: DCO/TL; ECO Monitoring: DCO; ECO; all expeditioners	If illegal landing is discovered, boat operator must show evidence of emergency or else vacate beach and immediately move craft outside the 500 m approach boundary; Legislation allows for confiscation of craft
Protection of PEI environment from disturbance by amphibious craft and boats	Minimal disturbance of wildlife by amphibious craft and boats	When operating authorised boats near wildlife, adhere to the IAATO Marine Wildlife Watching Guidelines	Monitor throughout duration of operations	Action: Boat operator Monitoring: DCO; ECO; all expeditioners	Recall boat to vessel immediately and take disciplinary action if necessary

Goal 5-8. Minimise disturbance of flora and fauna on and around the PEI during operation of craft (includes boats and helicopters)					
Objectives	Target	Actions	Monitoring	Responsibility	Remedial action
D. Search and rescue					
Limit disturbance to the PEIs environment during search and rescue operations	Responsible action during search and rescue procedure	**Provide** D: SO&AS **with a full report** of circumstances and actions within 30 days	Ensure that a comprehensive report is received within 30 days	Action: TL/DCO; ECO Monitoring: D: SO&AS	Follow up if report late or inadequate; If search and rescue resulted in significant disturbance, investigate and advise on remedial action
Limit disturbance to the PEIs environment during search and rescue operations	Safe retrieval of expeditioners while minimising disturbance to environment	If human life is under threat**, use** appropriate means of **transport** (helicopters, fixed-wing aircraft or amphibious craft) **to carry out search and rescue operations without prior permission from D: SO&AS**; Such operations may include accessing Zone 4 and 5 areas; **Obtain written permission** from **D: SO&AS** within 48 hours	After emergency, inspect landing site for signs of disturbance to environment (including birds and seals), and possible introduction of alien species	Action: DCO/TL; Helicopter Captain Monitoring: DCO/TL; ECO	Rehabilitate site if vegetation is damaged; Control and eradicate alien species; Monitor animals injured during procedure and euthanise humanely where necessary

BOX 5-4. GUIDELINES FOR THE USE OF AIRCRAFT AT THE PRINCE EDWARD ISLANDS

WARNING: Flying conditions at the Prince Edward Islands (PEIs) are often marginal. As an aircraft climbs in altitude, so the risk of turbulence and icing increases. Mist also increases risk during flight operations. Directorate: Southern Oceans and Antarctic Support (D: SO&AS) must only require of the aircraft operators to act within the safe limits of prevailing conditions. If this puts any sensitive bird or seal colonies at risk, then D: SO&AS must halt all flight operations.

SCAR guidelines for aircraft operations in the Antarctic

Because the Scientific Committee on Antarctic Research (SCAR) guidelines[13] are very specific to Antarctic conditions, they have been modified here to account for the unique conditions of the PEIs. Although SCAR has recommended flight guidelines and minimum horizontal and vertical flight distances from animal populations in the Antarctic, these distances are not applicable to the unique conditions and geographical size of the Prince Edward Islands. For this reason, this Management Plan does not require pilots to adopt the SCAR minimum distances and the following is an adaptation of the SCAR guidelines for the PEIs.

Animals in remote sub-Antarctic regions are extremely prone to disturbance by aircraft operations, often resulting in changes in their behaviour, physiology and breeding success. However such operations are imperative to the functioning of research bases in the region.

The level of impact varies according to the intensity, duration and frequency of disturbance, the species involved and the time related to the breeding season. At the PEIs, late September to early May usually represents the time when species are most sensitive to disturbance by aircraft operations.

Variations in noise levels experienced by animals on the ground depend on height at which aircraft fly, type of aircraft and engine, flight profile, weather and geography of the location. SCAR recommends that pilots should make the final judgement with regard to aircraft operations based on the aircraft type, task and safety considerations. However these decisions must also be made bearing in mind impacts on wildlife.

Bear in mind that the Protocol on Environmental Protection to the Antarctic Treaty defines 'harmful interference' as 'flying or landing helicopters or other aircraft in a manner that disturbs concentrations of birds and seals'. A colony is defined as constituting 20 or more animals in close vicinity.

To avoid disturbance, the following recommendations are made:

- Aircraft are prohibited from landing on the islands except during search and rescue operations, for the gathering of scientific information, during re-supply and waste removal or for any operation which promotes the proper management of the islands.
- Avoid all no fly zones (see Figure 5-1) except in case of emergency. Note that these zones are not fixed but may vary between and within years, so no fly zones should be confirmed with the Environmental Control Officer prior to the start of flight operations for each voyage.
- Where possible, adhere to the recommended flight paths (Figure 5-1) when flying around the island.
- Avoid flying over concentrations of birds and seals.
- Do not fly below 600 m above ground level over bird and seal colonies except in emergencies.
- Never hover or make repeated passes over wildlife concentrations or fly lower than necessary.

[13] *http://www.scar.org/publications/bulletins/155/resolution2.html*

- Avoid landing within 250 m of bird and seal colonies wherever possible, except in emergencies.
- Because most animals congregate along the coastline, avoid flying directly on the coastline and rather fly 500 m inland or seaward of the coastline and 600 m above ground level, but bearing in mind that the inland terrain and marginal flying conditions may make this difficult at times.
- When flying over the coastline, maintain a vertical separation of 600 m above ground level and a horizontal separation of 500 m where possible.
- Where possible, ensure that landings near concentrations of animals are downwind and behind a physical barrier such as a hill.
- Avoid flying toward concentrations of animals immediately after take-off; avoid steep banking turns in flight because such turns significantly increase the amount of noise generated.
- All Zone 4 (sensitive wildlife) and Zone 5 areas may not be flown over or within prescribed distances without a permit from D: SO&AS.
- Pilots should familiarise themselves with maps of the islands and Zone 4 and Zone 5 areas.
- Where flights must take place close to bird or seal colonies, keep these to a minimum.
- Avoid flying after dark to prevent bird strikes.
- Avoid flying when poor conditions such as low cloud or winds make the maintenance of flight distances difficult.
- Where possible, and in keeping with flight distances from bird and seal colonies, maintain flight paths that are as low on the horizon as possible.
- Apply the above recommendations maximally during wildlife breeding and moulting seasons.
- Take all the necessary precautions to avoid disturbing or endangering flora and fauna. In this regard, low flying over seal and bird colonies, especially when these animals are breeding, is strictly prohibited.
- The Departmental Coordinating Officer shall, with the full sanction of D: SO&AS, be responsible for ensuring that aviation operators abide by the above provisions.

Additional guidelines

The following additional guidelines must be adhered to in all except genuine emergency situations, when the guidelines for search and rescue should be used:

- Conduct flights within the restricted airspace of the PEIs only if allowed by D: SO&AS permit.
- It is the pilot's responsibility to remain clear of the no fly zones (See Figure 5-1). For the safety of the flight, however, the pilot can enter these areas to avoid low visibility, severe turbulence or any other emergency. Any entry into these areas must be reported to the Departmental Coordinating Officer and Environmental Control Officer as soon as the aircraft returns to base.
- It is the pilot's prerogative to use suggested flight paths or his/her own as long as he/she stays outside of the no fly zones and has the alternative flight paths approved by the Environmental Control Officer.
- Avoid landing on vegetation – use helipads wherever possible. Where landing on vegetation is unavoidable, the Environmental Control Officer must assess degree of disturbance and monitor for introduction of invasive species to the site each month for a period of a year or longer if deemed necessary.
- Where possible, lower containers onto landing platforms rather than directly on vegetation.
- Avoid landing on areas infested with alien and invasive vegetation; if such landing is unavoidable return directly to helipad or vessel and thoroughly clean and check skids and wheels thoroughly before redeploying aircraft or landing at any other sites.
- Keep wheels and skids propagule-free; clean and check wheels and skids before redeploying aircraft.
- Avoid disturbance of high-priority conservation areas (flagged as no fly zones); report unauthorised landings to Departmental Coordinating Officer and the Helicopter Captain.
- Helicopter landings on Prince Edward Island may only take place at Cave Bay on the east coast and Kent Crater on the west coast, except in case of emergency.

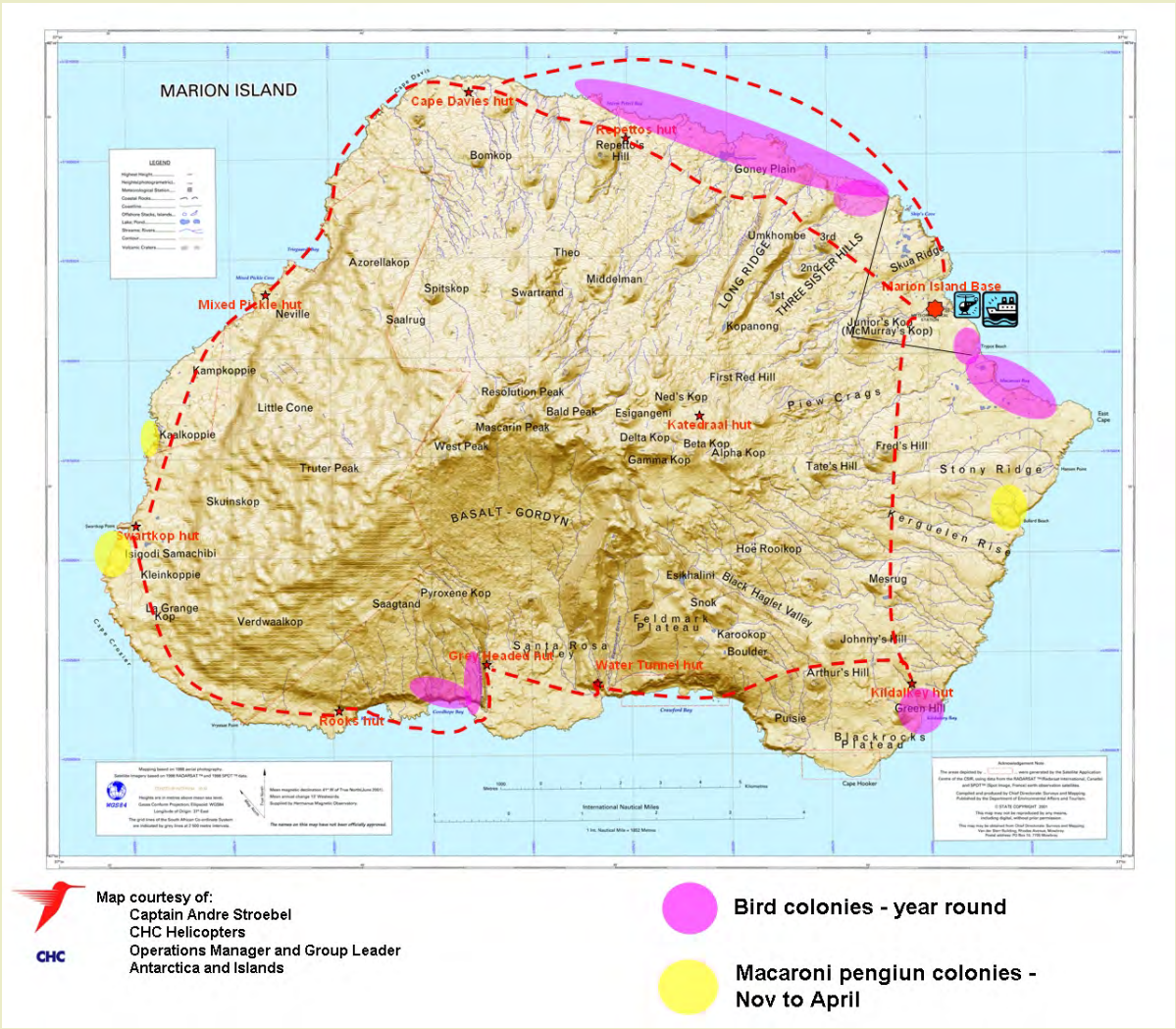

Figure 5-1. No fly zones and recommended flight routes on Marion Island

PART TWO: PEIMP STRATEGIC PLAN

Chapter 6: Historical conservation

PRINCE EDWARD ISLANDS MANAGEMENT PLAN

Chapter 6

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6. Historical conservation

Relevant legislation

- National Environmental Management Act (No. 107 of 1998)
- National Environmental Management: Protected Areas Act (No. 57 of 2003)
- Prince Edward Islands Act (No. 43 of 1948)
- National Heritage Resources Act (No. 25 of 1999)
- Maritime Zones Act (No. 15 of 1994)

The sailors, sealers and castaways who found themselves on the PEIs by chance or design left evidence to this fact at sites along the shoreline and scattered across the islands. Not much of their legacy remains, but most of that which does has been recorded in an inventory of Marion Island's archaeological sites and artefacts[1]. Anchors, rifles, trypots, the remains of a carved ship's frame and stoneware fragments are some of the artefacts found and/or recovered from sites around Marion Island. In the past, archaeological remains were not afforded the same degree of protection as the natural environment. However, the National Environmental Management Act (No. 107 of 1998) calls for the management of the PEIs' environment to take into account its cultural heritage (Section 23). The cultural heritage of the islands is protected by the National Heritage Resources Act (No. 25 of 1999) and the Maritime Zones Act (No. 15 of 1994).

6.1 Legal provisions

6.1.1 The National Heritage Resources Act (NHRA)

NHRA affords legal protection to all archaeological sites and artefacts on Prince Edward and Marion Islands 'through protecting, maintaining, preservation and sustainable use of places or objects so as to safeguard their cultural significance'. According to the Act, the South African Heritage Resources Agency (SAHRA) oversees the national archaeological estate while Heritage Western Cape (HWC) is the provincial authority (Section 8). Because the PEIs are part of the Cape Town magisterial district, their archaeological resources fall within the jurisdiction of HWC (Section 36 of the NHRA). The South African Maritime Museum is the official custodian of historical artefacts.

However, according to the Act all graves and burial grounds over 60 years old or victims of conflict and shipwrecks fall under the jurisdiction of the national body, SAHRA. The grave site at Tweeling, other suspected grave sites on Marion and Prince Edward Islands, and the shipwreck *Solglimt* at Ship's Cove are therefore protected by SAHRA.

According to NHRA, no-one may 'destroy, damage, excavate, alter, deface or otherwise disturb any archaeological (or palaeontological) site (or any meteorite)', 'which includes removing them from their original position or collecting material (Section 35)'. Trade in or export of historical material is outlawed by the Act, as is the use of any equipment (excavation or otherwise) to assist in the detection or recovery of such objects. All archaeological or palaeontological sites or meteorites are the property of the State and may not be excavated, altered or disturbed without a permit issued by HWC (Section 35 (2)). Any new finds must be reported to HWC

[1] Boshoff, J.J., Hart, D. & Loock, J. 1997. Survey of Historical sites on Marion Island. Privately Printed, Cape Town.

which may call for an archaeological survey to be conducted. Because many items have gone missing over the years, some artefacts are now in the possession of the public, having been obtained without the required permits under either NHRA or the now defunct National Monuments Act (1969); such items must be registered as a private collection with HWC (Section 35 (7) and (8)).

6.1.2 The Maritime Zones Act

The Maritime Zones Act (No. 15 of 1994) defines the sea beyond the 12 nm limit of the territorial waters but within a distance of 24 nm of the coast as the maritime cultural zone of South Africa (Section 6 (1) and (2)). Objects of archaeological and historical value found in the maritime cultural zone enjoy the same protection as objects in the territorial waters of South Africa.

6.2 Definition of archaeological sites and artefacts

Archaeological sites and artefacts are defined under Section 2 of the Act as being:

- Material remains resulting from human activity that are older than 100 years;
- Rock art – painting, engraving or other graphic representation on rock by human agency – which is older than 100 years;
- Wrecks of vessels or aircraft, or their associated debris and artefacts, wrecked on land or in water occurring in the maritime culture zone which are older than 60 years or which SAHRA considers worthy of conservation;
- Such items associated with military history which are older than 75 years and the sites on which they are found.

While archaeological sites or artefacts are generally defined as being older than 100 years, SAHRA encourages the protection according to the Act of any sites or artefacts older than 50 years or which are of interest. Iziko Museums are the official custodians of all artefacts removed from the islands and delivered to mainland South Africa.

6.3 Historical conservation policy

All artefacts associated with the 1948 annexation (including all things associated with that year) are defined as of historic interest even though they are not yet 100 years old. An update of the inventory (a heritage assessment) is required and will identify, describe and assess the significance of the heritage resources. This should be followed by drafting of conservation management plans for specific heritage resources that have high heritage value, or are at risk, to ensure their management is in line with good heritage practice.

The historical conservation policy of the PEIs aims to record and preserve sites and objects which have cultural and/or historical significance. In accordance with the status of the islands as a Special Nature Reserve, historical and archaeological research on the Prince Edwards Islands will be authorised only when it does not adversely affect natural ecosystems and/or biota. Furthermore, because of Prince Edward Island's status as a Zone 5 protected zone, where entry is limited to exceptional research or management cases, archaeologists have been unable to conduct a full survey of the historical sites and artefacts here. SAHRA strongly recommends that a priority be made of this matter in the near future. The Prince Edward Islands Management Authority, i.e. Department of Environmental Affairs, must make a recommendation regarding this matter.

6.4 Historical sites within Zones 1 and 5

Historical sites are defined as artefacts established at the time of annexation and up to the end of 1948. A full list is available (Appendix, 1.3) and included are:

- The Crawford survey beacons (of which at least three are extant) on Marion Island;
- The waste dump in the ravine south of the entomological laboratory on Marion Island that contains such items as broken Royal Navy crockery and 1948-dated beer bottles;
- Various items at Gunner's Point and Boulders Beach on Marion Island, including the base plate of the first crane, the annexation shell case, flag pole stump and plaque, and 'La Grange Villa' (used to house domestic pigs in the early 1950s and bearing historical graffiti);
- The flag staff and memorial plaque at the mouth of the cave at Cave Bay on Prince Edward Island (Zone 5).

All of these are of great historical significance as records of the annexation and of building the first base. It is strongly recommended that an EIA or any other kind of risk assessment process be undertaken prior to decommissioning, alteration and/or removal of buildings.

Goal 6-1. Protect and conserve Prince Edward Islands' archaeological and palaeontological estate					
Objective	Target	Action	Monitoring	Responsibility	Remedial action
Ongoing protection of the PEI's archaeological and palaeontological estate	No unauthorised disturbance of archaeological or palaeontological sites or artefacts	**Prevent excavation, alteration or disturbance of any archaeological or palaeontological site** except by a permitted archaeologist; Maintain the standards and procedures of the profession in the conservation of the site or artefact	Ensure that permit system and specific permit conditions are adhered to by all expeditioners	Action: HWC/SAHRA (permits for excavation and removal); DEA (permits for island access and for collection) Monitoring: Permitted archaeologist; TL/DCO; ECO	Report any site or artefact that is found to have been excavated, altered, disturbed or removed to D: SO&AS and HWC/SAHRA, whereupon advice will be given on how to conserve that site or artefact; Penalties may be imposed in accordance with NHRA
Ongoing protection of the PEI's archaeological and palaeontological estate	Conservation of archaeological and palaeontological artefacts that are deteriorating from exposure to the elements	**Retrieve and return to South Africa** (by a permitted specialist under specific circumstances) items that will suffer serious damage or loss if they are left exposed to the elements	Monitor the presence and condition of known sites and artefacts on an ongoing basis	Action: HWC/SAHRA (permits for excavation and removal); DEA (permits for island access and collection); Iziko Museums (advice on removal and transport, eventual custodianship) Monitoring: TL/DCO; ECO	Report unauthorised removal of artefacts to the TL, who may seek advice from HWC/SAHRA on how to proceed; Penalties may be imposed in accordance with NHRA
Ongoing protection of the PEI's archaeological and palaeontological estate	Conservation of all archaeological and palaeontological items held at the Marion Island base	**Store artefacts at the base under suitable conditions** as specified by Iziko Museums; In the interim, ensure that artefacts are spared exposure to the elements	Ongoing maintenance by designated personnel	Action: DEA (provision of storage and display facilities); designated personnel (maintenance of Marion Island collection); HWC/Iziko Museums (advice on curation) Monitoring: TL; ECO	Transfer to South Africa for proper curation

Goal 6-1. Protect and conserve Prince Edward Islands' archaeological and palaeontological estate					
Objective	Target	Action	Monitoring	Responsibility	Remedial action
Maintain a full inventory of the archaeological and palaeontological heritage of the PEIs	Full inventory of the PEI's archaeological and palaeontological estate	**Report new** archaeological or palaeontological **finds** to HWC/SAHRA	Report new artefacts to TL, who must in turn report to DEA and HWC/SAHRA	Action: All expeditioners; TL; DCO Monitoring: DEA	Report site or artefact to HWC/SAHRA; seek advice on how to proceed further regarding the preservation of the site or artefact
Maintain a full inventory of the archaeological and palaeontological heritage of the PEIs	Full inventory of archaeological and palaeontological artefacts	**Report** to HWC/SAHRA all unregistered archaeological **items** that have already been removed from PEIs and are kept **in private collections**	Report all artefacts that originated on the PEIs and are presently in private hands to the DEA and HWC/SAHRA	Action: Anyone in possession of or who knows of someone in possession of such items Monitoring: DEA	Report any unregistered items to HWC/SAHRA, which will decide on how to proceed further
Maintain a full inventory of the archaeological and palaeontological heritage of the PEIs	Full inventory of archaeological and palaeontological artefacts in Marion Island base	**Conduct a full inventory of** all archaeological and palaeontological **items held in the base**	Monitor on an ongoing basis, but particularly as the old base is decommissioned	Action: TL; DCO Monitoring: DEA	Any items found to have been removed or damaged to be placedin the base museum; If deemed necessary, the incident may be reported to HWC/SAHRA
Conserve the archaeological and palaeontological heritage of the PEIs	Conservation of all archaeological and palaeontological artefacts	**Initiate research and protection** of the archaeological and palaeontological heritage of the PEIs	Examine research reports and publications as part of DEA's annual reporting	Action: DST/NRF; HWC/SAHRA Monitoring: DEA	Encourage NRF and other funding bodies to fund research of this nature
Prevent illegal collection of archaeological and palaeontological items	No unauthorised disturbance of archaeological or palaeontological sites and artefacts	**Educate** all expeditioners about the nature of historical artefacts and sites, where they are located and the legal basis for their conservation	None	Action: DEA; TL/DCO; ECO Monitoring: ECO	None

Goal 6-1. Protect and conserve Prince Edward Islands' archaeological and palaeontological estate					
Objective	Target	Action	Monitoring	Responsibility	Remedial action
Prevent illegal collection of archaeological and palaeontological items	No loss or damage of archaeological or palaeontological artefacts in Marion Island base	**Monitor the presence and condition of known sites and artefacts** on an ongoing basis but particularly immediately prior to and during relief periods	None	Action: TL/DCO Monitoring: DEA	If individuals are found to have disturbed or removed archaeological or palaeontological artefacts, make them aware of the offence; Report removal of items to HWC/SAHRA; penalties may be imposed in accordance with NHRA
Prevent illegal collection of archaeological and palaeontological items	No loss or damage of archaeological or palaeontological artefacts during the decommissioning of the old base	**Ensure that items** currently stored in the old base **do not go missing during the decommissioning** of the base and transfer to the new base	A HWC/SAHRA or Iziko Museums official or appropriate designated person to be present during the relevant phase of decommissioning	Action: TL/DCO Monitoring: DEA and designated HWC/SAHRA or Iziko Museums official	Report damage or loss of artefacts to HWC/SAHRA and record on the inventory of artefacts; penalties will be applicable for theft or malicious damage

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7. *Waste Management*

Relevant legislation

- National Environmental Management Act (No. 107 of 1998)
- National Environmental Management: Protected Areas Act (No. 57 of 2003)
- National Environmental Management: Protected Areas Act Regulations for the Proper Administration of Special Nature Reserves, National Parks and World Heritage Sites (No. R 1061 of 2005)
- National Environmental Management: Waste Act (No. 59 of 2008)
- National Environmental Management: Air Quality Act (No. 39 of 2004)
- Dumping at Sea Control Act (No. 73 of 1980)
- National Environmental Management Integrated Coastal Management Act (Act No. 24 of 2008)
- Hazardous Substances Act (No. 15 of 1973)
- Carriage of Goods by Sea Act (No. 1 of 1986)

7.1 Legal provisions

As the management authority of the Prince Edward Islands (PEIs) Special Nature Reserve, it is the responsibility of the Department of Environmental Affairs (DEA) to ensure that the following legal provisions apply to waste management at the PEIs.

7.1.1 The National Environmental Management Act (NEMA)

NEMA requires of every person a duty of care and remediation of environmental damage. Under Section 28, every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment. The EIA process for the decommissioning of the old Marion Island base must take cognisance of any activities that may be listed in terms of the NEMA EIA Regulations.

7.1.2 National Environmental Management: Protected Areas Act (NEMPAA)

Under the NEMPAA Regulations (No. R. 1061 of 2005), no one may deposit litter, polluting substances, offal, dead organisms, dung, domestic garbage, mineral or industrial waste in the PEI Special Nature Reserve. The regulations also prohibit any pollution of water (e.g. river, spring, groundwater, dam or lake) and the dredging of or removal of substrate from such water areas. In addition, no retaining walls or weirs may be constructed; or sand, soil or stone dumped into a water body without the express permission of DEA and adherence to conditions imposed.

In keeping with Section 28 of NEMA and the regulations under NEMPAA, every effort must be made to prevent pollution or degradation of the environment at the PEI. The management of waste and sewage must be handled in accordance with this principle, with the high conservation status enjoyed by the islands, and with the policies and guidelines of the South African National Antarctic Programme (SANAP).

For the purposes of this Prince Edward Islands Management Plan (PEIMP), the term 'waste' refers to waste material accumulated due to human activities on the islands since the end of the year 1948. All materials

deposited on the islands prior to 1948 or during the 1948 annexation are considered to be of historical interest and will be managed in terms of the policy set out in this plan (see Chapter 6, Historical conservation).

7.1.3 Environment Conservation Amendment Act

The Environment Conservation Amendment Act requires that all waste must be discarded or disposed of at a permitted site or in a way prescribed by the Minister. Because no waste disposal sites are permitted on the PEIs, this law thus means that all waste generated at the PEIs and on the supply vessel which requires disposal must be returned to South Africa and entered into the waste stream on the mainland.

7.1.4 National Environmental Management: Waste Act (NEMWA)

In terms of NEMWA, waste is defined as any substance that is surplus, unwanted, rejected, discarded, or abandoned, and that must be treated or disposed of. NEMWA regulates waste management in order to protect health and the environment. This is achieved by providing measures for preventing pollution and ecological degradation and for achieving ecologically sustainable development. The Act is aimed at reducing, re-using, recycling and recovering waste as far as possible, and provides for the remediation of contaminated land. Schedule 1 of the Act lists waste management activities in respect of which a license is required. Category A and B activities require a Basic Assessment or an Environmental Impact Assessment process, respectively, as stipulated in the environmental impact regulations under NEMA. The EIA process for the decommissioning of the old Marion Island base must take cognisance of any activities that may be listed in terms of NEMWA.

7.1.5 Water Services Act

Sewage sludge falls under the Water Services Act (No. 108 of 1997). This Act provides for the right to access basic water supply and basic sanitation. Here 'basic sanitation' refers to the prescribed minimum standard of services necessary for the safe, hygienic and adequate collection, removal, disposal or purification of human excreta, domestic waste-water and sewage (Section 1 (ii)). It is thus the responsibility of DEA to ensure that basic water supply and sanitation is provided for all those visiting the PEIs. However, this provision must be in line with the conservation management principles laid out in the PEIMP and all other national legislation.

7.1.6 National Environmental Management: Air Quality Act

The National Environment Management: Air Quality Act allows the Minister to list activities which he/she believes have a significant detrimental effect on the environment, including health, social/ecological/economic conditions or cultural heritage. In order to ensure quality of ambient air at the PEIs, DEA and the PEIMP must adhere to this Act and all regulations promulgated in terms of this Act. If any activities taking place on or around the PEIs fall under the Act's listed activities, then atmospheric emission licenses must be acquired accordingly. Likely sources of such emissions in the vicinity of the PEIs are the supply vessel and its ancillary vessels, helicopters, diesel generators, the braai area at the research base, and any incinerators that may be installed at the base. None of these are likely to produce enough emissions to negatively impact on the ambient air quality of the PEIs. However, should the Minister or DEA decide to set strict controls and thresholds on atmospheric emissions, then the PEIMP must be adapted accordingly and the necessary licenses acquired.

7.2 Principles of waste management at the PEIs

The main principle of the waste management policy for the PEIs is to ensure a waste-free and healthy environment. The objectives of the waste and sewage disposal policy are:

- To ensure that activities at the PEIs do not lead to unnecessary, unsightly or irreversible pollution, marring of the environment, or to the build up of waste or debris on the islands;

- To reduce the amount of waste which is introduced to, produced at or disposed of on or around the PEIs as far as possible;
- To consider the following in the planning and execution of activities: waste storage, disposal and removal from the PEIs as well as recycling and source reduction.

In general, waste generated at the PEIs must be disposed of in a way which does not modify or endanger the natural ecosystems or species. Therefore non-biodegradable and non-burnable waste is returned to South Africa and disposed of at a permitted waste site in accordance with South African integrated waste management policy and legislation.

7.3 Types of waste generated

Four major categories of waste are generated at the islands. These are treated in different ways according to the environmental risks they pose, and it is important that the procedures set out in this PEIMP are strictly observed. The waste categories can be understood as follows:

- *Reusable and recyclable waste:* Waste that can be reused on the island for a time (e.g. bubble wrap, plastic bags) but ultimately is stored and returned to SA for reuse or recycling (glass, cans and drums, plastics including field markers, composites, paper, cardboard, wood). Note that no loose polystyrene packaging (polystyrene beads and chips) may be taken to the PEIs.

- *Burnable human/medical waste:* Certain types of medical waste (i.e. tampons and sanitary towels, disposable garments and bedding, clean and soiled swabs and cotton wool, small quantities of human tissue etc.) that is burnable in a medical grade incinerator.

- *Environmentally hazardous biodegradable waste:* Waste that could cause environmental impacts if released into the environment in an uncontrolled manner, but is organic and biodegradable. This waste consists of two main types:
    - Waste water, including 'grey water' from normal household use and 'black water', i.e. sewage, but excluding waste water that has been in contact with uncooked fish, meat or poultry or poultry-derived products or fish/meat/poultry bones;
    - Food waste or 'slop', excluding any waste water that has been in contact with uncooked fish, meat or poultry.

- *Environmentally hazardous non-biodegradable waste:* Oils and mechanical waste (such as used oil filters, oily rags etc.), waste cooking oil, batteries, herbicides, and laboratory, photographic, radiographic chemicals.

- *Bio-hazardous waste:* Due to the risks of releasing poultry and other meat waste, this category also includes all uncooked fish, meat and poultry waste, melt water and all bones (cooked and uncooked), all stones and pips from dried fruit and olives etc., and all non-burnable medical waste including contaminated latex/plastics, sharps and low-risk ash produced by the incineration of burnable medical waste.

The only types of waste that are disposed of at the PEIs are sewage, food waste ('slop') generated at Marion Island. This waste is biodegradable and it is believed that no significant risk is posed to the environment through this method of disposal.

7.3.1 Treatment of waste at the Marion Island base

Of all the waste generated at the PEIs, most is generated at the Marion Island base. Therefore it is of utmost importance that waste management at the base is taken seriously by all expeditioners and all the guidelines set out in this PEIMP are implemented.

In practical terms, the most important waste management practice is the separation of waste at source. This enables different types of waste to be treated differently and their disposal to be tightly controlled.

A. Treatment of reusable and recyclable waste

Waste type	*Preparation*	*Destination*	*Container*	*Marking*
Cans (includes all metal containers and metal foils), excluding oil cans	Rinse and flatten	Mainland	Orange steel containers	Metal
Drums and oil cans	None	Mainland	Orange steel containers	Metal
Glass	Rinse (do not crush as container weight may then exceed the limitations of helicopters)	Mainland	Orange steel containers	Glass
Paper and cardboard	Flatten	Mainland	Orange steel containers	Wood
Wood	None	Mainland	Orange steel containers	Wood
Plastics	Rinse and flatten	Mainland	Orange steel containers	Plastic
Polystyrene	Seal in bags to avoid the release of beads	Mainland	Orange steel containers	Plastic
Composites, such as foil-lined milk and fruit juice cartons	Flatten	Mainland	Orange steel containers	Plastic

B. Treatment of burnable waste

Waste type	*Preparation*	*Process*
Burnable human/medical waste	Place in burnable boxes and seal	Burn medical waste in incinerator and place ash in heavy-duty RED plastic bags, clearly marked as 'ash from medical waste incineration' and place in orange steel container with other medical waste

C. Treatment of environmentally hazardous biodegradable waste

Environmentally hazardous biodegradable waste is all human waste, waste water and food waste generated on the PEIs that does not contain poultry products or bones (red meat, chicken or fish). This waste, although a product of human activities on the islands, is easily degraded and small in volume. Therefore its controlled release probably represents no more than a minor risk to the coastal environment.

However, grey water from domestic use such as washing of floors is known to collect small particles of non-biodegradable material (such as plastic and foil), therefore grey water must be sieved to separate out such material before it is discharged into the grey water system. No grey water may be disposed of onto the ground around the Marion base but must be poured into a drain or toilet. Untreated sewage, or 'black water', is contained in a holder tank prior to discharge. Food slop is macerated before being flushed into a holding tank where it is stored prior to discharge after dark.

At the Marion Island research base, the aforementioned waste is all discharged underwater into the sea via pipelines from the base into the gully between Seagull (north) and Cabbage (south) Points, where it is dispersed by wave action and diluted by flushing into the open ocean.

Soiled paper and cardboard cannot be recycled or burnt (burning results in air pollution and ash which is hazardous if it escapes into the environment) and is thus returned to South Africa for disposal along with other environmentally hazardous non-biodegradable waste.

Waste type	*Treatment*	*Destination*	*Time*
Waste water ('grey' or black')	Grey water sieved out prior to discharge	Outfall into Seagull-Cabbage Point Gully	As required
Food waste or 'slop'	Maceration prior to discharge	Outfall into Seagull-Cabbage Point Gully	As required, only after dark to prevent scavenging by wildlife
Soiled paper and cardboard	Store in orange steel containers marked 'Paper: non-recyclable'	Mainland	Not applicable

D. Environmentally hazardous non-biodegradable waste

Used oils, chemicals, batteries, light bulbs and mechanical and medical waste have the potential to devastate the environment in the event of spillage, leakage or neglect. For this reason stringent controls must therefore be used in the management of this waste.

Waste type	*Preparation*	*Destination*	*Container*	*Marking*
Used oil (including cooking oil)	None	Mainland	20 l non-corrodible oil drums in orange steel containers	Oil
Mechanical waste	None	Mainland	Orange steel containers	Mechanical waste
Vehicle batteries	None	Mainland	Dedicated containers	Vehicle batteries
Other batteries	None	Mainland	Dedicated containers	Used batteries

Waste type	*Preparation*	*Destination*	*Container*	*Marking*
Chemicals (including laboratory, photographic and radiographic chemicals)	Place in original packaging	Mainland	Placed different types of chemicals in separate containers and clearly mark the contents	Clear markings for contents of each container, including hazard potential Marked against an inventory of waste chemicals
Light bulbs (Note that the phosphorus contained in bulbs is a potentially hazardous ground water contaminant and may be released when bulbs are broken)	Place in black bin bags, place bin bags inside strong cardboard containers to prevent breakage of bulbs	Mainland	Orange steel containers	Light bulbs

E. Bio-hazardous waste

Given the large and globally significant populations of birds on the PEIs, the introduction of avian diseases is a serious risk. Uncontrolled release of poultry meat and products into the environment may place indigenous bird populations at risk of contracting diseases to which they have no immunity. When introduced into breeding colonies of birds which nest close together (e.g. penguins), these diseases can have disastrous results[1].

Although no known mammalian or fish diseases can be introduced into the environment through uncooked red meat and fish products, a maximally cautious approach is nevertheless adopted. Therefore all uncooked red meat (beef, lamb, pork etc.) and fish will be treated in the same way as poultry.

In order to minimise the risk of disease being transmitted to the PEIs' bird, mammal and fish populations, all uncooked meat, fish and poultry products (i.e. chicken and shell-free egg products) must be irradiated before transport to Marion Island. No poultry products or uncooked fish and meat whatsoever are allowed on Prince Edward Island.

The following are treated as environmentally hazardous non-biodegradable waste and returned to the mainland for disposal:

- Uncooked fish, meat and poultry and poultry waste, including shell-free egg products and melt water from thawing chicken, fish and meat;
- Bones of cooked poultry, including bones found in canned chicken products and the contents of chicken pies;
- Bones of all meat products, including fish;
- Dried fruit stones and pips;
- Certain types of medical waste produce ash containing toxic heavy metals when incinerated, resulting in high risk waste which may only be disposed of at a licensed medical waste disposal site. For this reason no medical waste other than legitimate burnable medical waste may enter into the burnable waste cycle at the PEIs, even if the correct standard of medical waste incinerator is installed at the new base.

[1] Kerry, K., Riddle, M. & Clarke, J. 2000. Disease of Antarctic Wildlife. A Report for SCAR and COMNAP. Australian Antarctic Division, Hobart.

Waste type	*Preparation*	*Destination*	*Container*	*Marking*
Uncooked fish, meat and all poultry waste (including eggs, chicken, melt water and bones), dried fruit stones and pips etc.	Freeze in separate freezer/compartment	Mainland	Black bins	Bio-hazardous food waste
Medical sharps*	Place in sharps container and seal; only to be done by medical personnel unless in case of emergency	Mainland	Seal sharps in containers placed in thick red plastic bags stored in orange steel container	Bio-hazardous medical waste
Bio-hazardous non-burnable medical waste	Place in red plastic bags and seal	Mainland	Red plastic bags (thick) in orange steel container	Bio-hazardous medical waste

7.3.2 Waste management at field huts

Waste management at the field huts has become problematic due to infrequent hut clean-outs (mainly annual) and the ageing toilets at the huts. Most of the huts have a pit toilet system, while one, Katedraalkraans, has a removable bucket system. No chemicals are used and the toilet holes are filled with soil and closed when full. The pit toilets must be phased out as quickly as possible and replaced with a removable bucket or alternative system. The buckets should be changed during annual relief voyages, when the use of helicopters for transport is possible. This will ensure safer, more hygienic conditions at huts, although it is still not an ideal system should the number of visitors to the huts continue to increase. Alternative toilet systems for the field huts should be investigated by DEA as a matter of priority.

Food waste should be managed with care to ensure that no food is accessible to animals, including mice. Slop should be placed in the toilet, and cans and bottles rinsed and left in the hut waste bins along with all other waste that is not carried out from huts. If possible, other waste should be carried out, including paper and cardboard and all bones and poultry products. Small quantities of grey water may be disposed of directly onto the ground around the field huts, as long as it has been sieved first to remove any non-biodegradable materials picked up during the cleaning process. Every effort should be made to keep food waste to a minimum by not cooking more food than required or opening too many cans. Left-over food should be used at subsequent meals or carried out when feasible.

All washing (including bathing, washing of clothes, kitchen utensils etc.) must be done downstream of the point at which potable water is extracted for use at the hut.

7.3.3 Waste management on Prince Edward Island

Prince Edward Island is the most untransformed part of South African territory. Due to its near-pristine condition and its situation in the Southern Ocean, it represents a valuable scientific, educational and cultural resource for all South Africans. To maintain the island in its near-pristine state, no waste may be deposited on the island. All waste must be immediately secured, separated into categories and removed from the island at the end of every visit. All grey water and sewage must be containerised through the appropriate means (e.g. sealable slop buckets and the 'porta-loo' bag systems respectively) as it is produced. Where feasible, urinating on vegetated areas should be avoided, and should not occur within 20 m of camp sites to avoid nutrification over time.

On departure from a camp or research site or the island, all waste must be removed and must be entered into the supply vessel waste stream for processing. No waste should be returned to Marion Island because of risks of propagule or disease transfer. It is the responsibility of every individual visiting Prince Edward Island to adhere to this waste management policy.

7.4 Rehabilitation of un-used infrastructure and other impacted sites

Any rubble or building waste which has accumulated since the end of 1948, and therefore has no historical value, should be removed and the sites rehabilitated according to an approved restoration plan and the most recent SANAP document listing areas to be prioritised for waste removal (Appendix, 1.2). This also applies to parts of the old base that are no longer operational and that are to be decommissioned and removed. Rehabilitation should not involve removal of natural vegetation from other areas to the rehabilitated site. Removal of human constructions from the site and any appropriate stabilisation of soil should allow natural colonisation to take place. Disturbed areas are most likely to be colonised by alien species and should be kept off limits to non-conservation personnel.

Team members and other expeditioners should record the positions of new rubble sites (by GPS) and identify these (with photographs) to DEA to prioritise in future clean-up efforts. DEA must establish and maintain a database of long-term field markers, and the ECO should make sure, once every six months, that the site markers are in good condition. Markers must not be removed until it is clear that they are not part of a long-term study. The default assumption is that they are part of such a study and should be left in place, but a position taken.

No cleanup operations are currently under consideration for Prince Edward Island.

7.5 Guidelines for use of radioactive material

The use of radioactive material on the PEIs must be authorised in writing by DEA in accordance with the Hazardous Substances Act (No. 15 of 1973), the National Nuclear Regulator Act (No. 47 of 1999) and any regulations promulgated by the Nuclear Energy Corporation of South Africa (NECSA), the National Nuclear Regulator (NNR) or the Department of Health. Permits for the PEIs are to be endorsed accordingly (group 4 hazardous substances). Packaging of all radioactive material shall be in accordance with the instructions issued on the permit and in accordance with any instruction issued by the master of the supply vessel. The person responsible for the radioactive material must submit a full report on material used and returned, within 14 days of returning to the mainland.

No radioactive waste material may be deposited on the islands or within marine waters; all radioactive waste must be returned to South Africa for disposal at approved disposal sites. No radioactive material may be left on the islands for use at a later stage.

DEA and the Department of Minerals and Energy (DME) are currently developing a strategy for the management of radioactive waste[2], which will appear in the next version of the National Waste Management Strategy (intention to develop the strategy published in Government Gazette No. 33277, 8 June 2010). Management of radioactive waste on the PEIs must fall in line with this strategy.

[2] *http://www.info.gov.za/view/DownloadFileAction?id=70209*

Goal 7-1. Appropriate and sustainable management of waste at the Prince Edward Islands					
Objective	Target	Action	Monitoring	Responsibility	Remedial action
A. Policy					
Consider waste management in planning processes at the PEIs	Consider waste management in planning processes for all works and activities at the PEIs	**Prepare or commission an Environmental Management Plan** (including waste management) as part of all EIA processes; the plan must be considered prior to authorisation	Peruse all planning documents, including scoping/EIA reports by D: IEA and D: SO & AS prior to decision-making	Action: Project planners; D: SO & AS Monitoring: D: IEA; PEIAC	If plan absent or inadequate, refuse authorisation
B. Education					
Raise awareness about waste management at the PEIs	Increased awareness of expeditioners regarding waste management at the PEIs	**Present an onboard seminar** during every voyage, with compulsory attendance by all expeditioners, describing waste management procedures and explaining the need for these	Keep a record of attendance at the seminar; Monitor knowledge of procedures on an ongoing basis	Action: DEA; ECO Monitoring: ECO; DCO	Re-iterate correct procedures if necessary; Anyone who does not attend seminar may not disembark at the PEIs
Raise awareness about waste management at the PEIs	Increased awareness of over-wintering team regarding waste management at the PEIs	**Include** training in **waste management procedures during team training**	Monitor knowledge of procedures on an ongoing basis	Action: D: SO & AS; D: IEA Monitoring: ECO	Re-iterate correct procedures if necessary
Raise awareness about waste management at the PEIs	Increased awareness of supply vessel personnel regarding waste management at the PEIs	**Provide detailed instruction for supply vessel personnel** in correct waste management procedures prior to arrival at the PEIs	Monitor knowledge of personnel on an ongoing basis but especially at the start of the annual relief	Action: D: SO&AS; Vessel operator Monitoring: ECO	Re-iterate correct procedures if necessary
Raise awareness about waste management at the PEIs	Vessels permitted by DEA to operate tourist trips in the waters around the island aware of correct waste management procedures	**Provide tourist vessel operators with a copy of this management plan**, and explain waste management procedures that will apply	None	Action: D: SO&AS, D: IEA	Explain correct procedures if tourist vessel near the islands appears to be unfamiliar with these

Goal 7-1. Appropriate and sustainable management of waste at the Prince Edward Islands					
Objective	Target	Action	Monitoring	Responsibility	Remedial action
C. Minimisation of waste generated					
Minimise waste generated on the PEIs	Reduce amount of primary packaging entering the waste stream	Where possible, **remove all superfluous** plastic and cardboard **packaging** from supplies **at stores** and stow supplies in plastic bins before containerising	Observe the packing process at stores	Action: D: SO&AS; NDPW; SAWS (store managers) Monitoring: D: SO&AS; ECO	If excess packaging is not removed, instruct stores personnel accordingly
Minimise waste generated on the PEIs	Maximise recycling and re-use of packaging waste; Minimise use of non-biodegradable packaging	**Liaise with product suppliers to ensure** maximum use of **re-useable and recyclable packaging material; Avoid wood and polystyrene packaging** materials, especially wood shavings (note that polystyrene beads and chips are prohibited at the PEIs)	Examine supplies at stores prior to packing into containers	Action: D: SO&AS; NDPW; SAWS (store managers) Monitoring: D: SO&AS; ECO	If non-biodegradable packaging is used, remove wherever possible; Renegotiate supply contracts
Minimise waste generated on the PEIs	Reduce amount of primary packaging and excess food entering the waste stream	**Order** catering **supplies in appropriate quantities** (large for base to reduce packaging material, small for huts to reduce wastage of food etc.)	Check quantities of goods received for base and huts	Action: D: SO&AS; NDPW; SAWS Monitoring: D: SO&AS; ECO; TL/DCO; team members involved in hut resupply	Modify catering supply contracts if problems are encountered
Minimise waste generated on the PEIs	Prevent accumulation of expired food products on Marion Island	**Perform annual stores inventory** at the base and all field huts and **return all food that has expired** or will expire in the next year to the mainland	Ensure that each field hut and the base are inventoried separately each year; Observe restocking process at the PEIs	Action: TL; D: SO&AS Monitoring: TL; ECO; hut re-supply teams	Modify catering supply contracts and ensure that annual inventory is done, if necessary by external independent inspector; Ensure appropriate disposal in South Africa of returned expired foods

Goal 7-1. Appropriate and sustainable management of waste at the Prince Edward Islands					
Objective	Target	Action	Monitoring	Responsibility	Remedial action
Minimise waste generated on the PEIs	Minimise generation of plastic waste	**Use re-usable webbing straps** with ratchet fasteners instead of plastic strapping	Examine supplies on delivery to island	Action: D: SO&AS, NDPW Monitoring: ECO	Inform D: SO&AS and request corrective action
Minimise waste generated on the PEIs	Minimise generation of battery waste	**Use rechargeable dry cell batteries where possible; Avoid disposing of partially spent batteries**; check all batteries with a volt meter before discarding and re-use partially spent batteries in other equipment if possible	Self-regulated	Action: All expeditioners Monitoring: TL; ECO	None
D. Waste generated on the vessel					
Appropriately treat waste generated on the vessels in the vicinity of the PEIs	Protection of the marine and coastal environment of the PEIs	**Adhere to all sea waste disposal regulations** (Merchant Shipping Act), e.g. do not deposit any galley or human waste within 12 nm of the PEIs	Monitor ship waste release practices and familiarity of crew with at sea garbage disposal regulations on an *ad hoc* basis	Action: Vessel operator; Ship's Master Monitoring: ECO; DCO	Inform D: SO&AS as soon as possible of any breaches; immediately take up the matter with the Ship's Master; Instruct crew as to correct procedures
Appropriately treat waste generated on vessels in the vicinity of the PEIs	Protection of the bird, fish and seal populations of the PEIs from human-mediated disease outbreaks	**Freeze all uncooked meat and fish, uncooked and cooked poultry waste** on the supply vessel, including eggshells, eggs products and melt water from chicken, meat, fish and egg, and returned to SA for disposal	Observe ship waste release practices and familiarity of crew with at sea waste disposal regulations on an *ad hoc* basis; Carry out spot checks of meat freezer containers on vessel	Action: Ship operator; Ship's Master Monitoring: DCO; ECO	Inform D: SO&AS of any breaches as soon as possible; and take up with the Ship's Master

Goal 7-1. Appropriate and sustainable management of waste at the Prince Edward Islands					
Objective	Target	Action	Monitoring	Responsibility	Remedial action
Appropriately treat waste generated on the vessels in the vicinity of the PEIs	Protection of the marine and coastal environment of the PEIs	**Vessels or aircraft** permitted by DEA **for tourist trips** in the waters around the PEIs to maximally implement waste treatment procedures described in this management plan	Observe ship waste release practices as far as possible	Action: Ship operator; Ship's Master Monitoring: All expeditioners	Inform D: SO&AS of any breaches as soon as possible; D: SO&AS to take matter up at the highest level
E. Waste generated on the PEIs					
Safe and appropriate treatment and storage of **reusable and recyclable waste**	Separate all reusable and recyclable waste	**Separate all re-usable and recyclable waste** (glass, plastic, metals, cardboard and paper) into clearly marked containers (also see Section 7.3.1)	Self-regulate; Regularly check waste room to ensure that waste is being separated correctly and check again before emptying into orange containers	Action: All expeditioners Monitoring: Chef; Kitchen skivvy; DCO/TL; ECO	Provide feedback to team members on waste separation
Safe and appropriate treatment and storage of **reusable and recyclable waste**	Separate all reusable and recyclable waste from the 'hospital'	**Separate plastics** and other uncontaminated waste (e.g. packaging) **from the 'hospital' waste** and enter into main waste stream at base	Check that uncontaminated medical waste is routed through the correct channels	Action: Medical Officer Monitoring: DCO/TL; ECO	If in doubt about the contamination status of medical waste, place in red bags clearly marked 'bio-hazardous medical waste' for return to the mainland
Safe and appropriate treatment and storage of **reusable and recyclable waste**	Prevent pollution resulting from runoff from unsealed waste containers	**Store waste containers** (including orange steel containers and black plastic bins) **in enclosed, weatherproof areas**	Regularly check waste containers to ensure that they are not exposed to rain or wave action	Action: D: SO&AS Monitoring: TL/DCO; ECO	Move waste containers to appropriate location, and construct a new building for storage if necessary

Goal 7-1. Appropriate and sustainable management of waste at the Prince Edward Islands					
Objective	Target	Action	Monitoring	Responsibility	Remedial action
Safe and appropriate treatment and storage of **reusable and recyclable waste**	Facilitate recycling and minimise odours from stored waste	**Rinse all bottles, jars, cans and plastic packaging** prior to separation in the waste room, except those containing high quantities of oil and those containing uncooked chicken, fish and meat products	Regularly check waste containers	Action: All expeditioners Monitoring: Kitchen skivvy; DCO/TL; ECO	Provide feedback to team members on rinsing of recyclable waste
Safe and appropriate treatment and storage of **reusable and recyclable waste**	Proper treatment of waste wood	**Return waste wood to SA** for re-use or disposal	Regularly check for waste wood around the base	Action: NDPW, D: SO&AS Monitoring: TL/DCO; ECO	Cut large pieces of wood into smaller sections that can be containerised; If amount of waste wood is large, ensure that sufficient containers are available during the following relief voyage
Safe and appropriate disposal of **medical waste**	Safe and appropriate treatment and disposal of burnable medical waste	Place **contaminated burnable medical waste** in special red burnable boxes, clearly marked 'medical waste', and **incinerate** (see Section 7.3.1)	Regularly check medical waste containers	Action: Medical Officer Monitoring: DCO/TL; ECO	Give feedback to Medical Officer on correct disposal of waste
Safe and appropriate disposal of **medical waste**	Safe and appropriate treatment and disposal of medical waste	**Burn** burnables **daily, weekly or as required**; large burnables to be burnt immediately to prevent build up	Regularly check medical waste containers	Action: Medical Officer Monitoring: DCO/TL; ECO	Give feedback to Medical Officer on correct disposal of ash

Goal 7-1. Appropriate and sustainable management of waste at the Prince Edward Islands					
Objective	Target	Action	Monitoring	Responsibility	Remedial action
Safe and appropriate disposal of **medical waste**	Safe and appropriate treatment and disposal of ash from incinerated medical waste	**Burn** all burnable **medical waste immediately** in clean incinerator (free of ash from other waste incineration) and **containerise resulting ash promptly** (see Section 7.3.1)	Regularly check incinerator	Action: Medical Officer Monitoring: DCO/TL; ECO	Give feedback to Medical Officer on correct disposal of ash
Safe and appropriate treatment and storage of environmentally **hazardous non-biodegradable waste**	Separation and storage of environmentally hazardous waste	**Place toxic and environmentally hazardous waste** such as batteries (vehicle-type and other), laboratory, photographic and radiographic chemicals **in clearly-marked separate receptacles** (see Section 7.3.1)	Regularly check waste room to ensure that waste is being separated correctly	Action: All expeditioners Monitoring: DCO/TL; ECO	Handle breaches in discussion with Science Coordinator and other team members as required
Safe and appropriate treatment and storage of environmentally **hazardous non-biodegradable waste**	Safe storage and transportation of light bulbs	**Place spent light bulbs in black bags and store** bags carefully **inside sturdy clearly marked cardboard boxes**; Store inside orange steel containers in such a way that other waste is not dumped on top of the boxes	Regularly check packing of bulbs and containers	Action: All expeditioners Monitoring: DCO/TL; ECO	Handle breaches in discussion with Science Coordinator and other team members as required
Safe and appropriate treatment and storage of environmentally **hazardous non-biodegradable waste**	Safe storage and transport of waste oil	Place all **waste oils and fuels in clearly marked 20-l containers and return** to South Africa **for recycling** at the earliest opportunity	Conduct a quarterly inventory of contents of flammables store; regularly check cleanliness and condition of containers	Action: Diesel Mechanic Monitoring: DCO/TL; ECO	Handle breaches in discussion with Science Coordinator and other team members as required

Goal 7-1. Appropriate and sustainable management of waste at the Prince Edward Islands					
Objective	Target	Action	Monitoring	Responsibility	Remedial action
Safe and appropriate treatment and storage of environmentally **hazardous non-biodegradable waste**	Safe storage of flammables	**Conduct quarterly inspection of flammables store**; ensure that no containers have been damaged or corroded; sign off each inspection on schedule posted inside the store	Check inspection schedule quarterly	Action: Diesel Mechanic Monitoring: DCO/TL; ECO	Conduct inspection as a matter of urgency
Safe and appropriate treatment and storage of environmentally **hazardous non-biodegradable waste**	Safe storage of flammables	**Stack containers in flammables store** in such a way that they are easily inspected, and so that they do not damage those underneath them	Check stacking method and condition of containers	Action: Diesel Mechanic Monitoring: DCO/TL; ECO	Re-stack containers appropriately
Safe and appropriate treatment and storage of environmentally **hazardous non-biodegradable waste**	Responsibility taken for consignment of environmentally hazardous non-biodegradable waste	**Sign off final waste consignment** at end of year	Check final manifesto and inspection schedule	Action: Diesel Mechanic Monitoring: DCO/TL; ECO	Draft consignment list as a matter of urgency
Safe and appropriate treatment and storage of environmentally **hazardous non-biodegradable waste**	Safe storage and transport of environmentally hazardous non-biodegradable waste; Maintenance of wilderness aesthetic	Identify any **rubble and containers** around the base and huts and in the field, correctly containerise and **prioritise for removal** from the island	Annual check of condition of base and huts and surrounds during annual relief voyages	Action: Diesel Mechanic; DCO/TL Monitoring: DCO/TL; ECO	Immediately remove rubble and containers, irrespective of value of contents

Goal 7-1. Appropriate and sustainable management of waste at the Prince Edward Islands					
Objective	Target	Action	Monitoring	Responsibility	Remedial action
Safe and appropriate treatment and storage of environmentally **hazardous non-biodegradable waste**	Reduce accumulation of non-essential and/or expired chemicals	**Draw up an inventory of all chemicals** in laboratories and submit to Chief Scientist during annual relief	Shore-based Chief Scientist to inspect annually	Action: Laboratory personnel Monitoring: Shore-based Chief Scientist; ECO	Inform DCO/TL and ECO of all breaches; Remove all expired or unnecessary chemicals from the island; Permits for research can be revoked in the case of persistent offenders
Safe and appropriate treatment and storage of environmentally **hazardous non-biodegradable waste**	Reduce accumulation of non-essential and/or expired gas bottles and reduce risk of gas bottle corrosion	**Draw up an inventory of** all **gas bottles at base and huts** and submit to DCO during the annual relief; Report should include condition of bottles	TL to coordinate and DCO to inspect annually	Action: TL, laboratory personnel Monitoring: DCO/TL; ECO	Inform DCO/TL and ECO of all breaches; Remove all empty or corroded gas bottles from the island; Permits for research can be revoked in the case of persistent offenders
Safe and appropriate treatment and storage of environmentally **hazardous non-biodegradable waste**	Minimise the impact of cleaning products on the environment	**Use biodegradable, low-phosphate cleaning products** wherever possible	Examine supplies on delivery to island	Action: D: SO&AS Monitoring: DCO/TL; ECO	Inform D: SO&AS and request corrective action
Safe and appropriate treatment and storage of environmentally **hazardous non-biodegradable waste**	Prevent uncontrolled dispersal of packaging materials	**Secure and sort packaging materials** immediately after the contents have been removed in a closed room or under windless conditions; place in closed bins	Check that all packaging is secured and separated as soon as possible after product delivery	Action: All expeditioners Monitoring: DCO/TL; ECO	If packaging materials escape or are blown about, collect immediately and secure and dispose of appropriately; report uncollected material to the ECO

Goal 7-1. Appropriate and sustainable management of waste at the Prince Edward Islands					
Objective	Target	Action	Monitoring	Responsibility	Remedial action
Safe and appropriate treatment and storage of **bio-hazardous waste**	Safe disposal of food waste	**Freeze and store** uncooked fish and **meat**, uncooked and cooked **poultry and poultry-derived waste** (including bones and melt water from thawing frozen chicken, fish and meat products and shell-free egg products) and return to SA for disposal	Check slop containers before emptying and freezing contents	Action: All expeditioners, especially chefs and kitchen skivvy Monitoring: ECO; DCO/TL	Separate raw meat, fish, poultry, eggs and bones from other food waste; If in doubt, treat entire slop bin as poultry/fish/meat/egg and freeze
Safe and appropriate treatment and storage of **bio-hazardous waste**	Safe disposal of contaminated food packaging	**Freeze** with poultry waste **all packaging that contained poultry, egg products or meat** and return to South Africa for disposal	Regularly check waste room to ensure that contaminated packaging is being separated correctly	Action: All expeditioners, especially chefs and kitchen skivvy Monitoring: ECO; DCO/TL	Inform chefs and kitchen skivvy of the correct procedures for disposal, and reiterate importance of upholding procedures
Safe and appropriate treatment and storage of **bio-hazardous waste**	Sterilisation of contaminated food containers	**Clean all containers used to defrost chicken, fish or meat or frozen egg products** using a concentrated bleach solution, before flushing into grey water system	Check regularly	Action: Chef; kitchen skivvy Monitoring: DCO/TL; ECO	Inform chefs and kitchen skivvy of the correct procedures for cleaning of containers, and reiterate importance of upholding procedures
Safe and appropriate treatment and storage of **bio-hazardous waste**	Safe disposal of yeast	**Kill all unused yeast by boiling**, including the boiling of instruments (bowls, utensils) used with yeast	Check regularly	Action: Chef; kitchen skivvy Monitoring: DCO/TL; ECO	Inform chefs and kitchen staff of the correct procedures for cleaning of containers; reiterate importance of upholding procedures

Goal 7-1. Appropriate and sustainable management of waste at the Prince Edward Islands					
Objective	Target	Action	Monitoring	Responsibility	Remedial action
Safe and appropriate treatment and storage of **bio-hazardous waste**	Sterilisation of contaminated medical waste water	**Treat waste water** and cleaning products **contaminated with medical residues with disinfectant** to render it sterile prior to disposal through the grey water system	Check regularly	Action: Medical Officer Monitoring: TL/DCO; ECO	Re-iterate the correct procedures to the Medical Officer
Safe and appropriate treatment and storage of **bio-hazardous waste**	Adequate containers provided for non-burnable medical waste	**Order adequate supplies of containers**, i.e. sharps bins, burnable boxes in different sizes and red disposal bags; Add these items to standard schedules; Include five sealable body bags in the event that hygienic storage of a human body is needed	D: SO&AS to check against Medical Officer's order list at least one month prior to departure	Action: Medical Officer; D: SO&AS Monitoring: DCO/TL	If any of the required equipment is not available, report at once to D: SO&AS and in the meantime improvise by using clearly-marked, preferably red or yellow containers for disposal; D: SO&AS to obtain equipment at earliest opportunity
Safe and appropriate treatment and storage of **bio-hazardous waste**	Safe and appropriate treatment and disposal of non-burnable medical waste	**Place** non-burnable, **contaminated medical waste in red bags** clearly marked 'medical waste' and return to SA	Regularly check waste containers	Action: Medical Officer Monitoring: ECO; DCO/TL	Immediately notify D: SO&AS and team members of breaches; dispose appropriately where possible
Safe and appropriate treatment and storage of **bio-hazardous waste**	Safe and appropriate treatment and disposal of non-burnable medical waste	**Place** all contaminated and uncontaminated medical **sharps and ampoules in** commercially supplied, strong, sealable **sharps bins**; seal bins when full or at the end of the year and packed into red bags for return to SA (see Section 7.3.1)	Regularly check waste containers	Action: Medical Officer Monitoring: ECO; DCO/TL	Immediately remove any sharps that accidentally enter the normal waste stream, and dispose of as described

Goal 7-1. Appropriate and sustainable management of waste at the Prince Edward Islands					
Objective	Target	Action	Monitoring	Responsibility	Remedial action
Safe and appropriate treatment and storage of **bio-hazardous waste**	Safe and appropriate treatment and disposal of non-burnable medical waste	**Place** any **sharps and ampoules used by researchers** (e.g. darts used by seal researchers) **in sharps containers** provided by the Medical Officer	Regularly check waste containers	Action: Medical Officer; researchers Monitoring: ECO;DCO/ TL; Science Coordinator	Immediately remove any sharps that accidentally enter the normal waste stream, and disposed of as described
Safe storage, transport and use of radioactive materials	Safe storage, transport and use of radioactive materials	**Handle all radioactive material according to** the Guidelines for Use of Radioactive Material (Section 7.5) and all other **relevant legislation and policy** of SA	DCO and ECO to monitor at PEI; National Nuclear Regulator (NNR) to monitor by means of reporting system	Action: All users, D: SO&AS Monitoring: DCO; ECO; NNR	NNR to take appropriate action in case of breaches
F. Decommissioning of obsolete structures					
Safe and appropriate treatment of obsolete infrastructure; maintenance of wilderness aesthetic at the PEIs	Decommission and remove obsolete infrastructure	Design and **implement a comprehensive decommissioning and restoration plan** for redundant infrastructure, including safe shut down of facilities, dismantling of structures, removal of materials and restoration of affected vegetation communities	NDPW to submit annual decommissioning and restoration progress reports to D: SO&AS	Action: NDPW; D: SO&AS Monitoring: D: IEA, PEIAC; ECO	Inform CEC if cooperation on this matter cannot be achieved
G. Waste generated away from the research base					
Minimisation and safe handling and storage of waste away from base	Minimise pollution generated and minimise fire risk away from base; Maintain a wilderness aesthetic at the PEIs	**Do not bury or burn waste** in the field Collect, store and take photographs and GPS position of all waste found on the island	Self-regulate; Observe field activities on an *ad hoc* basis	Action: All expeditioners Monitoring: ECO; DCO/TL	Remove all ash and debris; and reiterate correct procedures and importance of these to field personnel

Goal 7-1. Appropriate and sustainable management of waste at the Prince Edward Islands					
Objective	Target	Action	Monitoring	Responsibility	Remedial action
Minimisation and safe handling and storage of waste away from base	Minimise pollution generated away from base	**Record the GPS positions of all field markers** and update this list annually; **Ensure that all field markers are removed** from the field **at the end of the research programme**	Ensure that all Group Leaders have provided the positions of new field markers by the end of the annual relief, and have indicated which old markers have been removed	Action: Group Leaders; Chief Scientist Monitoring: Chief Scientist; DCO/TL; ECO	Remove any field markers which are not on the list
Minimisation and safe handling and storage of waste away from base	Minimise pollution at field huts	**Place food waste** or 'slop' (excluding bones) **in hut toilets**, or carry back to base	Observe activities at huts on an *ad hoc* basis, but especially during the annual relief	Action: All expeditioners Monitoring: Overwintering team members; Group leaders; ECO	Inform expeditioners of correct procedures and the importance of following these; Inform D: SO&AS of repeated breaches
Minimisation and safe handling and storage of waste away from base	Minimise generation of bio-hazardous (high risk) waste at field huts	**Do not take uncooked meat, fish, chicken or egg products to huts**	Observe activities at huts on an *ad hoc* basis, but especially during the annual relief	Action: All expeditioners; D: SO&AS Monitoring: Overwintering team members; Group leaders; ECO	Containerise any bio-hazardous waste found at the huts, and return to base for freezing; Once origin of waste ascertained, D: SO&AS to follow up with appropriate penalties
Minimisation and safe handling and storage of waste away from base	Minimise waste accumulation at field huts	Wherever possible, **carry out all bones, paper, cardboard, batteries etc.** and enter into base waste stream	Observe activities at huts on an *ad hoc* basis, but especially during the annual relief	Action: All expeditioners Monitoring: Overwintering team members; Group leaders; ECO	Inform expeditioners of correct procedures and the importance of following these ; Inform D: SO&AS of repeated breaches

Goal 7-1. Appropriate and sustainable management of waste at the Prince Edward Islands					
Objective	Target	Action	Monitoring	Responsibility	Remedial action
Minimisation and safe handling and storage of waste away from base	Maximise recycling at field huts	**Rinse cans and bottles** and place in hut waste bins	Observe activities at the huts on an *ad hoc* basis, but especially during the annual relief	Action: All expeditioners Monitoring: Overwintering team members; Group leaders; ECO	Inform expeditioners of correct procedures and the importance of following these ; Inform D: SO&AS of repeated breaches
Minimisation and safe handling and storage of waste away from base	Safe storage and handling of sewage at field huts	**Decommission** and close or, where possible, remove contents of **all pit toilets;** R**eplace** with removable bucket or alternative system	Report annually to D: SO&AS	Action: DAI, Overwintering team members or other expeditioners Monitoring: ECO, TL/DCO; PEIAC	Annual reporting by D: SO&AS to DEA DG to point out lack of action
Minimisation and safe handling and storage of waste away from base	Safe storage and handling of sewage at field huts	**Replace hut toilet containers at least once per year**, whether full or not	Ensure that relief schedule accommodates resupply and waste removal at all huts	Action: DCO Monitoring: ECO	Remove waste at earliest opportunity
H. Waste generated on Prince Edward Island					
Maximally apply waste management policy	Strict adherence to specific waste management procedures	**Adhere to all waste management procedures** (refer to Chapter 7: 'Waste Management')	Inspect waste management practices of expedition personnel throughout duration of expedition	Action: All expeditioners Monitoring: Expedition Leader (EL); ECO	If waste management procedures are found to have been overlooked, implement these immediately; Immediately clean up any resulting damage and restore the area as possible within the period of the visit; Report incidents to D: SO&AS

Goal 7-1. Appropriate and sustainable management of waste at the Prince Edward Islands					
Objective	Target	Action	Monitoring	Responsibility	Remedial action
Prevent the disposal of any waste on Prince Edward Island	Minimisation of pollution generated at Prince Edward Island	**Remove excess and loose packaging** from food supplies before departure for the island; do not take small articles of packaging ashore	Check all food supplies prior to departure for the island	Action: All expeditioners Monitoring: EL; ECO	If excess packaging is found on the island, remove from supplies and store securely with other waste
Prevent the disposal of any waste on Prince Edward Island	Maximise recycling and safe storage and handling of waste on Prince Edward Island	**Separate all waste** into sealed containers **and store out of contact** with soil, vegetation and the elements	Check camping sites daily to ensure that all waste is secured as prescribed	Action: All expeditioners Monitoring: EL; ECO	Inform D: SO&AS as soon as possible of failure of waste control methods; D: SO&AS may revoke permits of parties responsible or refuse future visits
Prevent the disposal of any waste on Prince Edward Island	No waste left on Prince Edward Island	**Remove all waste** from the island	Thoroughly inspect camp sites prior to departure	Action: All expeditioners Monitoring: EL; ECO	Expedition party may not leave before all waste has been removed; Inform D: SO&AS of any breaches
Prevent the disposal of any waste on Prince Edward Island	Minimise impact of grey water waste on Prince Edward Island	**Deposit grey water** well **below the high water mark** (where possible at coastal areas) **or remove it** from the island (inland areas)	Self regulate; EL/ECO to raise awareness	Action: All expeditioners Monitoring: EL; ECO	Report any breaches to D: SO&AS

Goal 7-1. Appropriate and sustainable management of waste at the Prince Edward Islands					
Objective	Target	Action	Monitoring	Responsibility	Remedial action
Prevent the disposal of any waste on Prince Edward Island	Minimise impact of grey water and sewage waste on Prince Edward Island	As it is produced, **containerise** and secure **grey water** (produced inland) **and sewage (excluding urine)**, remove it from the island and enter into vessel waste stream	Self regulate; EL/ECO to raise awareness	Action: All expeditioners Monitoring: EL; ECO	Report any breaches to D: SO&AS~~I~~
F. Waste returned to South Africa					
Direct as much as possible of the waste generated by human activities at the PEIs into the waste stream of the mainland	Safe and organised transport of waste to facilitate disposal on the mainland	**Seal waste containers** to be transported; do not transport loose bags of waste	Check all waste destined for the mainland before loading onto the ship	Action: All expeditioners involved in cargo operations Monitoring: DCO/TL; ECO; Ship's Master	Re-pack waste containers before loading onto ship
Direct as much as possible of the waste generated by human activities at the PEIs into the waste stream of the mainland	Safe and organised transport of waste to facilitate disposal on the mainland	Clearly mark all waste containers bound for South Africa in the manner described in this management plan and in accordance with any instruction issued by the DCO or Ship's Master	Check all waste destined for the mainland before loading onto the ship	Action: All expeditioners involved in cargo operations Monitoring: DCO/TL; ECO; Ship's Master	Re-label waste containers before loading onto ship
Direct as much as possible of the waste generated by human activities at the PEIs into the waste stream of the mainland	Proper disposal of waste upon return to SA	**Make arrangements with a registered waste disposal company** to collect all ship and PEIs' waste from the harbour once supply vessel returns to SA	Observe offloading process on the mainland	Action: D: SO&AS Monitoring: D: SO&AS, Store manager	Take up matter with D: SO&AS

Goal 7-1. Appropriate and sustainable management of waste at the Prince Edward Islands					
Objective	Target	Action	Monitoring	Responsibility	Remedial action
Direct as much as possible of the waste generated by human activities at the PEIs into the waste stream of the mainland	Waste enters the waste stream in SA in the appropriate manner	Upon return to SA, only **offload waste containers onto the vehicles of the waste disposal company** and not onto the wharf	Monitor unloading of ship and collection of waste at the harbour	Action: Waste disposal company; vessel operator; Ship's Master Monitoring: D: SO&AS	D: SO&AS to renegotiate contract with vessel operator and waste disposal company
K. Disaster response procedures: Refer to Chapter 5, Goal 5-3					

APPENDIX

Appendix

All documents are available from Department of Environmental Affairs: Directorate: Southern Oceans and Antarctic Support telephone +27 21 405-9405.

1. General documents

1.1 CIB (2010) Preliminary report: decommissioning of old base, Marion Island. Unpublished report, DST-NRF Centre of Excellence for Invasion Biology, University of Stellenbosch. Pp. 23 .

1.2 Cooper, J. (2009) Country clean-ups at Marion Island: sites for action in April-May 2009. Unpublished report, DST-NRF Centre of Excellence for Invasion Biology, University of Stellenbosch. Pp. 5.

1.3 Cooper, J. & de Villiers, M.S. (2010) Protecting the history of 'Snoektown Settlement": a first descriptive list of historical objects present above Transvaal Cove, Marion Island. Unpublished report, DST-NRF Centre of Excellence for Invasion Biology, University of Stellenbosch. Pp. 8.

1.4 DST (2004) Antarctic Research Strategy for South Africa. Unpublished report, South African Department of Science and Technology. Pp. 20.

1.5 SANAP (2005) Filming Policy: Prince Edward Islands. Internal document, South African National Antarctic Programme, Department of Environmental Affairs. Pp. 3.

1.6 SANAP (2009) Voyage participants: gear checks. Internal document, South African National Antarctic Programme, Department of Environmental Affairs. Pp. 3.

2. SANAP Forms

2.1 Application for Filming on the Prince Edward Islands.

2.2 Conservation Certificate (addendum to SANAP 3 form).

2.3 Ethical Requirements for Research on Vertebrates.

2.4 Permit Application.

2.5 Questionnaire to be completed by Institutions requesting Export of Antarctic and Sub-Antarctic Fauna from Marion Island.

2.6 Voyage participation details (SANAP 3 form).

3. SANAP Duty sheets

3.1 Duties of the Department's Departmental Co-ordinating Officer (DCO) to Antarctica, Marion and Gough Islands.

3.2 Duty Sheet: Directorate: Integrated Environmental Authorities Environmental Control Officer.

3.3 Duty Sheet: Chief Scientists.

3.4 Duty Statement: Team Leader.

3.5 Duty Statement: Team Environmental Control Officer.