25th Prince Edward Islands Management Committee Meeting

7 November 2008

environment & tourism

Department:
Environmental Affairs and Tourism
REPUBLIC OF SOUTH AFRICA

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25 August 2008

Mr John Cooper
Avian Demography Unit
University of Cape Town
RONDEBOSCH
7701

Dear Mr Cooper

PRINCE EDWARD ISLANDS MANAGEMENT COMMITTEE (PEIMC)

Thank you for availing yourself to serve for an additional period on the PEIMC.

It is my pleasure therefore, to invite you to serve as a co-opt member of the PEIMC for a further period of six months as from 1 July to 31 December 2008.

The first meeting of the new PEIMC will be held end October/beginning November 2008.

I look forward to a fruitful association with you as a co-opt member of this committee.

Your contribution and commitment to the conservation of the Islands are appreciated.

Yours sincerely

MS NOSIPHO JEZILE-NGCABA
DIRECTOR-GENERAL

Rec. 31.08.08

environment
& tourism

Department:
Environmental Affairs and Tourism
REPUBLIC OF SOUTH AFRICA

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Mr J Cooper
CORE Initiatives
9 Weltevreden Ave
RONDEBOSCH
7701

27 October 2008

Dear John

PRINCE EDWARD ISLANDS MANAGEMENT COMMITTEE (PEIMC) MEETING:
7 NOVEMBER 2008 (09:30)

1. Enclosed for your information, please find the documentation (including agenda, time and venue) for the above-mentioned meeting. It would be much appreciated if you could kindly go through these documents in detail prior to the meeting.

2. Should you have any queries, you are welcome to contact me.

3. Looking forward to seeing you on 7 November.

Kind regards

Kusi Ngxabani-Tikana
for DIRECTOR-GENERAL

CONSERVATION REPORT

MARION ISLAND TAKE-OVER, MARCH-MAY 2008

John Cooper

Co-opted Member, Prince Edward Islands Management Committee
c/o CORE Initiatives, 9 Weltevreden Avenue, Rondebosch 7700, South Africa
(john.cooper@uct.ac.za)

Chant for Olga

Olga is a strong girl
When Olga says jump out, you must all jump out
When Olga says watch my blades, you must all watch her blades
Olga does not argue, you must all do as she says
Just like in Mother Russia

Flying to Katedraalkrans in a Kamov KA-32A, *Marion Island, 03 April 2008*

A job well done by the NDPW. The new Watertunnel Stream Field Hut, photographed on 17 April 2008 by John Cooper.

Introduction

I was appointed Relief Conservation Officer for the 2008 take-over at Marion Island by the Prince Edward Islands Management Committee at its 24th meeting, held on 4 March 2008. I accompanied the relief expedition over the period 26 March to 30 April, spending the period 31 March to 25 April ashore on Marion Island.

Unlike in previous years when I have filled this role, a Project Environmental Officer (Carol Jacobs (CAJ) of DEAT) also accompanied the takeover. This led to an amicable and fruitful sharing of duties, so that our separate reports are best read together (which also contain two duplicated appendices that we produced in concert).

Environmental education issues and permits

1. The various permits approved by the Prince Edward Islands Management Committee (PEIMC) at its March 2008 meeting were handed out to group leaders on the southward voyage by CAJ. In discussions with group leaders it was ascertained that several required permits had not been issued and these were requested to be faxed to the ship or to the island. The missing permits were received after arrival at the island and handed out to their respective group leaders. It is recommended that the new combined permit for each project (as appended to the new management plan, still to be formally adopted) be used from now on, for both relief and annual teams.

2. Copies of the islands' management plan and visitors' guide were available in the ship's passenger lounge on the southward voyage for consultation by passengers.

3. During the southward voyage an illustrated talk on conservation issues at the Prince Edward Islands was given in the passenger lounge by CAJ. Attendance was compulsory to all personnel intending to go ashore. Topics covered included permit zoning, alien biota and quarantine measures, disturbance to biota, littering, "night bird strikes" and the need for drawing blinds at dusk, and "souveniring". Notice was given of the forthcoming "boot-washing ceremony" and that attendance was compulsory for all those intending to go ashore.

Quarantine and alien introduction issues

<u>SANAP East Pier facilities</u>

Clothing store

Inspected on 25 March and found to be clean with no traces of food wastes or cobwebs. The windows were closed. No rodent or invertebrate poison bait stations/sticky traps were present, despite previous recommendations.

Food packing section

Inspected on 18, 20 and 25 March when packing was underway. The same spilled Rice Krispies were present on the floor on all three days, showing that no proper attempt had been made to clean up spilled food over a seven-day period. The section

was closed on 26 March so it is not known whether the spilled food had been removed before the ship sailed that day. No rodent or invertebrate stations were present, despite previous recommendations. On 18 March two windows were open. No cobwebs or spiders were seen.

Main ground floor area

At least two roller doors were open each day during inspections on 18, 20, 25 and 26 March. Three unsealed rubbish containers (a cardboard box, paper sack and plastic bin) were present at ground level containing food remains on all days. On 26 March one of these containers released a cloud of "fruit flies" (50+?) when inspected. Other unpacked/exposed food items seen on at least one day included wrapped chocolate bars and an apple core. An open shipping-type container with shelves containing dried food had exposed packets of Smash at ground level on 18 March, easily accessible to rodents. This container smelt of rotten milk.

It is strongly recommended that no food be allowed to be consumed over the whole of the ground floor outside the pantry (whose door should be kept closed when not in use), and that proper and sufficient waste bins with close-fitting lids and plastic liners be provided and serviced daily. On the plus side all rodent traps had been serviced recently (27 February) and no cobwebs or spiders were seen, although three dead crickets *Gryllus bimaculatus* were found on 18 March. Windows and doors should be kept closed or mosquito mesh should be fitted to windows as previously recommended.

It is recommended that SANAP staff responsible for the ground-floor packing operation be given a motivational lecture/course at least once a year on why and how the facility should be kept pest-free. Further, senior/management staff within SANAP should make their own unannounced spot checks at irregular intervals (but at least monthly) to ensure adequate quarantine procedures and practices are being kept up.

Lastly, an environmental audit of the East Pier facilities and procedures by a person experienced/qualified in quarantine procedures and practices would be very helpful.

Titan helicopter facilities

The two helicopters were already aboard the ship on the day planned for inspection (25 April) so no site visit was made. The on-board helicopters were inspected and found to be clean, prior to their use at Marion Island. However, the *Kamov*'s two blade boxes had previously been stored at the Titan facility at Newlands Forest, and probably as a consequence were found to contain dried plant material and a long-dead gecko. On request, the boxes were vacuumed before sailing.

NDPW facilities

No site-inspection was made as no NDPW team participated in the outward voyage.

S.A. Agulhas

The ship was inspected on 25 March. Rat guards were present on all mooring lines, although not all were deemed fully functional. A useful improvement whereby some guards were affixed with suspended weights to keep them from rotating was noted. The "Viper" light-attracting sticky traps were all in operation (but there is still only one at the back of the hangar despite previous recommendations). The presence of sticky traps for crawling invertebrates in many spaces (hangar, galley, messes, lounges) was noted with appreciation.

Mouldy/rotten vegetables were being removed from the ship's cool room at the time of inspection. One open pocket contained very old and growing potatoes from which many "fruit flies" emerged. Discarded vegetables had been dumped in and on the ground next to an open overflowing skip on East Pier opposite the ship – an attraction to rodents. This skip was still present on the day of sailing. It is recommended that only closable skips, with sufficient storage space be made available for this purpose. Skips should be kept closed at all times when not actually in use, especially overnight, and full skips should be removed – and replaced with empty ones – timeously.

Thirty glue boards were placed on the mooring lines by SWAT Pest Control & Hygiene Services (Service Report No. 13566) on 19 March 2008. The ship's three holds were fumigated by spraying and fogging on 26 March against "general pest" using Dursban L4911 and Mill-Fog L3683 (Service Report No. 13568). Copies of these certificates are available on request.

Shortly before sailing from Cape Town a mouse was seen aboard the ship, thought to have been brought back from Marion Island in waste/packing materials earlier in the month. As a consequence the ship is to be fumigated on its return to Cape Town from the relief voyage.

Boot-washing Ceremony

The "Boot-washing Ceremony" was held on 30 March on the southward voyage. All shore-based personnel as well as ship-based passengers (ship-based scientists, helicopter crew and medical doctor) and prospective shore-going crew attended with their protective clothing, issue fleece jackets, used socks, foot wear, back and day packs, camera/video bags, walking sticks/crooks and tripods, and signed the register. Plant and other material found was retained for possible identification by Jen Lee (University of Stellenbosch). It is strongly recommended that used over-trousers with Velcro on their cuffs be no longer issued, since, as in previous years, these contained much plant material.. Footwear was scrubbed in a commercial bleach (sodium hypochlorite) solution.

Invertebrates seen on the southward journey

No live invertebrates were seen aboard ship on the southward journey.

Inspections of landed cargo

All SANAP shipping containers (including those containing frozen food) were inspected during opening and unpacking ashore. An indigenous spider was seen in one container that had spent time on the island before being sent to the ship to load

frozen food. Another container contained a small rock, thought to be of Antarctic (SANAE) origin. All other containers were found to be clean on emptying and devoid of visible alien plant or animal material.

All containers ashore were unpacked from the top, and not via side panels, as a precautionary measure to make it less likely for any pests (invertebrate or mammalian) that might have been present to escape.

Eradication and control of alien species ashore

On the island mice were able to gain access to the *Eurocopter* (in which one was trapped) while it was within the hangar. Careful consideration needs to be given to how both the hangar and helicopters used at the island can be made mouse-tight. In the interim poison-bait stations should be set in the hangar during reliefs and regular daily snap-trapping undertaken. This is important so as to help keep the *S.A. Agulhas* rodent-free.. In this regard a "back-loading procedure" needs to be developed.

A search for the alien isopod *Porcellio scaber* within its known distribution in Zone 1 on 23 April yielded five specimens. No evidence of spread was noted. Monthly searches and collections by the M65 entomologist aided by the M65 Team Conservation Officer will continue in 2008/09.

The alien Couch Grass *Agropyron [=Elytrigia] repens*, occurring in a single patch at Ship's Cove at 46° 51.314'S, 37° 50.595'E; 66 m, was inspected on 9 April in the presence of the M65 Team Conservation Officer (TCO) and found to be growing luxuriantly. No significant signs of spread were noticed, however, and the boundary markers were still in place. It was ascertained that the plant had not been sprayed by the M64 TCO in the previous 12 months. A summer spraying schedule was then set up (see Appendix 1), but a critical shortage of herbicide (Glyphosate 360) on the island will hamper treatment. At least 40 l of herbicide should be sent to the island at the first opportunity.

Several patches of *Agrostis gigantea* plants were found (and marked out) on the steep slope below the diesel tanks towards Gentoo Lake in early April by Justine Shaw. This area is thought to be outside the area sprayed in the past. Plants from six patches on the slope were dug out, bagged into eight boxes and placed in a container on 23 April. The container was flown to the ship on 25 April and the grass and soil were dumped at sea on the return voyage to Cape Town on 28 April near 39° 09S, 26° 22'E. Several much larger patches found at the bottom of the slope on 23 April were bounded by four marker poles. It is intended all the known patches (including form where plants were removed) will be sprayed with herbicide from August 2008 to March 2009 (see Appendix 1).

The patch of *Luzula* near Sealer's Cave was shown to the M65 TCO and CAJ by Steve Chown and its boundaries marked out with plastic poles. The TCO will monitor the site for any signs of spread and request team members not to walk though it.

The as-yet unidentified thorny plant in the south-east of the island was visited by Valdon Smith and parts removed (but for which no permit was requested from or

issued by the PEIMC) in the hope that they would flower back in South Africa and thus allow specific identification. It is not yet known if this plant arrived naturally on the island or was introduced. In future, a permit must be issued before further collections are undertaken.

I formed the impression that the alien plants *Sagina procumbens* and *Cerastium fontanum* were both more abundant, more widespread and occurred in more habitats than in 2006 and previous years. Their current distribution has been studied by University of Stellenbosch researchers and will be reported on elsewhere.

No fresh fruit, vegetables or other plant material were observed to have been brought ashore from the ship. Frozen poultry waste (including egg shells) meat bones and dried fruit/olive pips were flown to the ship in sealed plastic bins in SANAP containers for return to South Africa. During the takeover sorting and disposal of food wastes was in the main conducted adequately. Dumping of unmacerated food wastes other than poultry products meat bones and fruit pips at sea from Gunner's Point (after dusk) is still currently practiced during takeovers on a daily basis – leading to the close-by presence of numbers of scavenging giant petrels *Macronectes* sp., even on dark nights. However, the new base has been fitted with a macerator that should result in only small particles (<? mm) of waste food (but still not poultry products) entering the sea via the combined waste-water/sewage system.

Hut inspections

All eight coastal field huts were visited by helicopter on 7 April as part of a four-person inspection team, and again on foot during a round-island trip, when all but one of the old hut sites were also visited (see Appendix 2). The inland hut at Katedraalkrans was also visited overnight on foot. In the main, hut surrounds were tidy and it is clear that the NDPW had done a sterling job in removing the old huts and meticulously clearing the old hut sites. In some cases all the support poles were removed (as the helicopter lifted the hut and platform in one unit!) and only one cut pole was seen: at Repetto's Hill Hut.

Serious problems (ecological, inadequate capacity, safety, comfort, hygiene and lastly privacy) with the new 20-l bucket system installed during hut restocking at most of the new field huts is discussed in detail in Appendix 3 where solutions are proposed. In summary, these are the temporary reversion to the open-air earth toilets in 2008/09 and the provision of enclosed, weather-proof barrel toilets fitted to the hut cat walks as soon as is feasible, along with the provision of a suitable disinfecting agent.

During over-night stays in huts it became obvious that not all relief users were familiar with waste-treatment (and other) practices and procedures adopted in the past. Thus a general procedures document (see Appendix 4) was drafted by CAJ with input from myself and several long-time hut users and then approved by the Chief Shore Scientist and the DCO. The final version was laminated in sufficient numbers to be placed in all huts by the M65 Team.

*

Most coastal field huts would benefit by the placement of additional (one to three) grating sections on the ground immediately below and/or adjacent to the access steps,

to reduce the effects of trampling. It is recommended that this be undertaken during the 2009 relief. Priority huts (with the suggested numbers of required grating sections in parentheses) are Repetto's Hill (1), Cape Davis (3), Mixed Pickle (1) and Swartkop Point (3). In the interim it is recommended that hut users gain access to the raised hut catwalks via the driest routes, which are not always via the steps.

O n two occasions I inspected the nine field hut containers near the E-Base while new items were added to them. No aliens were seen. However, these containers had been sitting on planks in the mire for at least a week before they were flown to the huts on 8 and 9 April. This runs the risk of transporting only locally-distributed aliens (such as the isopod) farther afield (as is thought aided the distribution of the alien slug). In future, hut containers should have their exteriors hosed down before lifting to huts.

Disturbance, light pollution and permit zone transgressions

A M65 Team Member was observed from the Base photographing displaying Wandering Albatrosses at very close (<5 m) range. He was approached and requested to desist and also to make himself familiar with the minimum approach distances as set out for the various forms of wildlife in the management plan. Because he was suitably apologetic the matter was not taken further, other than reporting back to the Chief Shore Scientist and PEO..

Black-out blinds were kept closed at nights at the Base (but not at the new base – whose blinds of the slatted type seemed inadequate for their required purpose). The new base surrounds were inspected with CAJ on a foggy night but no birds were seen. On this occasion all non-essential lights were switched off and blinds closed at our request. No bird strikes, including from meteorological equipment, were observed or reported ashore during the take-over period. The new field huts and pantries have been fitted with adequate blinds.

No transgressions of zonation permits were observed or reported during the relief.

The mire run and initiation ceremony on 19 April resulted in a certain level of unnecessary trampling to two sites with natural vegetation (one hitherto little disturbed) near the Base in Zone 1. Thought should be taken how these activities can take place in a more-environmentally friendly manner in 2009.

A large sign post (here illustrated) with eight "home-made" locality and distance boards attached has been erected since April 2006 alongside the path through Santa Rosa Valley (Zone 3) at the site where similar, but dilapidated, sign boards were removed (except for the upright post) by myself in 2005. The highest (well-made) board purports to justify the new erection as a memorial to the undoubtedly excellent work undertaken by the cat hunters in previous years. Lower (and presumably more recently added) sign boards of varying quality of manufacture include such as "Harrismith" and "Vaalwater", for which there is no obvious connection to the island. It is clear (to me at least) that this is an unauthorized structure in terms of the islands' management plan. However, opinions on the island differed as to whether it should be removed (and a suitable memorial to the cat eradication team perhaps erected in the new base instead) or whether it should be left untouched as a "historical" artifact

(despite its recent manufacture). It was therefore left in place. The matter of its future is here referred to the Management Committee for a recommendation. If it is to be left in place (which is not my own view), I deem it highly critical that such a decision is not to be seen in any way as a precedent for the erection of further unauthorized private/personal memorials (or any indeed any unauthorized structures of any type) anywhere at the Prince Edward Islands.

Sign board in Santa Rosa Valley, photographed on 16 April 2008, by John Cooper

Littering, waste treatment, pollution and rubble issues

Very few signs of littering were observed, around the two bases, field huts, and elsewhere. About five cigarette butts were found below windows ands near buildings of the old base.

Domestic waste treatment was not very well handled during the relief. The "blikkies kamer" became overfull on a near-daily basis and placing recyclable waste in the correct containers often became well-nigh impossible as a consequence. In mitigation the facilities provided were much too small for the amount of waste generated by the large number of people present on the island, but the institution of daily removals of domestic waste to the designated containers would have largely solved the problem.

Unfortunately, the incinerator was not emptied of its large load of ash during the last day's "chicken run" clean up.

Detailed information on "country clean-ups" is given in Appendix 2. A total of three and a quarter tonnes (3220 kg) of assorted waste and rubble (not including domestic waste generated by the Base or at field huts) was collected and removed from the island in four containers and one net. A successful "chicken run" around the old base environs and construction site was undertaken on 25 April, but, as seems usual, was not fully supported by everyone due to conflicting back loading needs on the day (which was also the day of departure from the island).

Despite repeated recommendations to the Management Committee to halt incineration at Marion Island, paper and cardboard continue to be burnt on the island in an inadequate incinerator that releases partially-burnt paper and ash as well as copious smoke and a burning plastic smell into the atmosphere. Given that at the Gough Island and SANAE 4 bases recycling back to South Africa of all these items (plus waste wood) has worked efficiently for a number of years, it is considered embarrassing that such a procedure has not yet been adopted at South Africa's only Special Nature Reserve. However, the M65 Team Leader has agreed to trial the halting of incineration and the collection of waste cardboard and paper for as long as sufficient storage space exists on the island. In future sufficient empty containers should be left behind each year for the purpose.

I regard the apparent decision to include a large(?) incinerator in the new base as a retrograde step, and suggest that only a small, high-temperature incinerator be

supplied, for the on-site disposal of biologically hazardous waste (such as medical and sanitary items). A compactor has already been fitted in the new base for the efficient compaction of recyclable wastes (e.g. cardboard, plastics, metal cans, etc.).

The use of toilet-cleaning chemicals that deliver a dose at every flush (e.g. Bloo, active ingredient 0.2% m/m Orthobenzylparachlorophenol) should be discontinued as an unnecessary source of marine pollution. This recommendation has been made in previous years but has yet been adopted despite endorsement by the PEIMC. However, the M65 Team Leader has expressed willingness to halt their use.

Further consideration should also be given to discontinuing the use of fabric softener (which is anyway not good for many modern outdoor clothing items worn at the island, some of which remain SANAP property) and of aerosol fresheners, and changing to biodegradable cleaning agents – as has been previously recommended on several occasions.

Efforts were made to remove expired/dangerous/unwanted chemicals (such as Formalin) from laboratories and return them to South Africa.

Field markers

Information (GPS positions, marker descriptions, etc.) on new and defunct study sites was requested from project leaders on the return voyage, in order to update the 2006 list (see Appendix 5). This will enable the removal by Relief Conservation Officers of those markers from studies no longer extant on an annual basis, but only following consultation with Project Leaders in the field (see also Appendix 2).

Fuel pumping

A total of 149 000 l of fuel (polar diesel) was pumped ashore on 2 April over a period of approximately seven hours. No leaks were observed or reported.

New base

The surrounds of the new base site were visited on 1 and 2 April in the presence of CAJ. Very little litter was seen and most unused materials had been removed for temporary storage on catwalks. Later in the takeover most of the remaining items (notably also the surplus water pipe sections from behind the hangar) were removed from the vegetation. Most of the affected patches of ground showed recovery of the vegetation, with the alien Procumbent Pearlwort *Sagina procumbens* being notable. A clean-up of two old dump sites close to the new base was organized by CAJ on 20 April and *c.* 375 kg of burnt material and contaminated soil was boxed and removed (see Appendix 2). Exposure of fresh ground should hopefully allow these sites to revegetate in time. More information on new base issues will appear in the report of the Project Environmental Officer.

Historical conservation

The collection of historical artefacts stored in a designated cupboard in the Lower General Purpose Laboratory was found to be in good order since I last checked it in 2006 (although one item could not be found, see Appendix 6). A South African Breweries beer bottle and a short section of green-painted Oregon pine cladding labelled "MARIO" in yellow, believed to be from or about the time of annexation, were added to the collection). These two items were found on the ground where the food store used to be. All items are individually labelled with their provenance as far as possible.

An additional item recovered from the general vicinity of the second highest point on the island, now renamed Resolution Peak in March/April 2007 is a doubled-over piece of copper(?) sheeting with "JAN SMUTS PEAK" punched into it with a square nail. This item is considered to be of major importance and was photographed in the hope something might be learnt about its manufacture and erection. An annotated list of the *c.* 50 items in the collection is provided in Appendix 6.

Most of the bones of a sheep were photographed near Karookop at 46° 57.101 S, 37° 46.712'E; 563 m on 17 April. It is recommended that these bones be left in place and undisturbed as an item of historical interest.

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ACKNOWLEDGEMENTS

Grateful thanks are due to Oskar Berg, Adam Bumby, Steve Chown, Linda Clokie, Carl Jacobs, Petrus Kritzinger, Godfrey Magagula, Trevor McIntyre, Rulene Peens, Justine Shaw, Helga Stassen, Venessa Strauss, Gideon van Zyl and Shiraan Watson for their help with the "country clean-ups". The Titan helicopter team functioned in a professional and helpful manner at all times. Jacques Burgers, Marion 64 Team Leader and Petrus Kritzinger, Marion 65 Team Leader were helpful in numerous ways. Adriaan Dreyer and Shiraan Watson are to be congratulated on running an efficient and pleasant take-over. Lastly, but not least, I thank Carol Jacobs for her valued inputs to this report and for helping to conserve the Prince Edward Islands.

MAIN RECOMMENDATIONS

1. Proper quarantine procedures need to be adopted at the SANAP ground-floor packing facilities at East Pier, including avoiding consumption of food, immediately cleaning up any spilled food during packing and providing proper containers with close-fitting lids for rubbish. Only closable skips with sufficient capacity should be supplied to the East Pier. Skips should be kept closed at all times, especially overnight. Full skips should be removed. An environmental audit of the East Pier facility is suggested.

2. Only over-trousers without Velcro on their ankle cuffs should be issued.

3. The new combined permit for each project should be used from now on, for both relief and annual teams. These should be supplied in multiple copies for distribution aboard ship.

4. Protocols for keeping the island hangar and island-based helicopters mouse-free and for back-loading cargo need to developed and adopted.

5. More herbicide needs to be sent to the island at the first opportunity to allow existing plant-eradication exercises to continue in a proper manner over the coming summer.

6. "Country clean-ups" should continue during the 2009 relief voyage, with helicopter support as necessary, as summarized in Appendix 2.

7. A decision should be made by the Management Committee on whether the unauthorized Santa Rosa signboard should be removed or not.

8. Paper and cardboard should be recycled, and incineration should be halted, as has been previously recommended.

9. A permanent solution to the disposal of human wastes at field huts, in keeping with the modern huts, needs to be developed and implemented in 2009.

10. Additional grating sections should be placed on the ground at most of the coastal field huts to reduce trampling.

11. All new field study sites should continue to be plotted and their GPS and site-marker information made available to the Management Committee. All non-registered/defunct field markers should continue to be removed once a year by Project Leaders and the Relief Conservation Officer.

12. An Environmental Impact Assessment (EIA) process for decommissioning and removing the current base and remaining hydroelectric structures and rehabilitating their sites is now due, following previous recommendations in Conservation Officer reports and by the PEIMC. The PEIMC (or its replacement) should be fully involved with this process.

Note: Further recommendations of a less important nature, or ones that are already being acted upon, are given in the main body of the text.

APPENDIX 1

DUTY STATEMENT: TEAM CONSERVATION OFFICER (TCO) – 2008/09

GENERAL

The TCO is responsible for all conservation issues on Marion Island during the over-wintering period, and decisions regarding such issues are made in conjunction with the Team Leader. All regulations pertaining to the Prince Edward Islands, which have been declared a Special Nature Reserve, are included in the Prince Edward Islands Management Plan (PEIMP) and an amendment concerning visits by non-DEAT (Department of Environmental Affairs and Tourism) vessels to Marion Island. There is also a variety of policy documents that pertain to environmental management at Marion Island. These can be obtained from DEAT. The PEIMP and its provisions are legally binding under the Environment Conservation Act (ECA), as well as the National Environmental Management Act (NEMA), the National Environmental Management Biodiversity Act (NEMBA) and the National Environmental Management Protected Areas Act (NEMPA). In the case of an emergency situation, where the regulations in the PEIMP were not adhered to, the Chair of the PEIMC must be notified in writing within 24 hours.

A comprehensive conservation report must be submitted to the PEIMC Chair on a monthly basis. The PEIMC Chair and/or the committee will provide responses to the issues that are raised. The current Chair of the PEIMC is Mr Henry Valentine (Tel: 021 405 9404, Cell: 083 306 7084, E-mail: hvalentine@deat.gov.za).

RELIEF DUTIES

The incoming TCO is to liaise closely with the outgoing TCO, and the relief CO (RCO). In conjunction, these three COs are responsible for conservation issues at the Prince Edward Islands during the relief period. All decisions must be discussed with both Team Leaders and the DEAT Coordinating Officer (DCO) of the voyage. The following specific duties are to be carried out:

INCOMING TCO:

1. Inspection of the *SA Agulhas*, together with the RCO, to ensure that the Master has rodent-free and fumigation certificates, that rat-guards are present on all mooring lines (this also to be done on return to South Africa), and that propagules are reduced to the minimum.
2. Inspect containers during packing of team's personal gear at the SANAP East Pier Store.

INCOMING & OUTGOING TCO:

3. Inspection of Zone 1, at the start of the relief, with the various Group Leaders to ensure that the base is in an acceptable condition.

4. Inspection of all food coming ashore to ensure that no fresh fruit and/or vegetable produce comes ashore, that only deboned poultry is supplied, and that eggs have been irradiated.
5. With the RCO, check all containers (not just food) during opening and unpacking to check for introduced aliens. Ensure that containers are opened from the top only for better control.
6. Monitoring of all logistic activities (such as the erection of repeater stations and the removal of waste) in Zone 3 to see that they comply with the provisions of the PEIMP.
7. Monitoring of all activities for which an Environmental Authorisation (EA) or Record of Decision (ROD) has been granted by DEAT - *(1) new Marion base and (2) field huts, (3) UKZN VLF antenna (near E-base) and ionospheric scintillation receiver (outside radio room) (RBGAN satellite communication system has been removed), and (4) UP AWS at Swartkops (if approved).*
8. Monitoring of the removal of waste, as specified by the PEIMC. Close liaison between the DCO and the Group Leader of the National Department of Public Works (NDPW) will be required.
9. Coordination and monitoring of waste separation at the base.
10. Regular discussions between scientific groups and the RCO must be held to see that scientific work does not compromise, and is not unnecessarily compromised by, the PEIMP. The TCO must see to it that permit requirements and restrictions are adhered to. This should be done in a friendly, encouraging and open fashion.
11. Inspection of Zones 1 and 2 to ensure that the correct waste disposal measures have been implemented, and that packaging materials conform to the requirements of the PEIMP.
12. Inspection of huts (including old hut scars) to ensure that waste disposal is being implemented correctly, and that site remediation is on-going.
13. GPS positions for waste, rubble, etc. in Zones 2, 3 and 4, along with a description and photographs of the item/s (if possible), should be obtained, included in the relief report and made available to the RCO.
14. Thorough inspection of all sites infested with (1) *Agrostis gigantea* and *(2) Agropyron repens,* including a report of these infestations in the monthly report *(refer to 1 and 2 of Annual Duties below).*
15. Inspection of Zone 1, in conjunction with the DCO and various Group Leaders, to ensure that litter and waste is cleared up prior to the end of the relief period.
16. Monitoring of incineration.

OUTGOING TCO:

17. Provision of an information session to all personnel on the first evening of the relief regarding the whereabouts of patches of alien plants that must be avoided, the risks of bird strikes and how to avoid these, waste management and all other provisions of the PEIMP, including codes of conduct regarding animal-approach distances, and the zoning of the Prince Edward Islands.
18. Provision of the necessary information to the helicopter crew regarding animal colonies and their proximity to areas of operation and participation in the first inspection flight around the Island to ensure that sensitive areas

are avoided *(refer to map with "no fly zones and routes")*. If a large helicopter, such as the Kamov is used, it should be conveyed to the helicopter crew that the disturbance to the environment and its fauna is much greater than when smaller helicopters are used in terms of downdraft and noise pollution, which must be borne in mind when flying.

ANNUAL DUTIES

ALIEN SPECIES

1. The sites where *Agrostis gigantea* plants (located behind the diesel tanks and down the slope on the southern side in front of the kitchen of the old base) were dug out in April 2008, and the site clearly marked with stakes, must be sprayed monthly as soon as possible and then again from August to March with *Glyphosate 360 *(refer to attached "directions for use")*, on a sunny, relatively wind-still day. Monitor the site for any new plants found and add these new sites to the spraying routine (1st priority). The team may be requested to assist. Footwear must be thoroughly cleaned afterwards with a mild solution of sodium hypochlorite (commercial bleach/Jik).
2. The sites where *Agropyron repens* plants (currently on the right hand side of the slope when descending to Ship's Cove) are present, must be clearly marked and sprayed as soon as possible and then again from August to March with *Glyphosate 360 *(refer to attached "directions for use")*, on a sunny, relatively wind-still day (2nd priority).
3. The Marion team should be made aware of the alien plants such as *Rumex acetosella* (near the base), and requested to avoid patches of these plants, and to record them where they are seen. This is especially important during takeover, when large numbers of people take short walks near the base.
4. The patch of *Luzula* near Sealer's Cave has been marked out and must be avoided.
5. Provision of a report on the types, amounts, and locality of use, of all herbicides must be provided at the end of each team year, as well as information regarding the remaining quantities and amounts to be purchased.
6. If new alien plant species are found in the base area, they must be removed before they flower, and pressed for later identification. Images should be sent to the PEIMC.
7. In terms of alien invertebrates, anything unusual, such as flying moths and butterflies, cockroaches, flies larger than 10 mm, isopods (woodlice) that are seen should be recorded (with a GPS position, if away from base) and collected, if possible. The invertebrate field assistant/s will be able to assist with this.
8. The TCO must ensure that no new alien plant and/or animal species are introduced (grown) at the base and/or to the environment.

9. Alien isopod (woodlice) in the vicinity of the base – undertake monitoring / collection / eradication, in conjunction with the invertebrate field assistant/s.
10. All vagrant bird species should be recorded (date, place, time, species, if known) and photographed, if possible.
11. Keep count of mouse-kills at base and huts, and report any other relevant information regarding the mouse problem.
12. Any environment/conservation-related problems are to be taken up with the Team Leader and managed on the Island. If there are any serious problems, they are to be channelled via the Team Leader to Mr Valentine, and copied to the Principle Investigator or employer of the person concerned.

** The Glyphosate 360 (1 container of the chemical and 2 sprayers) are located in the Bird Lab, and a 5% solution is recommended for the 2 alien plants to be sprayed (500 ml per 10 litres or 800 ml per 16-litre sprayer).*

INDIGENOUS SPECIES

1. The Marion over wintering team must be reminded to keep to the approach distances recommended, unless permit conditions specify otherwise.
2. Bird strikes at the base must be minimized by keeping outside lights off and by keeping blinds down after dark. The TCO and Team Leader are responsible for seeing to it that the Marion over wintering team is reminded to turn lights off and keep the blinds down at night.
3. Birds that have hit the base must be released once the ornithology group/s has had a chance to look at them and ring them if this is in line with their programme/s.
4. Birds found dead from unusual causes (e.g. suspected disease) should be reported (date, place, time, species).

VISITS BY SHIPS

(these responsibilities can also be undertaken by the over wintering Team Leader)

1. Visits are strictly regulated by DEAT and no unauthorized visits are allowed. The exception is in the case of life-threatening medical emergencies. In this case, DEAT must still be contacted for a list of illegal and legal fishing vessels. In all cases, the intricacies of emergencies must first be discussed with Mr Valentine.
2. All ships offloading cargo or visitors to the Island must be requested to provide rodent-free and/or fumigation certificates (except in the case of life threatening medical emergencies).
3. If visitors come ashore, their boots and protective clothing must be cleaned immediately on arrival on the Island, and inspected for propagules.
4. If cargo is delivered to the base, a person must be present at the crane, and another on Boulder Beach to keep a watch for rodents. Cargo must be unpacked in a sealed room. If a container is too large to fit into the

room, it must be inspected thoroughly first, and the TCO must search thoroughly for signs of alien propagules. The TCO must do spot-checks for the presence of ANY introduced aliens, e.g. invertebrates, seeds, etc. Cans of insecticide and sample bags should be on hand.

5. Rodent traps must be set in the room where the packages are unloaded. No unopened packages are to be removed from the sealed room.

CONTINGENCIES AND WASTE AT THE BASE

1. Decisions on environmental incidents at the base are to be made by the TCO and the Team Leader, with advice being given by the team members who have skills in the particular area.
2. If a serious environmental incident arises it must be reported to the PEIMC Chair within 24 hours, and must be included the monthly report.
3. The TCO must check all waste to see that it is being properly sorted, and that all poultry waste (including egg shells), dried fruit pips, meat bones, etc. are being frozen for return to South Africa. The Marion over wintering team should be reminded of waste treatment procedures.

OTHER ACTIVITIES ON MARION ISLAND

1. The TCO must ensure that no unauthorized structures are erected on the Island without the necessary EA or ROD granted by DEAT, in consultation with the PEIMC.
2. Provision of a report on the number, duration, and destination(s) (including hut use and/or hut nights) of all walks outside Zone 1 by members of the team over the year.

APPENDICES*

1. Prince Edward Islands Management Plan
2. Introductory Guide to Marion and Prince Edward
3. Marion map, with zones 1 – 4
4. Marion map, with no-fly zones and routes
5. New Marion base map, with safe access and walkways demarcations
6. Gear checks document
7. Glyphosate "directions for use" document
8. Copy of relevant Records of Decision (ROD) & Environmental Authorisations (EA)
9. Marion Island – Field Visits – Safety Procedures
10. Marion Huts – General Procedures
11. Marion Huts – Gas and Generator Operations Procedures
12. Visits by ships protocol (to follow)
13. Avian cholera outbreak protocol (to follow)
14. Format for monthly reports (to follow)

*Not included here; see PEO report.

APPENDIX 2

COUNTRY CLEAN-UPS AT MARION ISLAND: ACTIVITIES DURING APRIL 2008 AND REMAINING SITES FOR ACTION IN 2009

ZONE 1 (BASE VICINITY)

Boulder Beach cleared of about 30 small pieces of wood on 2 April and other fragments (glass, plastics) on 23 April. Several concrete lumps still require removal from the beach. La Grange Villa and adjacent wooden beams suspected to be part of the island's first crane should continue to be left intact on site, at least until inspected by an archaeologist.

Three containers filled with above and other assorted rubble (wood, metal poles, bagged sand and stone chips, etc.) from around the old and new bases (especially from behind the Entomology/Physiology Laboratory and E-Base, the food store site, rotten wooden frames from disused aerial concrete blocks and from two previously-reported dump/burn sites north of the new base) over the period 3-25 April. Items collected during the "chicken run" on 25 April added to one of these containers, along with accumulated cardboard from the "blikkies kamer". Total mass (less containers) flown to ship on and before 25 April: 1570 kg.

Two sections of hydroshack power cable remain that run underneath the upper helicopter landing platform (46° 52.548'S, 37° 51.478'E; 40 m) and along the bridge over Prion Valley to the old generator shack. Removal of both sections should wait on dismantling of the old base.

Sites partially cleared

ZONE 2

DAM SITE (46° 52.536'S, 37° 49.755'E)

One orange container (M33) placed on the north bank on 2 April was half filled with stone chips on 3 April. South bank stone-chip site previously cleared of stone chips and sand to ground level is being colonized by plants, especially alien *Sagina*. The container was flown to the Base on 10 April, and later to the ship. Total mass of contents was 1420 kg. Exposed soil should now allow the north bank site to become vegetated, as is slowly happening to the south bank site cleared in 2006 and in earlier years. Both sites should be inspected in 2009 to decide whether further stone chips need to be removed.

Site adequately cleared

DAM POWER CABLE (46° 52.527'S, 37° 49.856'E; 114 m)

End of power cable below dam on south bank (G PS Code MDAMPP) was inspected on 3 April. Approximately 30 m of previously exposed cable sawn off and placed in the container at the dam on 7 April. Removal of the cable all the way to the base will require trenching in places and should ideally be undertaken as part of the decommissioning and removal of the old base.

Site partially cleared

OLD BASE WATER PIPES (46° 52.670'S, 37° 51.078'E; 51m)

Four rotten wooden frames removed from alongside the old base water pipe from the dam to Base on 3 and 7 April. One frame still attached to the water pipe left in place. Remainder of coiled water pipe from behind E-Base alongside path to Junior's Kop (dug out in 2006) removed to E-Base on 4 April. Cut end remains at the above position for later removal by trenching. Ideally this should be undertaken as part of the decommissioning and removal of the old base, when it is intended to remove all the old base's water piping running from the dam.

Site partially cleared

NEW BASE WATER PIPE (No GPS)

Inspected on 3 April along its entire length from Helicopter Hangar to Dam. About 15 half broom poles removed to dam container. Places where pipes had been cached in wooden frames found to be largely cleared of wood and vegetation seen to be recovering.

Site completely cleared

HYDRO-ELECTRIC SCHEME STRUCTURES (46° 52.186'S, 37° 50.46'E)

Three loose and unsafe wooden steps to platform and a loose piece of aluminium cladding removed to Base on 7 and 24 April. Three longer pieces of wood from the ladder placed in building well on latter date for removal in 2009, along with a long scaffolding pole. One pole (out of a total of 10) pulled out and removed to Base in two pieces from the hydro-pipe river crossing on 7 April. Places where slag and concrete blocks were removed in previous years are now completely covered by vegetation. Section of large water pipe found alongside river nearby removed to Base by Steve Chown and Justine Shaw on 18 April and later placed below Bird Lab, to be kept as a historical artifact. A plank across the river acts as safety aid when the river is in spate.

Site should be inspected regularly by the Team Conservation Officer during 2008/09 and any loose items found removed to Base.

Site partially cleared

METAL STRAP (46° 52.409'S, 37° 51.065'E; 47 m)

Metal strap remains embedded in mire. Site not checked in 2008.

ZONE 3 (EAST COAST)

CAPE DAVIS BEACH (No GPS)

Visited on 11 April. Large amounts of drift wood present. No historical items seen. No clean-up attempted. A decision is required as to whether the site should be cleaned up, in a way similar to that of Archway Bay.

CAPE DAVIS RONDAVEL SITE (46 49.729'S, 37 42.254'E; 53 m)

Site inspected on 11 April. Two exposed anchor poles still present. Aerial pole that was present in 2006 has been removed. Site well vegetated.

Site partially cleared

CAPE DAVIS SKI-CABIN SITE (46° 49.691'S, 37° 42.242'E)

Site inspected on 11 April. .The prominent hut scar has commenced to vegetate. All exposed fragments (mainly of wood) collected and added to new hut waste. Two old toilet sites clean. Four helicopter landing site markers moved to near new hut.

Site completely cleared

CAPE DAVIS HUT (46 49.690'S, 37 42.230'E; 30 m)

New hut and toilet inspected by air on 7 and on foot on 11 April. Site tidy. Note this hut is in a new position next to Wild Cat Creek. Metal pole from top of nearby Louse-Kop removed to hut.

Site completely cleared

REPETTO'S HILL HUT (46° 50.302'S, 37° 45.201'E; 79 m)

New hut inspected by air on 7 April and by foot on 10 April. Five long planks stored above ground under the new hut should be removed. New toilet site since 2006. Old toilet site overgrown and hut scar revegetating but shows signs of trampling. Solar panel frame (see below) requires removal during the 2009 relief. Bagged hut waste removed by air on 20 April.

Site partially cleared

REPETTO'S HILL (46° 50.543'S, 37° 44.770'E; 366 m)

All loose fragments and a blown-away solar panel and frame from the non-operative radio repeater station on the hill top removed to Repetto's Hill Hut on 10 April. All fixed items removed by helicopter on 20 April to Base, leaving only two base platforms and anchor stakes in place. The platforms and stakes will be removed in 2009 if no longer needed for communication purposes.

Site partially cleared

LONG RIDGE RONDAVEL SITE(46° 51.185'S, 37° 47.841'E; 61 m)

Site inspected on 10 April. Two anchor poles still visible, although site is now well vegetated.

Site partially cleared

BILL BRIGG'S BEACON AND ENVIRONS (46° 52.000'S, 37° 48.049'E; 401 m)

Removed a quantity of rusted metal fragments from Bill Briggs Beacon on 20 April. Small anchor bolt in rock remains. Removed battered sheet of corrugated steel (*ex* geomorphological experiment) from general vicinity at 46° 52.245'S, 37° 47.899'E; 315 m to Base on foot on 20 April. Two further sheeting fragments reported from nearby were not found and require removal in 2009.

Sites partially cleared

SEALER'S BEACH (46° 50.876'S, 37° 49.721'E)

Rusted 200-l drum reported on shore adjacent to the King Penguin colony. Could not be found on 4 May 2006 at the above position. No large pieces of driftwood discerned. Site not checked in 2008.

Site not cleared

SHIP'S COVE (46° 51.314'S, 37° 50.595'E)

About 10 pieces of loose driftwood removed to Base on foot on 10 April. Embedded planks and other artefacts (e.g. a piece of broken trypot, barrel stave) from the pre-annexation era should be left untouched. Two poles used in past as abseiling attachments on adjacent bluff still require removal by digging out at 46° 51.248'S, 37° 49.468'E; 50 m.

Site partially cleared

KATEDRAALKRANS HUT AND ENVIRONS (46° 53.893'S, 37° 46.483'E; 754 m)

Site inspected on 21/22 April. Fragments collected from adjacent old and new hut sites and removed to Base. Five embedded metal stakes from old hut site require removal. At the entrance to the hut site large amounts (four refuse bags, one removed to Base) of "mineral wool" insulation material were collected from the ground and from rock crevices. An unknown quantity (some then under snow) still remains.

A defunct automatic weather station tripod a hundred metres or so south/south-east of the hut among black lava requires an accurate position. A report of several (3-4?) wooden planks dropped near the hut also requires confirmation and a position.

Site partially cleared

FIRST RED HILL (46° 53.620'S, 37° 47.097'E; 651 m)

Removed large aluminium pole from top to Base on foot and left rock cairn in place on 22 April.

Site fully cleared

PIEW CRAGS (No GPS)

A braai grid and several wooden "koskassie" planks in a plastic bag removed from a cave on 6 April 2008 by Adam Bumby.

Site fully cleared

TAFELBERG (No GPS)

Three wine bottles reported as present. Not checked in 2008.

TRYPOT BEACH (No GPS)

A rusted metal pole (C. Panagis study of the 1970s) and a wooden plank removed on 6 April.

Site fully cleared

THE FAULT (46° 52.741'S, 37° 50.137'E)

Aluminium ladder fixed by rope to a pole exists as a field aid. Rusted stump of an unused pole requires removal.

MACARONI BAY BEACH (No GPS)

Site not checked in 2008.

ARCHWAY BAY VICINITY (46° 54.026'S, 37° 53.608'E; 36 m)

All visible, non-embedded pieces (*c.* 150?) of wooden planking and pieces, plywood pieces and four redundant concrete marker blocks removed to an inland cache at 46° 54.014'S, 37° 53.587'E; 42 m on 6 and 8 April 2008. It is likely that one more concrete block remains towards the colony centre. A section of tree trunk with distinctive bark patterning and a piece of shaped wood containing two large bolts (from a sailing ship?) left on site, along with some large embedded planks at the rear of the King Penguin colony.

Net dropped at the cache by helicopter on 7 April and filled ready for removal on 8 April. Flown to ship on 22 April (mass less net 230 kg).

Two embedded poles present on the cliff top *c.* 50 m north of the colony should be dug out by hand.

Site partially cleared

SOFTPLUME RIVER AT WATERFALL BEACH (46° 56.547'S, 37° 52.404'E; 12 m)

Two unfixed aluminium ladders, one on each river bank, left in place as a safety aid for crossings during spates. Inspected 18 April.

SEALER'S CAVE (No GPS)

Four poles on cliff-top support an aluminium ladder and knotted rope that allows access to the shore. Should be left in place as a safety aid, but probably not all the poles are needed.

KILDALKEY HUT AND TOILET (46° 57.291'S, 37° 51.211'E; 81 m)

New hut and toilet inspected by air on 7 April and by foot on 17 April. Two aluminium ladders placed above ground on scaffolding below hut. A few fragments and an embedded plank removed from the old hut scar, which is revegetating well. Two of three rusted fence posts (old aerial supports) dug out and six metal poles, linking wire and a wooden plank removed from both river banks. All these items (except the wire) cached on hut catwalk for removal during the 2009 relief, along with the remaining embedded fence post (on top of north bank besides path) and seven metal items from the old Snok radio repeater site (see below).

Site partially cleared

ZONE 3 (WEST AND SOUTH COASTS)

"HOOKER COVE" (No GPS)

Thick, long and heavy mooring rope coiled by "sealers" above shore-line during early April. GPS position requested from the M65 marine mammal field assistants to aid in its removal during the 2009 relief by air in a net.

SNOK (46° 56.714'S, 37° 47.006'E; 602 m)

Removed all loose items (whip aerial, two unused metal stakes, wiring, cable ties, bolts, etc.) from the old radio repeater station site on the upper southern ridge of Snok to Kildalkey Hut on 17 April. Aerial and non-metal items taken to Base on foot on 18 April, aerial kept as a possible museum item. Site of newer repeater station higher up on Snok not visited. Both sites were later visited by helicopter when a team removed all structures save the base platforms and anchor stakes. The platforms and stakes will be removed in 2009 if no longer needed for communication purposes.

BERET VICINITY (No GPS)

Partially buried piece of suspected roof cladding, suspected from an old Watertunnel Stream Hut reported in 2006. Not visited in 2008.

WATERTUNNEL STREAM HUT AND TOILET (46° 57.737'S, 37° 44.916'E; 59 m)

New hut and old toilet inspected by air on 7 April and by foot on 16 April. Old hut scar revegetating well, although shows signs of some trampling. Pulled out an old aerial support pole, dug out a buried aerial pole adjacent to the old hut scar and collected wooden and metal fragments from the scar and surrounds. Poles stored on scaffolding under hut to be removed during the 2009 relief. New wooden toilet seat flown to the hut on 23 April (see Appendix 3) when bagged hut waste was removed.

Site fully cleared

GREY-HEADED ALBATROSS RIDGE HUT, TOILET AND ENVIRONS (46° 57.710'S, 37° 42.515'E; 87 m)

New hut inspected by air on 7 April and by foot on 15/16 April.. Old hut scar revegetating. Dug out a wooden plank and collected fragments from the scar site. Dug out remaining parts of the wooden ladder at the base of the path ascending the cliff, which now has an aluminium ladder (supported by a pole) in place. Pulled out two rusty fence posts used as old aerial supports. All the above wooden items flown out by helicopter to Base on 16 April (along with all bagged hut waste), but the two fence posts and a found scaffolding pole remain at the hut for removal during the 2009 relief.

Site fully cleared

GOODHOPE BAY BEACH (No GPS)

Visited on 16 April. No driftwood present on shore and site clean.

ROOK'S PENINSULA RONDAVEL SITE (46° 57.997'S, 37° 40°.976'E; 79 m)

Eight embedded poles and buried cladding remain. Not visited on 15 April due to bad weather.

Site partially cleared

ROOK'S BAY HUT AND TOILET SITES (46° 58.022'S, 37° 39.603'E; 65 m)

New hut inspected by air on 7 April and on foot on 14/15 April. Eight wooden planks and wooden fragments removed from two old toilet sites and cached at hut require removal during the 2009 relief. A few wooden and plastic fragments picked up from around the hut added to the hut waste.

Site fully cleared

LE GRANGE KOP (46° 56.828'S, 37° 35.701; 183 m)

Rusted stump of metal pole on eastern ridge *c.* 50 m from top, inspected on 14 April. Would need to be dug out.

SWARTKOP POINT HUT AND TOILET SITES (46° 55.462'E, 37° 35.719'E; 25 m)

New hut inspected by air on 7 April and on foot on 13 April. Partially-exposed plywood sheets and three old anchor poles currently used to support a too-short aerial wire still require removal. Wooden base from the old hut flown out prior to 13 April. Area where old hut stood is now a small pond and may not revegetate. Solidified block of white crumbling material (exact substance unknown) and several wooden fragments removed from the scar pond and added to hut waste. Toilet site has moved three times since 2006. The two old sites are now covered by rocks. Bagged hut waste removed by air on 23 April.

Site partially cleared

KAALKOP (46 54.436'S, 37 36.050'E; 103 m)

Rusted metal stump with old rope fixed on edge of crater gains access to remove any trapped Macaroni Penguins. Should probably be replaced for safety reasons, as has been previously recommended. Pole would need to be dug out.

KAMPKOPPIE RONDAVEL SITE (46° 52.992'S, 37° 37.828'E; 67 m)

Site visited on 13 April and a small cladding fragment removed. Seven embedded poles remain visible, along with various buried hut remains (see 2006 report). Poles need to be dug out.

Site partially cleared

MIXED PICKLE HUT AND TOILET (46° 52.332'E, 37° 38.320'E; 37 m)

New hut inspected by air on 7 April and on foot on 12 April. Hut scar revegetating. Dug out six buried planks (remnants of a wooden catwalk) from old hut entrance site and added to hut waste. An aluminium ladder found on the ground below hut placed on hut scaffolding above ground.

Site fully cleared

LAEKOP HUT SITE (46° 50.937'S, 37° 40.466'E)

Site thought to have been found on 12 April at above co-ordinates and provisionally identified by a line of rocks, presence of *Sagina* (otherwise not seen in immediate vicinity) and a seal skull, but previously reported rubble not found. Genevieve Jones, Marion 65 Team has agreed to recheck the site and vicinity during 2008/09.

Site not cleared

SCIENTIFIC AND OTHER FIELD MARKERS IN ZONES 2-4

Redundant (mainly wooden and bamboo) markers (not described in the 2006 PEIMC list of field projects) were removed from various old scientific sites and from *c.* 12 cat-trap sites. A number of field markers (bamboo poles, wooden dowels, painted pebbles, etc.), thought to be redundant, on a grey lava slope between Tafelberg and First Red Hill were left in place pending investigation by geomorphologists.

SUMMARY OF MAIN AIR SUPPORT REQUIRED DURING 2009 RELIEF

1. Removal of partially buried power cable which runs from near the dam to the old base. To be dug/pulled out, coiled in cut sections and removed by air.

2. Removal of redundant water pipe buried behind E-base towards Junior's Kop. To be dug out, coiled in cut sections and removed by air.

3. Removal of embedded anchor poles at various sites around the island, including at huts and old hut sites. Most could likely be dug out by hand and then removed by air during hut restocking.

4. Removal of poles and planks cached at huts during hut restocking.

5. Removal of cached mooring rope at Hooker Cove.

6. Removal of remnants of the three repeater stations on Repetto's Hill and on Snok (2) if no longer required for communication purposes.

APPENDIX 3

FIELD TOILETS ON MARION ISLAND

INTRODUCTION

It is accepted that that the current open-air bucket system for disposal of human wastes at field huts partially adopted this relief at Marion Island does not work for a number of cogent reasons, as set out succinctly in Steven Chown's e-mail to the PEIMC of 16 April (as Chief Shore-based Scientist) and as illustrated here: "one picture tells a thousand words"! As a consequence, and with the approval of the PEIMC, we have been tasked with proposing an urgent solution for the coming year, that ideally can be implemented before the ship departs later this month. As a separate exercise, we have also been asked to make suggestions as to a more permanent solution, that should be implemented no later than the 2009 takeover, and preferably before, if a suitable opportunity arises.

New bucket and old earth ('long drop") open-air toilets side by side at the Cape Davis Field Hut, photographed on 11 April 2008, by John Cooper

OVER-RIDING PRINCIPLE

The over-riding principle we wish to see adopted is the complete cessation of the use and further digging of holes at field huts, whether for buckets or as earth toilets, and the complete cessation of adding human solid wastes (and solid food wastes) to the terrestrial environment of the island.

INTERIM PROPOSAL FOR THE COMING YEAR

1. The earth toilet ("long drop") system be reinstituted immediately at the eight coastal field huts.

2. At those coastal field huts where the earth toilet still exists it be used in preference to the bucket system.

3. At those coastal field huts (e.g. Cape Davis) where the bucket system has been set up in tandem with the field toilet, the bucket be left in place, sealed, with a large rock on the lid, but not used further. If the existing field toilet becomes full during the year, then the bucket hole should be used to create a new earth toilet, with the sealed bucket (and its contents) securely stored under the hut, fastened by ropes to the platform supports.

4. At the two coastal field huts (Watertunnel Stream and Kildalkey) where the old field toilet has already been removed in its entirety and the hole filled in, materials (planks, camping chair, etc.) to create a new field toilet be flown to the hut as a priority, either for creation of a new toilet by NDPW/team

personnel during the relief, or later by the new team. In this case, the treatment should be as for three above.

5. No new holes should be dug for field toilets during the year unless absolutely necessary. In all cases they should be dug adjacent to the hole that needs to be disused, and not at a distance (as has happened for example at the Swartkops Point field hut where three separate localities have been used in no more than three years).

6. A different procedure is required for the inland Katedraalkrans Field Hut. An earth toilet is impracticable at this locality with its rocky substratum and ideally the large screw-top or clamped-lid barrel system previously used should be reinstated as an interim measure.

PERMANENT SOLUTION

1. Several suggestions have been mooted by concerned/interested parties on the island. We recommend we investigate the practicalities of these (and other options) and report back to the PEIMC as soon as possible. One option is the placement of an enclosed structure on the field hut catwalk mounted over a large (125-150-l) sealable barrel inserted in a frame under the catwalk (in which a suitable hole has been cut) that would be able to be used safely and hygienically, including in poor weather and at night. In this case, an environmentally-approved disinfecting chemical agent would need to be provided.

2. Other options exist, and all should be investigated before a final decision is made.

3. Recommendations for the treatment of human and other wastes (both solid and liquid) should also be made for Prince Edward Island as part of the above exercise.

John Cooper, Marion 2008 Relief Conservation Officer
&
Carol Jacobs, Marion 2008 Relief Project Environmental Officer

19 April 2008

Note: The above proposals received the approval of the Chief Shore Scientist and the Marion 65 Team Leader and were then passed to the Departmental Coordinator on 20 April for approval and subsequent action. As a consequence two wooden toilet seats were made in the Base for the Watertunnel Stream and Kildalkey Field Huts. The seat for the former hut was flown to the hut on 23 April, but the latter will need to be carried out by a team member. A similar wooden seat is also required for the Katedraalkrans Hut.

26 April 2008

APPENDIX 4

GENERAL PROCEDURES AT FIELD HUTS

THANK YOU FOR HELPING TO KEEP MARION ISLAND A SPECIAL PLACE

1. HUT ETIQUETTE:

1.1 For the duration of your stay, place a small container/bucket in the hut, lined with a plastic bag, for all **solid waste** (e.g. crushed cans, fruit pips, meat bones, cigarette butts (placed in sealable bottles, e.g. empty mayonnaise, etc.), paper, plastics, crumbs, etc.).

1.2 Do NOT put any loose, unbagged items into the large dustbins.

1.3 Use another container/bucket for all **liquid waste** (washing-up water, beverages, waste food ("slops"), etc.) and dispose of in the earth toilets ("long drops") or in the sea. At Katedraal, liquid waste is to be disposed of at the designated metal marker (no food).

1.4 Open the window (if operational) above the stove to prevent condensation in the hut while cooking. Point the kettle spout towards the open window.

1.5 Charge the radio battery for at least 30 minutes before and after use, and switch OFF after use.

1.6 Do NOT walk over the old hut scar (to facilitate the revegetation of the area).

1.7 Reduce solid food waste to a minimum, by cooking smaller meals, eating leftovers for breakfast, and/or carrying leftovers in lunch boxes to the next hut or to Base.

1.8 Check that the radio antenna wires are intact.

2. SAFETY ASPECTS:

2.1 No smoking in the huts (fire hazard).

2.2 Switch OFF the gas at night, at the cylinder and all levers.

2.3 Always leave a message in the hut book (even if you are only passing by), regarding your well-being and plans for the next day.

3. BEFORE YOU LEAVE:

2.1 Check hut surrounds for any loose waste and bag with solid waste *(see 1.1)*.

2.2 If the small container/bucket is full, place the tied-up solid waste bag in the large dustbins. If it is not full, seal the small container/bucket and place in the pantry.

2.3 Fill the water containers.

2.4 Ensure that there is water in the kettle on the stove.

2.5 Store all opened food (e.g. coffee, tea, rusks, sauces, etc.) in tote boxes that are stored in the left hand side of the racks in the pantry.

2.6 Wash, dry and pack away all pots, dishes and cutlery used.

2.7 Clean any candle wax and wipe down surfaces (shelves, table, etc.) and stove.

2.8 Sweep and mop the hut, dry room and pantry.

2.9 To keep the pillows dry, do not leave them next to the walls and spread them out on the beds (do NOT stack them).

2.10 Store the mops and brooms, bottom side up so that they can dry.

2.11 Wash the dishcloths in disinfectant, rinse and hang in dry room to dry.

2.12 As necessary, take the mattress covers and/or dishcloths back to Base to wash.

2.13 Make sure the gas and radio (bin closed properly, if possible) are switched OFF *(refer to "Marion Field Huts & Pantries Gas and Generator Operations Procedures" and the procedures on the radio itself)*.

2.14 Open all the blinds.

2.15 Ensure that the outer doors of the hut and pantry are closed properly.

2.16 In huts that are not used often (e.g. Katedraalkrans, Rook's Bay, etc.), remove the battery from the generator and place inside the hut.

2.17 Cover the generator and ensure that cover is hooked onto the catwalk.

2.18 Going back to base from Kildalkey, Repetto's or Katedraalkrans? If possible, carry your rubbish back with you to dispose of at Base.

REPORT ANY HUT DEFECTS TO THE MARION OVERWINTERING TEAM LEADER

APPENDIX 5

LONG-TERM STUDY SITES WITH FIELD MARKERS, APRIL 2008

Biocomplexity and Change Project

Project leader: Prof Steve Chown (slchown@sun.ac.za)

Site markers: Four dowel sticks with red reflective tape at each site (marking each corner of the plot), and numbered metal tags in some *Azorella selago* cushions at these sites.

Mixed Pickle Cove

MP –	H	46° 53.83'S, 37° 39.266' E	@ 597 m asl
	M	46° 53.211'S, 37° 38.860' E	@ 375 m asl
	L	46° 52.574'S, 37° 38.548' E	@ 210 m asl

Swartkop Point

SK -	H	46° 56.203'S, 37° 37.52' E	@ 566 m asl
	M	46° 55.820'S, 37° 37.222' E	@ 415 m asl
	L	46° 55.795'S, 37° 36.481' E	@ 218 m asl

Tafelberg

TL -	H	46° 53.676'S, 37° 47.290' E	@ 576 m asl
	M	46° 53.267'S, 37° 48.116' E	@ 360 m asl
	L	46° 52.750'S, 37° 49.649' E	@ 176 m asl

Stony Ridge

SL -	H	46° 54.060'S, 37° 47.971' E	@ 593 m asl
	M	46° 54.607'S, 37° 49.054' E	@ 366 m asl
	L	46° 54.928'S, 37° 51.440' E	@ 163 m asl

Skua Ridge

46° 52.061'S, 37° 50.317'E @106 m a.s.l.

History and Variability Project

Project Leader: Prof. Steve Chown (slchown@sun.ac.za)

Site Markers: metal rods in scoria, otherwise white plastic poles

Junior's Kop	Co-ordinates	Altitude
E TOP	S46 53.015 E37 49.850	325 m

N Bot	S46 52.818 E37 49.749	166 m
N TOP	S46 52.959 E37 49.803	304 m
NE BOT	S46 52.865 E37 50.119	160 m
NE TOP	S46 52.990 E37 49.841	309 m
NW BOT	S46 52.869 E37 49.678	154 m
NW TOP	S46 52.966 E37 49.748	294 m
S Bot	S46 53.136 E37 49.714	246 m
S TOP	S46 53.026 E37 49.771	293 m
SE BOT	S46 53.170 E37 49.957	190 m
SE TOP	S46 53.037 E37 49.824	309 m
SW BOT	S46 53.062 E37 49.623	237 m
SW TOP	S46 53.023 E37 49.742	298 m
W BOT	S46 52.976 E37 49.644	215 m
W TOP	S46 52.993 E37 49.754	281 m

Tafelberg

1 S46.88462 E37.79876
2 S46.88911 E37.80061
3 S46.88882 E37.80037
4 S46.88975 E37.79827

Tafelkop

1 S46.88876 E37.8002
2 S46.87974 E37.82046
3 S46,88874 E378030
4 S46.87957 E37.82003

Skua Ridge

1 S46.86704 E37.83949
2 S46.86625 E37.83981
3 S46.86601 E37.83760
4 S46.86713 E37.83736

(No new data supplied for 2006)

N.B. Information to come on position of two(?) mouse-exclusion cages.

Albatross Reproduction Project

Project Leader: Prof. P.G. Ryan (peter.ryan@uct.ac.za)

Long-term study colonies of Wandering Albatrosses

Boundary and nest markers: Numbered and flagged white plastic pipes placed and removed from nests annually. Boundary markers (not flagged) at Macaroni Bay and Sealer's Beach are set in concrete blocks.

Note: all positions are 46°S, 37°E; therefore only minutes in decimals are given, South, followed by East. Altitude by GPS in metres is available for most, but not for all. These co-ordinates also mark the boundaries of Zone-4 sites.

Macaroni Bay

1. 53.407	52.012
2. 53.467	52.025
3. 53.483	52.223
4. 53.515	52.246
5. 53.665	52.067
6. 53.836	52.266
7. 53.751	52.508
8. 53.703	52.633
9. 50.615	52.550
9A. 53.405	52.464
10. 53.315	52.381

Sealer's Beach

1. 51.106	50.373
2. 51.142	50.293
3. 51.118	50.159
4. 51.135	50.105
5. 51.163	49.962
6 51.257	49.764
7. 51.230	49.586
8. 51.192	49.444
8A. 50.934	49.506
9. 50.894	49.565
10. 50.898	49.667
11. 50.921	49.834
12. 50.968	50.051
13. 51.061	50.202
14. 51.079	50.328

Gony Plain

1. 50.638	48.385
2. 50.475	48.261
3. 50.369	48.180
3A. 50.325	48.058
4. 50.389	48.066
5. 50.440	48.049
6. 50.532	49.051
7. 50.601	48.074
8. 50.725	48.296

Long-term study of Grey-headed Albatrosses

At Grey-headed Albatross Ridge immediately to right of cliff path, visible from the hut. Top of ridge immediately above study colony is at 46° 57.701'S, 37° 42.387'E; 146 m. Is a Zone-4 area. Numbered plastic pipes inserted into sides of nests. No boundary markers in use.

Long-term study of Northern Giant Petrels

All occupied and previous nest sites in an area encompassed by Skua Ridge, Junior's Kop, Tom, Dick & Harry and Archway Bay are marked with H-numbered white-flagged long white plastic poles. Poles are placed and removed annually. No GPS positions for boundaries are available.

ACAP/CCAMLR Monitoring Project

Project Leader: Dr R.J.M. Crawford (crawford@deat.gov.za)

Long-term studies of Macaroni Penguins

Bullard Beach and Kildalkey Bay colonies have boundary markers and 5-m quadrats demarcated by concrete blocks, some of which have plastic pipes as risers. GPS positions are available, and surveyed maps exist for both colonies with boundary and quadrat markers trigonometrically surveyed in. GPS positions of boundary markers to be taken in 2008.

Macaroni Bay, Archway and Van den Boogaard River. Study colony at Macaroni Bay has boundary markers made of flagged plastic poles. No GPS positions currently available.

Long-term study of burrowing petrels

Flagged white plastic poles at various localities at Macaroni Bay, Skua Ridge, Van den Boogaard River/Skua Ridge valley and elsewhere inland. GPS positions are available.

Long-term study of White-chinned Petrel

Sixty burrows in general vicinity of the Base, Nellie Humps and Van den Boogaard River marked with numbered white-painted half broom poles and plastic poles. No GPS positions available, but a rough sketch map of sites exists on the island. Remaining broom poles are to be replaced with plastic poles in 2008.

Study of Great-winged Petrel

One hundred burrows marked with numbered and flagged plastic poles within Zone 2. No GPS positions available.

Study of Subantarctic Skua

Ten closest nests to Base marked each year with flagged plastic poles.

Vegetation Dynamics Project

Project Leader: Dr N. Gremmen (gremmen@wxs.nl)

Site markers: White plastic conduit pipes, and bamboo poles at NG3 only.

Sites NG1 and NG2

At base below Mammal Laboratory at 46° 52.43.3"S, 37° 51 30.8"E; 47 m. Blue ground-water pipes are present, flush with the ground.

Site NG3

North of Van den Boogaard River dam at 46° 52' 28.6"S, 37° 49' 48.8"E; 132 m

Golden Gate, Prince Edward Island

A total of 48 plastic pipes used in 2003 to replace bamboo poles placed in 1993. Remnants of bamboo poles removed in 2003.

(No new data for 2006-2008)

Geomorphology and Climate Change Project

Project Leader: Prof Ian Meiklejohn (ian.meiklejohn@scientia.up.ac.za)

Site markers: Variously steel rods, white plastic poles and sections of unpainted broom poles.

Table 1: Locations of ground thermal monitoring equipment installed during, 2006, 2007, and during the 2008 Marion Takeover

Site name	South	East	Altitude
Altitudinal transects	Each site (e.g. S400) consists of an i-button inserted at 2.5-cm depth, measuring soil temperature		
Eastern Transect			
E200	46°53'02.8"	37°49'25.2"	205m
E400	46°53'25.3"	37°47'48.1"	402m
E600	46°53'41.2"	37°47'12.2"	606m
E800	46°54'03.3"	37°45'51.8"	807m
Northern Transect			
N200	46°50'18.0"	37°44'20.0"	203m
N400	46°51'20.9"	37°43'55.8"	401m

N600	46°51'56.1"	37°43'37.7"	606m
N800	46°52'45.6"	37°43'18.0"	803m
Western Transect			
W200	46°54'56.9"	37°36'50.4"	208m
W400	46°54'47.5"	37°37'46.3"	420m
W600	46°54'37.9"	37°38'19.3"	614m
W800	46°54'56.9"	37°39'01.5"	799m
Southern Transect			
S200	46°57'29.6"	37°49'07.3"	205m
S400	46°56'48.7"	37°47'56.5"	402m
S600	46°56'23.2"	37°46'47.7"	609m
S800	46°54'51.8"	37°45'42.9"	800m
10-Channel Loggers	One or two 2 MCS 10-Channel Loggers installed at each site		
Katedraalkrans (2 Loggers)	46°53'57.6"	37°46'36.2"	750m
Repetto's (1 Logger)	46°50'47.4"	37°44'08.2"	312m
Feldmark (1 Logger)	46°57'12.4"	37°48'24.8"	313m
Bald Peak (1 Logger: A)	46°54'07.3"	37°44'09.2"	1034m
Bob Rand (1 Logger: B)	46°53'32.2"	37°43'19.4"	1036m

Each channel logger site has the following: a logger with soil-temperature sensors placed just beneath the ground surface and then at 50-cm intervals to a depth of 2m. The sensors were attached to a PVC pole that was inserted into a 7-cm aperture hole drilled using soil augering equipment. In addition, a soil-moisture sensor was placed at a 2.5-cm depth and a shielded air temperature sensor and rain-gauge were erected on a 1.5-m high pole that was secured using plastic coated cables attached to 1.2-m stakes hammered into the ground (See Fig 1 for photographs of two of the CALM logging sites). As a backup, at each site a second logger was installed to record ground temperatures 2.5 cm beneath the surface and then at 25-cm, 50-cm, and 75c-m depths, respectively.

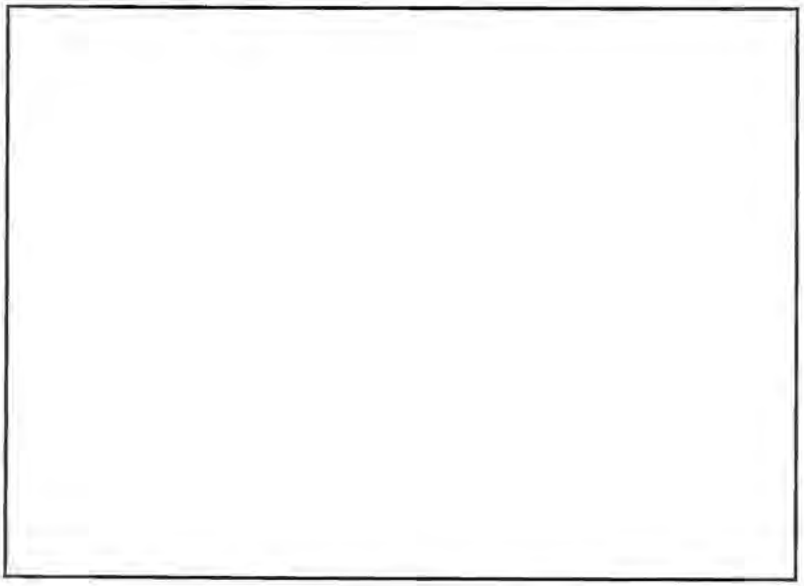


Table 2: Location of periglacial research sites set up during 2007 and surveyed during the 2008 Marion Takeover

NOTE: *At each site, the following were installed:*

1. *Two I Buttons (at 2.-5-cm and 10-cm depths) to record soil temperature.*
2. *Ten yellow marker stones (placed 10 cm apart along a 110-cm reference line). Average marker stone size (as calculated from 20 measured stones) = a-axis: 19 mm and b-axis: 12 mm.*
3. *Ten wooden dowels (placed 10 cm apart, approx. 5-10 cm above the reference line).*

	South	East	Altitude	Aspect	Geology
Northern Site – Theo					
S_NN	46°51'50.7"	37°43'51.2"	588m	N	Scoria
S_NS	46°52'0.6"	37°43'55.8"	575m	S	Scoria
S_NE	46°51'55.2"	37°43'59.1"	594m	E	Scoria
S_NW	46°51'55.1"	37°43'45.8"	624m	W	Scoria
G_NN	46°51'34.2"	37°44'12.2"	457m	N	Grey lava
G_NE	46°51'52.7"	37°44'4.5"	553m	E	Grey lava
G_NW	46°51'37.5"	37°44'8.9"	477m	W	Grey lava
Southern Site – Karookop					
S_SN	46°57'2.1"	37°47'10.3"	485m	N	Scoria
S_SS	46°57'9.0"	37°47'9.4"	512m	S	Scoria
S_SE	46°57'6.8"	37°47'19.2"	477m	E	Scoria
S_SW	46°57'6.2"	37°47'3.2"	508m	W	Scoria
G_SN	46°56'42.3"	37°47'42.6"	458m	N	Grey lava
G_SS	46°56'44.8"	37°47'44.2"	447m	S	Grey lava
G_SE	46°56'42.1"	37°47'44.6"	463m	E	Grey lava
G_SW	46°56'42.1"	37°47'40.7"	452m	W	Grey lava
Eastern Site - Tate's Hill					
S_EN	46°54'45.6"	37°48'57.7"	447m	N	Scoria
S_ES	46°54'52.3"	37°48'57.8"	438m	S	Scoria
S_EE	46°54'48.2"	37°49'4.4"	435m	E	Scoria
S_EW	46°54'50.1"	37°48'54.3"	460m	W	Scoria
G_EN	46°54'42.3"	37°48'45.5"	432m	N	Grey lava
G_ES	46°54'52.8"	37°48'39.9"	425m	S	Grey lava
G_EE	46°54'39.8"	37°48'49.9"	431m	E	Grey lava
G_EW	46°54'46.2"	37°48'41.5"	434m	W	Grey lava
Western Site – Hunchback					
S_WN	46°54'18.2"	37°37'57.0"	548m	N	Scoria
S_WS	46°54'20.1"	37°37'53.6"	525m	S	Scoria
S_WE	46°54'21.0"	37°37'59.9"	545m	E	Scoria
S_WW	46°54'22.5"	37°37'52.8"	536m	W	Scoria
Long Ridge South					
1 Nested Grid	46°52'31.1''	37°47'31.2''	425m	E	Grey Lava
Tafelberg					
1 Grid	46°53'11.4"	37°48'16.7"	338m	NE	Grey Lava
Katedraalkrans					
5 Grids *Note: This site additionally involves the utilization of wooden sticks for ground heave*	46°53'57.605"	37°46'36.252"	750m	Various	Black Lava/ Scoria

monitoring, which were cut from broomsticks					

Table 3: Locations of logging equipment in sediment sinks, installed during 2007.
NOTE: *At each site, the following were installed:*

1. *Five i Buttons (at 5 cm, 10 cm, 20 cm, 40 cm and 70 cm) to record sub-surface temperature.*
2. *One i Button in a radiation shield at 60 cm above the ground surface.*

Site name	S	E	Altitude
Gony (removed)	46°51'09.3"	37°47'49.1"	58m
Junior's Mire	46°52'33.9"	37°50'24.8"	85m
Swartkops	46°55'26.9"	37°36'10.4"	63m
Repetto's	46°50'12.5"	37°45'51.1"	31m

Capacity Building Programme for Climate Change Research (USAID)

Project Leader: Prof. S.L. Chown (slchown@sun.ac.za)

Site markers: Plastic poles with red reflective tape on the top. An i-Button data logger is placed approximately 2-5 cm below the soil surface at each marker.

Site	Co-ordinates		
Stevenson Screen	S 46° 52.600'	E 37° 51.528'	Within 10 m of the Stevenson Screen
0 m	S 46° 52.617'	E 37° 51.641'	Boulder Beach
100 m	S 46° 52.608'	E 37° 50.445'	Just off the pipeline
200 m	S 46° 52.978'	E 37° 49.354'	Between Junior's Kop and the base of Tafelberg
300 m	S 46° 52.979'	E 37° 48.694'	To the left of Tafelberg when coming down towards Base
400 m	S 46° 53.349'	E 37° 47.927'	On Tafelberg
500 m	S 46° 53.565'	E 37° 47.428'	Towards the base of First Red Hill just off the red scoria
600 m	S 46° 53.668'	E 37° 47.249'	Towards the top of First Red Hill just off the red scoria
700 m	S 46° 53.848'	E 37° 46.823'	Between the top of first Red Hill and the base of Katedraalkrans (not on the normal route to the hut)
800 m	S 46° 53.998'	E 37° 46.079'	At the base of Ned's Hill (occasionally a marker is temporarily placed at the hut when the 800-m logger is not accessible)

N.B.: Mammal projects (Prof M.N. Bester, University of Pretoria) do not currently utilize field markers.

APPENDIX 6

LIST OF HISTORICAL ITEMS COLLECTED FOR POTENTIAL DISPLAY IN AN ISLAND MUSEUM

NOTE: All items are stored in the Lower General Purpose "Bird" Lab unless noted otherwise (Items 1 & 2). Most are labelled. Genevieve Jones (Deputy Leader, M65) has been requested to look after the items during 2008/09.

1. Two sections of hydro-electric scheme piping. Larger collected from beside the Van den Boogaard River in April 2008 (see Appendix One). Both stored underneath the Bird Lab.

2. Wooden box. Collected from *Blechnum* slope near "Penis Rock". Filtration(?) box on old water pipe, with names of team members engraved on it. On catwalk section behind outside deep freeze.

3. Beer bottle. "Property of South African Breweries Ltd". Dug out from food store site, April 2008

4. Sterovita milk bottle. Broken. Collected from rear of Boulder Beach, April 2008.

5. Wooden cladding section. Marked "MARIO" Dug out from food store site, April 2008

6. Copper plaque. Punched with a square nail "JAN SMUTS PEAK". Found in general vicinity (exact locality uncertain) of Resolution Peak (*ex* Jan Smuts Peak) by Genevieve Jones, March/April 2007.

7. Piece of washed-up yacht. From near Kildalkey Bay, August 2006.

8. Repeater station whip aerial.. Collected from old repeater site on Snok, April 2008 (see Appendix One).

9. Long floor plank. Original food store at Gunner's Point. , Marked "MARION" and "DURBAN". Collected when floor dismantled and burnt , August 2003.

10. Anchor. Dived out of Transvaal Bay by Jaco Barendse and Johan Botha, 997.

11. Floor planks. From original food store floor at Gunner's Point. Labelled MARION and DURBAN. One long plank and on short sawn section.

12. Insulator. From old aerial system. Found buried near Bade, 15 November 2003.

13. Shot gun cartridge. Collected below Wet Lab (now food store)August 2003.

14. Wooden object. Unknown use. Found in site of original food store, April 2008

15. Antarctic(?) rock. Found in container on unloading at Marion, April 2008

16. Hut fragment. Kampkoppie rondavel site. Collected April 2008.

17. Aircraft fragments. From site of crash-landing by Henri Choroz. Collected August 2003.

18. Brick-layer's trowel. Found behind cladding of small hydroshack building on its removal, 16 November 2003.

19. Wooden cross. Removed from near summit of Junior's Peak03 September 2003.

20. Wandering Albatross nest marker. As used in 1980-1990s. Labeled "S" for Sealer's Beach study colony.

21. Cat skull and shot gun cartridge remnant. From Laekop hut site, collected 24 September 2003.

22. Gas light fitting. From Laekop hut site. Collected 3 May 2005.

23. Plank cat trap site marker. Collected west coast, April 2008.

24. Anorak,. Collected from slopes of First Red Hill in 2004.

25. Spotlights x 2. Similar to those used by cat shooters.

26. Hydroshack cladding fragment. Collected 14 April 2006.

27. Burrowing petrel treddles x 2. Recorded nest movements. Made for M Schramm in late 1970s. See descriptive short note in

28. Tape deck. As handed down to successive ornithological field assistants in early 1990s. Original owner was Anton Cawthorn-Blazeby.

29. Section of hydroshack power cable.

30. Longline fishing float. Japanese.

31. Gin traps x 8. As used by cat-eradication programme. From various localities as labeled. Various conditions: most badly rusted.

32. Beer bottle. Quart size, 'PROPERTY OF OHLSSON'S CAPE BREWERY LTD". "TALANA 1944". From Base bar 2003. Collection site unknown.

33. Cool drink bottle. "SUNSHINE SPARKLING BEVERAGES".

34. Cool drink bottle. "ZIMANS". From Base bar 2003. Collection site unknown.

35. Beer bottle. As for #31, but dated 1948. Collected from dump below insect lab, 10 September 2003.

36. Cool drink bottle. "SUNDEW" Collected from dump below insect lab, 10 September 2003.

37. Beer bottles x 2. Pint size. Collected from dump below insect lab, 10 September 2003.

38. Spirits bottle. Home-made on island. "RARETY PRINCE EDWARD ISLAND EXTRACT Proof 98%". Ex Base Bar 2003.

39. Hydroshack label. "FACTORIES, MACHINERY AND BUILDING WORK ACT , 1941".

40. ?Pollen trap. Collected from Hendrik Vister Kop. Could not be located in Bird Lab in April 2008. Last seen in May 2006.

AGENDA
of the
25th PRINCE EDWARD ISLANDS MANAGEMENT COMMITTEE MEETING

****

VENUE: ***Department of Environmental Affairs & Tourism***
Directorate: Antarctica & Islands Conference Room
East Pier Building
East Pier Road
V & A Waterfront
CAPE TOWN

DATE: ***Friday, 7 November 2008***

TIME: ***09:30***

****

1. WELCOME AND OPENING

2. MINUTES OF THE 24th PRINCE EDWARD ISLANDS MANAGEMENT COMMITTEE MEETING (*4 March 2008*) ***Doc 2***

MATTERS ARISING:

2.1	Building of new and decommissioning of old Marion Island base - Update on progress made *(Mr H Valentine)* - Funding of portaloos & investigate design options *(Mr H Buenk)*	***To be tabled***
	- Equipping scientific laboratories *(Mr B Archary)*	***To be tabled***
2.2	Removal of rubble and building waste *(Mr J Cooper)*	***Doc 2.2***
2.3	World Heritage Site (WHS) status for the Prince Edward Islands *(Mr H Valentine)*	***Doc 2.3***
2.4	Publication and implementation of the Prince Edward Islands Environmental Management Plan and way forward *(Mr H Valentine)* → CIB to update/ complete	
2.5	Extension of Special Nature Reserve Status of the Prince Edward Islands to include territorial waters out to 12 nautical miles (MPA) *(Mr J Cooper/ Mr H Valentine)*	***Doc 2.5***
2.6	RAMSAR Wetland Reserve Status for the Prince Edward Islands *(Ms K Ngxabani-Tikana)*	***Doc 2.6***
2.7	House Mouse update (par. 2.7) *(Mr J Cooper)*	
2.8	Application for King Penguins from Marion Island *(Ms K Ngxabani-Tikana)*	***Doc 2.8***
2.9	New huts at Marion Island *(Mr H Valentine/Mr D Smit)*	
2.10	CTBTO Station RN62 – Marion Island *(Mr H Valentine)*	
2.11	Pollution at Marion base (biodegradeable/eco-friendly products) *(Mr H Buenk)*	

doc/

OASIS?
RECYCLING GLASS PROBLEM
Enviroserve
Atlantic Glass

Virkon-S

→ google an NGO

agreed to obtain

2.12 Quarantine Procedures: notice of new alien wasp at Marion, placement of crawling insect sticky traps on *SA Agulhas,* procedures and facilities at East Pier, etc. *(Mr J Cooper)* ***Doc 2.12***

2.13 Fuel tanks - alarm system/portable drip trays (par. 2.14) *(M H Valentine)*

3. NEW ITEMS

3.1 SANAP Approved Projects *(Ms K Ngxabani-Tikana)* ***Doc 3.1A& Doc 3.1B***

3.2 Developing an ISO14001-based environmental, health and safety Management system for SANAP *(Ms C Jacobs/Mr G van Zyl)* ***Doc 3.2A***

- Marion Island New Research Base Construction and Take over Safety Plan *(Messrs H Smith/D Smit)* ***Doc 3.2 B***

3.3 Guide for Science Coordinators *(for info)* ***Doc 3.3***

Gear decks 3.3B ✓

5. DATE OF NEXT MEETING

6. CLOSING

AOB: Summer Survey.
- approved - POTMC comments sent to RDoCrayford. (to be cc to JE)

10 for PET approved rodent traps.

Doc 2

24TH PEIMC: MINUTES

Doc 2

24TH PRINCE EDWARD ISLANDS MANAGEMENT COMMITTEE (PEIMC) MEETING

MINUTES OF THE MEETING HELD ON 4 MARCH 2008 AT THE DEPARTMENT OF ENVIRONMENTAL AFFAIRS AND TOURISM, DIRECTORATE: ANTARCTICA AND ISLANDS, EAST PIER BUILDING, EAST PIER ROAD, V & A WATERFRONT, CAPE TOWN

PRESENT

Mr H R Valentine *(Chair)*	-	Department of Environmental Affairs and Tourism (DEAT), Directorate: Antarctica and Islands (D: A&I)
Ms A van Wyk	-	S A National Parks
Mr H Hendricks	-	S A National Parks
Mr K Gierdien	-	National Department of Public Works (NDPW)
Mr D Smit	-	DEAT; Directorate: Environmental Impact Evaluation (D: EIE)
Ms C Jacobs	-	DEAT, D: EIE
Ms T Bossenger	-	National Research Foundation (NRF)
Ms K Ngxabani-Tikana	-	DEAT, D: A&I
Mr H Buenk	-	DEAT, D: A&I
Dr M de Villiers	-	University of Cape Town (UCT)
Mr J Cooper	-	UCT
Prof S L Chown	-	University of Stellenbosch (US)
Mr M Majodina	-	S A Weather Service (SAWS)
Ms N Ntantiso *(Minutes Secretary)*	-	DEAT, D: A&I

APOLOGIES

Prof M N Bester	-	University of Pretoria (UP)
Ms T Frantz	-	DEAT, Marine and Coastal Management (MCM)

1. WELCOME AND OPENING

The Chair welcomed everyone present and thanked them for attending. He reported that there were no apologies from DST.

Adoption of agenda:
The agenda was adopted.

2. APPROVAL OF PREVIOUS MINUTES (23rd PEIMC MEETING)

Minutes were reviewed with amendments as follows:

- page 1:
  9 February 2007 – should read "26 October 2007"
- page 8, par. 4.3:
  3rd line Copper – should read "Cooper"
- through out the document
  Bosman – should read "Bossenger"

The minutes were then adopted and the Chair thanked Ms Ntantiso and Ms Jacobs for recording and editing the minutes respectively.

MATTERS ARISING:

2.1 Building of new and decommissioning of old Marion Island base

- *Update on progress made*

The Chair reported that the SA Agulhas was sailing for the last construction voyage in the afternoon (of the meeting) at 14:00 and would return with the takeover personnel on 2 May 2008. He mentioned that he would get the full report of what needed to be done in the new base after the construction voyage to determine if it could be commissioned. He reported that SANAE had been switched on a new satellite system (just an extension away) and Marion Island would be dealt with during the forthcoming relief voyage to avoid paying for two bandwidths as was currently the case. Mr Gierdien confirmed that the new base was 80% – 85% complete and he would wait for Mr Mike Murphy's return from Marion Island for further feedback as he just returned from SANAE.

Mr Smit stated that in one of the Project Environmental Officer's (PEO) reports, it had been reported that there was polystyrene and its wooden cladding structure under the upper and old lower helipads. His concern was that if it was not removed, it could subsequently become a problem at a later stage. Ms Jacobs suggested that the removal of this structure be included in the decommissioning of the old base. Mr Cooper added that it was mentioned that removing rubble under the helipad was part of construction and its removal would be made much harder by building over it, which means that a definite opportunity has been lost. He also mentioned that the old wooden walkway (now only partially exposed) that runs up to the hangar connecting two helipads also need to be removed. The Chair then recommended that it was critical that the structure needed to be removed. Ms van Wyk suggested that Basic Assessment should start during the take over of 2008. Mr Cooper advised that EIA should include the helipad, as well as health and safety issues. Dr de Villiers agreed and added that burning of polystyrene was a health risk. The Chair stated that, at this

stage, the decommissioning would have to be done during takeovers, and not dedicated voyages, as had been the case with construction.

Prof Chown suggested that there should be a clear indication of what would happen when everything moved to the new base.

- *Funding of portaloos & investigate design options*

The Chair reported that Enviroserv provided DEAT with sealable containers that could be used as portaloos on Marion Island. He mentioned that he was not happy with the kind of buckets provided for trials during the forthcoming relief voyage until Enviroserv provided the required design. The bucket was shown to the committee members.

- *Equipping scientific laboratories*

Ms Bossenger stated that the submission was still with DST and there was no progress on the matter.

2.2 Removal of rubble and building waste (Country clean-ups at Marion)

Mr Cooper undertook to follow up on recommendation he made in his 2006 Marion Island relief voyage report during the forthcoming relief voyage. He outlined that he would do round island to check old huts sites, old huts platforms needed to be removed, continue with removing rubble, audit all the huts sites, construction personnel to visit all huts and remove whatever they could to avoid more flying. He indicated that he would discuss with Ms Jacobs and NDPW team on what they intended to do with the poles at old huts sites. The Chair stated that his understanding was that during construction NDPW would visit all the huts and remove rubble and building waste whilst the helicopters were still available on the island. Dr de Villiers stated that Mr Dreyer's e-mail confirmed that platforms would be removed. Mr Cooper concluded that everything should be removed.

2.3 World Heritage Site (WHS) status for the Prince Edward Islands (PEI)

The Chair reported that he had a meeting with Biodiversity directorate concerning the withdrawal of South Africa's nomination. He stated that three suggestions were made – firstly to nominate Prince Edward Islands only, secondly to combine South Africa's nomination with New Zealand's and lastly, to stick to the original plan and update areas of concern. He mentioned that the Director-General had set the date for a meeting to re-start the process. Mr Cooper stated that during the 23rd PEIMC meeting the three suggestions were mentioned. He indicated that the World Conservation Union suggested a logical group to perhaps jointly submit with Crozet Islands as in the past year France declared the island a Nature Reserve. In his personal opinion France had always been interested in collaborating with South Africa in this regard. He concluded that Prince Edward Island stood a good chance if submitted alone and that Dr Deon Nel of WWFSA proposed a workshop in August 2008 in this regard. The Chair suggested that he (Mr Cooper) forward a list of potential people to brainstorm and come up with strong motivation. The team should consist of Mr Cooper, Dr Nel and Prof Chown. Prof Chown excused himself as he felt there was inaccuracy and political issues that needed to be sorted out first. Mr Cooper was willing to provide

inputs during the intended August Workshop. He further suggested that a person from the Department of Foreign Affairs could shed some light with regards to political frame in this matter. Ms van Wyk mentioned that she read some reports, although they were not that bad but she also could sense some political involvement. Ms van Wyk undertook to approach people at SANParks and to report back to the committee. Dr Hendricks proposed that the committee had to decide on how to deal with the politics involved in this facet. The Chair replied that he was not sure if it was the committee's responsibility and further suggested Department of Foreign Affairs' involvement.

2.4 Publication and implementation of the Prince Edward Islands Environmental Management Plan (EMP)

The Chair reported that there were minor changes to be done to the original plan. Ms Jacobs stated that the Biodiversity unit of DEAT needed to submit the plan to the Minister for approval once it had been finalised. The Chair mentioned that it was up to the Directorate: Antarctica and Islands to appoint a person to draft the advertisement for publication in the Government Gazette.

2.5 Extension of Special Nature Reserve Status of the Prince Edward Islands to include territorial waters out to 12 nautical miles (MPA)

The Chair stated that the department was concerned on declaring MPA's without compliance and management in place. The declaration of Marion Island as MPA had taken a 'back seat'. Mr Cooper stated that the Minister was keen to declare MPA's. The Chair responded that according to Marine and Coastal Management's (MCM) compliance directorate, it would be a political disadvantage to declare MPA's while there were no control or compliance in place. Dr Hendricks was concerned of inadequacy and that things were not clarified as to why they were not happening. Mr Cooper undertook to ask Dr Crawford if the document was done or filed and to be made available to the committee for comments. The Chair concurred and mentioned that if it was not too big it could be circulated electronically to all committee members.

2.6 RAMSAR Wetland Reserve Status for the Prince Edward Islands (PEIs)

The Chair reported that Mr S Tshitwamulomoni withdrew his participation in the construction voyage that was departing in the afternoon. He added that it would have been great help to clarify the questions asked in the last meeting. Mr Cooper stated that Mr Tshitwamulomoni's directorate would have to do a report and he would come to the Chair and the committee would supply information. Dr de Villiers enquired if there was publicity about RAMSAR Wetland Reserve Status of PEI. The Chair replied that there was none because it was supposed to be linked to something else. The Chair was concerned that it was not formally announced in South Africa. Mr Cooper suggested that the Chair should obtain information on the Ministers' speeches and found out if it could be added. Ms Jacobs suggested that the Chair draft a press release and forward it to the Communications directorate.

2.7 House Mouse update

Mr Cooper showed everyone the document that he was currently working on. He added that terrestrial birds on Marion Island might be at risk of poisoning and the Sheath Bill was a concern as well.

2.8 Application for King Penguins from Marion Island

Dr de Villiers enquired from the committee the number of birds that Pretoria Zoo requested from the island. The Chair replied that he was not sure of the number and age but concentration was on completion of the facility. He said communication regarding capturing, keeping them in transit could be revisited. He suggested that he could extract bits from previous minutes and circulate them to the committee. He also suggested that Linda Clokie could assist as she was one of the 2008/09 overwintering expedition members on Marion Island.

2.9 New huts at Marion Island

Ms Jacobs reported that Ms P Skepe-Mngcita was currently on Marion Island as PEO to monitor the finalisation of the new hut installation and removal of the old ones. She (Ms Jacobs) would conduct inspections of the new huts and old hut sites as PEO during the relief voyage in April-May 2008. Mr Cooper suggested that after removing the platforms the sites be made 'no go' areas and be marked with poles and a botanist could be approached to monitor them. The Chair suggested use of conduit pipes and that they (Mr Cooper and Ms Jacobs) needed to include this information in their presentations onboard SA Agulhas en route to Marion Island for the forthcoming relief voyage. Mr Cooper added that 3m poles were required, cut to 1m and voyage participants be reminded not to take short cuts.

2.10 CTBTO Station RN62 - Marion Island

Province

The Chair reported that he had a meeting with Prof Faanorf who told him that they were looking at an alternative site in the North West. It was not final maybe the CTBTO station would be built in North West or on Marion Island. Mr Majodina enquired if there were maybe any pictures of the intended structure available. The Chair responded that for purposes of uniformity the structure should be similar to that of the new base.

2.11 Pollution at Marion base (biodegradable products)

Mr Buenk reported that there was little progress made. He elaborated that items had been ordered, received and already packed. The Chair suggested that some unnecessary products could be withdrawn for Marion Island and be sent to SANAE instead. Prof Chown stated that in his opinion he thought that ablution were over utilised and it was a health hazard. Mr Cooper suggested that Team Leader needed to be informed that some of the items would be withdrawn but Prof Chown requested retaining of toilet blocks because of high level use of facilities for purposes of human health. The team needed to be informed of the status on biodegradable products. The

Chair undertook to inform the team and Environmental Officers to add this matter in their presentations.

2.12 Quarantine Procedures: notice of new alien wasp at Marion, placement of crawling insect sticky traps on SA Agulhas, procedures and facilities at East Pier, etc.

The Chair reported that small sticky traps would be placed on SA Agulhas during construction voyage of March 2008, especially in places that handled food. Mr Cooper thanked the Chair and added that they would monitor them and they would do the inspection. The Chair stated that Ultra Violet lights would be installed before the take over voyage.

- Notification for SANAP voyage participants regarding gear checks and fresh produce

Mr Cooper enquired if there was policy on taking own food onboard the SA Agulhas. Prof Chown replied that fresh produce should not be taken onboard especially that it was supplied by the ship. He felt that that information should be documented and made available to inform participants. The Chair agreed and stated that a document would be drafted. Mr Cooper stated that in the mean time he would remind people during the environmental talks. Dr de Villiers stated that there had been a "gear checks" document that was provided to voyage participants before the voyage, but was not sure if it was still available. Ms Ngxabani-Tikana was to ascertain its whereabouts. Prof Chown mentioned that an information document had been provided to Principal Investigators, but felt that there should be an official document that participants needed to sign.

3. SANAP 3 VOYAGE PARTICIPATION DETAILS

The Chair stated that the D: EIE had gone through all the SANAP 3's and that the queries had been addressed. Mr Cooper queried guided tours for visitors to zone 2, indicating that there were various zone 4 species within this zone. The Chair stated that according to his knowledge when there were visitors/guided tours an experienced overwintering team member or Environmental Officer accompanied each group. Dr de Villiers suggested that if people needed to visit zone 3 areas they should be asked to provide reasons. Ms Jacobs stated that the Team Leader had submitted a request to operate an amateur radio station on Marion Island, and that the committee's endorsement was required. The PEIMC had no objections to this request.

3.1 Dr Andrew Collier

2 x takeover participants
Zones 1 – 2
Needed a guided tour

3.2 Prof Johan Lutjeharms

11 x takeover participants
Zones 1 – 2

3.3 Prof Melodie McGeoch

5 x takeover participants
Zones 1 – 3

3.4 Prof Steven Chown

6 x takeover participants and 3 x overwintering participants
Zones 1 – 3

3.5 Prof Hannes Rautenbach

1 x takeover participant
Zones 1 – 3

3.6 Prof Peter Ryan

2 x takeover participants and 2 x overwintering participants
Zones 1 – 4

3.7 Mr J Stander

1 x takeover participant and 3 x overwintering participants
Zones 1 – 3

3.8 Prof Marthan Bester

4 x takeover participants and 2 x overwintering participants
Zones 1 – 3

3.9 Mr John Cooper

1 x takeover participant
Zones 1 – 3

3.10 Mr Hennie Stassen

1 x takeover participant
Zones 1 – 3

3.11 Mr Henry Valentine

4 x takeover participants
Zones 1 – 3

3.12 Mr Henry Valentine

17 x overwintering participants
Zones 1 – 3

3.13 Dr Rob Crawford

2 x takeover participants and 2 x overwintering participants
Zones 1 – 4

3.14 Prof Valdon Smith

3 x takeover participants
Zones 1 – 4

3.15 Mr Danie Smit

1 x takeover participants
Zones 1 – 4

3.16 Prof Ian Meiklejohn

4 x takeover participants and 1 x overwintering participant
Zones 1 – 3

3.17 Dr Bettine van Vuuren

See doc. 3.4

3.18 Capt Dick Hilland
10 x takeover participants
Zones 1 - 4

4. NEW ITEMS

Presentation by Two Oceans Aquarium
The Two Oceans Aquarium, based in the V&A Waterfront, submitted a request to the Chair: PEIMC to capture penguins on Marion Island for exhibition at a new facility within the Aquarium, and provided a brief presentation to the PEIMC during the meeting.

In principle, the PEIMC supported the exhibition, however, the committee felt that a lot more research was required, that experts should be consulted with to provide advice on this matter, and that other options for acquiring penguins should be investigated. Ms Jacobs indicated that the same process should be followed as with the Pretoria Zoo's still-pending application, and that the previous correspondence should be consulted for relevant questions to be addressed and the relevant application form to be completed. A fully detailed motivation and application could then to be re-submitted for consideration.

5. CLOSING

The Chair thanked everyone for their inputs and attendance, especially those who had travelled from afar.

6. DATE OF NEXT MEETING

The members would be advised of the next date accordingly.

H R Valentine
CHAIR: PEIMC

Date:

Doc 2.1A

Solids in waste bank
- accumulate or can
empty & remove?

Preferably

① no drip a hole
② no backing
③ replaceable

Doc 2.1.A.

wosh hire

Woshbox Hire (Pty) Ltd
2008/001797/07
VAT No. 4400246593

Dear Erik

Thank you for your enquiry- in respect of 7 toilet systems for Marion Island. 8?

The system would include-

1. A single fibreglass foam insulated kiosk with one window as per the drawing.
2. A hydroloo waste processing system, including a venting system and specialized toilet bowl
3. A galvanised steel frame, boxed with galvanised sheet and blown with PU foam to insulate and contain the waste tank, and to provide a base mounting for the Kiosk.
4. All components will be flat packed in order that they may be transported by helicopter- ready for on site assembly, including all fixers and sub-assemblies as may be required.

The entire system ex-our Cape Town factory including transport packaging, sealants and assembly training would amount to R39 000-00 plus VAT each.

Possible extras that may be required are a Stair set
A lighting system.

Give the operational parameters described we anticipate that the system would work for up to 10 years with no further attention except possibly to occasionally clean the MBR filter. We will supply extra filter cartridges as required.

Sincerely

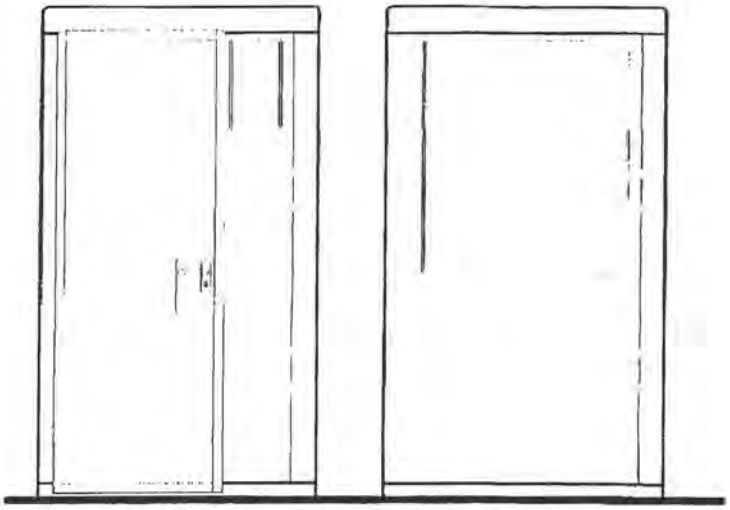
MJ Mackenzie for Woshbox.

Detailed drawings to follow your provisional acceptance of this quote, we would also require a better understanding of each location to ensure that the frames we build make it as easy as possible to install the units at each location. We would be able to provide qualified personnel to install on Marion Island if so required.

Modular Single or Double Kiosk

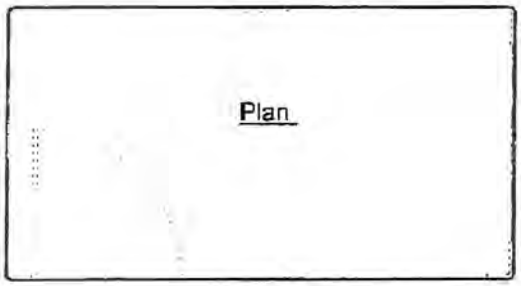
Interlocking Panel construction throughout to form self- supporting weatherproof cubicles with sanitary finishes, and flat continuous internal & external surfaces.
Interlocking rebates are set away from the smooth radius corners to create a neat chamfer edged rectilinear cubicle. Optional door & window panels (Layout variable) as shown below.

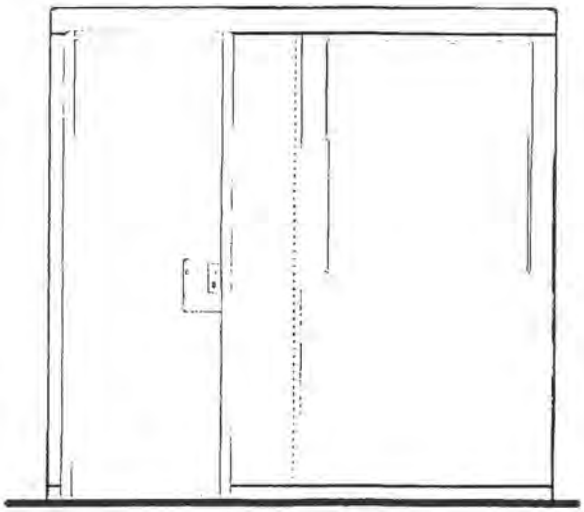
Single Kiosk



Door Elevation Elevation

Double Kiosk





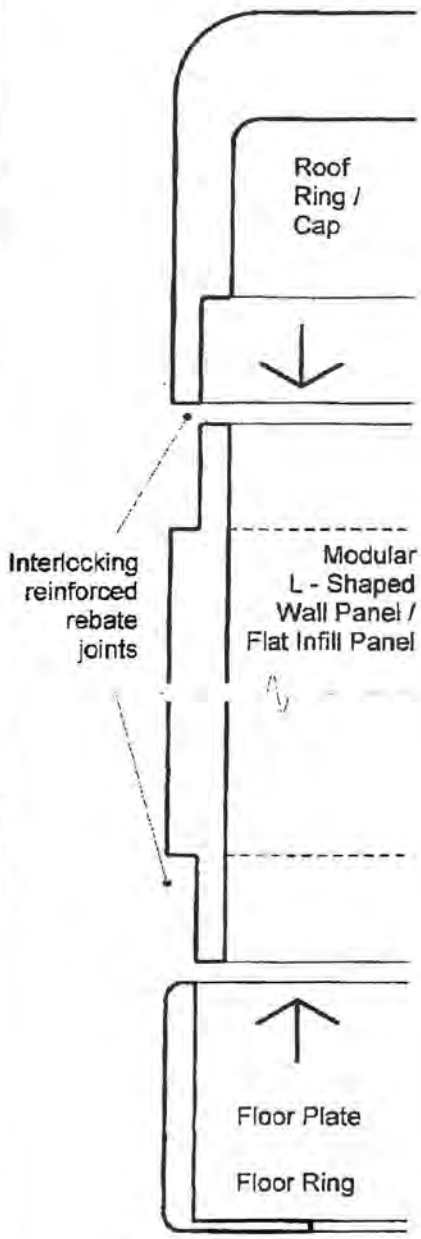
Door Elevation

Kiosk Sub - Assembly Plan

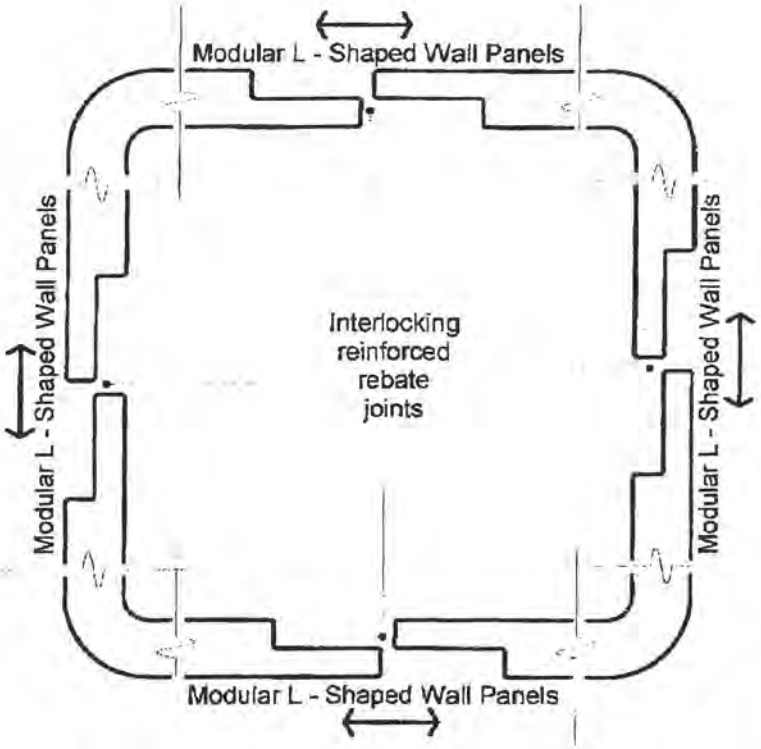
Showing the Schematic of Joints between modular components

Section Roof - Walls - Floor
Sectional Plan Walls Assembly
Sectional Plan Walls - Joiner Assembly
Sectional Plan Walls - Infill Panel Assembly

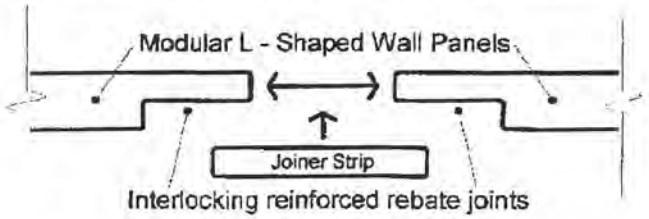
Section Roof - Walls - Floor



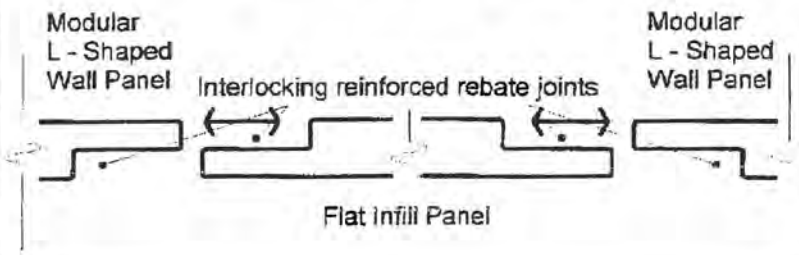
Sectional Plan Wall Assembly



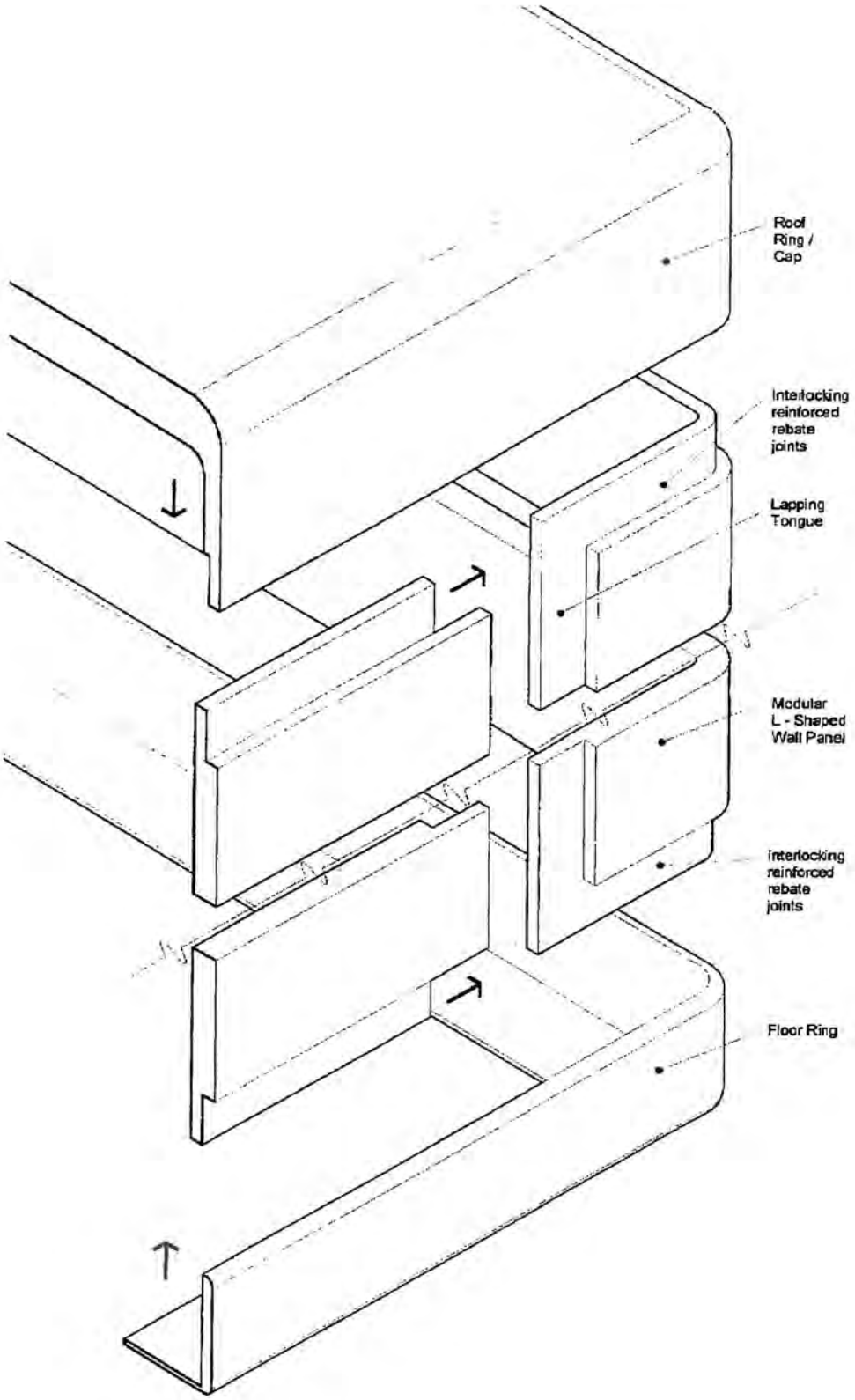
Sectional Plan Wall - Joiner Assembly



Sectional Plan Wall - Infill Panel Assembly



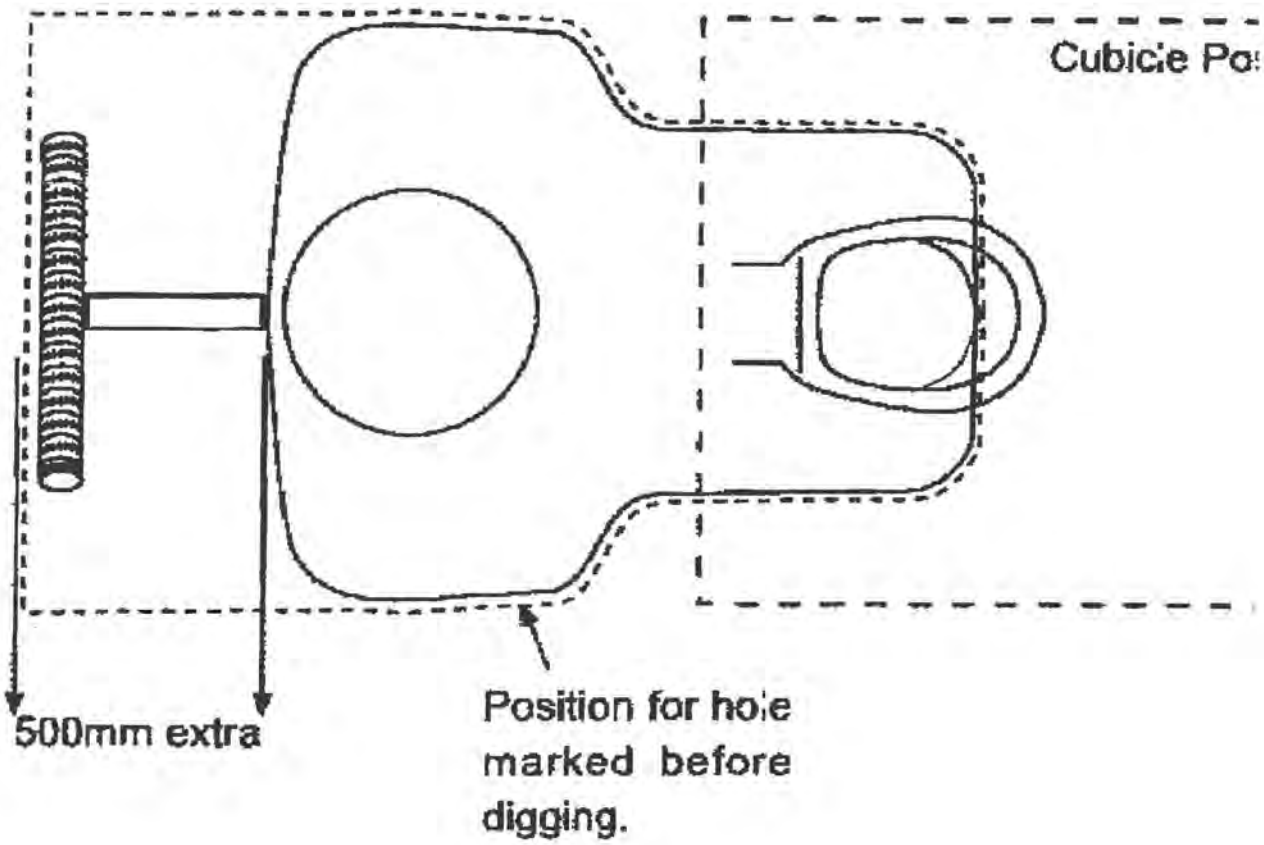
Kiosk - Exploded Isometric



STEP ONE

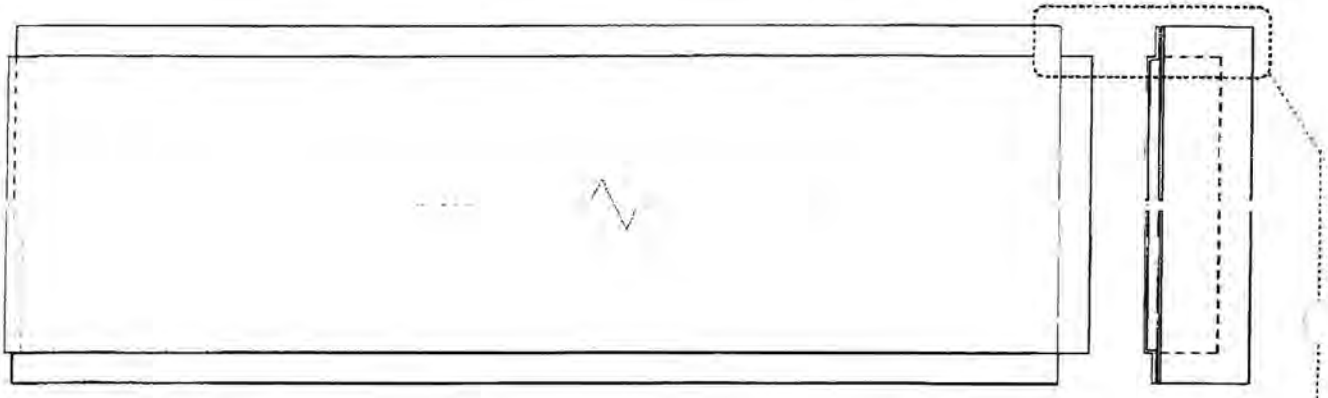
Digging of the hole

The hole should be marked out using the Hydralo
the pattern. Allow 500mm extra at the back of the Hydr
for the soak-away.

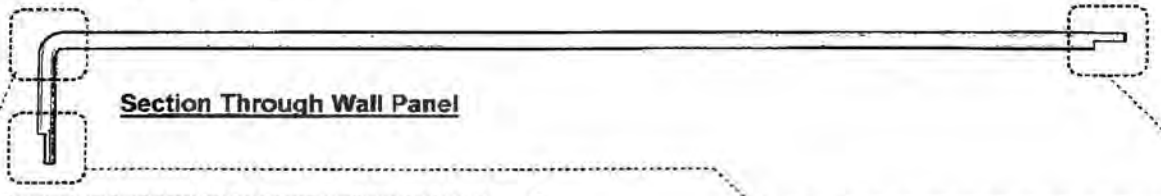


Modular Interlocking Corner Wall Panel

A Clam Shell Moulded Composite of GRP, Cotton Flock & Polyurethane Foam forms an insulated structural panel with a smooth flat finish inside and out.
The L - Shaped Panel (*see Figure 1*) interlocks via a continuous structurally reinforced rebated joint around the perimeter(*see Figure 2*). At the vertical edges of each panel 1 edge is lapped and the opposite edge is cut back to form a lapping tongue (*see figure 3*) horizontal rebates accept a roof ring/cap, a floor ring & floor plate to form a kiosk.



Front Elevation **End Elevation**



Section Through Wall Panel

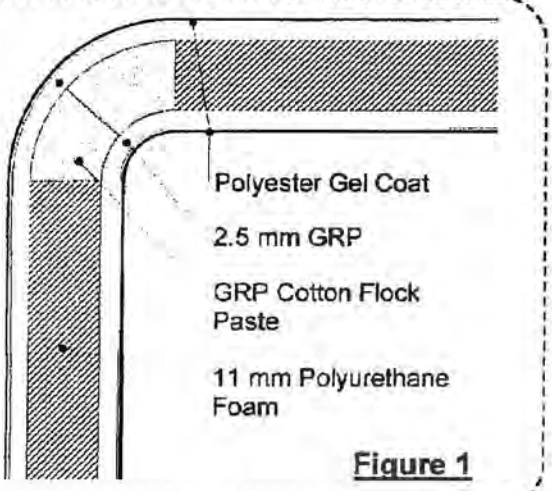


Figure 1

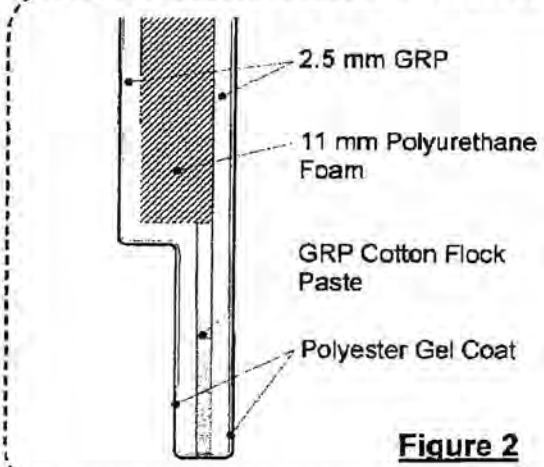
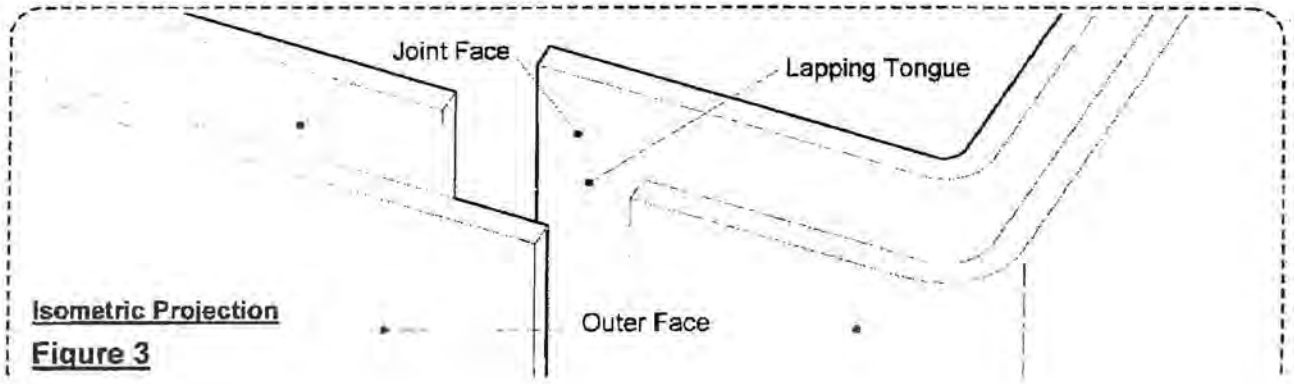


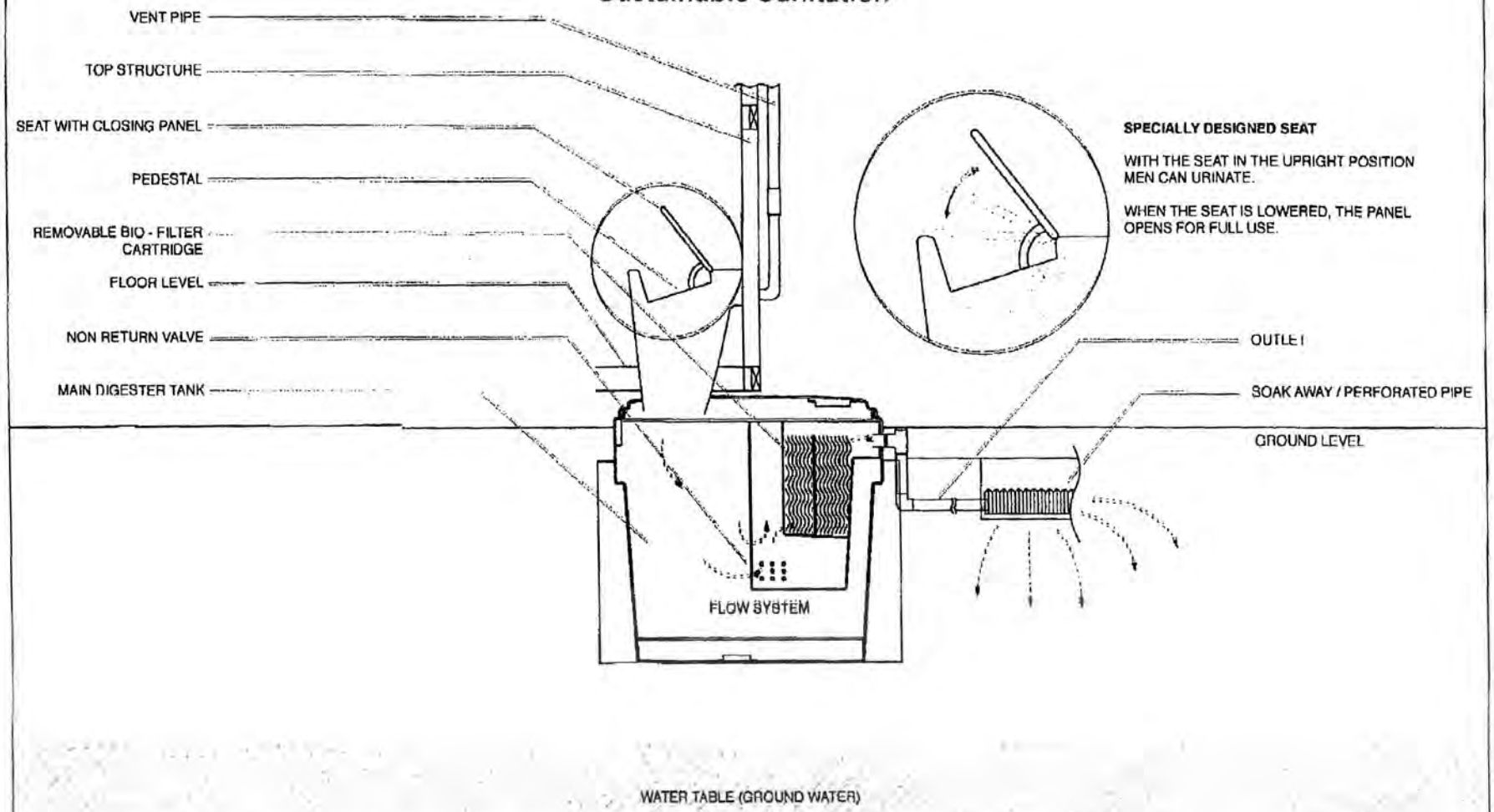
Figure 2



Isometric Projection

Figure 3

Sustainable Sanitation



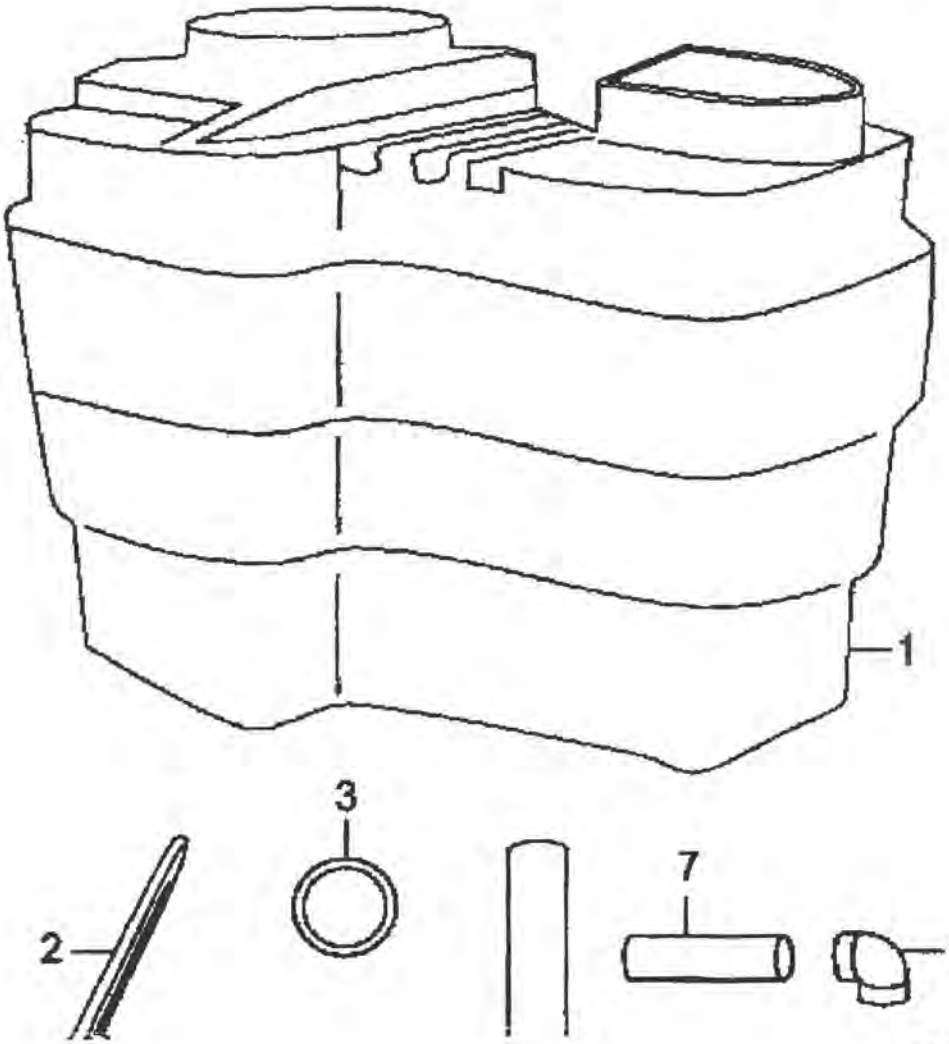
SA Biotech
Hydra-loo

Self Contained Mini Sewage Treatment Plant

Patent: 98/4506

Your Hydraloo System includes the following

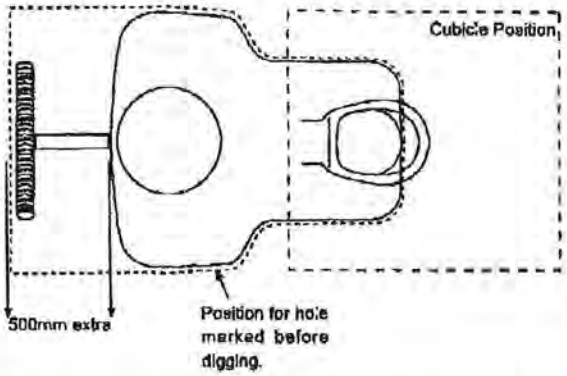
1. Septic Tank
2. Pedestal
3. Sealing Ring
4. 75mm Pipe (2m long)
5. 50mm Elbow
6. 50mm Pipe (500mm
7. 50mm Short Pipe
8. Black Perforated Pi
(Sub-terrain Pipe)



STEP ONE

Digging of the hole

The hole should be marked out using the Hydraloo as the pattern. Allow 500mm extra at the back of the Hydraloo for the soak-away.

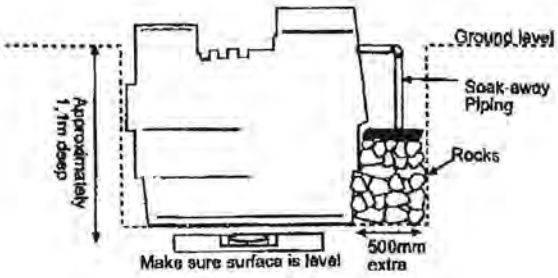


The hole required for the hydraloo has to be approximately 1,1m deep.

STEP TWO

Placing the tank into the ground.

The base of the hole must be leveled so that the tank is level when placed into the hole.



The only parts of the tank to be above the ground when closed with sand will be the man-hole and the pedestal insert.

Fit the piping for the soak-away at the rear of the tank, and place some rocks at the back of the tank around the piping where the water will soak-away.

The rocks only need to be a little higher than the sub-terrain pipe.

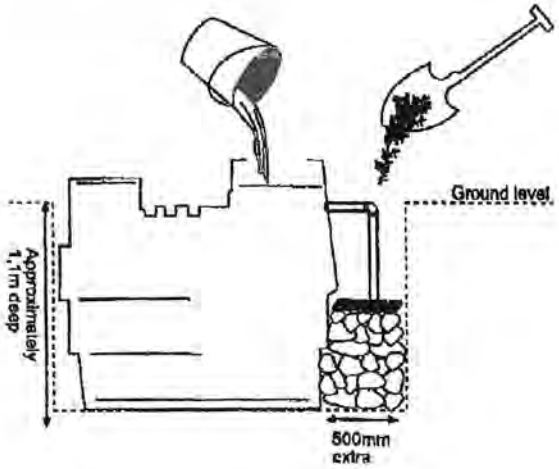
STEP THREE

Backfilling around the tank

Now the backfilling can be performed but this has to be done carefully not to collapse the sides of the tank.

Once the backfilling has been completed the tank can be filled with water. Once the tank has been filled with water the back filling can be compacted.

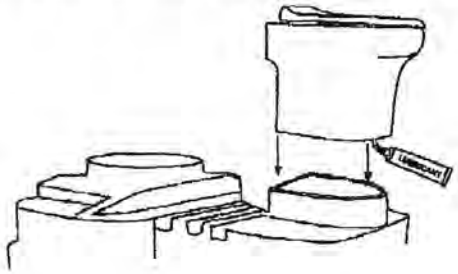
The area around the pedestal end must be compacted well so that the toilet cubicle does not sink away when it starts to rain at a later time.



STEP FOUR

Fitting the pedestal

The pedestal can now be fitted by putting some lubricant on the base of the pedestal, put into position. Push the pedestal down very hard, until it snaps into position.



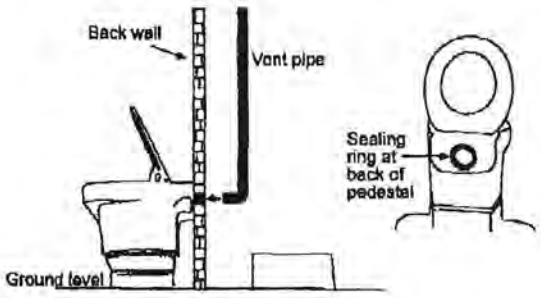
STEP FIVE

The vent pipe must now be fitted

The hole for the vent pipe must be made in the back wall of the cubicle in line with the vent pipe hole in the back of the pedestal.

The sealing ring which fits into the pedestal and around the vent pipe must now be fitted into the pedestal.

The Bend for the vent pipe must now be fitted through the wall and into the pedestal, now the long pipe can be fitted up the back of the cubicle. Once fitted, this pipe should sit above the roof.



Doc 2.2

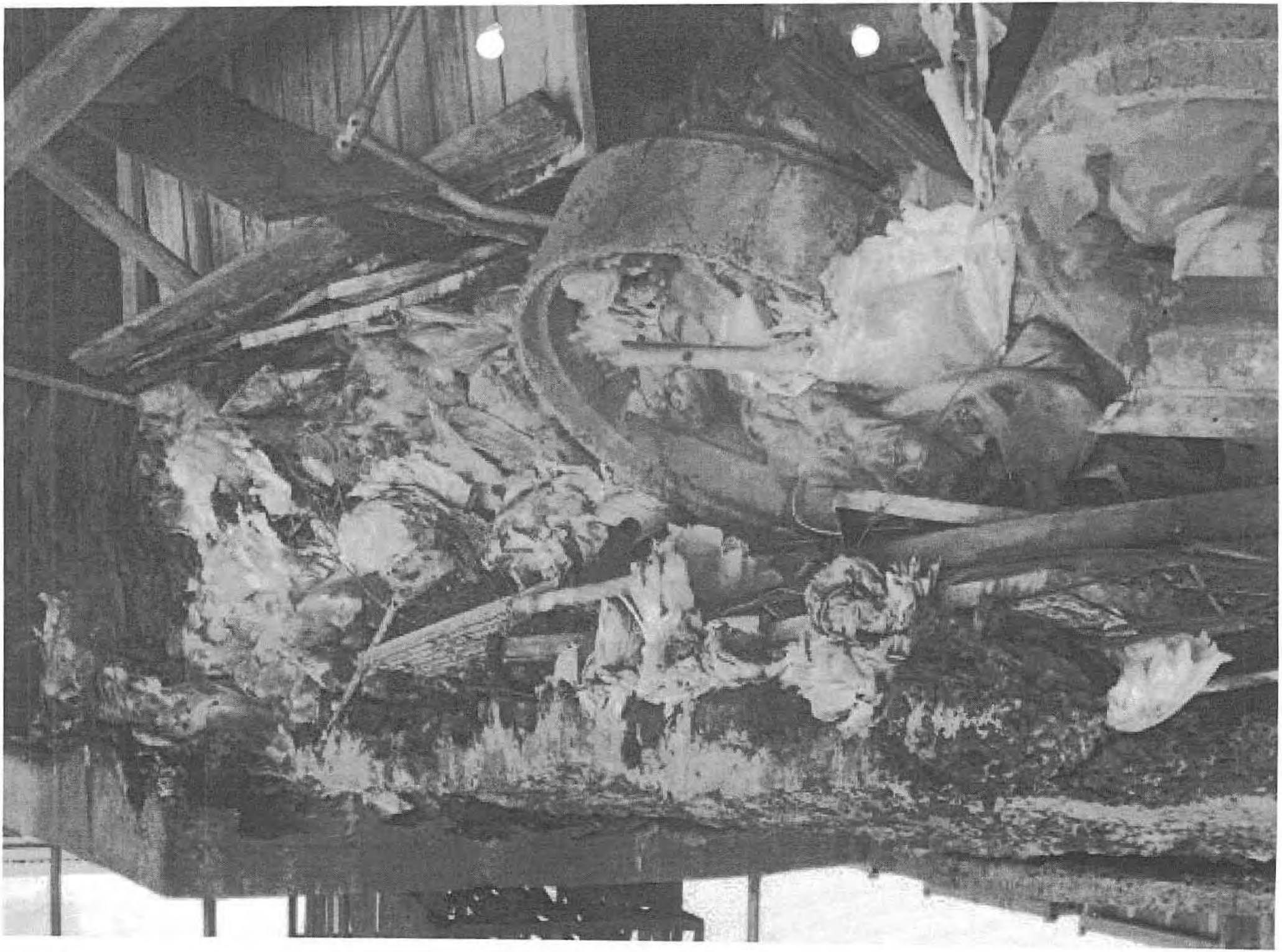
* Crane platforms rubble –
old EIA process – 2009 relief.

* Cat exclosure materials →
ask Retus – can be
collected into a cache
for a net pick up?

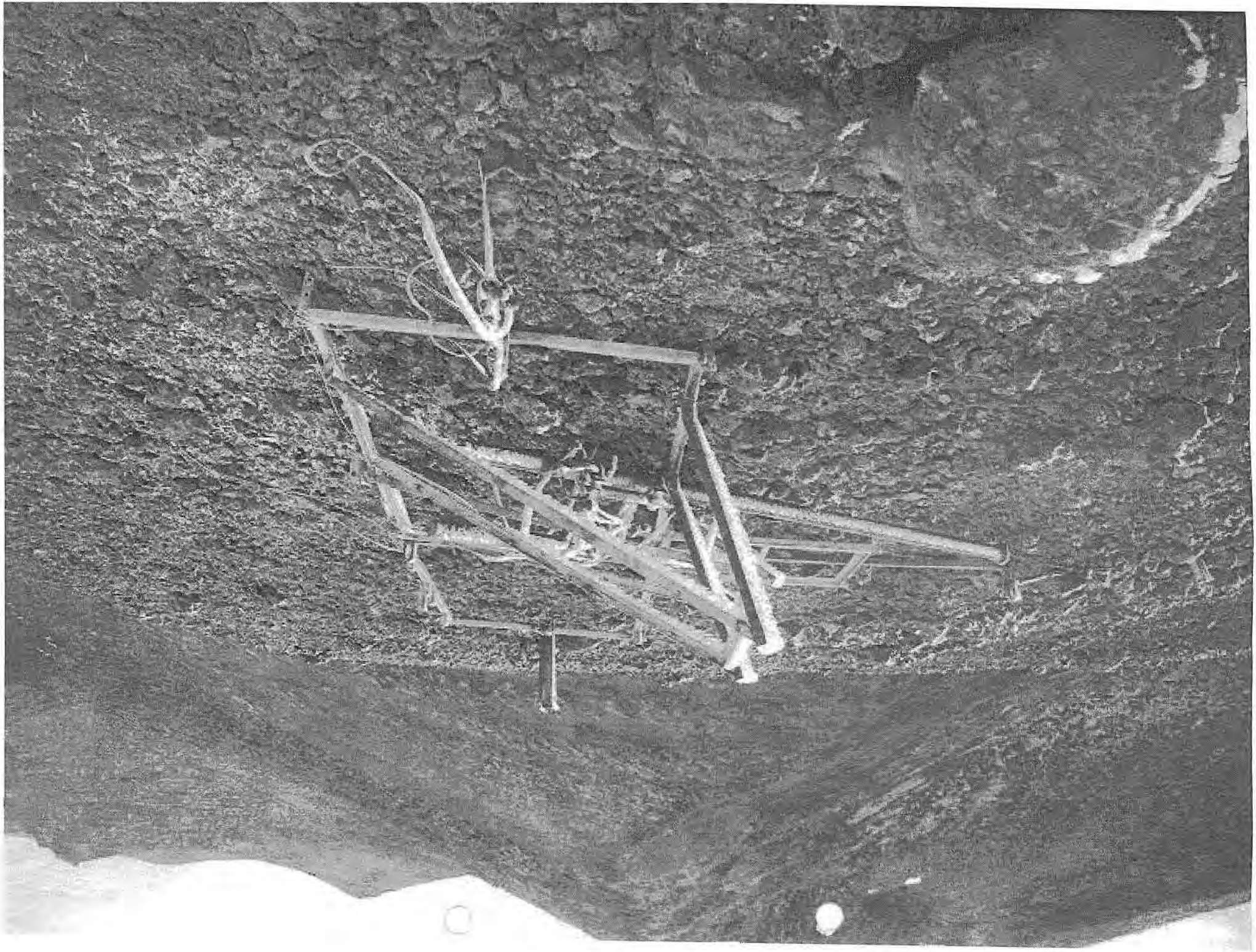
* Repeater station bases –
Gideon v. Zyl requests left in
place – but inspectors
can remove any loose pieces.

* JC volunteered to [illegible]
clean per ship 2009 relief.

Doc 2.2



Doc 2.2B



Doc 2.3

8. Agreed PETMC supports the PET option only.

8. Ask summer survey to collect a series of 'scenery' pictures

8 Discussion meeting planned for early 2009 c Ntsiki November in Pretoria
To attend
JC
Howard Hendricks.
Coral Jacobs/Davie Smit
Henry Valentine

Item 2.3a

From: John Cooper
To: Kngxabani-Tikana@deat.gov.za, NNovember@deat.gov.za
Akhwinana@deat.gov.za, CPhamoli@deat.gov.za, HValentine@deat.gov.za,
CC: RMahasha@deat.gov.za, Smancotywa@deat.gov.za, ZDaniel@deat.gov.za,
slchown@sun.ac.za
Date: Wednesday - October 29, 2008 11:03 AM
Subject: Re: PRINCE EDWARD ISLAND RENOMINATION FOR WORLD HERITAGE STATUS

Dear Kusi

Thank you for your message and the good news that South Africa is willing to pursue a renomination to the World Heritage Convention for its sub-Antarctic island group.

My views remains much as I put to the last meeting of the Prince Edward Islands Management Committee, and plan to do so again at its next meeting. This is that, rather than working towards a serial nomination at this stage, South Africa first submits only Prince Edward Island (the smaller and more pristine of the two islands in the group) down to low-water mark.

This, I believe, should stand a much better chance of acceptance, for several reasons:

1. It leaves out Marion Island, altered by mice and other alien species, as well as by the past effects of cats, etc.
2. It leaves out a marine component, for which much less is known (a critical comment in the IUCN review).
3. On a comparative basis Prince Edward will score highly when compared with other sub-Antarctic islands in the Kergeuelen biogeographical region (roughly the southern Indian Ocean).

In taking this view I am mindful of the following:

1. The most logical other sub-Antarctic island group with which to combine a nomination would be the French Crozet Islands, roughly 1000-km distance, not with the New Zealand islands in the southern Pacific, much farther away and biogeographically more distinct.

2. Preparing a combined ("serial") nomination would inevitably be a slow process, as it would presumably first require high-level negotiations between countries. As far as I know, the French do not currently have plans to nominate any of their islands in the Crozet Group to the WHC, and may not be sympathetic to the suggestion.

3. A successful nomination of Prince Edward Island would not obviate a later nomination of an expanded site, whether it be by including a marine component, Marion Island, or even a French island(s). A good example of this approach was the

inclusion of the UK's Inaccessible Island in the south Atlantic with Gough Island (already a World Heritage Site) to declare a new expanded site.

My suggestion is that you circulate this e-mail to all the members of the PEIMC, and that at its meeting next month we attempt to come to a concensus view (whether the above one or not) to forward to the South African World Heritage Convention Committee for endorsement.

The next stage would then be to prepare a new nomination document (rather, I think, than editing the old one). This could be done under contract as before, but the PEIMC should be closely involved, and the contract this time should go to an individual or group with a first-hand biological and physical knowledge of the sub-Antarctic, especially of the Prince Edwards.

In taking my view I am conscious of the multi-disciplinary biological survey of Prince Edward Island by DEAT's Marine & Coastal Management planned for this December. If it goes ahead successfully, a slew of new information will be come available, inter alia on numbers of and trends in birds and seals, more knowledge on the plants and invertebrates, including alien species, of the island, and of its historical sites. This would greatly add to the authority of a new nomination text, both in its breadth and by being up-to-date.

If the above scenario is followed, I could envisage a new nomination text being prepared under contract in the course of next year, allowing for an expert workshop, peer review, revision etc., with the aim of a submission to the WHC from 2010.

With kind regards

John

Co-opted member. PEIMC

>>> "Kusi Ngxabani-Tikana" <Kngxabani-Tikana@deat.gov.za> 10/22/08 4:09 PM >>>
Dear Ntsizi

Thank you for the update below and the minutes of the meeting held on 4 June 2008. The suggested collaboration with the sub-Antarctic Islands of New Zealand mentioned in your minutes also came up during the 24th Prince Edward Islands Management Committee (PEIMC) meeting held in Cape Town on 4 March 2008, hence copying Mr John Cooper (co-opt member of the PEIMC) in this e-mail as he is one of the people actively involved in this subject.
I will table the document (minutes) for further discussion during the 25th PEIMC meeting to be held on Friday 7 November 2008. I undertake to communicate the outcome to you for further action.

Kind regards
Kusi

Ms Khuselwa Ngxabani-Tikana
Assistant Director
Department of Environment and Tourism

Antarctica and Islands
P O Box 52126
V&A WATERFRONT
8002

Tel: +27 21 405-9421
Fax: +27 21 405-9424
Mobile: +27 84 540 3123

>>> Ntsizi November 10/22/2008 1:44 PM >>>
Dear Kusi,

Our telephone conversation of earlier today regarding the above-mentioned matter has reference.

As I informed you, since the withdrawal of the site before it was considered by the UNESCO World Heritage Committee in 2007, efforts to pursue the re-nomination of the Prince Edward Island was considered by the South African World Heritage Convention Committee (SAWHCC). I attached a copy of the Committee minutes for your information. Other than this, the matter has not been followed up from our side and your call this morning could be seen as a re-initiation of the project. To take the matter forward, I suggest that we convene a meeting of our sections to obtain a common ground on how we can take the matter forward. In one of our discussions with IUCN, it was recommended that we link the site with the SubAntarctic Islands of New Zealand that are already on the World Heritage List.

I will contact you to arrange for a meeting of our sections.

Regards

Ntsizi November
Tel: 012-310 38 29
Mobile: 072 678 0396

Doc 2.3

DEPARTMENT OF ENVIRONMENTAL AFFAIRS AND TOURISM

RECORD OF DECISIONS OF THE SOUTH AFRICAN WORLD HERITAGE CONVENTION COMMITTEE

Venue: 4th Floor Boardroom, Department of Environmental Affairs and Tourism, Pretoria

Date: 04 June 2008

Time: 09:00 to 15:00

Chairperson: Ms Skumsa Mancotywa

#	Agenda item	Resolution	Due Date
1	**Purpose of the Meeting**	Purpose of the meeting was highlighted primarily to be the revival of the intergovernmental South African World Heritage Convention Committee (SAWHCC) as per the Minister of Environmental Affairs and Tourism invitations to government departments and parastatals.	
2	**Presentation on the World Heritage Convention**	It was decided that the Secretariat should email the Powerpoint presentation that was made to all the Committee members.	6 June 2008

3	**Terms of Reference**	It was decided that:	
3.1	Inputs on the draft Terms of Reference	1. All Committee members will review the draft terms of reference of the Committee and submit their inputs to the Secretariat.	18 June 2008
3.2	Task team for the Terms of Reference	2. A task team will be established that comprises mainly of Committee members from the National Department of Foreign Affairs; Department of Arts and Culture; and Department of Environmental Affairs and Tourism to finalize the terms of reference. This task team was empowered to co-opt other members who will assist in improving the terms of reference.	June 2008
3.3	Development of Strategic Plan	3. Ms Hannetjie du Preez will draft the Committee's Strategic Plan that is aligned to provincial strategic planning processes. Ms Du Preez was empowered to co-opt any member that she will work with when she sees it fit. It should be noted that media monitoring will be part of the media strategy.	16 – 17 October 2008
3.4	Kimberley meeting records	4. The Secretariat will retrieve the Kimberley meeting records and circulate them to all members so as to empower their inputs.	10 June 2008
4	**Follow-up on implementation 31st session of World Heritage Committee decisions**		
4.1	Cape Floral Region Protected Areas	Progress report be provided to the next Committee meeting regarding: - Efforts towards establishing a single coordinating authority for the CFR Protected Areas - Increase of budget and staffing for public works programmes clearing of invasive species and monitoring of fires (responsibility of Management Authorities) - Preparation of Progress report for 33rd session of the	16 – 17 October 2008

		World Heritage Committee to be held in Spain	
4.2	Robben Island Museum	Progress report be provided to the next Committee meeting regarding: - Implementation of the IMP - Preparation of Progress report for 33rd session of the World Heritage Committee to be held in Spain	16 – 17 October 2008
4.3	Richtersveld Cultural and Botanical Landscape	Initiation of process for the nomination of the Succulent Karoo and a transboundary site with Namibia (responsibility of Mr Andrew Hall)	16 – 17 October 2008
4.4	Prince Edward Island	Initiation of process for the re-nomination of the Prince Edward Island as a serial site with the Sub-Antarctic Islands (responsibility of Secretariat with involvement of Western Cape Province and Marine and Coastal Management Branch of DEAT). The Committee highlighted that champions of the process should liaise with New Zealand and Australia.	16 – 17 October 2008
5	**32nd session of the World Heritage Committee**		
5.1	Vredefort Dome	Secretariat should circulate the IUCN's Vredefort Dome State of Conservation Report once it is available on the UNESCO World Heritage Committee website in order to afford Committee members a chance to inform State Party position on the issues. All the other documents for the 32nd session should also be circulated for the same purpose.	June 2008
5.2	Circulation of Documents	Ms Hannetjie du Preez was supported as the Committee's lead on the item of World Heritage and Astronomy and that she should present the Committee's recommendation on the item to the South African Delegation to the 32nd session.	July 2008

6	**Other matters**		
6.1	Boundary demarcation process	Secretariat should develop a diagram illustrating standard processes that are and should be followed when determining boundaries of potential World Heritage sites	16 – 17 October 2008
6.2	State of conservation presentation template	Mr Roger Porter should develop, in consultation with members he will co-opt into a task team, a template for reporting the Committee on the State of Conservation by World Heritage Management Authorities.	16 – 17 October 2008
6.3	World Heritage Listing Process Document	Secretariat should circulate to members a World Heritage Listing Process Document (developed by the previous Committee) for review with the possibility of its adoption at the next meeting.	10 June 2008
6.4	Circulation of SAWHCC Documents	Secretariat should circulate all future Committee documents on CD-ROM and further explore the possibility of creating a SAWHC Committee page on the DEAT Website for communication with members.	16 – 17 October 2008
6.5	Circulation of Management Effectiveness Toolkit	Secretariat should circulate the toolkit for management effectiveness that was presented at the Durban +5 meeting in Cape Town.	10 June 2008
6.6	Inclusion of CBD Programme of Work on Committee agenda	Secretariat to include on the agenda of the next Committee meeting an item on the CBD Programme of Work.	16 – 17 October 2008

Doc 2.5

PEIMC — letter to WWF-SA/Dean nel
Keuling for repat
& giving our ~~repa~~ concerns ~~approval~~ &
say we'ing forward to
then cc DG declaration

DRAFT MANAGEMENT PLAN FOR THE PRINCE EDWARD ISLANDS MARINE PROTECTED AREA

Compiled by Dave Japp[1], Martin Purves[2*] and Deon Nel[3]

[1]Dave Japp, Capricorn Fisheris Montoring cc, P.O. Box 50035 Waterfront Cape Town, 8002,

Email: dave@capfish.co.za

[2]Martin Purves, Capricorn Fisheries, Montoring cc, P.O. Box 50035 Waterfront Cape Town, 8002

**Current address Marine Stewardship Council,*
P.O. Box 7107, Roggebaai 8012,

[3] WWF Sanlam Living Waters Partnership, WWF South Africa, Private Bag X2,
Die Boord, 7613, South Africa.

1. INTRODUCTION

The management of marine living resources in South Africa is a national responsibility, and marine protected areas (MPA's) are declared under the *Marine Living Resources Act (No. 18 of 1998)* (MLRA). The Prince Edward Islands themselves (i.e. the terrestrial land above the high water mark) are currently declared as a Special Nature Reserve under the National Environmental Management: Protected Areas Act 57 of 2003 (NEMPA). The reserve is currently managed in terms of a management plan (PEI-MPWG 1996), soon to be replaced by a revised version – the Prince Edward Islands Environmental Management Plan - that takes account of the provisions and requirements of NEMPA. The plan set out here, the "Prince Edward Islands Marine Protected Area Management Plan" describes how the Department of Environmental Affairs and Tourism (DEAT) intends managing the Prince Edward Islands Marine Protected Area primarily through its Branch: Marine and Coastal Management (MCM).

Citation: D. Japp, M. Purves & D. Nel. 2008. Draft Management Plan for the Prince Edward Islands Marine Protected Area. *In:* Nel D. & Omardien A. (eds). *Towards the Development of a Marine Protected Area at the Prince Edwards Islands.* WWF South Africa Report Series - 2008/Marine/001.

The territorial waters and Exclusive Economic Zone (EEZ) surrounding the Prince Edward Islands are located in the Southern Ocean (42°45'-50°45'S, and 32°45'-43°E) and are home to unique marine biodiversity not found elsewhere within South Africa's marine jurisdiction. Unfortunately, the Prince Edward Islands' territorial waters and EEZ have also been subjected to significant impacts during the last decade, mostly as a result of Illegal Unreported and Unregulated (IUU) fishing activity during the late 1990s. The development of a Marine Protected Area (MPA) surrounding the Prince Edward Islands has been strongly advocated by the Minister of Environmental Affairs and Tourism as a means of conserving and protecting these unique biodiversity assets and restoring some of the damage to the ecosystem that has occurred from 1990 onwards. The final delineation of the Prince Edward Islands MPA is the result of a thorough science-based planning exercise (Lombard *et al.* 2007) and consultative process (Nel *et al.* 2006). Further, the rationale for establishing a MPA around the Prince Edward Islands includes the following:

a) **The International Status, Uniqueness, Pristine Nature, and High Level of Endemism of the Island Group**

In an assessment of the status of Southern Ocean islands, Chown *et al.* (2001) demonstrated that Prince Edward Island is one of the most pristine islands in the Southern Ocean, emphasising the need to limit future human intervention as far as possible. The Special Nature Reserve status accorded the Island Group represents South Africa's highest form of protected status, equivalent to a World Conservation Union (IUCN) Category 1a reserve, dedicated to science. Commercial tourism is not allowed within a Special Nature Reserve in terms of the NEMPA. An original proposal made in 2000 by the Prince Edward Islands Management Committee, South Africa has recently recognised the exceptional value of the Prince Edward Islands by nominating the islands and their territorial waters for inscription in the 1972 Convention Concerning the Protection of the World Cultural and Natural Heritage (World Heritage Convention[1]) (Fischer et al. 2006) with a decision by the World Heritage Convention expected to be made by mid 2007 (Appendix 2). Further, in May 2007 the Prince Edward Islands received international recognition by being registered with the Ramsar Convention on the Conservation of Wetlands of International Importance. This development is highly significant in as much as the Prince Edward Islands have become the very first Ramsar Wetland of International Importance in the sub-Antarctic region, making South Africa a world leader in this regard. The Prince Edward Islands' Ramsar Wetland extends 500 m offshore so as to include the inshore shallow waters and their kelp beds and rich benthic life, as well as the various land-based inshore predators, such as several species of penguins.

1 Note: World Heritage Convention – South Africa has submitted the Prince Edwards Islands for recognition as a World Heritage Site. The World Heritage List includes 830 properties forming part of the cultural and natural heritage which the World Heritage Committee considers as having outstanding universal value. Ref: http://whc.unesco.org/en/tentativelists/1923/

b) The Inseparable Relationship between the Marine and Terrestrial Environments

Terrestrial nutrient input (and thus ecosystem functioning) is strongly driven by birds and seals that forage in the marine environment, and then provide nutrients to the ocean via run-off from the land (Frost 1979, Froneman & McQuaid in press, Smith & Froneman in press). Protection of the terrestrial environment is thus reliant on a healthy marine environment.

c) The Foraging Requirements of the Top Predators

Many bird and seal species breed on the Islands (e.g. Williams et al. 1979, Condy 1981, Hofmeyr & Bester 1997, Chown et al. 1998a, Pistorius et al. 1999a, Crawford & Cooper 2003), and forage either close to the Islands within 12-nautical mile territorial waters (inshore feeders), or within and beyond the 12-200-nm EEZ (offshore feeders). The birds especially are affected both indirectly (competition for resources), and directly (incidental mortality), by fishing activities in the area. Many of these bird species are globally threatened (Crawford & Cooper 2003).

d) Impact of Global Climate Change

There is evidence that the Islands are being rapidly impacted by climate change (Smith 1991, Bergstrom & Chown 1999, Pakhomov & Chown 2003). Any anthropogenic reduction in the resilience of species occurring within the EEZ may render them locally extinct, for example, if sea surface temperatures change drastically (Mélice *et al.* 2003), or if the position of the oceanic fronts moves farther south (Lutjeharms *et al.* 2002). There is evidence that many birds and seals forage in the vicinity of these fronts (Jonker & Bester 1998, Nel *et al.* 2001).

e) The Precautionary Approach

Benthic surveys have been conducted only on the shelf between the two islands (Beckley & Branch 1992, Branch *et al.* 1993), and very little is known about the benthic habitats within the EEZ. Un-described species, as well as major geological features (such as hydrothermal vents on the Southwest Indian Ridge), are all likely to occur within the EEZ. Given that there is potential for oil and gas exploration in the area as well as an interest in ship-based tourism (especially if World Heritage Status is obtained), representative habitats need to be set aside to mitigate future threats. A number of shipping-related processes threatens the marine (and therefore terrestrial) environments. These include the introduction of alien species, via ballast water or on hulls (Frenot *et al.* 2005); pollution such as from oil spills (Cooper & Condy 1988) and other wastes; light pollution leading to bird strikes on vessels; and the discarding of fishery-related gear leading to harmful effects on both seals and birds (Nel & Nel 1999, Hofmeyr *et al.* 2002). At present fishing vessels are permitted to use the lee of the island to shelter from storms, although no fishing is currently allowed within 12 nautical miles (territorial waters) of the Island Group, creating a *de facto* marine reserve.

f) A National and Regional Network of MPAs

The creation of a Marine Protected Area around the Prince Edward Islands will complement the existing and planned network of South African MPAs, all of which are situated along the continental coastline, thus ensuring that all South African biomes, including the sub-Antarctic, have significant portions being within legal protection. Further, a South African MPA within its sub-Antarctic territorial waters/EEZ will match and complement the two Marine Parks (equivalent to MPAs) recently declared by Australia in the territorial waters/EEZs of its sub-Antarctic island groups: Macquarie, and Heard and McDonald (Environment Australia 2001, 2005) and by New Zealand in the territorial waters around its Auckland Island Group (New Zealand Department of Conservation, 2007), thus contributing to a developing network of MPAs both within the Southern Ocean and globally. It will also lend support to ongoing efforts by international bodies such as the Antarctic Treaty through its Committee on Environmental Protection, the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) and the World Conservation Union (IUCN) (e.g. Kelleher 1999, Gjerde & Breide 2003, ATCM 2005, CCAMLR 2005, CCAMLR-XXIV 2005).

1.1 Objectives and goals of the Prince Edward Islands MPA

The overall objectives of the Prince Edward Islands MPA are[2]:

1) *To contribute to a national and global representative system of Marine Protected Areas, by providing protection for endemic and rare species, species with globally significant populations, habitats and ecosystem processes,*
2) *To serve as a scientific reference point that can inform the future management of the area,*
3) *To contribute to the recovery of the overexploited Patagonian toothfish* Dissostichus eleginoides *population.*
4) *To reduce the incidental mortality of particularly albatrosses and petrels in the Patagonian toothfish fishery (Nel & Nel 1999, Nel et al. 2002c) as well as controlling the by-catch of fish and other marine species other than Patagonian toothfish in the commercial fishery*

Further, implementation must also address four strategic components, these being : bio-physical, socio-economic, governance and compliance objectives as outlined in the Section 4 herein.

[2] Noting that these objectives were accepted following a thorough consultative process

1.2 Development of the PEI-MPA Management Plan

In June 2004 the Minister of Environmental Affairs and Tourism announced his intention to declare one of the largest MPAs in the world around the Prince Edward Islands. Following this, DEAT, with support from the WWF Sanlam Marine Programme, put together a process to develop a spatial marine biodiversity conservation plan that would inform the delineation of the proposed MPA. This plan was developed with extensive consultation with stakeholders (including the fishing industry and interested civil society groups). The plan was finalised in January 2006 and has been published as a paper in the peer-reviewed international scientific journal *Antarctic Science*, as a testimony of the scientific integrity of the process (Lombard *et al.* 2007). Furthermore, the proposed regulations pertaining to the MPA were developed as a result of a series of workshops and consultations with all stakeholders during the period March to May 2006 (Nel *et al.* 2007).

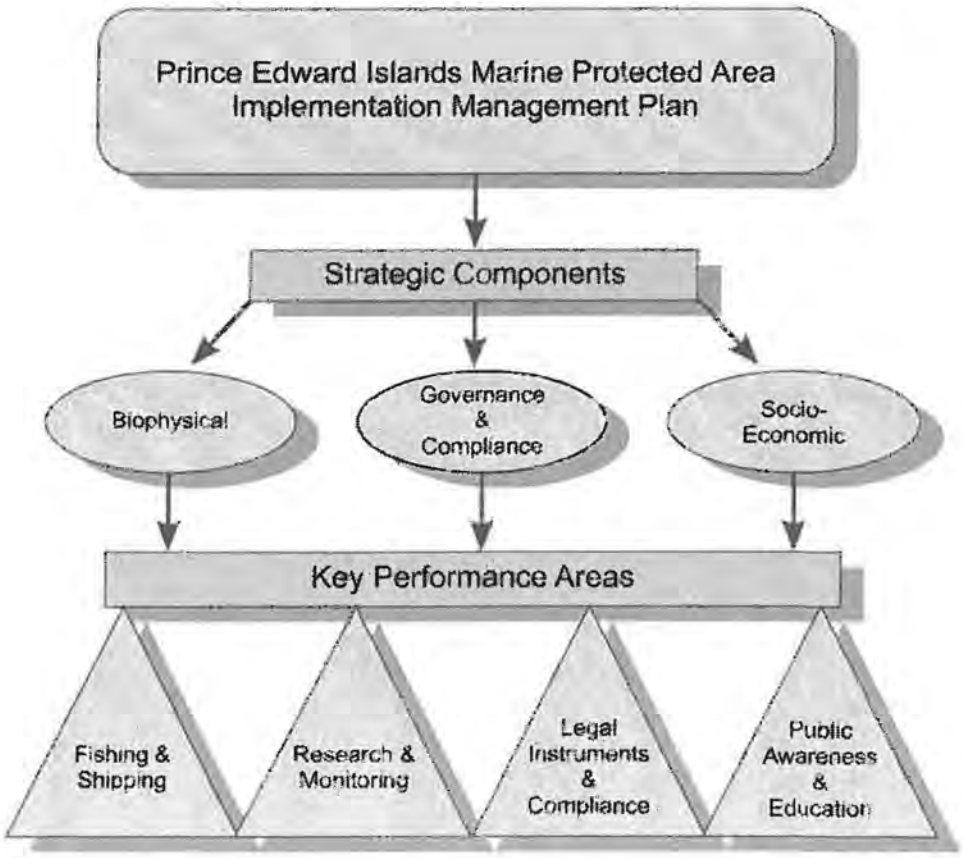


Figure 1. Key Components of the Prince Edwards Island Marine Protected Area Management Plan

The current plan (structure shown in Figure 1) draws on international experience of MPA management and relevant guidelines published by the World Conservation Union, and incorporates legal and institutional requirements. An annual review of the management plan and regulations is prescribed for the first three years from adoption and thereafter reviews will be required every five years. The implementation of the MPA incorporates strategic components, which outline overarching strategies that are essential if the objectives are to be met, many of which will need to be conducted in collaboration with Marine and Coastal Management. Also, key performance areas have been determined which are the ongoing requirements that managers must address to meet or maintain the goals. There are also sections devoted to Compliance, Education and Awareness, Research and Monitoring. These are activities with specific requirements that must be fulfilled if all the objectives of the Prince Edward Islands MPA are to be met.

2. DESCRIPTION OF THE AREA

2.1 Geography, habitat and history

The territorial waters and EEZ of the Prince Edward Islands extending 200 nautical miles from the islands cover 528 020 km^2 and lie in the Southern Ocean between 42°45'-50°45'S, and 32°45'-43°E and comprise four broad habitats: the Southwest Indian Ridge in the northwest, a plateau area with seamounts and rises in the northern half; an abyssal area in the southern half; and the islands and the shallow waters between them in the centre (Figure 2). The two islands, Marion and Prince Edward, which have a combined terrestrial area of 339 km^2, represent the peaks of a volcano that had its last minor eruption on the south side of Marion Island in 2004. The suggested age of the islands is approximately 0.5 to 1 million years old.

The earliest evidence of the existence of the Prince Edward Islands can be dated back to the 4th March 1663 when the 1 210-ton Maerseveen passed the islands *en route* to Java (Cooper & Headland 1991, Cooper in press). One hundred years later the Islands were "re-discovered" by Marion du Fresne in 1772 who never landed on the Islands due to bad weather. He eventually realized the land he thought was the Southern Continent was actually only islands, and named the group the Frigid Islands and left. Five years later Captain James Cook came across the islands. His chart did not give the names bestowed by du Fresne and so he renamed them both the Prince Edward Islands (after the fourth son of King George III). At a later stage the larger island of the group was named Marion (in honour of du Fresne). Cook and other southern explorers essentially sparked the economic interest in the islands after they reported a wealth of animal life on and around them. Visits by whalers and sealers increased rapidly, and the whalers were believed to have used the islands as temporary shelter for their ships. The sealers on the other hand went ashore to specifically obtain skins and oil from the seals.

One of the first documented biological records were observations and collections of seabirds during a British sealing exhibition in 1830-1831. Later, in April 1840, the HMS Erebus of Captain James Clark Ross' expedition made dredges at the Prince Edward Islands to collect marine animals and in 1873, a British corvette, the HMS Challenger, arrived at the islands as part of a scientific research expedition that circumnavigated the globe. A landing was made on Marion Island and the day was spent exploring and collecting samples and specimens. During this time the captain dredged and trawled in the channel between the two islands and around their coastline and made topographical surveys of the area. Soundings were also made that were carefully plotted and the chart that was compiled from their few days' stay remained the only reliable graphic source of information available since the first discovery of the islands (in 1663) and the time of annexation (in 1947). No landing was then made on Prince Edward Island and therefore no biological information could be gathered. Prince Edward Island remained untouched by scientists until after the islands' annexation in 1948 with the first scheduled research visits only carried out in 1965. At least eight vessels have floundered off the Prince Edward Islands between the time of their discovery in 1663 and annexation in 1947. Of these eight, five were wrecked in the vicinity of Prince Edward and three at Marion Island (the sites of all but one wreck at Marion Island remains unknown and no evidence of them have been discovered).

2.2 Annexation and occupation

South Africa became increasingly aware of the islands' strategic position after the Second World War, both for defence and navigation, and set about annexing the islands in December 1947. Marion Island was annexed on the 29th of December 1947 and Prince Edward Island on the 4th of January 1948. The first team to occupy Marion was a meteorological team in February 1948 and the first scheduled research visit to both islands took place in January 1965. The research expedition in 1965 was also the first "official" visit to Prince Edward Island since the annexation[3]. The only visits to Prince Edward Island since then have been strictly of a scientific nature with all visits being of short duration during relief voyages to Marion Island.

South Africa's scientific base is situated on Marion Island at Transvaal Cove[4]. Initially, the meteorological station set up after annexation was the primary reason for the continued staffing and occupation of the Marion base. Scientific work (mainly biological research), now forms one of the major reasons for the maintenance of the scientific base on Prince Edward Island. The information gained from nearly half a century of near-continuous biological research has resulted in an almost unparalleled understanding of the islands' animals, plants and ecosystems, both in a South African and in a global context. This has set the stage for addressing many of the Island Group's environmental management challenges and for advancing our understanding of the Island Group's ecosystem. Examples of the former include the very successful feral cat eradication programme that took place in the late 1980s,

[3] Noting that Prince Edward island is not occupied permanently and there is no established weather station
[4] Construction of a new base started in August 2003 and was scheduled for completion in 2008

and the current studies on the effects of fishing in the Southern Ocean on bird and mammal species. Because of their unique location in the world, understanding the effects of climate change on the islands ecology is likely to provide a baseline for helping understand the global impacts of climate change.

2.3 Climate

The Island Group is situated in the "Roaring Forties" and is subjected to westerly to north-westerly winds approximately 60% of the time. Gale force (>55km/h) winds lasting at least one hour are experienced for an average of 107 days a year. Gales usually exceed this speed and duration, however, and can reach 200 km/h. Winds exceeding 70km/h often continue unabated for more than 24 hours. The climate of the Prince Edwards Islands is therefore cool with an annual mean air temperature of 5.9°C. The maximum and minimum temperatures recorded at the base are 23.8°C and - 6.8°C, respectively. Although minimum temperatures below zero occur every month of the year, winter temperatures rarely fall below -4°C because of the moderating influence of the ocean. The mean surface air temperature has increased by 0.93°C from 1951 to 1988 and is believed to be as a result of changing oceanic and atmospheric circulation (Chown *et al.* 2001).

The Island Group experiences an average of 25 days of precipitation a month (308 days average a year). Rainfall is relatively high with an average of 2,500 mm a year, mainly in the form of rain, which is distributed fairly evenly throughout the year. Most of the rain falls as light showers with heavy falls of over 25mm/day occurring on average, twice a month. Marion Island research base experiences an average of 95 days of snow and 46 days of fog a year. Snow is more frequent in winter, particularly from July to September and sometimes covers the whole of Marion Island. In low-lying areas the snow usually melts within a few days. Marion Island also experiences high cloud cover with only a 30% estimate of direct (cloud free) sunshine annually. On average, no days with more than 90% of possible sunshine are encountered including an annual average of 130 days with a cloud base below 300 m above sea level.

2.4 Marine environment

The Island Group, along with many other islands (Figure 2) is in the path of one of the world's widest current systems, the Antarctic Circumpolar Current (ACC), which flows clockwise around the Antarctic Continent at a surface speed of 0.5-2km/h. Consequently the Island Group has an upstream (westerly-facing) and a downstream (easterly or sheltered) side. The importance of this is that the land-based vertebrate predators depend on the sea for food with the availability of food dependent upon oceanographic conditions. The ACC carries the primary food supply, in the form of plankton, to the Island Group from the west.

The marine environment around the islands is complex due to their position within the Indian sector of the Polar Frontal Zone (PFZ), which is delimited by two of the main frontal systems of the Southern Ocean, the Sub-Antarctic Front (SAF) to the north and the Antarctic Polar Front (APF) to the south. These fronts separate major water bodies with different chemical and physical properties that act as strong bio-geographical boundaries with different suites of marine species to the north and south of each front. These fronts are areas of enhanced biological activity and their location is dynamic, changing with wind direction and intensity as well as being affected by the oceanic topography which may result in deviations of the frontal flow patterns. In the Antarctic region, the PFZ is characterised by numerous small islands that seasonally are home to an abundance of predators including flying seabirds, penguins and seals. These islands (which include the Prince Edward Island Group) are also important feeding grounds for land-based predators further underpinning their importance in the ecosystem. Importantly, all the vertebrate predators that are found on these islands are reliant directly or indirectly on the surrounding ocean for their food encompassing the whole marine food chain including zooplankton, fish and squid.

The Prince Edwards Islands have relatively unstable and hostile littoral environments, resulting in a generally low biodiversity and low density of littoral organisms. Due to the predominantly westerly winds, the shores around the islands are exposed, especially those with a westerly aspect. Weathering from large swells and unstable substrates (e.g. boulders) has resulted in abrasion that further contributes to the harsh environmental conditions. The Prince Edward Islands also form the highest point of a shallow oceanic plateau, approximately 200 to 500 m deep, that drops off very rapidly into much deeper waters (ca 3 000 m). This plateau supports a rich seabed community of approximately 550 species, dominated by filter feeders, which are largely supported by local phytoplankton production. The swimming prawn *Nauticaris marionis* is the primary link between this community and seabirds. Adult prawns feed on the fauna on the seabed and themselves are an important component in the diets of most birds with short foraging ranges, especially the Gentoo *(Pygoscelis papua),* Macaroni (*Eudyptes chrysolophus*) and Rockhopper (*Eudyptes chrysocome*) penguins as well as the Imperial cormorant, *Phalacrocorax [atriceps melanogenis.* (also known as the Crozet Shag).

Figure 2/...

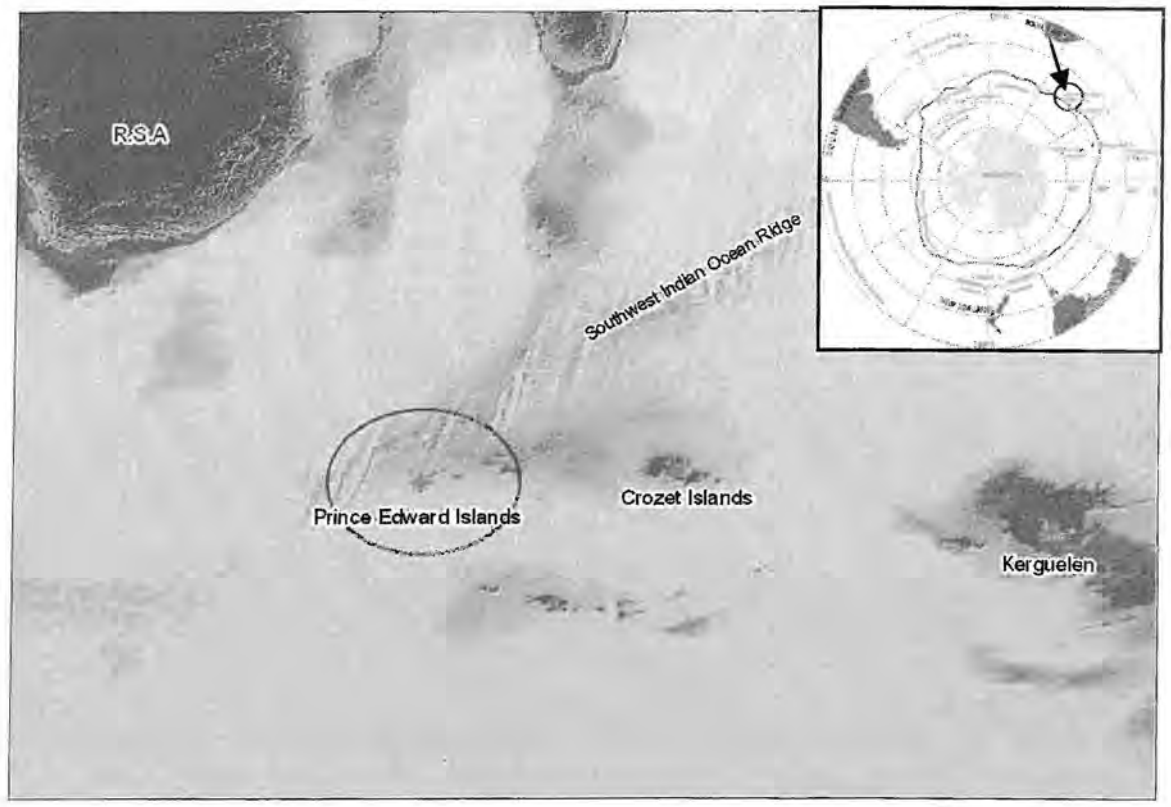


Figure 2. The location of Marion and Prince Edward Islands, 1,000 km southeast of South Africa, in the Southwest Indian Ocean. The nearest eastward islands to the Prince Edward group are the French Crozet Islands. The inset shows the relative position of the Prince Edward Islands in the Antarctic to the continental masses to the north as well as the approximate position of the Antarctic Polar Front.

2.4.1 Marine Flora and Fauna

Marine mammals, fish, birds (bird breeding/roosting sites), invertebrates (including corals), plants and habitats are all vital components of the Prince Edward Islands' ecology that will benefit from a Marine Protected Area.

Mammals

Three seal species breed on the Island Group: the southern elephant seal *Mirounga leonina*, Antarctic fur seal *Arctocephalus gazella*, and sub-Antarctic fur seal *A. tropicalis*. Leopard seals *Hydrurga leptonyx*, Weddell seals *Leptonychotes weddelui* and South African (Cape) fur seals *A. pusillus* are occasional non-breeding visitors. Pods of killer whales *Orcinus orca* frequent both islands in summer. Other cetaceans sighted around the islands include Long-finned pilot whales *Globicephala melas*, Southern Right whales *Eubalaena australis* and Humpback whales *Megaptera novaeangliae*. Sperm whale *Physeter macrocephalus*,

Bryde's whale *Balaenoptera edeni*, Minke whale *B. acutorostrata*, Heaviside's dolphin *Cephalorhynchus heavisidii*, Dusky dolphin *Lagenorhynchus obscurus* and Southern bottlenosed whale *Hyperoodon planifrons* are some of the other cetacean species that have been sighted farther offshore. Both Killer Whales and Sperm Whales have been reported to interact with longline fishing vessels targeting Patagonian toothfish, taking fish off the lines when being hauled. There are no indigenous land mammals on the Island Group. Introduced house mice *Mus musculus* are present on Marion Island but do not occur on Prince Edward Island[5].

Avian Fauna

The Island Group supports 29 species of breeding birds as well as 22 species of vagrant seabirds and 28 species of non-marine vagrant species have been recorded . Four orders of seabirds are present on the Island Group: Sphenisciformes (penguins), *Procellariiformes* (albatrosses and petrels), *Charadriiformes* (skuas, gulls and terns) and *Pelecaniformes* (cormorant). Several of the surface-breeding seabirds constitute substantial proportions of their global populations (Crawford & Cooper 2003). Populations of most of these have decreased at the islands since the 1980s and 12 of the 29 species are regarded as Threatened or Near-Threatened regionally or internationally. The main causes of population decreases are thought to be incidental mortality[6] of albatrosses and giant petrels in longline fisheries, and environmental change influencing availability of prey to penguins and the Crozet shag. Although the breeding bird species include only one endemic taxon (the Lesser Sheathbill *Chionis minor marionenis*) most species have a very limited breeding area that is restricted to a handful of Sub-Antarctic islands. Furthermore, the large distances between breeding sites and the high philopatry (natal site fidelity) characteristic of these species has led to limited genetic interchange and hence considerable geographical variation within species.

Most of these avian species are wholly or predominantly dependant on the marine environment for their primary energy needs and are capable of foraging great distances away from the Islands. They only use the Islands as bases for breeding and moulting (in the case of penguins). Outside their breeding seasons they disperse away from the islands to more productive foraging areas. The large numbers of seabirds that breed on the Prince Edward Islands are an important vehicle for the transfer of essential nutrients from the marine environment to the terrestrial (island) environment, primarily in the form of guano. Most of the seabirds found on the Islands are long-lived and only breed after a prolonged juvenile stage. Almost all seabird species found in the area breed only once a year and only lay one or two eggs. The chick-rearing period is prolonged with moderate breeding success. Some albatross species for example, only lay one egg every second year. Seabird populations in the area are therefore extremely vulnerable to adult mortality, and will take a

[5] The introduced feral cat *Felis catus* was exterminated from Marion Island in 1991

[6] Incidental mortality differs from "by-catch". Whereas the hooking of seabirds on longlines is "incidental", by-catch in fisheries is often directed or a recognized component of e.g. directed targeting on Patagonian toothfish

long time to recover from any negative impact on the population structure (e.g. a decrease in adult survival).

Fish and Fisheries

Thirty three species of fish from 13 families are known from the oceans around the Island Group (Gon & Heemstra 1990). This is more than has been recorded at the Crozet Islands (25 species) to the east, but fewer than the number found off Kerguelen Island (59 species), another sub-Antarctic island to the east of the Prince Edward Islands. A formal South African fishery for Patagonian toothfish *Dissostichus eleginoides* within the South African territorial waters and EEZ at the Prince Edward Islands was commenced in October 1996 (fishing is no longer permitted within territorial waters). Intelligence reports indicated however that Illegal, Unreported and Unregulated (IUU) vessels were already operating in the area by 1995 and possibly from 1994. Since the start of the licensed fishery, the estimated IUU catch has exceeded the reported catch for most years.

Marine Flora and Invertebrates

The various marine plant species and invertebrates around Marion Island are closely associated with the demand for nutrients and water as well as other environmental and physical characteristics such as gradient, aspect and temperature. Most flora on the Islands can be grouped into characteristic communities that are easily distinguished. The marine niche forms one of these characteristic communities that is dominated by the giant kelp *Macrocystis pyrifera* (giant kelp beds), found up to –1000 m offshore in protected coves, as well as in water 10 - 20 m deep. *Lithothamnion sp.* (encrusting algae) are also found in the intertidal zone, *Durvillaea antarctica* (Bull kelp) at shoreline cliffs and *Porphyra sp.* on spray zone boulders.

The distribution and density of many invertebrates is strongly influenced by manuring by birds and seals. High densities and biomass of invertebrates accompany high plant densities, soil nutrient content and plant nutrient content in heavily manured areas. Both islands in the Island Group have relatively unstable and hostile littoral environments, which results in a generally low biodiversity and low density of littoral organisms. All the shores around the islands are exposed (those with a westerly aspect severely so) due to the predominantly westerly winds. Large swells and unstable substrates (e.g. boulders) that result in abrasion also contribute to unfavourable conditions. Some 147 species of indigenous and introduced invertebrates are known from Marion Island. This includes 19 alien species that have become naturalised and 13 introduced species that have not, as yet, established themselves. Thirty nine species of soil ciliates have been found on Marion Island and seven endemic invertebrate species identifed. The endemic species include two springtails (*Isotoma marionensis* and *Katianna n, sp.*), three beetles (*Bothrometopus elongatus, Ectemnorfrinus marioni and E. similis*) and two moths (*Pringleophage marioni* and *P. kerguelensis*).

3. THE MARINE PROTECTED AREA - Boundaries and Zoning

The Prince Edward Islands MPA (PEI-MPA) encompasses three principle zones, each of which has specific objectives and different levels of protection. This follows international practice where MPAs are zoned according to a range of requirements, the level of exposure to anthropogenic impacts, commercial exploitation, biodiversity, habitat type and numerous other criteria[7]. The PEI-MPA will further be managed in accordance with relevant international obligations, conventions and agreements.

The PEI-MPA therefore is zoned as follows :

a) a Territorial "Sanctuary Zone" (12 nm) around the islands
b) a "Restricted Zone", and
c) a "Conservation Zone"

All vessels fishing within any of the zones where fishing is permitted must carry a scientific observer. A compliance strategy for the effective enforcement of the MPA will be developed by DEAT within six months of the promulgation of the PEI-MPA. The PEI-MPA zones are delineated as shown in Figure 3 with the exact co-ordinates of this delineation given in Table 1[8].

Table 1. The exact geographic coordinates (WGS 84 spheroid) of points 1-22 in Figure 3

Point	Latitude	Longitude	Point	Latitude	Longitude
1	43° 34' S	34° 56' E	12	49° 16' S	34° 03' E
2	44° 10 S	35° 35' E	13	50° 14' S	35° 36' E
3	45° 06' S	36° 36' E	14	49° 20' S	36° 35' E
4	46° 06' S	37° 42' E	15	47° 57' S	38° 07' E
5	46° 06' S	38° 44' E	16	46° 42' S	41° 48' E
6	44° 50' S	42° 27' E	17	46° 42' S	43° 02' E
7	44° 30' S	33° 44' E	18	45° 46' S	41° 48' E
8	45° 16' S	34° 35' E	19	45° 46' S	42° 53' E
9	46° 12' S	35° 36' E	20	46° 06' S	37° 03' E
10	47° 03' S	36° 31' E	21	47° 21' S	37° 03' E
11	48° 02'S	35° 25' E	22	47° 21' S	38° 44' E

[7] The IUCN Protected Areas Categories have been used as guidelines to define the PEI-MPA zones
[8] Noting the position of and recognizing the northern limit of the designated areas 58.6 and 58.7 of CCAMLR (Commission for the Conservation of Antarctic Marine Living Resources).

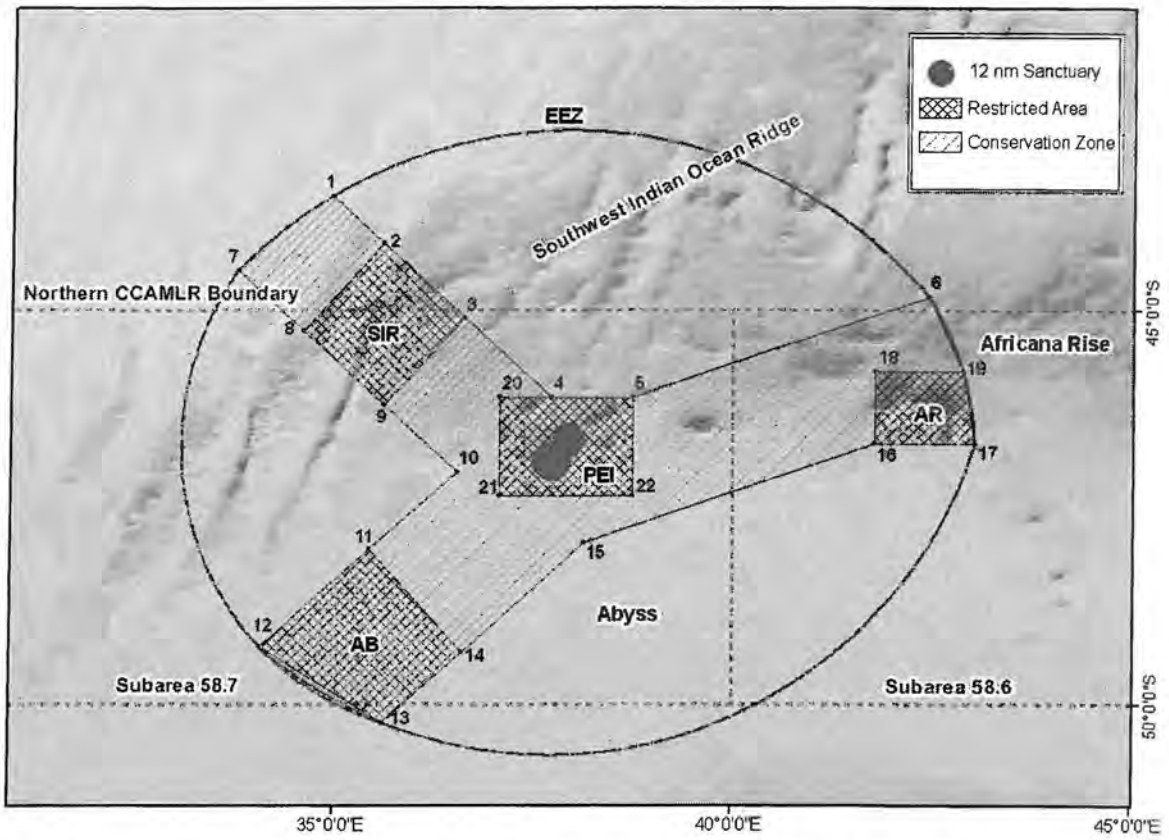


Figure. 3. The proposed boundaries of the Prince Edward Islands MPA. The three zones are shown, including the four IUCN Category 1a (Restricted Zone) reserves: Southwest Indian Ridge (SIR); Prince Edward Islands (PEI); Africana II Rise (AR); and Abyss (AB). Other reference points are the CCAMLR boundaries and sub-areas, the Southwest Indian Ocean Ridge to the north, the Africana Rise (to the east) and the abyss area in the south.

3.1 The 12-nautical mile Sanctuary Zone[9]

Function:

This zone is to be managed as a strict no-take zone for the preservation of the unique island ecosystem and adjacent territorial waters.

Management:

The following activities are prohibited in this zone unless by permit[10]:

(a) Fishing;
(b) The disturbance, removal, damage to or destruction of any fauna or flora;
(c) The disturbance of, destruction or alteration of the natural environment, including mining, dredging, extraction of sand or gravel, discharge or depositing of waste or any other polluting matter of any kind;

[9] Note that this zone extends from the shoreline and includes the littoral and inter-tidal areas to the spring high water marks.
[10] Note : This does not exclude applications to DEAT for approved scientific research-based activity

(d) The construction and or erection of buildings or other structures on or over any water within the Sanctuary Zone except for such designated structures approved for scientific research;
(e) To carry out any activity which may be deemed to impact adversely on the ecosystems of that area;
(f) Maritime activity, including research, fishing merchant and recreational vessels in possession of a prescribed permit, will be restricted to designated shipping lanes and anchorages and fishing vessels will only be permitted in the zone with their fishing gear stowed, and may not have fish or fish products of any nature on board and will be subject to a mandatory reporting protocol. Deck lighting on all vessels to be kept to a minimum to reduced bird strikes;
(g) Fishing vessels not in possession of the prescribed permit may only enter this zone under conditions of *force majeure*.

3.2 The Restricted Zone

Function:
The four Restricted Zones are designed to protect representative proportions of all habitat types in the Prince Edward Islands Exclusive Economic Zone and aim to specifically contribute to the recovery of the Patagonian toothfish stock(s) in the zone.

Management:
(a) Resources in these areas to be fully protected with disturbances limited to scientific monitoring activities only;
(b) Toothfish populations in these areas will be monitored scientifically[11] using standardised commercial or other fishing techniques. The DEAT may enter into an agreement with commercial rights holders to perform these monitoring activities as part of their permit conditions. DEAT scientists, in consultation with the commercial rights holders, will determine the nature and extent of the monitoring effort. The scientific effort level should not exceed the average annual number of hooks set in each of these zones over the period 2002 to 2005 and total effort in the restricted zones should never exceed 40% of the total effort in the EEZ (see Table 2);
(c) The scientifically-controlled fishing will not exclude the use of alternative fishing methods that might be deemed more appropriate for the area.

[11] Noting that only approved research will be permitted in the zone controlled and monitored under strict scientific supervision

Table 2. Average number of commercially deployed longline hooks set in each of the proposed Restricted Zone areas from 2002-2005

Restricted Zone area	Average annual effort in hooks from 2002 to 2005
Prince Edward Islands (PEI)	554 912 hooks
Africana II Rise (AR)	345 671 hooks
Southwest Indian Ridge (SIR)	143 630 hooks
Abyss (AB)	0 hooks (not fished at all)
Total	1,044,213 hooks

Furthermore the following activities will be prohibited:

(a) Any fishing or attempt to fish, in excess of the effort designated for the scientific monitoring specified in (b) (above)

(b) Fishing by methods known to cause damage to benthic habitats and biota (e.g. bottom trawling)

(c) The intentional destruction or removal of any other fauna or flora.

(d) The disturbance of, destruction or alteration of the natural environment, including mining, dredging, extraction of sand or gravel, discharge or depositing of waste or any other polluting matter.

(e) To construct or erect any building, offshore platform or other structure anywhere within the Restricted Zone;

(f) To carry on any other activity which may be deemed to adversely impact on the ecosystems of that area;

(g) Fishing vessels not in possession of a legal permit and traversing these areas, will do so with fishing gear stowed, and may not have fish or fish products of any nature on board and will be subject to a mandatory reporting protocol.

(h) Deck lighting on all vessels to be kept to a minimum to reduced bird strikes.

3.3 The Conservation Zone

Function:
This zone is to be managed as a low-impact exploitation zone that links the other protected areas spatially. It aims to protect representative proportions of benthic habitat in the EEZ, to help sustain ecosystem processes, whilst still allowing sustainable utilization of Patagonian toothfish resources.

Management :

(a) Fishing for Patagonian toothfish by rights holders to have catch and or effort limits using approved fishing methods that minimise the impact on the benthic environment. Fishing effort should be sustainable and should minimise ecologically threatening rates of both non target fauna (incidental mortality) as well as non-target species (by-catch). Specific restrictions include:

- The prohibition of fishing methods that are known to impact benthic habitats (e.g. bottom trawling);
- The disturbance, destruction or alteration of the natural environment, including mining, dredging, extraction of sand or gravel, discharge or depositing of waste or any other polluting matter;

(b) Best currently available seabird mitigation measures, including consideration of those adopted by CCAMLR, must be applied to mimimise the incidental mortality of seabirds. Should seabird mortality exceed a prescribed limit, fishing within the Conservation and Restricted Zones should cease forthwith. It is recommended that the total seabird mortality permitted due to fishing in the Conservation and Restricted Zones collectively, be set at fifty (50) birds annually in total, or thirty (30) birds per vessel. Lighting on vessels to be kept to a minimum with deck lights turned inwards away for lines, hooks and bait.

4. STRATEGIC PLAN – OF THE PEI-MPA

The strategic plan outlined herewith focuses on actions, identifies responsibilities and monitors progress of the implementation of the PEI-MPA in three key areas: a) the Biophysical Environment, b) Socio-economic Requirements, and c) Governance and Compliance.

4.1 Biophysical environment

The aims of the PEI-MPA with respect to the biophysical environment are as follows :

- To protect the endemic and rare species, species with globally significant populations, habitats and marine ecosystem processes representative of this region and to maintain biodiversity and optimal ecological functioning.
- To protect populations of depleted, threatened, rare, globally significant and endemic species as well as the habitats which are important for these species and populations.
- To contribute towards the long-term viability of marine fisheries.

Action	Lead Agency (and partners)	Progress and Indicators
Assess and monitor health and integrity of the unique ecosystems of the PEI-MPA		
(a) Develop a set of ecosystem indicators of MPA health and facilitate the collection and analysis of these data	MCM, Antarctica & Islands, researchers	• Long term studies of several land-based predators (seabirds & seal) are in place • Long term studies of physical oceanography are in place • Fisheries catch and effort trends
Develop ecosystem approach to management in the area		
(a) Facilitate the development of approaches and tools to achieve integrated and ecosystem-based management (i.e. manage all the key links in the ecosystem as well as manage human activities and their impacts).	MCM	• Ecosystem Approach being applied to Fisheries through CCAMLR regulations • Good progress in implementing Ecosystem Approaches in other SA fisheries

Build capacity to enable effective integration of conservation measures across sectors and with stakeholders.

(a) Provide the fishing industry with clear information on conservation management arrangements in the area (particularly for listed marine species), including compliance requirements.	MCM	• All fishing vessels carry fisheries observers and have good record of contributing to surveillance activities
(b) Enhance coordination between key groups and agencies involved in conservation and resource management, through information sharing, communication and informal reporting.	MCM, Prince Edward Islands Management Committee	• Prince Edward Islands Management Committee already functioning

4.2 Socio-economic

The aims of the PEI-MPA with respect to the socio-economic requirements is as follows:

- To promote recovery of over-exploited commercial fish stocks.
- To provide opportunities for research, training of marine scientists and monitoring of environmental effects of human activities on marine ecosystems.
- To promote non-consumptive, ship-based eco-tourism.

Action	Lead Agency (and partners)	Progress and Indicators

Enhance and encourage fishing industry capacity for, and participation in, marine protected area management in the area

(a) Support initiatives that raise fishing industry and community (through NGO's) awareness of the importance of, and build capacity for, their participation in marine ecosystem monitoring of the MPA.	MCM, Fishing Industry, NGO's	• Fishing Industry already plays important MCS role • Management plan promotes the use of standardised commercial fishing techniques in the MPA.
(b) Review existing stakeholder consultation mechanisms regarding the MPA to ensure effective and efficient ongoing participation in marine planning and management.	MCM, Fishing Industry	• Resource management working groups being established
(c) Build industry support through codes of conduct and other non-regulatory approaches.	MCM, Fishing Industry	• Current rights holders are members of the Coalition of Legal Toothfish Operators (COLTO)

Support the development of partnership approaches to marine research and monitoring

(a) Build on existing research partnerships and support the development of new partnerships in the area between researchers and the fishing industry.	MCM, Fishing Industry, PEIs marine research community	• Fishing Industry already plays important MCS role • Management plan promotes the use of standardised commercial fishing techniques in the Restricted Zone to monitor recovery of stocks

Improve access to research, data and expert ecological advice for the management of the MPA

(a) Develop a central data archive of all spatially explicit biodiversity data for the MPA that can inform and refine its management.	MCM	• Such a central data archive has been developed through the MPA planning project and will be housed within the SANBI bioregional planning division

4.3 Governance and Compliance

The aims of the PEI-MPA with respect to governance and compliance is as follows:

- To ensure appropriate and effective legal structures are developed and maintained to ensure comprehensive protection of MPA biodiversity and exploited resources.
- To fulfil South Africa's international commitment to marine protection in terms of international protocols and conventions.
- To enhance international co-operation for Monitoring, Control and Surveillance (MCS) in the area
- To promote wise spatial use of the territorial waters and EEZ and to reduce potential conflict between users
- To contribute to resource protection, facilitate fishery management, and reduce user conflict arising from competing uses in the MPA.
- To complement other elements of the Management Plan and lead to an increased level of success

Action	Lead Agency (and partners)	Progress and Indicators

Increase efficiencies in enforcement and compliance activities in the MPA

(a) Investigate the enforcement and compliance challenges and opportunities associated with the increasing use of spatial management of marine resources in the MPA.	MCM	• Initiation of a compliance plan • Co-management arrangements with interested and affected parties • International agreements
(b) Implement appropriate MPA Permit processes, including database development.	MCM	• Formalise database and management • Review fishing permit conditions

Review legislation

(a) Development of MPA-specific regulations, including revenue generation ability from activities other than fishing (e.g. film-making).	MCM	• Draft regulations • Regulations to be gazetted
(b) Manage impacts of all users in the MPA through zoning and permit requirements/conditions.	MCM	• Permit process developed and gazetted as needed

Promote co-operative governance

(a) Nurture co-operative relationships with national authorities, international agencies and relevant governments and stakeholders	MCM, Defence, SAMSA, CCAMLR, ACAP, Govs. of neighbouring islands	• Initiative to be followed through by DEAT at government and foreign affairs levels
(b) Manage trans-boundary impacts between the MPA and adjacent areas including RFMOs	MCM	• Compliance and monitoring plan operative

Promote international co-operation for MCS operations in the region

(a) Finalise MCS Agreement with the Government of Australia	DEAT, Gov. of Australia	• Agreement in final draft format
(b) Develop and sign MCS Agreement with the Government of France	DEAT, Gov. of France	

Develop vessel reporting procedure through VMS and Observations

(a) Establish strict Vessel Monitoring Procedure into and out of zones including high seas, CCAMLR, EEZ and MPA zones. Establish synergies with France and Australia	MCM, Navy, Hydrographic office	• Procedures in place and reporting protocol functioning
(b) Develop reporting procedure for all maritime traffic in the area with emphasis on identifying IUU vessels	MCM, Dept of Transport, Navy	• Established protocol legislated

Establish random patrolling of area coordinated with MCM and Navy

(a) Conduct routine random patrols using both navy and MCM vessels	MCM, Navy, Hydrographic office	• Procedures in place and reporting protocol functioning
(b) Coordinate area coverage with permitted fishing vessel operators	MCM, Dept of Transport, Navy, fishers	• Coordinated vessel planning and surveys

Develop an Oil Spill Mitigation and Contingency Strategy

(a) Ensure that the PEI MPA and surrounds are accommodated adequately within the National Oil Spill Contingency strategy and ensure compliance with MARPOL	MCM	• Oil Spill contingency plan specifically dealing with PEI developed and tested

Review and install alternative technologies for monitoring

(a) Utilisation of satellite technology, radar and other alternatives	MCM, Navy, Hydrographic office	• Introduction of trials on alternative technology, establish benefit cost

5. KEY PERFORMANCE AREAS

Key performance areas are activities in which the success of the PEI-MPA can be monitored. Performance areas will be specific to a particular MPA. In the PEI-MPA performance areas will include fishing and shipping, scientific research, legal instruments and enforcement and public awareness. Subsumed into these components will be a range of activities that are critical to the success of the MPA. Due to the remote nature of the area, recreational and tourist programmes are currently only of minor concern for the PEI-MPA[12]. Commercial fishing however is a concern and is a key performance indicator of the health of the Prince Edward Islands ecosystem. A proactive approach to the management and control of both legal and illegal (IUU) fishing activity is therefore vital.

Various other issues (apart from fish stocks) have been identified that need to be resolved to protect the values contained in the PEI-MPA. Considerations include minimising the impacts on habitat (substrate primarily) of fishing and other activity, the disturbance to marine mammals, incidental mortality of chondrichthyan species, and birds.

5.1 Fishing and shipping

The longline fishery for Patagonian Toothfish, which started in 1996, was the first commercially viable finfish fishery around the Prince Edward Islands. There are however records of Japanese exploratory fishing in the area in the 1980's and unconfirmed reports of toothfish vessels already operating in the area in 1995. The fishery developed at a rapid pace and South Africa was poorly prepared to manage the distant water fishery effectively. The same year saw an influx of large numbers of Illegal, Unreported and Unregulated (IUU) fishing vessels to the area and within three years these illegal fishing activities had overexploited the toothfish stocks in the area and killed significant proportions of the populations of seabirds breeding on the islands through incidental mortality during fishing operations. The IUU fishery continued largely unchecked due to South Africa's lack of high seas fisheries patrol capabilities. Increased compliance efforts in the neighbouring EEZs of France (Crozet and Kerguelen Islands) and Australia (Heard and McDonald Islands) only served to worsen South Africa's predicament by shifting IUU fishing activity into the unprotected Prince Edward Islands' EEZ. Since the year 2000, IUU activity in the area has decreased, probably due to the low commercial viability of the stocks in this area. Despite this, there has been good co-operation between the governments of South Africa, Australia and France in curbing IUU fishing in this area and several joint compliance operations have resulted in the arrests of IUU vessels. This co-operation has culminated in a joint MCS agreement between Australia and France, and a draft MCS agreement exists between South Africa and Australia.

[12] Noting that ship-based tourism to the islands has occurred only once but is likely to increase with time.

A small legal fishery survives in the area despite the depleted state of the stock. Since the start of the licensed fishery, at the end of 1996, the estimated IUU catch has exceeded the reported catch for most years. A maximum of five operators has been licensed by South Africa to fish in any one year. During recent years only one or two licensed vessels have been active in the fishery operating under a strict set of permit conditions[13]. In addition to the permit conditions associated with longlining for Patagonian Toothfish, the following shall apply to shipping in the area. The principle objective of these conditions is the protection of biodiversity and the minimisation of pollution risk:

a) Within the 12-nautical mile sanctuary Area

i. Commercial shipping and all other maritime activity, including fishing vessels in possession of a legal permit, will be restricted to specified shipping lanes and designated anchorages;
ii. Fishing gear must be stowed (applies to legal operators and transit vessels).
iii. Fishing vessels not in possession of a legal permit may only enter this zone under conditions of *force majeure*.
iv. Marpol conditions to be stringently enforced. In addition dumping of fish waste and discharge of sewage will not be permitted[14].

b) Within the Restricted Zone

i. Fishing vessels not in possession of a South African permit to fish in these waters and traversing these areas, must do so with fishing gear stowed, may not have fish on board, and will be subject to mandatory reporting procedures.
ii. All other vessels traversing the areas of this Zone will also be subject to mandatory reporting procedures.
iii. Marpol conditions to be stringently enforced. In addition dumping of fish waste and discharge of sewage will not be permitted.

5.2 Scientific research & monitoring

Scientific research and monitoring are strategic components of the PEI-MPA management. Scientific research is applied in specific areas of interest and is aimed at informing managers of biological, environmental and many other processes considered important for the running of the PEI-MPA.

[13] Authorized operators fish under a strictly controlled set of permit conditions with permanent independent Observes deployed on each vessel. Permit condition available through Marine and Coastal Management.

[14] Noting the CCAMLR conservation measures for e.g. the Ross Sea does not allow ship-borne and fish waste to be discharged in sensitive areas. Waste must be retained on board or incinerated and may only be discharged when vessels are steaming at designated speeds and are outside of designated sensitive areas.

The primary objectives of scientific research and monitoring on the PEI-MPA are :

- *To contribute to a national and global representative system of Marine Protected Areas, by providing protection for endemic and rare species, species with globally significant populations, habitats and ecosystem processes,*
- *To serve as a scientific reference point that can inform the future management of the area,*
- *To contribute to the recovery of the overexploited Patagonian toothfish* Dissostichus eleginoides *population,*
- *To reduce the incidental mortality of particularly albatrosses and petrels in the Patagonian toothfish fishery (Nel & Nel 1999, Nel et al. 2002c) as well as controlling the by-catch of fish and other marine species other than Patagonian toothfish in the commercial fishery.*

In addition to the applied scientific research activities, scientific monitoring is also an essential strategic activity that forms part of important feedback mechanisms that indicate the effectiveness of the MPA in achieving its defined goals. In addition, protected areas are used to support research projects of both academic and commercial interest. All scientific research and monitoring should however be compatible with the PEI-MPA objectives. Published scientific research associated with the marine environment in the vicinity of the Prince Edward Island group is listed in Appendix 3.

5.2.1 Baseline data collection, scientific research and monitoring priorities

The collection of baseline data, scientific research and monitoring requirements for the effective management of the PEI-MPA may either be conducted by (a) the authorised Managing Agency, (b) a contractor, or (c) the management authority may encourage separately-funded research institutions to carry out the necessary work.

The baseline, scientific research and monitoring requirements are separated into three categories:

a) Biodiversity and ecological processes;
b) Fisheries; and
c) Non-consumptive activities.

a) Biodiversity and Ecological Processes

i. Develop, implement and maintain databases of information relevant to the management of PEI-MPA and develop a meta-database that will provide an interface capable of accessing information from all these databases (in conjunction with MCM).
ii. Gap Analysis - Analyse and compile existing data to facilitate management of the PEI-MPA and to identify critical gaps in our information;

iii. Develop a spatial database that includes biodiversity information, threats and trends in their status. Describe and map the physical environment (bathymetry) and identify the spatial distribution of habitats and ecosystem characteristics;
iv. Identify and establish benchmark areas for monitoring and scientific research and investigate the possibility of further zoning to provide enhanced protection for research and monitoring sites;
v. Conduct surveys aimed at determining the structure, function, extent and biodiversity of the Prince Edward Islands marine ecosystem(s);
vi. Identify and investigate ecological processes of the PEI-MPA and to relate this to the PEI and global ecosystem functioning;
vii. Conduct monitoring of episodic events;
viii. Biodiversity: Determine the status of biodiversity in the PEI area, trends and potential impacts, identify targets and threats to these targets and the magnitude of these threat;
ix. Measure impacts/change as a result of activities occurring in the PEI-MPA;
x. Interpret and feed research and monitoring data to management (compliance and educators) and the community;
xi. Establish protocols and methods to determine threshold limits of acceptable change on a site-specific basis (related to zoning). In particular, determine acceptable levels of use by tourism, recreation and fishing;
xii. Develop collaborative research and monitoring arrangements with tertiary institutions and other research groups;
xiii. Ensure information from stranded marine animals is collected, collated and interpreted.

b) Fisheries Management Actions

i. Analyse and compile existing data to facilitate management of fisheries in the PEI-MPA and to identify critical gaps in our information;
ii. Quantify and describe marine resource use and determine trends;
iii. Develop a specific PEI-MPA fisheries database incorporating the MCM and CCAMLR databases. Consolidate these data with any other available data e.g. information on alternative ecosystem processes and habitat types, flora and fauna;
iv. Maintain 100% independent scientific observer coverage of all commercial fishing operations;
v. Where practical, conduct independent scientific biomass assessments using research vessels;
vi. Conduct an annual fisheries stock assessment, determine catch and effort levels and implement precautionary catch and effort limits to maintain ecosystem functioning;
vii. Assess impacts of fisheries on biodiversity and ecosystem functioning;
viii. Collect data on impacts of fishing on non-target fish species and incidental mortality of mammals, seabirds and other affected fauna;
ix. Conduct ongoing research and monitoring of methods to mitigate ecosystem impacts;
x. Conduct research on alternative fishery and vessel monitoring methods.

c) Non-consumptive user (socio-economic) activities

i. Analyse and compile existing data to facilitate management of the PEI-MPA and to identify critical gaps in our information;
ii. Identify and document activities occurring in the PEI-MPA;
iii. Quantify user activities and measure trends;
iv. Determine socio-economic profiles to target education and understand issues leading to the displacement of users;
V. Develop a spatial database that collates user information (GIS system);
VI. Identify potential for tourism, particularly ship-based tourism within the PEI-MPA;
VII. Develop a protocol to regulate future tourism activity[15].

5.3 Legal instruments and enforcement of the PEI-MPA

Management of the PEI-MPA is the primarily the responsibility of DEAT and their Branch: Marine and Coastal Management. Further, the management of the area will be supported through the formation of a "Prince Edwards Islands Marine Protected Area Implementation and Management Committee" (Appendix 1).

Research and monitoring projects will be designed to determine whether the objectives of the PEI-MPA are being met. Monitoring will be designed accurately to reflect the changes that require a management response and must be integral to the biophysical management and management effectiveness process. The choice of indicators/monitoring must be scientifically credible, easy to understand, easy to monitor regularly, be cost effective, have relevance to policy and management needs and purposely contribute to monitoring of the management plan towards its improvement. An MPA Guidebook (Pomeroy et. al. 2004) offers managers a process and methods to evaluate the effectiveness of their MPA for the purposes of adaptive management. This should be used in conjunction with an extensive list of publications and material available on the management of Marine Protected Areas, as well as specific reports and publications on the Prince Edward Islands (Appendix 3). Marine and Coastal Management has developed a generic list of monitoring that should be conducted at MPAs. This monitoring is focused on a national level rather than at a local level[16].

[15] This protocol should consider *inter alia* the carrying capacity of the PEI-MPA for tourist programmes, and, if necessary, consideration given to limiting tourist operator numbers, as well as times, days and locations of activities to minimise potential ecosystem impacts. This may require zonation and user group categorisation.

[16] It is envisaged that this monitoring should occur at all South African MPAs to get an overall view of the state of the marine environment in South Africa.

5.3.1 Legislation

For the effective implementation and enforcement of MPAs a legal framework (international and national is required). In this regard South Africa has an established and integrated legal framework that facilitates the implementation and enforcement of the PEI-MPA.

Maritime Zones

South Africa's maritime zones cover territorial waters, contiguous, exclusive economic zone (EEZ), the continental shelf and the Prince Edward Islands. As sovereign territory of South Africa (Prince Edward Islands Act 43 of 1948), South Africa asserts its right under the 1982 United Nations Law of the Sea Convention (LOSC) to a 12-nautical mile territorial sea and a 12-200 nautical mile exclusive economic zone (EEZ), through its Maritime Zones Act 15 of 1994. Most of the EEZ surrounding the islands also falls within the Convention on the Conservation of Antarctic Living Marine Resources (CCAMLR) area of competence, to which South Africa is a member. Although, nothing can derogate from South Africa's sovereign rights in its EEZ, international law (through the LOSC and the 1995 UN Fish Stocks Agreement[17] (UNFSA) requires South Africa to implement management measures that are compatible with those of CCAMLR (Nel, 2006)

Biodiversity

Although the LOSC confers sovereign rights on coastal States to explore and exploit the marine resources of their EEZ, it also places a general obligation on these States to protect and preserve the marine environment through 'proper conservation and management measures' that can include, amongst other, 'fishing area regulations'. South Africa's membership to the 1992 Convention on Biological Diversity (CBD) obligates the State to plan and develop protected area networks. In 2003 South Africa adopted the National Environmental Biodiversity Act (No. 10 of 2004) (NEMBA). Further the CBD's application to the marine environment was developed through the 1995 Jarkarta mandate and culminated in the advice to the 8th Conference of Parties, which set a global goal to develop a representative global network of MPAs by 2012. South Africa has also publicly committed itself to two global policy statements, the 2002 World Summit on Sustainable Development (WSSD) and the 2003 World Parks Congress, that collectively require States to develop representative networks of MPAs that amount to at least 20-30% of each marine habitat. South Africa's membership of the Agreement on the Conservation of Albatrosses and Petrels (ACAP) also obligates the State to protect the foraging and migration habitats of four species of albatross that breed on the Prince Edward Islands.

[17] Full title: Agreement For The Implementation Of The Provisions Of The United Nations Convention On The Law Of The Sea Of 10 December 1982 Relating To The Conservation And Management Of Straddling Fish Stocks And Highly Migratory Fish Stocks

- Sea Birds and Seals Protection Act (No. 46 of 1973)
- Sea Shore Act (No. 21 of 1935)
- Nature and Environmental Conservation Ordinance, (Ordinance 19 of 1974)
- World Heritage Convention Act (No 49 of 1999)

Marine Living Resources

The authority for the establishment of Marine Protected Areas in South Africa is provided by Section 43 of the Marine Living Resources Act 18 of 1998. The Prince Edward Islands themselves are currently declared as a Special Nature Reserve under the National Environmental Management: Protected Areas Act 57 of 2003 (NEMPA) with the boundary set at the high water mark. The MLRA allows the Minister of Environmental Affairs and Tourism to regulate a wide range of activities, including 'any activity that may adversely impact the ecosystems of that area'. This provision has been used widely to regulate inter alia the passage of fishing vessels through MPAs. Such fishing vessel 'exclusion zones' are used internationally for the main purpose of simplifying prosecution of fishing vessels within restricted zones (i.e. the State merely has to prove presence of the vessel in the area, and not actual fishing activity, which is more difficult to prove). Special Nature Reserve status under NEMPA on the other hand invokes a far more restrictive visitation regime, and sets aside protected areas exclusively for scientific purposes and monitoring. Passage of vessels not engaged in these activities would thus be prohibited from such areas.

Maritime Traffic

The Maritime Traffic Act 2 of 1981 allows the Minister of Transport to regulate shipping traffic through inter alia the prescription of designated sea lanes and routeing measures. Although foreign vessels enjoy the right of innocent passage within the territorial seas of coastal States under the LOSC, this right is not unconditional and coastal States may regulate the passage of vessels in respect to a number of issues, including the conservation of living marine resources. When prescribing such measures the coastal State merely needs to take into account the recommendations of the International Maritime Organization (IMO). In the EEZ of coastal States foreign vessels enjoy freedom of navigation. However, these rights are also not unconditional and coastal States can, with the consent of IMO, adopt special measures for specific designated areas. These measures may include mandatory reporting and routeing measures. The IMO also provides for the designation of Particularly Sensitive Sea Areas (PSSAs) for areas that need special protection because of its significance for recognized ecological, socio-economic and scientific reasons. The protective measures for PSSAs are those within the purview of the IMO and include mandatory reporting and routeing measures, and 'areas to be avoided'.

Other Relevant Legislative tools

In addition to the above legislation, the Prince Edward Islands are directly affected by the 1) Sea Birds and Seals Protection Act (No. 46 of 1973), 2) Sea Shore Act (No. 21 of 1935) 3) the Nature and Environmental Conservation Ordinance, (Ordinance 19 of 1974) and 4) the World Heritage Convention Act (No 49 of 1999).

Regulations and Permits

With regard to the measures set out in this plan specific regulations applicable to the Acts specified above would need to be adopted. Marine Protected Area Permits for example, can only be issued under Section 43 of the Marine Living Resources Act (No. 18 of 1998). Until specific permit requirements are promulgated, these permits will authorise activities not covered under Section 13 or Section 81 of the MLRA. A summary of activities permitted in the PEI-MPA given in Table 3.

Legal Requirements to Conduct Scientific Research

Research Permits are issued under Section 81 of the MLRA which states "If in the opinion of the Minister there are sound reasons for doing so, he or she may, subject to conditions that he or she may determine, in writing exempt any person or group of persons or organ of state from a provision of this Act". All permits will be subject to a fee under Section 25 of the Marine Living Resources Act (No. 18 of 1998).

International Agreements

In addition to being a signatory of CCAMLR, South Africa is in the process of developing Memoranda of Understanding (MOUs) with its neighbours in the Southern Ocean, specifically with Australia and France. The purpose of these agreements is to facilitate communications, trans-boundary monitoring (such as hot pursuit) and scientific research. In addition, South Africa is a signatory to UNCLOS, MARPOL (International Marine Pollution Regulations) and the Agreement on the Conservation of Albatrosses and Petrels (ACAP).

Table 3/...

Table 3. Summary of Activities permitted within the Prince Edward Islands Marine Protected Area

PERMITTED ACTIVITY)	SANCTUARY ZONE	RESTRICTED ZONE	CONSERVATION ZONE
Fishing			
Scientific Research	Yes	Yes	Yes
Recreational Fishing	No	No	No
Commercial Fishing (longlining only)	No	No	Yes
Recreational/Tourist Activities			
Tourist Programmes (including marine animal watching, excluding motorised water sports)	No	No	No
Tourist Programmes involving motorised water sports and aircraft use (subject to development)	No	No	No
Diving (scuba or other) subject to permit only or for research	No	No	No
Recreational aircraft use below 1000 ft	No	No	No
Commercial Boat-based whale watching (may be developed)	No	No	No
Maritime Traffic			
Anchoring/Mooring (Subject to Permits excludes *Force majeure)*	Yes	Yes	Yes
Transit	No	No	No
Research and Compliance Vessels	Yes	Yes	Yes
Photography			
Recreational	No	No	No
Commercial photography (subject to permit)	Yes	Yes	Yes
Scientific Research (subject to permit – includes specialised activities such as biomass surveys, sampling using SCUBA gear and other underwater activities)	Yes	Yes	Yes

5.3.2 Compliance

Clearly the development of an MPA around the Prince Edward Islands would be futile, without the necessary enforcement and compliance measures. Recent developments within CCAMLR will allow better monitoring, control and surveillance of such areas. Firstly, the adoption of a mandatory satellite-based Vessel Monitoring System (VMS) will greatly increase the ability of member States and the Commission to monitor the movements of fishing vessels. Similarly, South Africa's national legislation requires all large fishing vessels (clusters A,B & C) to be fitted with VMS's. South Africa has also acquired a purpose-built fisheries patrol vessel with extended blue-water capabilities, as well as four new navy corvettes. The Marine Living Resources Act allows South Africa to set a minimum financial security for vessels apprehended contravening the Act, which includes the costs incurred by the State in making the arrest. This allows for cost recovery of expensive surveillance exercises. South Africa is also in the process of concluding a MOU compliance agreement (see section 5.3.1) with Australia, which will allow for co-operative surveillance operations in the two States' Southern Ocean EEZs.

The compliance objective for the Prince Edward Islands Marine Protected Area is to enforce the PEI-MPA and in so doing achieve resource protection and to ensure fulfilment of the objectives of the MPA. It is recognised that compliance cannot be one dimensional – it needs to be a composite of many different approaches if it is to be effective in achieving these goals. Because of the remoteness of the PEI-MPA from South Africa, it presents unique challenges for compliance, the difficulty of which has already been demonstrated through the over-exploitation of the Patagonian Toothfish resource in the area by IUU vessels in the 1990s. Nevertheless, resourceful managers do have an array of tools that can enhance compliance of the PEI-MPA. The practical aspects of enforcing obviously need a strong legislative basis which is provided primarily through the MLRA, but also other legislation as indicated in section 5.3.1.

It is also stressed that the implementation of an effective compliance plan for the Prince Edward Islands, should not require commitment of any additional resources, other than those already required for the fulfilment of South Africa's international obligations to manage and protect the marine resources of this area effectively (as required by the Law of the Sea Convention Articles 192 and 194). In fact the MPA is merely a spatial delineation that should facilitate more efficient protection of the most important biodiversity assets of the area. A compliance strategy for the effective enforcement of this MPA would be implemented by MCM in collaboration with other components as needed (e.g. the South African Navy and Air Force). Key elements of such a strategy would include:

- As part of the MPA proclamation, the South African vessel/s in possession of a fishing license will continue to fish in the area and in fact conduct standardised commercial fisheries monitoring within parts of the MPA. This will allow these commercial vessels to perform a surveillance and deterrent function.

- MCM's major environmental patrol vessel (EPV) the Sarah Baartman, is designed specifically to operate in the role of offshore protection. As part of fulfilling South Africa's international obligations under the LOSC to manage and protect the marine resources of this area, this vessel is required to make regular clandestine patrols to the area. The vessel can also be used in a reactive manner in response to other information (e.g. from commercial vessels, information from other States, radio traffic, etc.).

- The recent acquisition of four Navy corvettes was done partly in order to secure South Africa's offshore marine resources. These vessels should therefore be available to assist in MCS operations in the area. However, due to higher running costs of these vessels, it is envisaged that these vessels should only be used to compliment operations headed by the Sarah Baartman or in a reactive manner (i.e. hot pursuit). Operational guidelines for co-operation between MCM and the SA Navy will need to be developed.

- An additional national presence is through research and relief cruises to the area by MCM's major research vessels, the SA Agulhas and Africana, as well as other vessels that may be deployed to undertake research in the region.

- South Africa also has an exceptional track record of co-operation with France and Australia in terms of joint compliance operations in the Southern Ocean, which has resulted in several arrests of IUU vessels. This has resulted in co-operation agreements between France and Australia and a draft agreement between South Africa and Australia. Further, the notification of South Africa's intention to declare an MPA around the Prince Edward Islands has been welcomed by CCAMLR states. This bodes well for future co-operation with these States in order to secure the management of this MPA.

- Finally, the use of complementary technology needs to be investigated. For instance several States (including the United Kingdom and France) have made very successful use of satellite imagery to detect IUU fishing activity in their Southern Ocean EEZs.

The key elements of the PEI-MPA compliance strategy are shown in Figure 4. For the integrated compliance strategy to work effectively the following key components must communicate and support one another :

- MCM should be the lead coordinating agency
- A regular co-ordinated vessel patrolling strategy must be in place that facilitates a near-continuous presence in the area including MCM and Navy vessels, legal fishers, research vessels, *ad hoc* surveillance flights and coordination with any international patrolling activity in adjacent areas
- 24-hour VMS monitoring with a minimum four-hour reporting schedule
- Established reporting protocol when moving into and out of the EEZ and MPA zones
- Use of alternative technologies for monitoring (e.g. radar and satellite)
- An established and aggressive communication network aimed at identifying activity and vessel movements into and out of the PEI area.
- Legal response to prosecutions should be an effective deterrent – prosecutions should be assured and the training of compliance officers specifically for high-seas duty is essential.

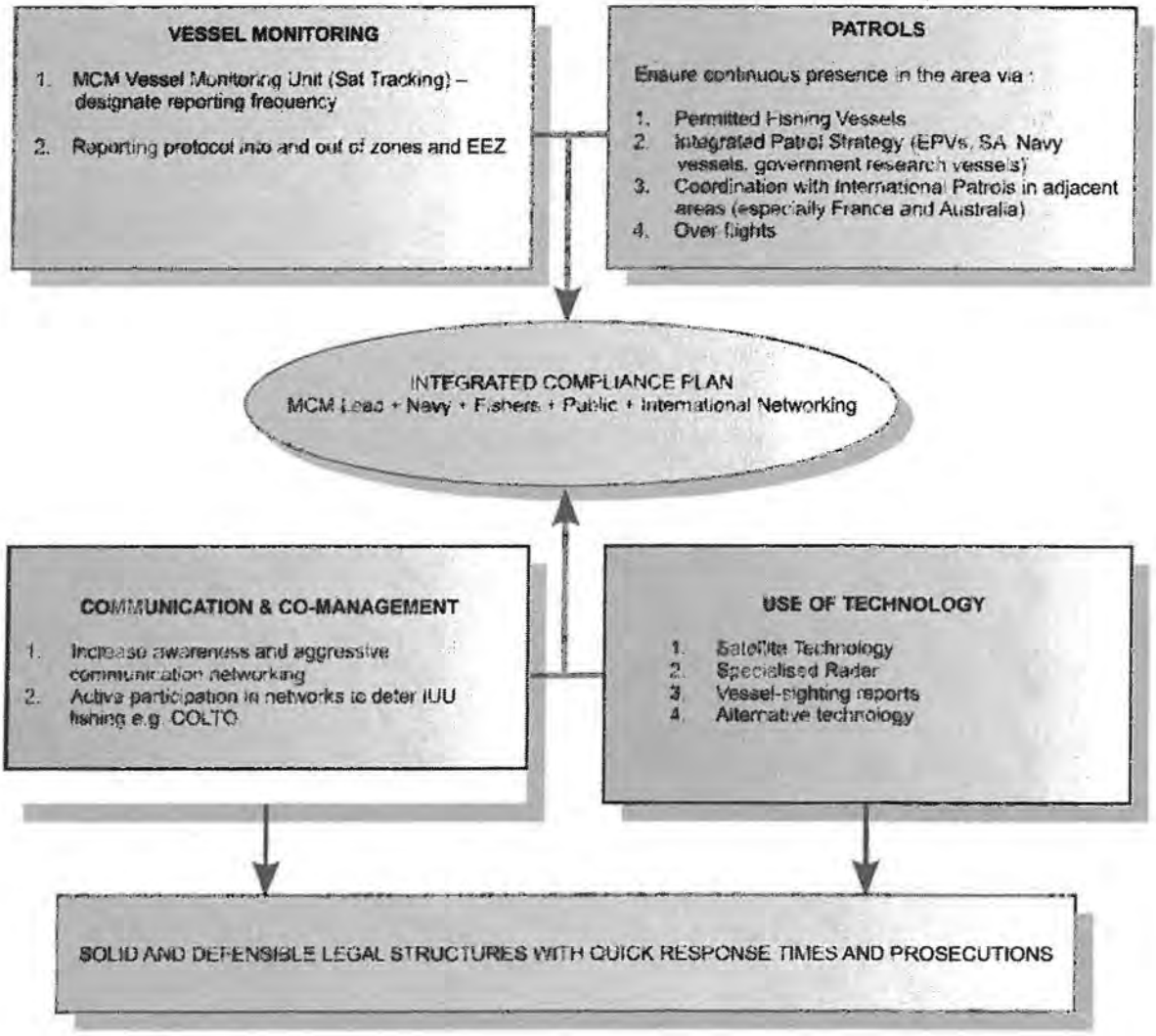


Figure 4. Schematic showing the integrated approach to compliance of the PEI-MPA

5.4 Awareness Plan

DEAT recognises that its proficiency as the manager of South Africa's marine resources depends largely on its ability to inspire public support and participation through awareness. The focus of this awareness plan is to promote an understanding of the importance of healthy ocean ecosystems, the importance of MPAs and the role that the community may play in their care (refer to the Actions in 4.2). Marine protected area management has developed because of the growing recognition of the importance of marine ecosystems to

our communities, economy and environment and is emerging as a national priority due to undesirable and unsustainable impacts on the marine ecosystem[18].

In the case of the Prince Edward Islands, the development of MPAs within South Africa has taken on a new geographical dimension. Whereas MPAs generally have been instituted in the coastal and near-shore areas, the PEI-MPA is offshore and remote. As such the value of such an MPA is less exposed to the public. On the other hand the PEI-MPA is highly significant in the global context. Raising awareness of the PEI-MPA will therefore need to be targeted at both national and international levels. This should include educating and communicating not only the "generic" benefits of MPAs such as have been applied broadly to coastal and inshore waters, but also expanding on the uniqueness (in a South Afican context) of the Prince Edward Islands and the benefits that are likely to accrue to not only South Africans, but also to the global community. Typically such, awareness raising will include participation at appropriate levels, particularly direct stakeholder involvement. The media should also be actively involved using all forms possible. Creating awareness should be one of the tasks of the PEI-MPA Committee. As such a specialized task team should be appointed with the authority to co-opt members with appropriate media and communication skills to help achieve the objectives indicated below.

5.4.1 Awareness objectives

The PEI-MPA awareness strategy should focus on the following key areas :

a) Protection of marine biodiversity of the Prince Edward Islands MPA;
b) Provision of opportunities for the multiple use of the area that are consistent with the long-term protection of natural resources;
c) Addressing conflict between user groups over access to, and use of, the MPA;
d) Promotion of voluntary compliance with regulations and awareness of the marine ecosystem through education of interested and affected parties;
e) Encourage opportunities for the involvement and upliftment of historically disadvantaged communities;
f) Enhance marine protected area management through partnerships at national, and international levels;
g) Encourage stakeholder participation and voluntary compliance

5.4.2 Awareness strategy

To achieve the awareness objectives as far as possible the following should be included :

- Achieve public and market awareness of the Prince Edward Islands MPA and the values, services and products offered.

[18] Noting that the awareness plan has "generic" components applicable to coastal zone MPA's and as such certain requirements might not apply to the offshore (distant) location of the PEI-MPA

- Provide information and material *on the benefits/importance of Prince Edward Islands MPA. Provide support to educators to implement this information and the material developed and meet with other education stakeholders and interested and affected parties to coordinate and plan education programmes and messages.
- Promote marine conservation through local, national and international media (Internet, newspapers, magazines, TV, etc.).
- Notify media whenever anything is happening.
- Interpret and disseminate the findings of Prince Edward Islands MPA research for use by the non-research community.
- In consultation with user groups, develop user group guidelines, codes of conduct, and environmental briefing standards that allow for use in a manner that protects the environment. Periodic evaluations to monitor their effectiveness should be undertaken to recommend changes when necessary.
- Promote alternative non-consumptive activities in the Prince Edward Islands MPA (such as eco-tourism).
- Conduct a public information campaign on the Prince Edward Islands MPA rules and regulations.
- Target the international scientific community to raise awareness of the work conducted on the PEI-MPA and promote/advance the potential for research in the area and the value therein in the global context.
- At a political level get the support of government and raise the awareness of the significance of the PEI-MPA.
- Raise the awareness of the implications of poor compliance and IUU fishing activities and Promote collaboration with regard to similar activities in adjacent areas (Crozet, Heard and Macdonald Islands)
- Actively canvass for support and the raising of funds to enhance the management, research, governance and compliance of the PEI-MPA.

6. ACKNOWLEDGEMENTS

The formulation of this plan would not have been possible without the collaboration and consultation with interested and affected parties. In particular Marine and Coastal Management and the Patagonian Toothfish rights holders.

The financial support of Sanlam and WWF South Africa is gratefully acknowledged. John Cooper and Marcel Kroese reviewed the plan and provided invaluable input.

7. APPENDICES

Appendix 1

PRINCE EDWARD ISLANDS MARINE PROTECTED AREA IMPLEMENTATION AND MANAGEMENT COMMITTEE (PEI-MPAC)

A Prince Edward Islands MPA Working Committee will be amalgamated[19] with the Prince Edward Islands Nature Reserve Working Committee to discuss management activities, monitoring and research in the MPA. The Prince Edward Islands Management Committee (PEIMC) liases closely with the Biological and Oceanographic Sciences Task Groups and the South African Committee on Antarctic Research (SACAR) of the Department of Environmental Affairs & Tourism. The PEIMC chair has representation at all levels in the Directorate Antarctica & Islands (i.e. in task groups, in SACAR, and within the Antarctic Management Committee). All research at the islands is assessed in light of the requirements of the Management Plan.
This committee will become known as the Prince Edward Islands Nature Reserve and Marine Protected Area Working Committee (PEI-MPAWC). There is no statutory requirement to convene a Working Committee, however, to ensure effective co-management and consultation of the PEI-MPA, it is recommended that a Working Committee be established. The Committee will aim to involve all stakeholders associated with the Prince Edward Islands MPA.

IMPLEMENTATION PROCESS FOR A WORKING COMMITTEE
MCM recognises the importance of co-management of our marine resources. The Committee will be representative of the current stakeholder.

Composition of the Committee
The Committee will be formalised as soon as possible. A formal letter of invitation and advertisements placed in local newspapers calling for nominations to participate will be forwarded to appropriate groups. Each group will nominate in writing a representative and also an alternative representative, who will represent their constituency only when the nominee is unavailable, and forward this name to MCM. The committee should have representation from the following competencies :

Integrated Coastal Management (ICM), Compliance, Resource Management, recognised scientific researcher(s) and the commercial fishing industry. These portfolios should subsume the following :

- MPA manager, management representative
- Marine and Coastal Management (MCM)
- Commercial Fishing
- Tourism industry
- Department of Transport (SAMSA)

[19] Noting that amalgamation will include changes to the TOR for the PEI-MPAC

- Maritime surveillance (SAN, MCM compliance)
- NGOs

Chair's role

The Chair will be a MCM staff member. The Chair schedules and sets agendas for the Committee meetings and presides over all meetings of the Committee, and ensures that meetings are run according to accepted meeting practices, signs all correspondence and documents authorised by the Committee, and generally represents the Committee's interests and concerns to the public.

Vice-Chair:

The Vice-Chair will be a MCM staff member, which will serve as Chair in the absence of the Chair and assists as necessary in performing executive duties of the Committee.

Secretary:

Prepares and convenes meetings, circulates notices and takes minutes. The secretariat (secretary plus resources will be supplied by MCM).

Roles of the Working Committee

1. Provide input to MCM on PEI-MPA plans and proposals, including those related to research.
2. Help identify and resolve issues and conflicts, including emerging issues.
3. Serve as a liaison between the Committee and the community, disseminates information about PEI-MPA to the various stakeholders and the public.
4. Assist in identifying potential partners and stakeholders with which the PEI-MPA should be working.
5. Assist in identifying and securing priority partnerships, with special reference to previously disadvantaged communities.
6. Provide technical and background information on issues facing the PEI-MPA.

Committee meetings

It is anticipated that the Working Committee will meet every sixth months. The Chair will develop meeting agendas and make those available to Committee members in advance. Meeting notes will be taken by the secretary and made available to the public upon request.

Financing of the Working Committee

The cost of the secretary, the hiring of venues, paper postage, and miscellaneous items required for meetings will be covered by MCM.

Appendix 2

SOUTH AFRICA'S SUBMISSION FOR "WORLD HERITAGE SITE" STATUS FOR PRINCE EDWARDS ISLANDS

Ref: http://whc.unesco.org/en/tentativelists/1923/

The Prince Edward Islands
Property names are listed in the language in which they have been submitted by the State Party.
South Africa (Africa)

Date of Submission: 24/06/2004
Criteria: (vii)(viii)(ix)(x)
Category: Natural
Submission prepared by:
Department of Environmental Affairs and Tourism
Coordinates:
Marion Island 46°49'30"-46°58'30" S / 37°35'-37°54' E Prince Edward: 46°35'50"-46°39'55" S / 37°52'50"-38°00'45" E
Ref.: 1923

Description
Topography
Marion Island consists of a central highland area that reaches 1,249m ASL at its highest point. There is a 4 - 5. km wide coastal plain (up to 300m ASL) on the northern and. eastern sides of the island that slopes gently up to the highlands. The coastal plain on the western and southern sides of the island is only about 100m in altitude and irregular due to extensive erosion by wave action on these sides of the island. The Island Group is characterised by abundant conical cones of scoria (volcanic cinder). Prince Edward Island rises to 872m ASL at its highest point (Van Zinderen Bakker Peak) and consists of a central highland that slopes gently to the east and drops to the western lowland in the form of a 400m high escarpment. The coastlines of both islands consist mostly of coastal cliffs rising abruptly from the sea, interspersed by small pebble and boulder beaches in protected bays.

Geology and geomorphology
The Island Group is located near the centre of the West Indian Ocean Ridge and represents summits of a volcano of Hawaiian type rising more than 3500m from the ocean floor. The age of the oldest lava flows on Marion Island are estimated at 450,000 years. Marion Island is regarded as a dormant volcano, since the latest (and only recorded) volcanic eruption occurred on the island's west coast in 1980. This makes Marion Island one of only two sub-Antarctic Islands to have erupted volcanically in recorded history. It is thought that Prince Edward Island is a remnant of a closely associated shield volcano, of which four fifths have since subsided below sea level.

Two stages of volcanic activity can easily be recognised on both islands: older grey lava and younger black lava flows. The grey basalt lavas, which are between 270,000 and 48,000 years old, occur mainly as elevated ridges with a smooth topography and bear extensive marks of glaciation in the form of deep striations, unsorted rocky material and large solitary boulders. Glaciation occurred

between 12,000 and 16,000 years ago, Prince Edward Island does not show signs of glaciation, possibly because the island has never been covered by an ice sheet or because the glaciated sections have since eroded away.

With the retreat of glaciers about 16 000 years ago, Marion Island was subjected to a second wave of lava flows that formed the black basalt lavas. The black lavas form very ragged-flows between and over the grey lavas and mainly occupy intervening valleys between the ridges, As they have never been subject to glaciation, their topography is very uneven. These younger flows are associated with approximately 130 scoria cones on Marion Island. Scoria cones are distinctive features of the geomorphology of both Islands. There is a stationary glacier or "ice plateau" in the central highlands of Marion Island the only glacier on South African territory. The glacier is static and consists mostly of hard blue ice that is partially hidden by large moraines.

Soils

Most of the rock on the island has not weathered sufficiently to form deep, well-developed soils. Many of the higher lying "fjeldmark" or wind desert areas are characterised by desolate wind-swept surfaces covered by loose stones and volcanic ash. Most of the soils consist almost entirely of slowly decomposing organic matter (peat) from plants and fine volcanic ash. Generally, the islands' soils are characterised by Immaturity, negligible influence of parent material on the soil profiles and a marked effect of slight variations in topography and wind exposure. Deeper peat soils occur along the waterlogged coastal plain and. in valleys that are protected from wind. Peat slips are common features of these soils, especially on slopes where they have been disturbed by human trampling or by seats. Soils of low-altitude and vegetated areas are usually peat, containing volcanic ash in varying amounts.

Climate

The Island Group has a cool climate with an annual mean air temperature of 5.9°C. The absolute maximum and minimum temperatures ever recorded at the base are 23.8°C and - 6.8°C, respectively. Absolute minimum temperatures are below zero every month of the year, but even in the winter temperatures rarely fall below -4°C because of the moderating influence of the ocean. The mean surface air temperature has increased by 0.93°C from 1951 to 1988. This Is ascribed to changing oceanic and atmospheric circulation patterns at sea level.

The Island Group experiences high precipitation (an average of 2,500 mm per annum), mainly in the form of rain, which is distributed fairly evenly throughout the year. Most of the rain falls as light showers. Heavy falls of over 25mm/day occur about twice a month on average. The Island Group experiences an average of 25 days with precipitation a month and 308 days with precipitation per annum. Snow Is frequent in winter, particularly from July to September. Snow sometimes covers the whole of Marion Island, but in low-lying areas it usually melts within a few days. The base experiences an average of 95 days of snow and 46 days of fog per annum.

Marion Island has a high level of cloudiness (annual sunshine duration ca 30% of the maximum possible. On average, no days with more than 90% of possible sunshine are encountered. An annual average of 130 days with a cloud base below 300m above sea level are encountered. Average annual cloud cover is 79%. The island Group is situated in the "Roaring Forties". Thus the islands are subjected to westerly to northwesterly winds approximately 60% of the time. Gate force (>55km/h) winds lasting at least one hour are experienced for an average of 107 days per annum. Gales usually exceed this speed and duration, however, and can reach speeds of up to. 200km/h. Winds exceeding 70km/h often continue unabated for more than 24 hours.

General Ecology

The features of the sub-Antarctic islands that have combined to produce their particular ecosystem are geographic isolation., wind exposure, temperature, high rainfall, and the strong influence of the marine ecosystem (e.g. manuring by. birds and seals). Two factors in particular have contributed to a relatively low floral and faunal diversity on the sub-Antarctic islands in general and on the Island Group in particular. The first factor is that the Island Group is geologically very young. The second factor is the remoteness of the Islands from continents. A slow process of colonisation has established biota on small "pinpricks" of land across vast expanses of ocean. Thus, there is a low number of species of indigenous flora. Many of these indigenous species have wide ecological amplitudes and occur over a range of habitats. Five percent of the. plant species are endemic to the Island Group and 23% of the plant species are restricted to the South Indian Ocean Biogeographlical Province.

Indigenous species that play a major role in continental ecosystems (e.g. herbivorous and carnivorous land mammals) are absent from the natural terrestrial ecosystem of the Island Group. Combined with the very high primary production of many plant communities, this has a significant effect on ecosystem. structure and function. It means that detritivores like fungi and bacteria, rather than herbivores, control energy flow. Arthropods and other Invertebrates play very important roles as detritivores and invertebrates are by far the most dominant herbivores in the ecosystem.

Nutrient cycling

The ecosystem of the Island Group can be regarded as semi-closed systems with significant interaction between the terrestrial and oceanic systems. The ecosystem is characterised by a significant level of nutrient transfer between the terrestrial environment and the ocean. Seabirds and seals bring nutrients to the islands, mainly in the form of guano. These nutrients support the growth of specific plant communities, particularly In the vicinity of penguin and seal colonies, but also farther inland. An example is the way that tussock grasslands replace fembrake communities where burrowing petrels and prions establish their burrows, These nutrients are further spread through the soils by invertebrates. Nutrients are returned to the oceans when they are washed off the island by rainfall. The nutrients are absorbed by plankton, and are then cycled higher up the food chain and eventually to inshore-foraging seabirds such as Gentoo penguins and cormorants and to seals.

Vegetation

The vegetation of Marion Island is relatively poor in species. This is typical of sub-Antarctic islands due the isolation from other landmasses and rigorous climate_ The Island Group has 22 indigenous vascular plant species and 21 alien plant species, either naturalised or transient. See Appendix A for a species list of vascular plants, Mosses (79 species), liverworts (36 species) and lichens (ca 50 species) are important components of the vegetation. Most of the island's vegetation has a very slow growth rate due to the extreme climate. This, combined with slow reproduction, makes the vegetation very sensitive to external disturbances. Six main plant communities can be distinguished. Vegetation distribution is mainly affected by factors such as the soil-water regime, the influence of salt spray, mechanical damage (e.g. due to trampling) and enrichment by guano deposition.

Invertebrates

Some 147 species of indigenous and introduced invertebrates are known from Marion Island, This includes 19 alien species that have become naturalised and 13 introduced species that have not, as yet, established themselves. 39 Species of soil ciliates have been found on Marion Island. Seven endemic invertebrate species have been identifed. The endemic species include two springtails

(*Isotoma marionensis* and *Katianna* n, sp.), three beetles (*Bothrometopus elongatus, Ectemnorfrinus marioni* and *E. similis*) and two moths (*Pringleophage marioni* and *P. kerguelensis*).

The distribution and density of many invertebrates is strongly Influenced by manuring by birds and seals. High densities and biomass of invertebrates accompany high plant densities, soil nutrient content and plant nutrient content in heavily manured areas.

Mammals

There are three seal species on the Island Group. Their numbers are indicated in parentheses: the southern elephant seal *Mirounga leonine* (2,000), Antarctic fur seal *Arctocephalus gazelle* (330), and sub-Antarctic fur seal *A. tropicalis* (44,800). Leopard seals *Hydrurga leptonyx* and Weddell seals *Leptonychotes weddelui* are occasional non-breeding vagrants. There are no indigenous land mammals an the Island Group. Introduced house .mice are present on Marion Island but do not occur on Prince Edward Island. The. introduced feral cat was exterminated in the early 1990s.

Birds

The Island Group supports 29 species of breeding birds as well as 22 species of vagrant seabirds and 28 species of non-marine vagrant species (see Appendix D for a complete list of. species). Although the breeding bird species Include only one endemic taxon (the Lesser Sheathbill *Chionis minor marionenis)* most species have a very limited breeding area that is restricted to a handful of sub-Antarctic islands. Furthermore, the large distances between breeding sites and the high philopatry (natal site fidelity) characteristic of these species have led to limited genetic interchange and hence considerable geographical variation within species.

Most of these species are wholly or predominantly dependant on the marine environment for their energy needs and are capable of foraging great distances away from the Island Group; they only use the Island Group as a platform for breeding and moulting (in the case of penguins). Outside their breeding seasons they disperse away from the islands to more productive foraging areas. The large numbers of seabirds that breed on the Island Group are an important vehicle for importing nutrients from the marine environment to the terrestrial island environment, primarily in the form of guano. The seabirds on the Island Group are generally long lived. They only breed after a prolonged juvenile stage and breed very slowly. Almost all species breed only once a year and only lay one or two eggs. The chick-rearing period is prolonged with moderate breeding success. Some albatross species only lay one egg every second year. Just over half the eggs successfully fledge a chick in a given season. This means that populations are extremely sensitive to adult mortality, and will take a long time to recover from a perturbation to the population demographics (e.g. a decrease in adult survival). Four orders of seabirds are present on the Island Group: *Sphenisciformes* (penguins), *Procel[ariiformes* (albatrosses and petrels), *Charadriiformes* (skuas, gulls and terns) and *Pelecaniformes* (cormorant).

Freshwater systems

Marion Island has three perennial streams, but it is not known whether Prince Edward Island has any perennial watercourses due to the infrequent visitation of this island. Apart from the flowing water types, there is a range of lentic waters on the Island Group, Including shallow takes, lava-lakelets (primarily on black lava flows), crater lakes (in the craters of scoria cones) and wallows formed by the activity of animals. There are no indigenous fish in the freshwater environments (the introduced brown and rainbow trout are now extinct), and zoopiankton, therefore, represent the highest level in the freshwater food chain. Two species of copepods *Pseudoboeckella vofucris* and *Daphniopsus studeri*

dominate fresh waters and there are also a number of species of mites and a common freshwater midge *Umnophyes minimus*.

Marine environment

The Island Group is in the path of one of the world's widest current systems, the Antarctic Circumpolar Current (ACC), which flows clockwise around' the Antarctic continent at a surface speed of 0.5-2km/h. As a result the Island Group effectively has an upstream (westerly) and a downstream (easterly) side. This is important because all the Island Group's land-based vertebrate predators depend on the sea for food. The availability of food is controlled by oceanographic conditions. The ACC .carries food, in the form of plankton, to the island Group from the west. The Island Group also lies close to two major oceanic frontal systems. These fronts separate major water bodies with different chemical and physical properties and act as strong biogeographical boundaries with different suites of marine species to the north Sand south of each front. In addition, the fronts are areas of enhanced biological activity. They consequently form important feeding grounds for land-based predators.

Both islands in the Island Group have relatively unstable and hostile littoral environments, which results in a generally low biodiversity and low density of littoral organisms, All the shores around the islands are exposed (those with a westerly aspect severely so) due to the predominantly westerly winds. Large swells and unstable substrates (e.g. boulders) that result in abrasion also contribute to unfavourable conditions.

The Island Group forms the highest point of a shallow plateau, approximately 200 to 500 m deep, that drops off very rapidly Into much deeper waters (ca, 3 000 m). This plateau supports a rich seabed community of approximately 550 species, dominated by filter feeders, These are largely supported by local phytoplankton production. The swimming prawn Nauficaris marfonis links this community to the seabirds. Adult prawns feed on the seabed community and are important in the diets of birds with short foraging ranges, especially the Gentoo, Macaroni and Rockhopper penguins and the Imperial cormorant. 33 Species of fish from 13 families are known from the oceans around the Island Group. This Is more than has been recorded at the lies Crozet (25 species) but Inferior to the number at the lies Kerguelen (59 species).

History and development

The Island Group was probably first sighted in March 1663, when a vessel of the Dutch East India Company, the Maerseveen, under command of Barent Barentzoon Ham, went off course en route to Batavia. Commander Ham named the northerly island "Dina" and the southerly island "Maerseveen". The French naval officer Marion du Fresne, who was in command of the vessels Le Mascarin and Marquis du Castries, rediscovered, the Island Group more than 100 years later in January 1772 in ignorance of the first discovery. The next person to sight the Island Group was Captain James Cook. He reached the Island Group on 12 December 1775. Having a chart that did not indicate du Fresne's earlier names for the islands, Cook renamed the Island Group "Prince Edward's Islands' after the fourth son of King George III. It was only by the middle of the 19o century that the larger of the two islands became known as Marion island, presumably due to the notorious vagueness with which sealers named the islands they visited.

'None of the above-mentioned voyagers landed on either of the islands. Although mention is made of sealers having been established on the islands by 1802, the first recorded landing was in December 1803 or January 1804 from the vessel the Catherine. The Commander of the Catherine, John Fanning, however, made no claim to have made the first landing, and the name of the first vessel to

have landed at the Island Group remains a mystery. The Island Group was heavily exploited by the sealing industry in this early part of the 1 P century - so much so that by 1810 the fur seal population had been virtually decimated. Exploitation of elephant seals for blubber and oil continued, but by 1860 this activity had also become uneconomical as elephant seal numbers were declining. Sealing continued until the early 20th century, but had ceased by the 1930s when the industry became uneconomic due to dwindling seal numbers.

There have been several shipwrecks on both Prince Edward island and Marion Island. Few have been well documented, however. Artefacts from sealers and castaways are present at several sites on Marion Island and Prince Edward Island. Some remains of a village of 17 huts constructed by shipwrecked sailors from the Solgiimt (dating from 1908) can still be seen at Ship's Cove close to the Marion Island base. Following in the wake of World War II, the South African government realised the strategic value of the Island Group for navigation and defence. Lieutenant-Commander John Fairbaim, in command of the frigate MHSAS Transvaal, annexed Marion Island and Prince Edward Island on 29 December 1947 and 4 January 1948, respectively, The South African Parliament subsequently passed the Prince Edward Islands Act (Act 43 of 1948) to formalise the annexation of the Island Group. Transvaal Cove, where the Marion Island base is situated, was named after the naval frigate Transvaal.

The first meteorological party started work on the island in February 1948, Since then, an unbroken record of meteorological data has been kept, Research teams were relieved twice a year until 1956, and once a year since then. Research teams are relieved by ship. No fixed wing aircraft has been used on the Island Group apart from emergency aerial drops such as after the burning down of the accommodation and communications building In 1966 and an emergency crash landing of a light aircraft during 2002 on Marion Island. Formal biological research started in 1965 with the first biological and geological expedition led by Prof. Eduard van Zinderen Bakker Sr. of the University of the Orange Free State, Since then ongoing research has yielded a wealth of findings, and has given rise to more than 800 scientific publications and items of popular literature.

APPENDIX 4

DEFINITIONS OF TERMS USED IN THE MANAGEMENT PLAN

AIRCRAFT – Any craft capable of self-sustained movement through the atmosphere, excluding hovercraft.

BIOPROSPECTING – In relation to indigenous resources, means any research on, or development or application of, indigenous biological resources for commercial or industrial exploitation, and includes:
the systematic search, collection or gathering of such resources or making extractions from such resources for purposes or such research, development or application;
the utilisation for purposes of such research or development of any information regarding any traditional uses of indigenous biological resources by indigenous communities; or
research on, or the application, development or modification of, any such traditional uses, for commercial or industrial exploitation (as taken from *National Environmental Management: Biodiversity Act 2004*).

COASTCARE – An educational programme developed by Marine and Coastal Management to promote voluntary compliance and public awareness.

COMMERCIAL ACTIVITY – An activity conducted for financial gain.

COMMERCIAL BOAT BASED WHALE WATCHING – May only occur with a permit issued under Section 58 of the Regulations in terms of the *Marine Living Resources Act 1998.*

COMMERCIAL FISHING – Fishing for any of the species that have been determined by the Minister in terms of section 14 to be subject to the allowable commercial catch or total applied effort or parts of both. (as taken from the MLRA, 1998).

COMMERCIAL PHOTOGRAPHY – The use of still, video or cine camera equipment for the recording of images and these images are used for financial gain.

DESIGNATED AREA – means an area within a zone or zones set aside for the purposes for special management.

EDUCATION PROGRAMME – An activity that is:

component of a course conducted by a school or tertiary institution that is recognised by a provincial or national department responsible for education; or
conducted by an overseas institution that is accredited by the national body responsible for education in the country in which the institution is established and is recognised in South Africa by a provincial or national department responsible for education.

EEZ – ``exclusive economic zone'' means the exclusive economic zone as defined in section 7 of the Maritime Zones Act, 1994 (Act No. 15 of 1994); (x)

FISH – The marine living resources of the sea and the seashore, including any aquatic plant or animal whether piscine or not, and any mollusc, crustacean, coral, sponge, holothurian or other echinoderm, reptile and marine mammal and includes their eggs, larvae and all juvenile stages, but does not include sea birds and seals. (MLRA, 1998)

MARINE LIFE – includes any aquatic plant or animal whether piscine or not, and any mollusc, crustacean, coral, sponge, holothurian, echinoderm, reptile and marine mammal and includes their eggs, larvae and all juvenile stages, and includes sea birds and seals.

the MINISTER - means the Minister of Environmental Affairs and Tourism

NETS – Includes beach-seine net, bottom trawl-net, cast-net, drag-net, hoop-net, purse-seine-net, shove-net and set-net.

PRECAUTIONARY APPROACH –

RECREATIONAL DIVING - An individual or group who undertake scuba diving activities without financial gain.

RECREATIONAL FISHING – means any fishing done for leisure or sport and not for sale, barter, earnings, or gain. (MLRA, 1998).

RECREATIONAL PHOTOGRAPHY - The use of still, video or cine camera equipment for the recording of images and these images are not used for financial gain.

RESTRICTED ZONES – the Zone where fishing is prohibited.

RISK ASSESSMENT – A process that involves identifying the valued attributes of the marine protected area that are considered to be at risk and determining when an impact is deemed to be significant on these values.

SCIENTIFIC RESEARCH - means research carried out by a recognised institute established for the purposes of research, or research carried on by a recognised institute of higher learning, provided that to undertake such scientific research the recognised institute requires its staff, students or contractors to enter the Marine Protected Area (as taken from *MLRA Regulations*).

SCUBA DIVING - means swimming below the surface of the sea with the aid of compressed or pumped air or other gases (as taken from *MLRA Regulations).*

STOWED – secured in such a way that it is not available for immediate use.

TERRITORIAL SEA - ``territorial waters'' means the territorial waters as defined in section 4 of the Maritime Zones Act, 1994; (xiv)

TOURIST - A person who is in the marine protected area for recreation, including, for example, recreational fishing or sight seeing.

TOURIST PROGRAMME – An activity conducted for financial gain that includes the provision of transport, accommodation or services for tourists, advertising or promoting the use of a marine protected area as part of the programme, advertising or promoting the use of a marine protected area as a feature associated with a resort or tourist facility on land adjoining the area and includes traversing the Prince Edward Islands Marine Protected Area to conduct tourist programmes outside of the MPA.

TRAVERSING – a vessel entering the MPA for the purpose of accessing another area outside of the MPA.

Part 5

Proposal for the Proclamation of the Prince Edward Islands Marine Protected Area

PROPOSAL FOR THE PROCLAMATION OF THE PRINCE EDWARD ISLANDS MARINE PROTECTED AREA

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1. INTRODUCTION

This document culminates 18 months of planning towards the delineation of the proposed MPA around South Africa's Prince Edward Islands in the Southern Ocean.

This initiative followed the Minister of Environmental Affairs and Tourism, Marthinus van Schalkwyk's announcement in June 2004 that it was his department's intention to declare one of the largest MPAs in the world around the Prince Edward Islands. In November 2004, Department of Environmental Affairs and Tourism's (DEAT) Marine & Coastal Management branch, teamed up with WWF South Africa (and funding from Sanlam) to develop a spatial marine biodiversity conservation plan that would inform the delineation of this proposed MPA. The plan was developed by the CSIR with extensive consultation with stakeholders and experts. Please see Appendix 1 for a summary of these meetings.

In January 2006 the project team produced the final spatial conservation plan, included in this report (Part 1). This final plan was workshopped with the fishing industry and other stakeholders in March 2006 and May 2006. This document summarizes the agreed outcomes of these meetings and is now in a form for DEAT approval before being drafted as a government gazette.

Citation: D.C. Nel, T. Akkers & A. Boyd. 2008. Proposal for the proclamation of the Prince Edward Islands Marine Protected Area. *In:* Nel D. & Omardien A. (eds). *Towards the Development of a Marine Protected Area at the Prince Edwards Islands.* WWF South Africa Report Series - 2008/Marine/001.

2. OBJECTIVES OF THE PRINCE EDWARD ISLANDS MPA:

The MPA zonation around the Prince Edward Islands seeks to contribute to the following four major objectives:

1) To contribute to a national and global representative system of Marine Protected Areas, by providing protection for unique species, habitats and ecosystem processes (e.g. foraging grounds, shelf areas with increased nutrients, etc.)
2) To provide scientific reference points that can inform the future management of the area
3) To contribute to integrated and ecologically sustainable management of marine resources of the area
4) To reduce the ecological impacts of fisheries and other extractive industries (e.g. bycatch of the toothfish fishery, particularly of albatrosses and petrels)

It is proposed that:

1 The MPA should follow the delineation shown in Figure 1. The exact co-ordinates of the delineation are given in Table 1.

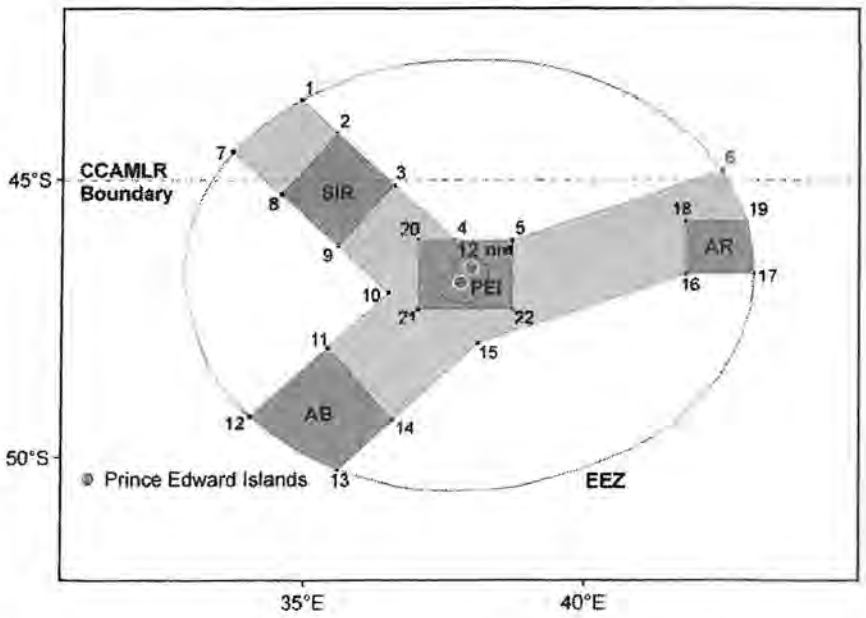

Fig. 1. The proposed boundaries for the Prince Edward Islands MPA. The four Category 1a reserves are: Southwest Indian Ridge (SIR); Prince Edward Islands (PEI); Africana II Rise (AR); and Abyss (AB).

Table 1. The exact geographic coordinates (WGS 84 spheroid) of points 1-22 in Fig. 1

Point	Latitude Degrees	Minutes	Longitude Degrees	Minutes	Point	Latitude Degrees	Minutes	Longitude Degrees	Minutes
1	43	34	34	56	**12**	49	16	34	3
2	44	10	35	35	**13**	50	14	35	36
3	45	6	36	36	**14**	49	20	36	35
4	46	6	37	42	**15**	47	57	38	7
5	46	6	38	44	**16**	46	42	41	48
6	44	50	42	27	**17**	46	42	43	2
7	44	30	33	44	**18**	45	46	41	48
8	45	16	34	35	**19**	45	46	42	53
9	46	12	35	36	**20**	46	6	37	3
10	47	3	36	31	**21**	47	21	37	3
11	48	2	35	25	**22**	47	21	38	44

2 The MPA will be comprised of three types of zones:

2.1 A 12 nautical mile sanctuary (no-take) zone covering the area extending 12 nautical miles from the low water mark of the islands (i.e. the entire extent of the territorial sea)

2.2 Four restricted zones, indicated as PEI, SIR, AR, and AB in figure 1.

2.3 A conservation zone, linking the four strict nature reserves

3 These areas should be managed as follows:

3.1 **The 12nautical mile Sanctuary Zone:**

Purpose:

3.1.1 This zone is to be managed as a strict no-take zone for the preservation of the unique island ecosystem.

Management:

3.1.2 The following activities are prohibited in this zone:

3.1.2.1 Fishing or attempting to fish

3.1.2.2 To destroy or remove any other fauna or flora

3.1.2.3 To mine, dredge, extract sand or gravel, discharge or deposit waste or any other polluting matter, or in any way disturb, alter or destroy the natural environment;

3.1.2.4 To construct or erect any building or other structure on or over any land or water within such a marine protected area; or

3.1.2.5 To carry on any activity which may adversely impact on the ecosystems of that area.

3.1.2.6 Non-government shipping activities, including fishing vessels in possession of a legal permit, will be restricted to shipping lanes and designated anchoring zones.

3.1.2.7 Fishing vessels not in possession of a legal permit may only enter this zone under conditions of force majeur.

3.2 **The Restricted Areas:**

Purpose:

3.2.1 These areas are designed to protect representative proportions all habitat types in the Prince Edward Islands EEZ and to contribute towards the ecologically sustainable management of marine resources.

Management:

3.2.2 Resources in these areas to be fully protected with disturbances limited to scientific monitoring activities.

3.2.3 Toothfish populations in these areas will be monitored using standardized commercial fishing techniques. The DEAT shall enter into an agreement with permitted commercial rights holders to perform these monitoring activities as part of their permit conditions. The design of the monitoring effort will be determined by DEAT scientists in consultation with the commercial rights holders. The monitoring effort should be set at the average annual number of hooks set in each of these zones over the period 2002 to 2005 and total effort in the restricted zones should never exceed 40% of the total effort in the EEZ (see Table 2).

Table 2. Average number of hooks set in each of the proposed Scientifically Monitored Nature Reserves from 2002 to 2005

Scientifically Monitored Nature Reserve	Average effort in hooks from 2002 to 2005
PEIs	554,912 hooks
AR	345,671 hooks
SIR	143,630 hooks
AB	0 hooks (not fished at all)
Total	1,044,213 hooks

3.2.4 Furthermore the following activities will be prohibited:

3.2.4.1 Any fishing or attempt to fish, over and above that required for the scientific monitoring required in 3.2.2 (above)

3.2.4.2 Fishing by methods known to cause damage to benthic habitats and biota (e.g. bottom trawling)

3.2.4.3 To destroy or remove any other fauna or flora.

3.2.4.4 To mine, dredge, extract sand or gravel, discharge or deposit waste or any other polluting matter, or in any way disturb, alter or destroy the natural environment;

3.2.4.5 To construct or erect any building or other structure anywhere within this zone; or

3.2.4.6 To carry on any other activity which may adversely impact on the ecosystems of that area.

3.2.4.7 Fishing vessels not in possession of a legal permit and traversing these areas, will do so with fishing g ear stowed, may not carry fish and will be subject to mandatory reporting procedures.

3.3 The Conservation Zone

Purpose:

3.3.1 This zone is to be managed as a low impact zone that links the other zones spatially, protects representative proportions of benthic habitats, and sustains ecosystem processes, whilst still allowing sustainable utilization of Patagonian toothfish resources.

Management:

3.3.2 Fishing for Patagonian toothfish subject to catch or effort limits by rights holders will be allowed here, but will not involve methods that impact on the benthic environment or that result in unsustainable or ecologically threatening rates of bycatch. The following activities will be prohibited:

3.3.2.1 Fishing method that is known to impact benthic habitats (e.g. bottom trawling)

3.3.2.2 To mine, dredge, extract sand or gravel, discharge or deposit waste or any other polluting matter, or in any way disturb, alter or destroy the natural environment (e.g. through mining)

3.3.2.3 Best currently available seabird mitigation measures must be applied to mimimise seabird bycatch. Should seabird bycatch exceed a prescribed limit, fishing within the conservation and restricted zones should cease. It is provisionally recommended that the total seabird bycatch limit for the conservation and restricted zones collectively, be set at 50 birds annually in total, or 30 birds per vessel.

4 The MPA will be managed in accordance with relevant international obligations, conventions and agreements

5 All vessels fishing in any of the above zones should carry a scientific observer

6 A compliance strategy for the effective enforcement of this MPA will be developed by DEAT, within six months of its promulgation.

Appendix 1: Summary of meetings

Date	Purpose	Attendees
15 June 2005	*Expert and stakeholder consultation*	Theressa Akkers (DEAT), Dr Isabelle Ansorge (UCT), Richard Ball (Ziyabuya Fishing), Prof Maarthan Bester (UP), Prof George Branch (UCT), John Cooper (UCT), Dr Rob Crawford (DEAT), Heidi Currie (Feike), Sarah Davies (Univ Stellenbosch), Brian Flanagan (Fishing Industry), Prof William Froneman (Rhodes Univ), Niekie Kock (Suidor Fishing), Dr Mandy Lombard (Conservation Systems), Pheobius Mullins (DEAT), Dr Deon Nel (WWF), Samantha Petersen (BirdLife &WWF), Dr Belinda Reyers (CSIR), Lindie Smith-Adao (CSIR), Frances Taylor and Barry Watkins (UCT)
06 October 2005	*Expert input*	John Cooper (UCT), Prof Maarthan Bester (Univ Pretoria), Sarah Davies (Univ Stellenbosch), Dr Mandy Lombard (Conservation Systems), Dr Belinda Reyers (CSIR), Dr Deon Nel (WWF), Prof William Froneman (Rhodes), Dr Isabelle Ansorge (UCT)
03 March 2006	*Stakeholder consultation*	John Cooper (UCT), Jan Glazewski (UCT), Heidi Currie (Fieke), Samantha Petersen (BirdLife), Estelle van der Merwe (ASOC), Henry Valentine (DEAT), Daniel Bailey (Bato Fishing), Richard Ball (Ziyabuya Fishing), Dr Isabelle Ansorge (UCT), Theressa Akkers (DEAT), Niekie Kock (Suidor Fishing), Barry Watkins (UCT), Dr Mandy Lombard (Conservation systems), Dr Deon Nel (WWF), Aaniyah Omardien (WWF)
16 May 2006	*Fishing industry consultation and implementation planning*	Theressa Akkers (DEAT), Dr Colin Attwood (DEAT), Dr Alan Boyd (DEAT), Richard Ball (Ziyabuya Fishing), Daniel Bailey (Bato Fishing), Dr Deon Nel (WWF), Aaniyah Omardien (WWF), Samantha Petersen (WWF), Dr Mandy Lombard (Conservation Systems)
23-26 May 2006	*Final Consultations and drafting of recommendations*	Dr Alan Boyd (DEAT), Dr Colin Attwood (DEAT), Barry Watkins (UCT), Dr Peter Ryan (UCT), Dr Rob Crawford (DEAT), Richard Ball (Ziyabuya Fishing)
11 October 2007	*Consultations on request of the industry to discuss issues raised by Prof Butterworth*	Theressa Akkers (DEAT), Dr Colin Attwood (WWF), Dr Alan Boyd (DEAT), Richard Ball (Ziyabuya Fishing), Daniel Bailey (Bato Fishing), Dr Deon Nel (WWF), Aaniyah Omardien (WWF), Samantha Petersen (WWF), Prof Doug Butterworth (UCT), Dr Rob Crawford (DEAT). Dr Kerry Sink (SANBI), Barry Watkins (BirdLife), Brian Flanagan (Arniston fishing), T Samaai (MCM), RN Ruka (Ziyabuya fishing), E Planganyi (UCT), H Oosthuizen (MCM), ME Links (Ziyabuya fishing), AS Johnson (MCM), C Edwards (UCT), A Brandao (UCT), N Kock (Suidor fishing).

Item 2.5a

From: "Nel, Deon" <dnel@wwf.org.za>
To: "Omardien, Aaniyah" <aomardien@wwf.org.za>, "Kusi Ngxabani-Tikana" <Kngx...
Date: 11/6/2008 3:16 PM
Subject: Update regarding the Prince Edward Islands MPA

Dear Kushi

A brief history of the project can be found in the introduction of the report sent to you by Aaniyah. I hope that you have managed to secure hard copies for the committee members from our office.

Briefly, the history is as follows:

June 2004: Minister commits publicly to developing a large MPA around the PEIs

2005: WWF and DEAT collaborate on developing a spatial conservation plan to inform the delineation of the MPA

March 2006: PEIs MPA spatial plan complete following in depth discussions with the fishing industry. Paper published in Antarctic Science.

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The latest updates since the publication of this report are as follows:

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I hope that this will help the committee understand the latest developments. Any further encouragement from this committee to the Minister would be greatly appreciated.

Kind regards

Deon

From: "Kusi Ngxabani-Tikana" <Kngxabani-Tikana@deat.gov.za>
To: "Aaniyah Omardien" <aomardien@wwf.org.za>, "Deon Nel" <dnel@wwf.org.za>
CC: "Chuma Phamoli" <CPhamoli@deat.gov.za>, "Erik Buenk" <HBuenk@deat.gov.za>, "Henry Valentine" <HValentine@deat.gov.za>, <john.Cooper@uct.ac.za>
Date: Thursday - November 6, 2008 4:36 PM
Subject: Re: Update regarding the Prince Edward Islands MPA

Dear Deon

Thank you for the brief history of the project below - much appreciated!

I had made copies of the 'Draft Management Plan for the PEI MPA received from Aaniyah and sent them well in advance of tomorrow's meeting to PEIMC members.

Thanks and kind regards
Kusi

>>> "Nel, Deon" <dnel@wwf.org.za> 11/6/2008 1:45 PM >>>
Dear Kushi

A brief history of the project can be found in the introduction of the report sent to you by Aaniyah. I hope that you have managed to secure hard copies for the committee members from our office.

Briefly, the history is as follows:

June 2004: Minister commits publicly to developing a large MPA around the PEIs

2005: WWF and DEAT collaborate on developing a spatial conservation plan
to inform the delineation of the MPA

March 2006: PEIs MPA spatial plan complete following in depth discussions with the fishing industry. Paper published in Antarctic Science.

Mid 2006: Dr Monde Mayekiso (DDG DEAT:MCM) informs WWF that he is reluctant to support the MPA, without a management plan. WWF raises funds and commissions the development of a draft MPA management plan

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I hope that this will help the committee understand the latest developments. Any further encouragement from this committee to the Minister would be greatly appreciated.

Kind regards

Deon

Doc 2.5B

Marion-eiland word nie 'n PAPIERPARK

Marioneiland, 'n vulkaniese blerts in die Suidelike Oseaan, wat onder meer belangrike seevoël-broeikolonies bevat. Foto: NICO DE BRU

op die kritiek oor die traagheid vir die skep van 'n mariene bewaringsgebied rondom die Prins Eduard-eilandgroep, skryf JORISNA BONTHUYS.

Die departement van omgewingsake en toerisme wil nie "papierparke" vestig as hy dit nie na behore kan bestuur nie. Só sê mnr. Mava Scott, waarnemende direkteur van kommunikasie.

Hy het gereageer op kritiek van die WWF-SA oor die skep van 'n mariene bewaringsgebied rondom dié eilandgroep. Detail hieroor is vervat in 'n 180 bladsyverslag van dié bewaringsgroep. Dit is uitgereik om saam te val met die pas afgelope 4de Internasionale Konferensie oor die Biologie en Bewaring van Albatrosse en Stormvoëls.

Daarin kap die WWF-SA die regering omdat hy vier jaar nadat 'n hoëvlakonderneming gegee is dat 'n mariene bewaringsgebied dáár verklaar gaan word, dit steeds nie gedoen is nie. Dr. Deon Nel van dié organisasie sê dit kom ondanks 'n politieke onderneming hieroor deur mnr. Marthinus van Schalkwyk, minister van omgewingsake, dat een van die grootste mariene bewaringsgebiede ter wêreld dáár gevestig sal word. Hy meen dit is onduidelik waarom die regering voete sleep hiermee terwyl aanduidings is dat dit wél ekonomies lewensvatbaar is om dit te vestig.

IN DUIE GESTORT

Die WWF-SA is die afgelope paar jaar as deel van 'n vennootskap met die regering besig met navorsing en die opstel van konsep-bestuursplanne vir só 'n "seepark". Dit maak onder meer voorsiening vir sekere gebiede waar daar nie visgevang mag word nie. . "Suid-Afrika se historiese gebrek aan wetstoepassing in die gebied het reeds veroorsaak dat Patagoniese tandvisbronne daar, wat 'n winsgewende visbedryf kon onderhou, feitlik in duie gestort het," sê Nel.

"Suid-Afrika het 'n internasionale verantwoordelikheid om dié streek, waarop hy gebiedsaansprake het, na behore te bestuur inaggenome die sensitiewe aard daarvan."

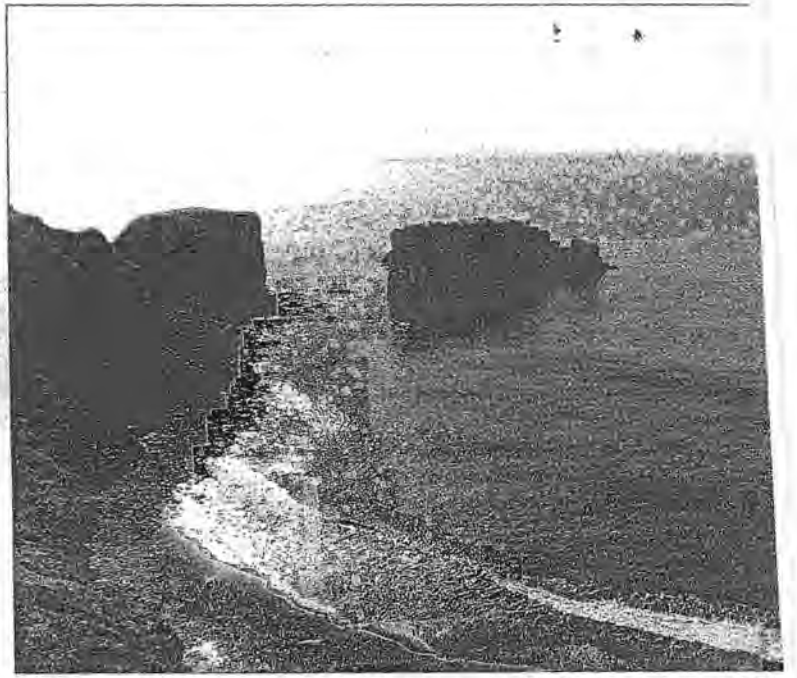
Nel sê verskeie moniteringstelsels (wat al elders getoets is) is beskikbaar wat koste-doeltreffende bestuur van visserypraktyke in dié deel van die oseaan moontlik maak.

Voorts moet Suid-Afrika in elk geval kragtens internasionale ondernemings dié deel van die oseaan na behore bestuur (veral ingevolge die Konvensie oor die Wet van die See).

Scott sê in 'n verklaring hieroor die beraamde koste om só 'n mariene bewaringsgebied na behore te bestuur, sal 'n groot hap van die regering se begroting vir kusbewaringsgebiede opslurp. Hierteenoor sê die WWF-SA egter dit hoef nie soveel meer te kos om dié seepark te vestig as wat die bestuur van dié waters (ingevolge internasionale ondernemings) in elk geval gaan beloop nie.

'n Kaart wat die ligging van die eilande toon. Grafika: JACO GROBBELAAR

Suid-Afrika het 'n internasionale verantwoordelikheid om dié streek na behore te bestuur.



Die kleiner Prins Eduard-eiland op die agtergrond. Dié eiland, geleë sowat 19 ki van Marioneiland (op die voorgrond), is nog méér ongerep. Foto: PIERRE PISTORIL

VANGSONE VERGROOT

Die departement sê hy maak wél vordering ingevolge ondernemings om 'n mariene bewaringsgebied daar te vestig.

In 2005 is die geenvangsone rondom die eilandgroep kragtens permitvoorwaardes vir die wettige visvangvaartuie wat daar toegelaat word, vergroot (van 8 tot 12 seemyle). Strenger riglyne geld nou wat byvangste betref om seevoëlvrektes weens swak visvangpraktyke te verminder. 'n Konsepbestuursplan en 'n bewaringsplan is opgestel en patrollievaartuie besoek die omliggende waters.

Nel sê pogings om dié eilandgroep tot 'n wêrelderfenisgebied te laat verklaar, sowel as planne om Suid-Afrika se gebiedsaansprake op die kontinentale plat uit te brei, kan die regering se hand sterk wat wetstoepassing in dié waters be tref.

Hy reken tegnologiese hulpmid dels (soos radarstelsels) kan bai help met monitering, terwyl 'n sa mewerkingsooreenkoms me Australië en Frankryk oor wets toepassing in dié deel van die ose aan dringend kortkom.

Scott sê gesprekke is onderweg met dié lande oor sulke ooreen komste.

Tans is al die land se beskermde "seeparke" naby die kus geleë. Suid-Afrika het tans 19 mariene beskermde gebiede, waarin ongeveer 'n vyfde van die kuslyn formeel beskerming geniet. Sommige sluit geenvang-sones in.

Minder as 1% van die land se eksklusiewe visvangwaters (wat 200 seemyle see-in strek) geniet tans formele beskerming.

DOC 2.6

From: Stanley Tshitwamulomoni
To: Kusi Ngxabani-Tikana
Date: 10/20/2008 4:20 PM
Subject: Re: 23rd PEIMC meeting minutes

CC: Kiruben Naicker; Lufuno Ravhandalala; Wilma Lutsch

Dear Kusi

Prince Edward Islands and Makuleke wetlands were formally designated on the 22 of May 2007 and the Ramsar Secretariate made an announcement in the website. However, due to the availability of the minister the hand over of the certificate was not possible in 2007 and 2008. After careful consideration, and taking into account all the relevant and potential environment days of the year, a decision was made that the hand over of any Ramsar certificates will in future take place on 2 February (World Wetlands Day), i.e. the certificates for both Prince Edward Islands and Makuleke wetlands will be handed over next year on the 2nd of February and you will be informed in time.

x wall plaque

I hope you will find this in order.

Regards

Stanley

****

Stanley Tshikonelo Tshitwamulomoni
Ramsar Convention Focal Point, South Africa
Sub-directorate: Biodiversity Planning
Department of Environmental Affairs and Tourism
Private Bag X447, Pretoria
0001
Tel : +27 12 310 3919
Fax : +27 12 320 2488
Cell : +27 82 643 0623
E-mail: stanleyt@deat.gov.za
Website: www.deat.gov.za

Ask Alan to think what to do.

>>> Kusi Ngxabani-Tikana 2008/10/20 01:21 PM >>>
Dear Stanley

Following our telephonic conversation a few minutes ago, attached please receive the above-mentioned minutes as regards to item 2.6 - RAMSAR Wetland Reserve Status for the Prince Edward Islands for your action.

Kind regards
Kusi

Ms Khuselwa Ngxabani-Tikana
Assistant Director
Department of Environment and Tourism

Antarctica and Islands
P O Box 52126
V&A WATERFRONT
8002

Tel: +27 21 405-9421
Fax: +27 21 405-9424
Mobile: +27 84 540 3123

Doc 2.6 B

CONVENTION ON WETLANDS
CONVENTION SUR LES ZONES HUMIDES
CONVENCIÓN SOBRE LOS HUMEDALES
(Ramsar, Iran, 1971)

Gland, October 10, 2009

Upstream-Downstream: Wetlands connect us all

2nd February 2009

About these World Wetlands Day materials

Our suggested slogan for World Wetlands Day 2009 is *Upstream-Downstream: Wetlands connect us all*, designed around a theme of wetlands and river basin management. To help support World Wetlands Day activities in 2009 we have produced a poster, sticker, some briefing notes to set the scene, a do-it-yourself frog to test your patience, 20 questions for young people, and two comic strips just for fun.

As always, our approach is global, yet your activities are more likely to be either national or local. Each year we encourage you, our key WWD actors, to customize our materials to make them more meaningful in your situation. More information on this is available below.

We are delighted to send you in this package a number of materials which we hope will help you to animate your activities. Enclosed you will find:

- ✓ Posters and stickers on the theme in both hard copy and in printable format on the CD.
- ✓ A full-colour leaflet to brief you on *9 things we all need to know about river basins*. This is available as a PDF file on the CD at two different resolutions.
- ✓ Do-it-yourself frogs for some hands-on activity for children of all ages, from 7-70 years old! These are available on the CD as PDF files and include an instruction sheet. No staples or glue needed this year, just some clever finger-work!
- ✓ 20 Questions for children (maybe with a little help from their teachers or animators!).
- ✓ Two comic strips from *Pattie* in Argentina for your amusement.

Here are some additional points to think about:

- ❖ **We encourage everyone to consider customising and printing these materials using the original design files,** which we will be happy to supply to you on DVD disk. This has many advantages: making the images and text relevant to your own situation; translating the text into your local or national language; printing many, many more copies than we

/could hope to .....

- could hope to supply for you. Please write to wwd@ramsar.org if you would like to receive the design files – and don't forget to include your full mailing address. For further technical details on the design files, please visit
  http://www.ramsar.org/wwd/9/wwd2009_index.htm.

- **Should you require additional copies of the poster and stickers, please contact wwd@ramsar.org.** Since this is a 'COP year' for the Secretariat we are a little late in sending out these materials so if you do require more copies it is important that you **SEND A REQUEST IMMEDIATELY TO THIS EMAIL ADDRESS.**

- **Please don't forget to send us a report of your WWD activities** – we will post as many of them as we can on the Ramsar web site. View last year's reports here www.ramsar.org/wwd/8/wwd2008_reports.htm. Photos, text, sample materials, and reasonably-sized PDFs are all welcome. Contact wwd@ramsar.org.

Wetlands and river basins

Managing at the basin level makes ecological sense. In fact it makes ecological non-sense not to! Yet the challenges at this level are immense and this is especially so for the wetlands sector that must work closely with the water sector in managing at the basin level. We have briefly addressed a broad range of river basin management issues in our leaflet *9 things we all need to know about river basins*, looking at upstream-downstream issues, ecosystem services from basins, impacts of water scarcity in basins, the impacts of urban living on basin health, cross-sectoral challenges, and the need for a broad participatory approach to management. We hope this will help 'set the scene' for your WWD activities. And we hope you will help everyone who takes part in your WWD activities rise to the WWD 2009 challenge – *what can YOU do to improve the river basin that you depend upon?*

With best wishes,

The Ramsar Secretariat

Doc 2.8

Eugene Marais

From: Eugene Marais
Sent: 22 October 2008 12:55 PM
To: 'Kusi Ngxabani-Tikana'
Cc: Craig Allenby; Dr Abeda Dawood; Derek Moodley
Subject: RE; Request for King Penguins

Tracking:

Recipient	Read
'Kusi Ngxabani-Tikana'	
Craig Allenby	
Dr Abeda Dawood	Read: 2008/10/22 05:02 PM
Derek Moodley	

15/7/1

Dear Kusi

Thank you for your mail.

With regards your first question; yes we still require penguins from Marion Island.

As far the second question is concerned; a project manager has been appointed to draw up a snag list with regards the new complex, and to expedite the resolution of such list.

At this stage we are looking at 2010 for the collection of the birds.

Kind regards

Eugene Marais
Animal Transaction Officer
Mobile: 083 408 2941
eugene@nzg.ac.za

Doc 2.12

Island Studies Journal, Vol. 2, No. 2, 2007, pp. 177-192

The Quarantine Protection of Sub-Antarctic Australia: Two Islands, Two Regimes

Sandra Potter
School of Geography and Environmental Studies
University of Tasmania, Australia
s_potter@utas.edu.au

Abstract

Sub-Antarctic Heard Island and Macquarie Island are among Australia's offshore properties susceptible to colonization by species introduced by humans. While both islands share World Heritage status and are IUCN Category Ia Protected Areas (Strict Nature Reserves), different quarantine protection regimes are in operation. Macquarie Island's biosecurity appears to be less catered for while the means and likelihood of introductions are greater. The administrative, political, practical and geographical contexts within which quarantine management planning takes place variously impact on the level of quarantine protection provided to both islands. These and other remote sites of high conservation value are unlikely to receive heightened protection until the issues associated with such management contexts receive greater attention.

Keywords: island studies, protected areas, conservation, invasive species, aliens, biosecurity, Heard Island, Macquarie Island, Australia

Introduction

The international significance of islands to biodiversity conservation is widely acknowledged; so is the special vulnerability of endemic island biota to the impact of introduced species (Loope, 1992; US Congress, 1993; D'Antonio & Dudley, 1995; McNeely, 2004). Geographically remote and or evolutionarily isolated islands are at particular risk (SSC, 2000). Recognizing these concerns, the Convention on Biological Diversity's Conference of Parties calls upon signatories to establish quarantine barriers to protect islands within their nation states from the entry of species that could, amongst other things, damage island ecosystems and induce biodiversity loss (CBD, 2006).

A review of the literature establishes that much research attention has been given to predicting likely 'alien invaders' and the environmental impacts of species introduced: such as *Biological Invasions,* a journal dedicated to the subject. However, comparatively few studies have focused on the design and administration of quarantine management systems and the implications of such factors on the ground (*but see* McAusland & Costello, 2004; Perrings *et al.*, 2005; Nerlich & Wright, 2006; Stokes *et al.*, 2006). In this paper, I consider the means by which Australia's sub-Antarctic islands and their surrounding islets, offshore rocks and shoals are notionally protected from human-

facilitated introductions of non-indigenous species. I describe how species and material of quarantine concern may be introduced to these sites – including by the agencies tasked with providing for the islands' protection – and the quarantine controls in place as at June 2007. Then, using information obtained by way of stakeholder interviews conducted between April 2006 and January 2007, personal observations, and examining management plans and agency records, I identify and discuss issues of significance to the islands' quarantine integrity.

Sub-Antarctic outposts

Heard Island (53°06'S, 73°31'E) lies in the Indian Sector of the Southern Ocean, some 1,000 km north of Antarctica and 4,000 km south-west of Australia. It is a heavily-glaciated land mass approximately 43 km long and 25 km in diameter. Its highest point is 2745 m above sea level. The island's wildlife includes migratory birds and marine mammals listed under four international conservation agreements, and species listed as endangered or vulnerable under Australian environment protection legislation. The Territory of Heard Island and McDonald Islands was inscribed on the World Heritage List in 1977 on account of its outstanding natural universal values. Heard Island also forms part of a Commonwealth Marine Reserve managed by the Australian Antarctic Division (AAD) of the Australian Government Department of the Environment and Water Resources, acting under delegation from the Director of National Parks. The Marine Reserve was declared in 2002 and is, in its entirety, an IUCN Category Ia Protected Area of 65,000 km^2. The terrestrial component has been managed as a Category Ia site since 1996.

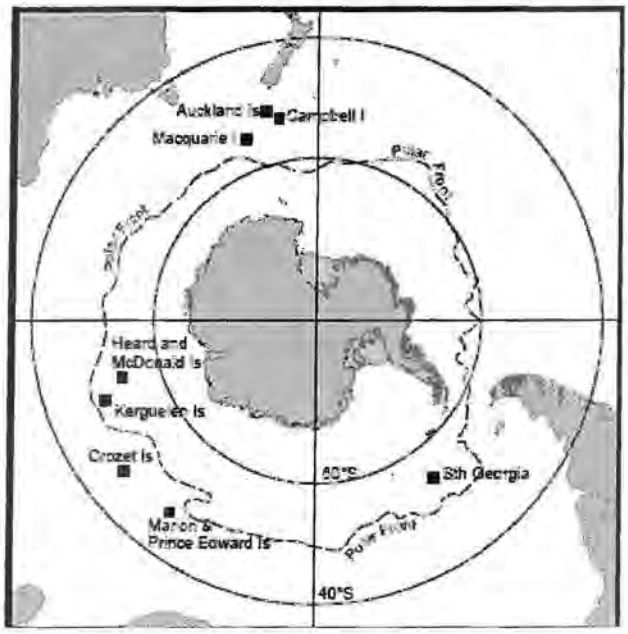


Figure 1: Islands of the sub-Antarctic (Source: Australian Antarctic Division, Australian Antarctic Data Centre: © Commonwealth of Australia. Reproduced with permission).

In the vastness of the Southern Ocean (Figure 1), Heard Island is relatively close to the Kerguelen Islands (France), which are heavily impacted by introduced species (Gaucel *et al.*, 2005). Heard Island is however little-visited. In the absence of infrastructure typical of other Australian ports, personnel access and cargo discharge is by helicopters, inflatable rubber boats, amphibious craft and workboats. Usually two or three authorized landings of typically two or three hours' duration are made each year and it is plausible that unreported, unauthorized landings are made there from time to time. Scientific expeditions, of which there have been two in the last decade, involve the establishment and occupation of campsites for two or three months at a time.

While the first people landed on Heard Island in 1855, it was perhaps not until 1952 that the first intentional but transient human-facilitated introduction of non-indigenous species took place. Concerted effort was involved: 24 Border Leicester sheep transported aboard the *Tottan* were moved to the wings of the ship's bridge after their wooden pens were demolished by waves (Law, 1983). Despite these efforts, unlike most other sub-Antarctic islands for which numerous introduced species are recorded (see review by Frenot *et al.*, 2005), only four 'aliens'[1] are known to have established – thrips *Apterothrips apteris*, mites *Tyrophagus putrescentiae*, earthworms *Dendrodrilus rubidus* and annual meadow grass *Poa annua* (AAD and Director of National Parks, 2005). Because of Heard Island's near alien-free status, its negligible alteration by humans, and the conservation values ascribed to the Territory, the prevention of introductions associated with human activity is a major factor in management considerations (AAD and Director of National Parks, 2005). A specified aim of the island's management is:

> "To prevent the human introduction into the Reserve of alien species or disease and to respond to reports of such events to minimize impacts on the Reserve's values" (AAD and Director of National Parks, 2005:49).

Macquarie Island (54°30'S, 158°57'E) is not as isolated, lying some 1500 km south-east of Tasmania and 600 km south-west of the Auckland Islands (New Zealand) on a well-established sub-Antarctic cruise ship route. The island is 34 km long and 5.5 km at its widest point, and has steep coastal slopes flattening out mostly some 200-300 m above sea level. Macquarie Island is listed as habitat critical to the survival of wandering albatrosses *Diomedea exulans* and grey-headed albatrosses *Thalassarche chrysostoma* and is home to numerous other threatened species. It is also the site of a continuously-occupied Australian Government research station supporting the Australian Antarctic Program (AAP) and accommodating up to 40 scientists, support staff, meteorologists and park rangers.

Macquarie Island is a Tasmanian (State) Nature Reserve administered by the Director of the Parks and Wildlife Service (PWS) of the Department of Tourism, Arts and the Environment. The island and its surrounds within a 12 nautical mile radius were inscribed on the World Heritage List in 1997. In addition, the island and its surrounds to 3 nautical miles are a restricted area under the *National Parks and Reserves Management Act* 2002. On its eastern side, the Reserve is abutted by a 1999-proclaimed Commonwealth marine park (IUCN Protected Area, Categories Ia and IV).

---

[1] "At HIMI [Territory of Heard Island and McDonald Islands], an alien species is defined to be a species, subspecies or lower taxon that has been introduced to the HIMI Marine Reserve as a result of human activity in or around the Reserve, or that has arrived in the Reserve by natural means from an area to which it was introduced as a result of human activity. This means that an alien is a new species that arrives at HIMI having been directly transported there by human activities (in someone's pocket, or on equipment), or having arrived by natural processes (such as wind, seabirds) from a location to which it had been introduced by humans (e.g. from another subantarctic island group)" (AAD, 2006: unpaginated).

There are approximately eight ship and yacht visits to Macquarie Island each year and most are associated with tourism. An annual limit of personnel landings is set at 750 (PWS, undated), although between 1990-91 and 2004-05 the average annual number of visitors was 334 (Kriwoken *et al.*, 2006).

Macquarie Island has long-received numerous human-assisted introductions, mostly by sealing gangs operating in the 1800s and early 1900s, including rabbits in 1879 (Cumpston, 1968:118). Also imported have been cats, rats, mice, wekas, sheep, goats, cows, horses, donkeys, pigs, ducks and geese. There are five alien plant species recorded in the reserve; chickweed *Cerastium fontanum* and *Stellaria media,* curled dock *Rumex crispus,* sweet vernal *Anthoxanthum odoratum* and annual meadow grass *Poa annua.* Three of these are deemed common and widespread. All are recorded as being present on account of human activity (PWS, 2006). The island's remaining introduced vertebrates – rabbits *Oryctolagus cuniculus*, rats *Rattus rattus* and mice *Mus musculus* – threaten the island's native biodiversity (Brothers *et al.*, 1982; Copson & Whinam, 2001; PWS, 2006). A key reserve management objective is:

> "To prevent further accidental introductions of alien plant species or fauna and to eradicate or control, as far as possible, previously introduced species that affect or endanger native species and habitats" (PWS, 2006:49).

The very significant impacts already caused by introduced species (*see* PWS, 2007), the cost of cat eradication at US$2.3 million in 2000 (Martins *et al.*, 2006), and the forecast cost of a rabbit and rodent eradication program due to commence in 2009 (at US$20 million) give weight to the importance of quarantine arrangements, and their review.

Local Frameworks for Protection

Heard Island's quarantine protection is provided for by a territory-specific instrument: the Environment Protection and Management Ordinance (EPMO) 1987, and a management plan prepared under the (Cwth) *Environment Protection and Biodiversity Conservation (EPBC) Act* 1999. The relationship between the Ordinance and the Act is described thus:

> "[T]he provisions of the EPMO apply to and govern a broader range of activities and conduct than the *EPBC Act* or the EPBC Regulations do. As such, the EPMO can allow for more comprehensive protection of the Reserve and its values. For example, unlike the *EPBC Act* or EPBC Regulations, the EPMO imposes a broad prohibition on the introduction of any 'organism' (as defined)[2] [or soil] into the Territory without a permit issued under that Ordinance. It also prohibits entry to the Territory without a permit" (AAD and Director of National Parks, 2005:16).

[2] "Any plant or animal; or any virus, bacterium or yeast, alive or dead" (s. 4). And while 'take' (from the Territory) is defined, 'introduce' is not.

Macquarie Island's quarantine protection is provided for in particular by the (Cwth) *Quarantine Act* 1908 which constrains imports to Macquarie Island by virtue of constraining imports to Australia generally, the Tasmanian *Nature Conservation Act* 2002, a management plan prepared under the Tasmanian *National Parks and Reserves Management Act* 2002, and measures proposed and implemented by the AAD or its contractors. These measures are underpinned by a set of quarantine management guiding principles detailed in Potter and Maggs (in press).

For both islands, the *EPBC Act* also has bearing with respect to matters deemed to be of national environmental significance. These matters include the protection of World Heritage values and the protection of threatened and migratory species. If an action is likely to have a significant impact on a matter of national environmental significance, or poses a credible risk of such an impact, then the activity is required to be referred to the Australian Government Environment Minister for decision on whether approval is required, and his or her determination on the environmental impact assessment process that is to be followed.

Practical Mitigation against Introductions

Quarantine measures specified in management plans and aimed at minimizing human-facilitated introductions to Heard Island and Macquarie Island are listed at Table 1. Measures prescribed for Heard Island but not Macquarie Island include a ban on the landing of eggs and poultry meat; a ban on landing untreated timber; restrictions on routing to the island from ports outside Australia; and a ban on wearing ashore outer clothing previously used elsewhere. Additional measures specific to and selectively applied across AAP operations are listed at Table 2.

Macquarie Island's management plan makes provision for the conduct of a number of activities precluded at Heard Island. Those activities having quarantine implications include air drops, the cultivation of vegetables, track making, and the development of infrastructure associated with tourism. Air drops require specific prior authorization while proposals involving landscape modification are required to be assessed by way of a process set out in the 'Tasmanian Reserve Management Code of Practice'. For hydroponics, the permit issued by the Parks and Wildlife Service stipulates the use of a dedicated facility; the use of expanded clay as the growing medium; that only vegetables and herbs are to be grown; plants must not be allowed to grow to seed; and nutrient waste is to be repatriated to the Tasmanian mainland (AAD, 2005). Notwithstanding the criticisms past AAP hydroponic operations have attracted (Greenslade, 1987; AAD, 1994), when operating within the permit controls, hydroponics are viewed by the land manager as a means of reducing the risk of introductions on account of the mooted reduction in the fresh produce procured for shipment to the island (PWS, 2006).

Table 1: Comparing management plan-prescribed quarantine-related controls and measures.

Quarantine Measure	Heard Island	Macquarie Island
Access authority/permit to make landings	Yes	Yes
Restrictions on sites at which landings may be made	Yes	Yes
Previous port of call to be Australian/AQIS controlled	Yes[3]	No
Authorised official to accompany any visit to ensure compliance with quarantine requirements	Yes[4]	No
Authorised official to be present at ship departures to ensure compliance with quarantine requirements	Yes[4]	No
Ban on ballast water discharge within 12 nm	Yes	Yes
Actions to ensure ships' freedom from hull fouling	Yes[1]	Yes[1]
Application of anti-foulants	No	Yes[1,5]
Requirement for ships to have Deratting Certificate or Deratting Exemption Certificate	Yes	No[6]
Inspection for rodents conducted on day of departure	Yes[4]	No
Laying of rodent baits and traps on ships	Yes	No
Shipboard insect trapping	Yes	No
Ban on ships mooring to shore	Yes	Yes
Fumigation or other approved treatment of timber	Yes	No
Actions to ensure cleanliness of cargo, helicopters, watercraft	Yes	Yes[1]
Containerization of cargo during shipment, where practicable	Yes	No
Ban on landing of brassicas	Yes	No
Ban on landing of other fresh fruit and vegetables	Yes[2]	No
Ban on landing of fresh fruit and vegetables from ships' stores	Yes	Yes
Ban on landing viable seeds and viable fungal products	Yes	No
Ban on landing poultry meat and eggs	Yes[8]	No
Ban on landing live plants and animals unless specifically permitted	Yes	Yes
Ban on import of soil	Yes	Yes
Ban on taking certain food stuffs off station	n/a	Yes
Requirement for outer clothing to be new or used only at the island	Yes	No
Pre-landing scrubbing of footwear	Yes	Yes
Disinfection of scientific equipment in contact with animals	Yes	No
Controls on conduct of hydroponics	n/a	Yes
Laying of rodent baits and traps at landing area	Yes	n/a[7]
Incineration or removal of food waste	No	Yes

[1] *Not routinely compliance-checked by land manager.*
[2] *Unless the land manager is satisifed that they have been effectively treated to eliminate the risk of introducing associated alien species and diseases.*
[3] *Unless exceptional circumstances means this is not feasible and the land manager is satisfied that the entry to the Territory of the vessel presents a sufficiently low risk of the introduction to the Territory of alien species or disease.*
[4] *Discretionary.*

[5] *Implied requirement given that the land manager may require evidence of hull anti-fouling as a condition of access.*
[6] *Ships must be certified free of rodents since their last major port of call.*
[7] *Rodents are well-established on the island.*
[8] *Other than egg powder, or products containing egg powder, which can be taken ashore if kept in sealed containers and opened only in an enclosed shelter.*

Table 2: Quarantine Controls and Measures specific to AAD/AAP Operations, and the Islands for which they are undertaken.

Quarantine Measure	Heard Island	Macquarie Island
Use of quarantine approved premise for cargo consolidation	Yes	Yes
Inspection of mail using quarantine detector dogs	n/a	Yes
Pre-departure inspection of ship holds, galley and accommodation	Yes	Yes
Ship cabin and baggage checks using quarantine detector dogs	Yes	Yes
Ozone treatment of produce during transit	n/a	Yes
Personal effects cleanliness declarations	Yes	No
Third party hand inspection of all personal effects landed	Yes	No

Issues in Constituting Protection

This section discusses specific issues seen as potentially compromising the quarantine protection of Heard Island and/or Macquarie Island. Their significance emerges out of: semi-structured interviews with senior public servants (referred to below as 'stakeholders') responsible for the islands' conservation, policy development, biosecurity and/or operational logistic support; perusal of management plan prescriptions, agency-issued permits, and post-activity reports; and personal observations and experience. Although, in-depth interviews with a few, carefully selected persons can provide significant insights into issues surrounding research topics (Bradshaw & Stratford, 2000), I do not claim to have necessarily drawn out the only quarantine protection-related issues, or the most compelling.

Unbridled imports

A growing body of literature links the volume of imports to islands and the probability of introductions. Practice also suggests that quarantine management systems, no matter how rigorously designed and implemented, cannot totally guard against unintentional introductions (Nairn *et al.*, 1996; Joint Committee of Public Accounts and Audit, 2003; Wittenberg & Cock 2005; author's observations). For Heard Island, a management plan prescription seeking to address this concern advocates that "the quantity of material to be taken ashore in the Reserve should be minimized to the greatest extent practicable" (AAD and Director of National Parks, 2005:71).

Even programs declared to be small scale, minimalist or low impact and intended to *contribute* to island protection can entail the landing of considerable volumes of cargo that may undermine the islands' biosecurity. For example, in support of the 2000-01 summer AAP campaign to Heard Island, 76 pallets and crates, 17 huts, 20 gas bottles, 131 drums of fuel, 2590 kg of personal effects and equipment, and 50 cartons of perishable food were landed via some 230 ship-shore helicopter sorties (unpublished AAD records). In support of standard Macquarie Island programs, some 500-900 m^3 of cargo are typically shipped to the island each year: volumes that have provided for the inadvertent landing of seeds and other plant material, and one or more live tree frogs, spiders, slaters, snails, ants, cockroaches, wasps, beetles and weevils (Potter, 2006; unpublished AAD records). Incursions such as these, however, are reported with diminishing frequency as quarantine protocols are continuously reviewed and improved (unpublished AAD records).

Stakeholders questioned on the adoption of material-minimizing actions in relation to imports to Heard Island and Macquarie Island considered that such an agenda was unlikely to be embraced. A reason offered was that for sub-Antarctic operations, contingency planning is all-important in light of the few resupply opportunities: 'over catering' can become a norm. Also suggested was that the rigours of life on these remote outposts can generate a demand for material comforts by way of compensation for social deprivations; hence the shipment of *more* cargo. A stakeholder involved in the shipping support of AAP operations at both islands noted that the volume of materials imported thus far has been constrained only by the cargo space available on the ships chartered to deploy parties, and by unfavourable weather and sea conditions over the period allocated for cargo discharge.

While at some sites of high conservation value it is deemed appropriate to place controls on the number of personnel landings that may be made (Macquarie Island included) and the number of individuals that may be ashore at any one time, limits are rarely placed on how much cargo may be landed at such sites. For instance, at Barrow Island, a 23,438 ha 'A-Class Nature Reserve' off the coast of Western Australia, an estimated three million tonnes of industrial freight will most likely be landed (R. Stoklosa, consultant to ChevronTexaco, personal communication, 2007).

Conflicting interests: operational versus environmental policy

As administrator of the Territory of Heard Island and McDonald Islands, the AAD self-regulates its programs there, raising the potential for conflicts of interest with respect to the priority given to environmental management activities. Kriwoken *et al.* (1989:16-17) submit that:

> "The role of protagonist of operations, with its pressure to cut corners in the interests of (say) efficiency, ease and maintenance of [shipping] schedules, and the role of implementer and enforcer of environmental 'thou shalt nots', inevitably conflict, and, in the absence of any watchdog over the watchdog, it is to be expected that such conflicts will often be resolved in favour of operational interests rather than the interest of the executor of environment policy interests. ... Under

> such conditions, operational concerns will frequently triumph at the expense of environmental priorities."

Actions that lend weight to Kriwoken *et al.*'s claim include the authorization of the local disposal of food scraps and human waste, and the delayed repatriation of other wastes stockpiled on the island at the end of the 2004 AAP campaign. A stakeholder identified occasions when scientific equipment evaded pre-departure quarantine procedures on account of its late availability for loading, and when cargo was unable to be containerized and fumigated in line with standard operating procedures. While these departures from procedure were managed in such a way that the cargo involved presented negligible quarantine risk (author's observation), scenarios such as these are indicative of the introduction of flexibilities that could lead to inadvertent introductions.

Indeed, the Australian Government has considerable discretion to act, or not act, on Heard Island protection issues including those related to quarantine. The text of the Reserve's management plan includes considerable non-committal language. Thus the Director of the AAD *may* rather than *will* take various courses of action. The implementation of management plan prescriptions is also subject to funding availability (AAD and Director of National Parks, 2005).

Implementation of the prescriptions in the Macquarie Island plan is similarly qualified, being "subject to the provision of funding and other resources sufficient to meet them, and may be prioritized by the Director of National Parks and Wildlife at the Director's discretion according to resource availability" (PWS, 2006:132). And, while the Parks and Wildlife Service self-regulates its activities on Macquarie Island, there is greater potential for third party scrutiny than occurs at Heard Island on account of the concurrent presence of personnel from other agencies, greater tourist visitation, and the Parks and Wildlife Service's use of the AAD's facilities.

Ship fouling mitigation

Sub-Antarctic shipping provides for the transport of marine species via ballast water discharge and fouling (Lewis *et al.*, 2005). Lewis and Summerson (2005:40) consider that "vessels residing in port regions for long periods, especially those vessels without antifoulant or with incomplete antifoulant protection, represent a major risk of translocating invasive marine species" to the region. A seaweed *Undaria*, introduced to New Zealand around 1987, was recently discovered in waters around that country's sub-Antarctic islands (DOC, 2006).

While quarantine protocols for ships entering the Macquarie Island Nature Reserve's 3 nautical mile outer boundary are under development (PWS, 2006:97), various hull fouling management measures have been recommended for ships likely to operate in the Macquarie Island Marine Park (see Lewis & Summerson, 2005). For the ships assessed as representing the highest quarantine threat the measures proposed include in-water hull cleaning, annual dry-docking, and off-season lay-up in fresh water. These measures are either unlikely to be authorized (see ANZECC, 2000) or are unlikely to be acceptable to

operators and ship owners on account of the costs and (im)practicalities (G. Dannock, AAD Shipping & Air Operations Manager, personal communication, 2006).

Currently, an implied Parks and Wildlife Service requirement is the application of anti-foulant to ships entering within 3 nautical mile of the island (as opposed to hull cleanliness *per se*).[3] Invocation of this requirement would constrain the use of the icebreaker presently chartered by the AAD to resupply its station, and could leave the Parks and Wildlife Service with few if any other means of (free) island access for land management purposes. The level of protection provided to Macquarie Island's near-shore environment could therefore be weakened by any unwillingness, on the part of the Parks and Wildlife Service, to 'bite the (AAD) hand that feeds it.'

While the Heard Island management plan specifies that ship hulls "must be cleaned or treated to minimize the risk of marine introductions from fouling species" (AAD and Director of National Parks, 2005:70), compliance with this requisite has yet to be verified (Potter, 2006).

Provisions for international shipping

Despite Macquarie Island's designation as an IUCN Category Ia Protected Area, and although the island is not a proclaimed 'first port of entry' into Australia under the Commonwealth's Quarantine Regulations 2000 (or permitted entry point for plant material under the Tasmanian *Plant Quarantine Act* 1997), landings are permitted from ships originating from ports outside Australia. Some of these ships transport Parks and Wildlife Service personnel to the island *gratis* or at reduced fares. Indeed, a criterion used in the selection of tourist vessels to be granted island access is "benefits to the [island's] management and protection ... for instance, assistance with programs, or with transport of equipment and personnel" (PWS, 2006: 111). Paradoxically, the use of tourist ships to transport AAD/AAP personnel to the island is identified by the Parks and Wildlife Service as being a cause of concern (PWS, 2006: 98).

In contrast, landings at Heard Island may only be made from ships that have departed Australian ports where pre-departure quarantine protection activities can be readily monitored by the AAD, unless exceptional circumstances mean this is not feasible and the ship's visit is deemed to present a low risk of introductions (AAD and Director of National Parks, 2005).

On arrival at Macquarie Island, ships from overseas are granted partial pratique by a member of the AAD's staff appointed as a temporary quarantine officer under the *Quarantine Act* 1908. This concession exists despite there being limited on-site capacity to respond to any landings of contaminated materials or to manage disease events (author's observation), and despite the high quarantine risks believed to be associated with sequential sub-Antarctic landings. Possibly, as many as half of the ships visiting

[3] "The Director may require evidence of hull anti-fouling as a condition of access authorization of access (*sic*) to the reserve" (PWS, 2006:98).

Macquarie Island route via New Zealand's sub-Antarctic islands.

The tyrannies of isolation and remoteness

Stakeholders noted the potential for isolation and remoteness to negatively impact on island quarantine protection, their views providing counterbalance to the argument that these island may be 'naturally protected' by their geographies. Among issues identified for one or both islands were: the need for heavy reliance on third party biosecurity protocols and agreements to achieve quarantine goals; likely delays in detecting introductions; a likely inability to control or eradicate species by the time they are discovered; reduced capacity for quarantine management workloads to be shared; the aforementioned limited availability of on-site resources for quarantine incursion or disease response; and the existence of 'out of sight, out of mind' attitudes. The last aspect was presented as having both positive and negative aspects in terms of land managers' activities not being subject to the usual levels of public scrutiny, versus the challenge of generating enthusiasm and support for the protection of an island that only a privileged few are able to visit.

Island research: a little-explored threat?

IUCN Category Ia Protected Areas are valued as sites for monitoring, baseline studies, research into the functioning of ecosystems, and the conservation of biodiversity. A qualifier on their use nevertheless applies: "The responsibility to understand and study protected and environmentally sensitive areas must not take precedence over our primary obligation: to protect and care for them" (ASTEC, 1998:1). Notwithstanding this ideal, stakeholders noted the absence of robust mechanisms by which land mangers could assess the environmental impacts potentially associated with the conduct of island-based research against the likely contributions of the research to the islands' conservation. There may also be little incentive for researchers to draw attention to the potential of their activities to result in the introduction of species, a disincentive being the possible withdrawal or curtailing of the research community's island access privileges.

While the quarantine risks presented by scientific programs at Heard Island and Macquarie Island have not been quantified, they have nevertheless been identified, by stakeholders, as being a significant management concern. A 2003-conducted survey of the clothing and footwear of 46 personnel on a sub-Antarctic plying tourist vessel gives weight to the nomination of researchers as a potential source of introductions to the sub-Antarctic region. Of the 344 propagules collected during the survey, the greatest number was associated with the field scientists on board (Selkirk, 2006). The quarantine threats associated with research have also been touched upon in an unpublished risk assessment commissioned by the AAD, and research undertaken by Whinam *et al.* (2005).

Quarantine governance complexities

Several agencies have multiple roles in the islands' quarantine protection. For example, under a memorandum of understanding arrangement, Quarantine Tasmania officers undertake inspection and surveillance functions for AAP voyages to both islands on behalf

of the AAD; as a condition of permits issued by the AAD to other Commonwealth agencies chartering ships sailing to Heard Island, Quarantine Tasmania undertakes audits of pre-departure processes; Tasmanian quarantine officers undertake national (Australian Quarantine and Inspection Service) quarantine border functions in Tasmania and by implication at Macquarie Island; in practice, the station medical officer (an Australian Government employee) undertakes national border functions on Macquarie Island; and the station leader and the Parks and Wildlife Service's ranger-in-charge are locally responsible for environmental management activities. (The arrangements at Heard Island are less complex as the Territory of Heard Island and McDonald Islands, and Australian Antarctic Territory, are excluded from the *Quarantine Act* 1908 and its associated instruments.)

Stakeholders, including a quarantine official, commented that establishing 'who is responsible for what' in relation to Macquarie Island was a challenge. Indeed, the absence of clarity and shared understanding in some areas has impacted upon monitoring compliance with management plan prescriptions - see Lewis *et al.* (2006) for results of a monitoring oversight - and the timely delivery of quarantine protection messages (author's observations). Island governance issues also extend beyond the quarantine barrier: State and Commonwealth ministers have recently been locked in a protracted debate over the provision of funding for the eradication of the island's rabbit and rodent population (*e.g.*: Maiden, 2006; Australian Government, 2007; Turnbull, 2007).

While beyond the scope of this paper, the potential for Macquarie Island to be a source of 'reverse' quarantine threats to other parts of Tasmania and the Australian mainland has so far been little-considered (*but see* Greenslade *et al.*, 2007 with respect to the potential translocation of flatworm *Arthurdendys vegrandis*). Marine debris, including drums and containers filled with unknown substances (RPDC, 2005:43), and other soil-sullied materials are shipped each year from the island to the Tasmanian mainland. Because these shipments are intra-state movements, there are few if any administrative impediments or quarantine barrier controls in operation (author's observation). In apparent contradiction, the shipment of wastes from the Antarctic to Australia is regarded by the Australian Quarantine and Inspection Service as a high risk activity for which authorization is difficult if not impossible to obtain (G. Dannock, AAD Shipping & Air Operations Manager, personal communication, 2006). Currently at issue is the import of kitchen scraps made up from produce originally shipped to Antarctica from Australia, and the import of material mixed with Antarctica's near ahumic 'soil' (T. Maggs, AAD Environmental Policy & Protection Manager, personal communication, 2007).

Summary and Concluding Remarks

A suite of practical mitigation measures underpinned by varying protected area and quarantine management instruments, and a precautionary approach, provide for some controls on the introduction of species, soil, and other material of quarantine concern to Heard Island and Macquarie Island. By identifying issues of relevance to the arrangements currently contributing to the quarantine protection of these sub-Antarctic properties, this research highlights the need to give due consideration to the administrative, political, practical and geographical contexts in which quarantine management planning occurs. The

heightened protection of these and other islands of high conservation is unlikely to be advanced until the implications of such factors are fully explored.

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APPROVED PROJECTS FOR 2009/13

PROJECCT LEADER	RESEARCH PROJECT	INSTITUTION
BIOLOGICAL SCIENCES		
Prof M N Bester	Population ecology of Pinnipeds at the Prince Edward Islands	University of Pretoria
Dr ADS Bastos	Diversity and transmission routes of infectious micro-organisms in the invasive house mouse Mus musculus on Marion Island	University of Pretoria
Prof V R Smith	A vegetation biomass and nutrient budget of Marion Island	University of Stellenbosch
Dr P G Ryan	Short-term evolution of Nesospiza buntings on Inaccessible Island	University of Cape Town
EARTH AND MARINE SCIENCES		
Dr AJ Bumby	Neotectonic stress analysis on Marion Island	University of Pretoria

Doc 3.1 B

Further information on project *"A vegetation biomass and nutrient budget of Marion Island"* (SNA2008050700003) requested by the The Prince Edward Island Management Committee.

The biomass determinations will be on a plant guild basis, which means that small quadrats (containing only a single guild) will be harvested, rather than the large quadrats usually sampled in biomass/production studies. Quadrat size will be range from 0.01 m^2 (mosses, mat dicots, cushion plants) through 0.1 m^2 (mire graminoids) up to a maximum of 0.25 m^2 (tussock graminoids). In all instances the harvested area will be less than 1% of the surface of the particular stand selected for study. It is therefore not necessary to rehabilitate the stands - much larger quadrats were harvested in past studies and in no instances can the scars be seen today. In total, an island area of about 8 m^2 will be affected, about 1% of the area (measured with Carol Jacobs in April 2008) that has been denuded or scarred badly enough to need active intervention for rehabilitation as a result of recent base-building activities.

It is not possible to give exact localities to be harvest sampled, but it is envisaged that none will be in zones 3 or 4. A possible exception to this are biotic mires on Goney Plain, but if that is the case the necessary permit application will be lodged with the PEI Management Committee before any sampling. Sample sites will be decided on using criteria such that the plant sampled must be a true representative of the guild archetype, the habitat must be either the archetype habitat or a secondary habitat, of that guild, (eg Acaena magellanica occurs mainly in slope drainage lines but there is also an ecotype in mesic fellfields and open fernbrakes).

At the end of each year of the project I am prepared to provide GPS positions of all harvested sites.

Valdon Smith, 14 October 2008

2008 SANAP PROPOSALS: INPUTS RECEIVED FROM PEIMC

GENERAL
John Cooper

1. I assume it is NRF policy not to name the project applicant when requesting reviews - although I can guess at several.

2. Scanning has obscured some high-lighted text, but I can read around them.

3. All approved projects will need to apply for access and collection permits.

PROJECT 1
PROJECT TITLE: NEOTECTONIC STRESS ANALYSIS ON MARION ISLAND
APPLICANT: DR AJ BUMBY

John C
No environmental issues foreseen.

PROJECT 2
PROJECT TITLE: VLF, ELF & ULF SIGNS OF IONOSPHERIC DISTURBANCES
APPLICANT: DR AB COLLIER

John C
No environmental issues foreseen. Any new aerial structures will require an environmental evaluation before erection.

PROJECT 3
PROJECT TITLE: KILLER WHALES AT MARION ISLAND
APPLICANT: DR S PLOEN

Project will be resubmitted when these comments will be considered

Adriaan D
We must be sure that we will be able to handle the logistical requirements before the projects are approved.

Project 3:
- will they be using their own boat that will be shipped to Marion on the Agulhas?
- will there be a qualified skipper?
- they will need to have all the necessary safety equipment onboard the rubber boat
- will they operate from the ship or from the island? If from the island, they will require the crane at the point.
- will the normal dinghy conditions document and rules apply to them as well?
- will the rubber boat only be used during take-over periods, therefore taken back to SA after take-over?
- should they have problems on sea, what will their back-up plan be (especially if the Agulhas is away on the oceanographic cruise)

Marienne D V

Although responses of cetaceans to biopsy are generally regarded as low-level and short-lived, ethics approval will be required for this project and should consider:
1. Size and location of the biopsy size (intensity of response of dolphins correlated with size of sample and hit location; size of sample and thus wound also presumably related to healing time),
2. Methods to avoid inadvertent re-sampling the same individuals;
3. The recording of responses of target and non-target animals.

Personnel safety should be given careful consideration. What qualification will the RIB skipper have? What communications will there be between RIB and Base / Agulhas? Etc.

If the project supplies its own RIB, this should be thoroughly cleaned prior to loading on the Agulhas, and should also be inspected by the Conservation Officer prior to launch at Marion.

John C
No environmental issues foreseen.

PROJECT 4
PROJECT TITLE: FUNGAL COMMUNITIES ON MARION ISLAND
APPLICANT: DR K JACOBS

John C
A consultation of Rheeder et al. (1990) S. Afr. Bot. J. 56: 482-486 for the previous collection sites shows that some (e.g. F11)now fall within a Zone-4 area (Wandering Albatross study colonies); thus a Zone-4 permit will need to be issued, and entries should be conducted in liaision with ornithological field assistants and the Team Conservation Officer.

PROJECT 5
PROJECT TITLE: RESEVOIR HOST POTENTIAL OF INVASIVE MUS MUSCULUS
APPLICANT: PROF ADS BASTOS

John C
Zone-4 areas should be avoided.

PROJECT 6
PROJECT TITLE: A VEGETATION BIOMASS AND NUTRIENT BUDGET OF MARION
APPLICANT: PROF VR SMITH

John C
I woud like to know what the quadrat sizes will be, and what efforts will be made to rehabilitate harvested [sic] sites. In some mire habitats complete removal of above- and below-ground vegetation sometimes causes an apparently irreversible (at least within a decade or so) change into a small pond. This should be avoided (by restricting quadrat size?). No information is given on collection localities: Zone -4 areas should be avoided.

PROJECT 7
PROJECT TITLE: ALGAL MATS ON MARION ISLAND
APPLICANT: PROF JU GROBBELAAR

Marienne D V
The description of the workplan does not include much detail but refers to "experimentation." If this is to take place in the field (rather than the lab), more detail on experimental procedures would be useful.

John C
No information is given on collection localities: Zone -4 areas should be avoided

Doc. 3.2

SANAP

ISO 14001-based Environmental Management System (EMS)

Background

We have progressed a long way towards (re-)establishing an EMS for SANAP based on the principles of the ISO 14000 standard. We have developed the 18 overarching documents (draft versions circulated to you in the meeting documentation), initially focusing on SANAE IV only, but we hope to extend the EMS to incorporate Marion and Gough, as well as SA-based operations across the board. This will involve some documents which are applicable to the entire programme, and some that will be location-specific.

We have also revised some of the current SANAP Standard Operating Procedures (SOPs).

What prompted us to follow this course of action?

It is recognised that SANAP is a difficult programme to administer effectively and that all role-players need to co-ordinate their efforts. Over the years, due to the loss of personnel, knowledge and expertise, things have become disjointed and the quality of SANAP's documentation has deteriorated. To a large extent, focus has been lost, information is duplicated and documents are outdated.

There was no standard way or established practice to do things by. As a result, due to varying degrees of knowledge and expertise, some things were done extremely well, some less so and in some places SANAP was just plain lucky to operate fairly effectively.

In an effort to re-establish order within SANAP, it was felt that an ISO 14001-based EMS could address these issues. We do not intend to seek certification at this stage, as SANAP is a fairly small programme, with limited resources – both in terms of manpower and finances.

ISO 14000 will provide:

- structure and a basic standard for the operation of SANAP
- a way forward that includes a cyclic self-examination and continual improvement spiral, in terms of (but not limited) to the way SANAP operates in the environment (we also hope to address issues of human health and safety, but this will probably be addressed in a parallel system)
- prescribed ways of managing documents and ensuring that only one set of the latest documents are always available to everyone that needs them

What we have achieved so far

We started off with a small workshop to identify "***aspects and impacts***", after which the system was developed - described by the set of draft 18 overarching documents included in your meeting documentation.

The intention of these documents is to illustrate to all stakeholders how we want to manage and develop this EMS. There are different phases that will continually lead us to identify and re-evaluate SANAP's operations and what impacts we will have on the environment, what legislation guides our operations and subsequently assist us in developing ways to lessen the significant impacts on the fragile Antarctic and sub-Antarctic environments.

"***Objectives and targets***" will be developed and addressed through:

- Action plans - for immediate rectification
- SOPs (which will form an essential part of the EMS) - for continuing operations
- Emergency response procedures - for when things fail
- Environmental Management Plans (EMPs) – for addressing significant impacts
  - this is where the PEI EMP plays a crucial role

In terms of reviewing the EMS, we intend to check the way we do things through self-checks and internal audits (D: EIE - Carol's section), followed by a Management Review by SANAP management on an annual basis to address problems and provide strategic direction.

Visit to the Australian Antarctic Division (AAD)

- Despite our size and lack of resources, SANAP is on the right track
- There was a lot of information exchanged and many in-depth discussions
- Much guidance and enlightenment was obtained in terms of refining the system, including the following:
  - The way the AAD identifies and addresses their aspects and impacts has led them to describe them as activities, which were immediately recognised by us, and we feel that this approach will be far more effective in the SANAP EMS. The Impacts and Aspects.Register will thus be revised accordingly.
  - The AAD's approach also identifies ownership of activities, i.e. responsibility, which will aid in resolving issues by the parties involved.
  - The AAD has approached some of the major requirements (and actually usefulness) of the EMS with software/Intranet solutions, e.g. a document management system, an incident reporting system, etc.

- Some of our initial interpretations of some of the overarching documents (representing various elements of ISO 14001) have been incorrect, and the documents will need to be amended accordingly.
- We received clarity on all of our questions and a lot was learned about making the SANAP EMS more user-friendly.

Current goals

In terms of the coming ***SANAE*** relief voyage, we aim to decide on our standard document format, and review and finalise the most crucial documents, such as:

- Safety Manual
- Search and Rescue Procedures
- Fire Response and Evacuation Procedures
- Fuel Spill Handling Procedures

Of course, a complete set of documentation will need to be in place when the new ***Marion*** base is commissioned, of which the PEI EMP forms a part.

How the ISO 14001 EMS and the PEI EMP will interact

The PEI EMP will be a separate document that forms part of the EMS, largely addressing how any activities that would or could have significant impacts on the environment should be undertaken, i.e. certain ways of doing things, rules to apply, conditions to observe, and so on.

The ISO14001 EMS, SOPs, and other related documentation will be in line with achieving the goals of the PEI EMP.

Doc 3.2A

Environmental, Health and Safety Management System (EHSMS) Manual

SANAP

July 31, 2008

Revision 1.0

Prepared by: _____
(Gideon van Zyl (A&I) & Carol Jacobs (EIE))

Approved and Authorized by: _____
(Director: Antarctica & Islands)

COMPLETE EHSMS DOCUMENTATION

0.0 COMPLETE EHSMS DOCUMENTATION

OVERVIEW

1.0 EHSMS OVERVIEW
- Introduction
- Scope
- Purpose
- Background
- Overview
- Acronyms & Abbreviations
- Definitions

ENVIRONMENTAL POLICY & COMMITMENT

2.0 ENVIRONMENTAL POLICY (4.2)
- SANAP Mission & Vision
- EHS Mission
- General Environmental Policy (NEMA)
- EHS Policy
- ENVIRONMENTAL POLICY COMMITMENT

PLANNING

3.0 EHS ASPECTS PROCEDURE (4.3.1)
- 3.1 Environmental Aspects and Impacts Register

4.0 LEGAL AND OTHER REQUIREMENTS PROCEDURE (4.3.2)
- 4.1 Environmental Legal Register
- 4.2 Health & Safety Legal Register
- 4.3 Environmental Publications Register

5.0 O&Ts, ACTION PLANS AND EMPs PROCEDURE (4.3.3)
- 5.1 O&Ts Register
- 5.2 Action Plans
- 5.3 EMPs

IMPLEMENTATION & OPERATION

6.0 ORGANISATIONAL STRUCTURE (4.4.1)
- 6.1 Organograms
- 6.2 Roles, Responsibilities & Authorities Matrix
- 6.3 Duty Sheets

7.0 COMPETENCE, TRAINING & AWARENESS PROCEDURE (4.4.2)
- 7.1 Training Needs Analysis Matrix
- 7.2 Training Plan
- 7.3 Training Schedules
- 7.4 Training Register

8.0 COMMUNICATION PROCEDURE (4.4.3)
- 8.1 Communications Register

9.0 DOCUMENT CONTROL POLICY (4.4.5)
- 9.1 Document Control Register
- 9.2 Document Development Register

10.0 OPERATIONAL CONTROL PROCEDURES

- 10.1 Voyage Planning
  (How to plan a voyage / flowchart / required forms / dates / etc)
- 10.2 Handover Manual (Participant's Handbook)
  - 10.2.1 General Info Doc/Man &
  - 10.2.2 Operations Manual
  - 10.2.3 Base Rules
  - 10.2.4 Organisation of Operations
  - 10.2.5 Conduct of Participants in SANAP (letter), etc.)
  - 10.2.6 Code of Conduct (+ Guidelines for Visitors)
  - 10.2.7 Ship's Manual
    - Passenger Information Brochure
    - Fleet Instruction Manual
  - 10.2.8 Helicopter Manual
- 10.3 Overwintering (or Year-) Team Manual
  - 10.3.1 Going South with SANAP - brochure in progress
  - 10.3.2 Define the Teams (participants)
  - 10.3.3 Define Working Document Folder (WDF) for each member
- 10.4 HR Procedures & Policies
  - 10.4.1 Overtime Policy (current Overtime Policy)
  - 10.4.2 Communication Policy
  - 10.4.3 Adventure Policy
  - 10.4.4 Fleet Alcohol Policy
  - 10.4.5 Disciplinary Procedure
- 10.5 Health & Safety Policies & Procedures
  - 10.5.1 Safety Policy
  - 10.5.2 Safety Manual
- 10.6 Vehicle & Equipment Procedures
  - 10.6.1 Vehicle Usage Manual (incl. routes) (current Vehicle Policy)
  - 10.6.2 Cargo Handling Manual
  - 10.6.3 Dinghy Use
- 10.7 Waste Management Manual (various)
- 10.8 Preventative Maintenance Procedures
  - 10.8.1 Preventative Maintenance Policy
  - 10.8.2 Preventative Maintenance Procedures
  - 10.8.3 Weekly inspection checklist
  - 10.8.4 Monthly inspection checklist
- 10.9 Provisioning Procedures
  - 10.9.1 Purchasing
  - 10.9.2 Storage
  - 10.9.3 Specified Environmentally Friendly Chemicals
  - 10.9.4 Clothing Specifications
- 10.10 Housekeeping
  - 10.10.1 Delivery and storage of substances
  - 10.10.2 Indoor Air Quality
  - 10.10.3 Energy
  - 10.10.4 Water

11.0 EMERGENCY PREPAREDNESS & RESPONSE (4.4.7)
- 11.1 Search & Rescue Procedures
  - 11.1.1 Dronning Maudland – SANAE IV – Antarctica
  - 11.1.2 Marion Island
  - 11.1.3 Gough Island
- 11.2 Fire Fighting & Emergency Evacuation
- 11.3 Fuel/Oil Spill Contingency Plan (+ assoc COMNAP Docs)
- 11.4 Medical Emergencies
- 11.5 Environmental Disaster Preparedness & Recoveries
- 11.6 Other Reporting

CHECKING

12.0 MONITORING & MEASUREMENT PROCEDURE (4.5.1)
- 12.1 Key Performance Indicators Table

13.0 EVALUATION OF COMPLIANCE PROCEDURE (4.5.2)
- 13.1 Compliance Assessment Checklist
- 13.2 Compliance Tracking Log

14.0 NONCONFORMITY, CORRECTIVE & PREVENTATIVE ACTIONS PROCEDURE (4.5.3)
- 14.1 Corrective Action Reporting Register
- 14.2 Corrective Action Reporting Form

15.0 CONTROL OF RECORDS PROCEDURE (4.5.4)
- 15.1 DEAT Filing System

16.0 AUDIT PROCEDURE (4.5.5)
- 16.1 EHSMS Audit Schedule
- 16.2 EHSMS Audit Reports

MANAGEMENT REVIEW

17.0 MANAGEMENT REVIEW (4.6)
- 17.1 EHSMS Review Schedule
- 17.2 Minutes of Management Review Meetings

CONTINUAL IMPROVEMENT

Introduction

SANAP has developed and is maintaining an EHSMS in order to ensure that we continue to provide high quality service to our customers while providing a safe, healthy workplace for our employees and acting as a responsible member of our community. The SANAP's EHSMS is designed to help us understand our environmental impacts and, through proactive management, reduce the risks that our operations pose to our employees and to the environment. The EHSMS is also the means through which we follow through on the commitments expressed in our environmental policy.

Scope

SANAP's EHSMS presently covers only the SANAE IV base. More specifically, the EHSMS covers all operations occurring on-site at the base and surrounds. All on-site operations fall within the scope of the EHSMS, including maintenance, scientific and logistic activities, and the activities of on-site contractors. The EHSMS takes waste disposal into account in evaluating the environmental impacts of on-site activities, even though SANAP may not ultimately be the final disposer of its waste.

SANAP plans to extend the EHSMS to all SANAP sites.

Purpose

The purpose of this manual is to serve as a high-level "road map" to SANAP's EHSMS and to house the procedures which SANAP follows in implementing and maintaining its EHSMS.

This manual, and subsequent revisions, is distributed by the EHSMS coordinator to all relevant SANAP stakeholders. It will also be made available to all SANAP employees.

This manual also serves as the basis for SANAP's internal assessment of its EHSMS.

Background

SANAP is an Antarctic and sub-Antarctic scientific research programme, managed jointly by the Departement of Science and Technology through the National Research Foundation for scientific management and administration and logistic support rendered by the Department of Environment and Tourism. SANAP operates three research bases, one in Antarctica (SANAE IV), one on Marion Island and one on Gough Island, and a research and supply vessel (SA Agulhas).

South Africa signed the Antarctic Treaty on 1 December 1959, along with 11 other original signatories, with its first Antarctic expedition commencing in January 1960.

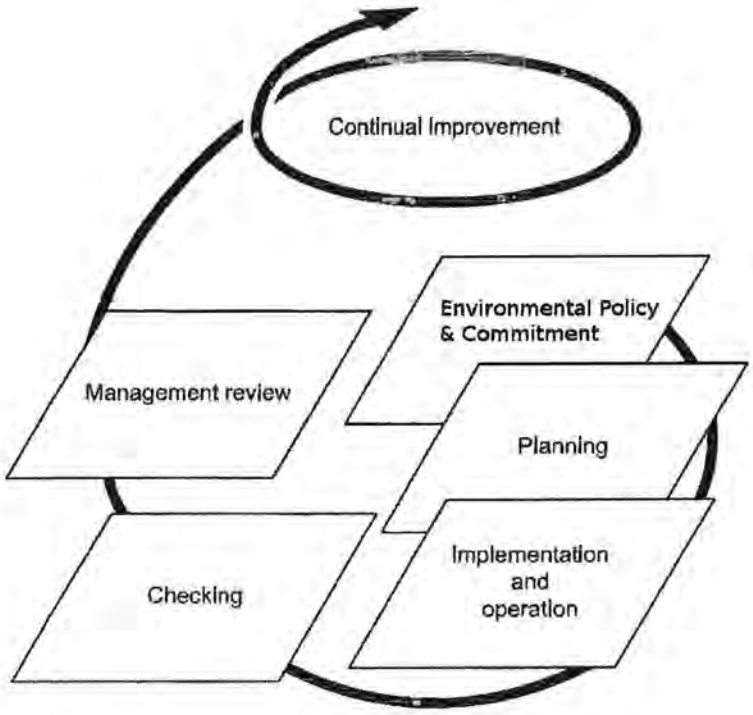
In December 1947 and January 1948 South Africa annexed Marion and Prince Edward Island respectively and this Prince Edward Islands group constitutes South Africa's only remote territory. Meteorologists have occupied the island ever since, joined in later years by scientists conducting research in various disciplines.

South Africa has operated a weather station on Gough Island since 1956. Although Gough Island is a British possession, the land the station is built on is leased to South Africa on a contract basis.

Overview

This overview focuses on the environmental requirements as specified in the international standard ISO 14001:2004 EMS. The EHSMS provides specifications which guide SANAP in managing its environmental performance. The purpose of this document is to highlight that all the elements of ISO 14001 have been implemented.

The ISO 14001 standard highlights five main elements to apply to SANAP for continual improvement in environmental performance as shown in the following diagram:

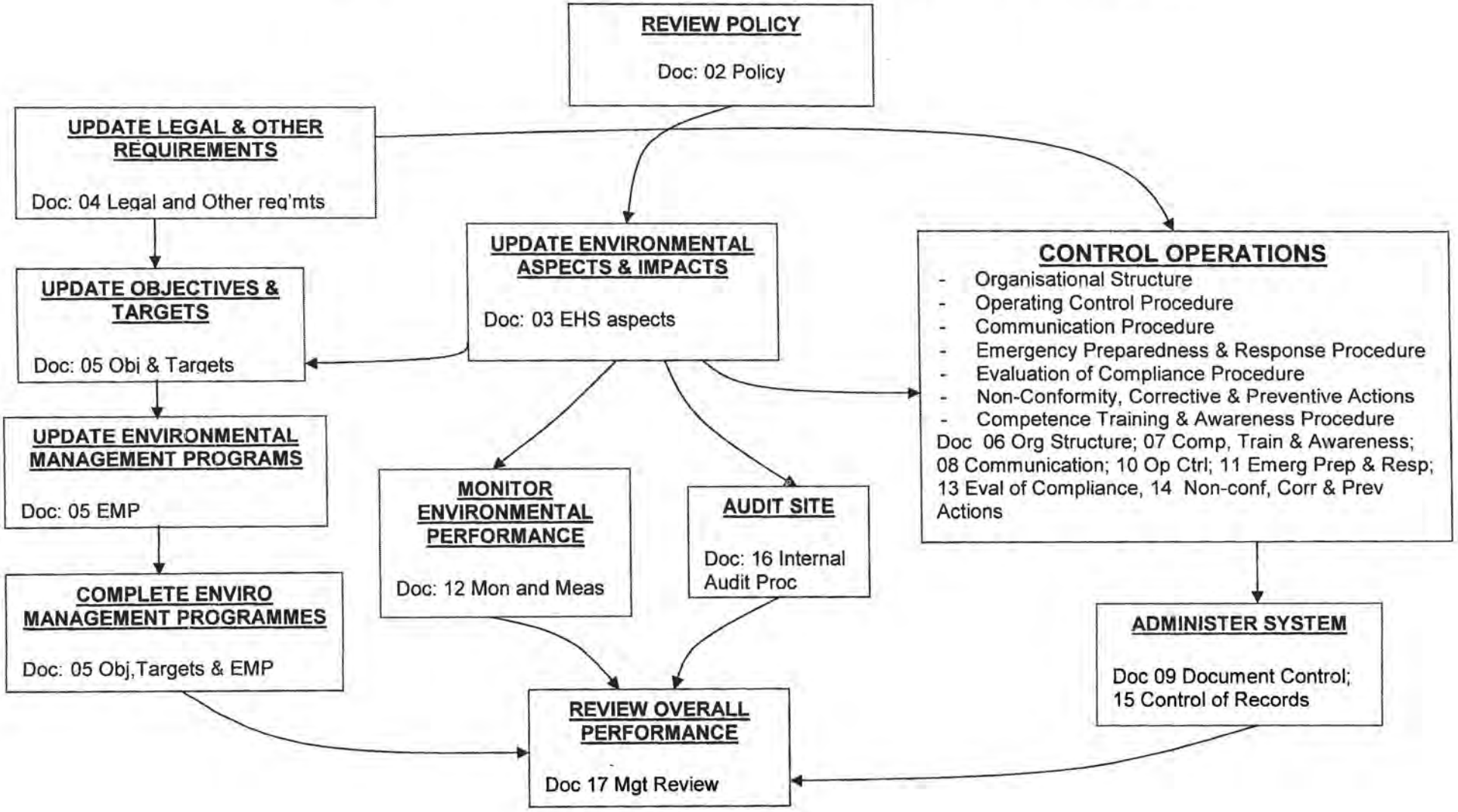


To fulfil requirements in each of these elements, documentation is required.

The EHSMS is made up of the following types of documents:

- Policies, Manuals & Procedures;
- Registers & Records
- Forms; and Checklists.
- Work & Operational Instructions
- Plans & Programmes
- Publications

A GUIDE TO THE ENVIRONMENTAL, HEALTH & SAFETY MANAGEMENT SYSTEM



Acronyms & Abbreviations – *alphabetical order*

AEON	Antarctic Environmental Officers Network
ATCM	Antarctic Treaty Consultative Meeting
ATCP	Antarctic Treaty Consultative Party
CEP	Committee for Environmental Protection
COMNAP	Council of Managers of National Antarctic Programmes
DCO	Departmental Co-ordinating Officer
DEAT	Department of Environmental Affairs and Tourism
DFA	Department of Foreign Affairs
DST	Department of Science and Technology
EA	Environmental Aspect
ECO	Environmental Control Officer
EHS	Environmental Health and Safety
EHSMS	Environmental, Health & Safety Management System
EMP	Environmental Management Plan
EMS	Environmental Management System ***(still to be included? – Should maybe be coupled to EHSMS as meaning the same?)***
NDPW	National Department of Public Works
NEMA	National Environmental Management Act
NRF	National Research Foundation
OCP	Operational Control Procedure
OHS (Act)	Occupational Health and Safety (Act)
PI	Principal Investigator
SABS	South African Bureau of Standards
SANAP	South African National Antarctic Programme
SAWS	South African Weather Service
SCALOP	Standing Committee on Antarctic Logistics and Operations
SCAR	Scientific Committee on Antarctic Research
SEA	Significant Environmental Aspect

Definitions

Alternatives evaluation
Process by which alternative methods for completing a particular function are evaluated using business and environmental criteria

Auditor
Person with the competence to conduct an audit

Continual improvement
Recurring process of enhancing the environmental management system in order to achieve improvements in overall environmental performance consistent with the organization's environmental policy

Corrective action
Action to eliminate the cause of a detected nonconformity

Environment
Surroundings in which SANAP operates, including air, water, land, natural resources, flora, fauna, humans, and their interrelation

Environmental aspect (EA)
An element of SANAP's activities, products, or services that can or does interact with the environment (create an environmental impact)

Environmental impact
Any change to the environment, whether adverse or beneficial, resulting from SANAP's activities, products, or services / wholly or partially resulting from SANAP's environmental aspects

Environmental management system (EMS)
Part of an organization's management system used to develop and implement its environmental policy and manage its environmental aspects
NOTE 1 A management system is a set of interrelated elements used to establish policy and objectives and to achieve those objectives.
NOTE 2 A management system includes organizational structure, planning activities, responsibilities, practices, procedures, processes and resources.

Environmental, Health and Safety management system (EHSMS)
Part of an organization's management system used to develop and implement its environmental, health and safety policies and manage the identified environmental, health and safety aspects
NOTE 1 A management system is a set of interrelated elements used to establish policy and objectives and to achieve those objectives.
NOTE 2 A management system includes organizational structure, planning activities, responsibilities, practices, procedures, processes and resources.

Environmental objective
Overall environmental goal, consistent with the environmental policy, that an organization sets itself to achieve

Environmental performance
Measurable results of an organization's management of its environmental aspects
NOTE In the context of environmental management systems, results can be measured against the organization's environmental policy, environmental objectives, environmental targets and other environmental performance requirements.

Environmental policy
Overall intentions and direction of an organization related to its environmental performance as formally expressed by top management
NOTE The environmental policy provides a framework for action and for the setting of environmental objectives and environmental targets.

Environmental target
Detailed performance requirement, applicable to the organization or parts thereof, that arises from the environmental objectives and that needs to be set and met in order to achieve those objectives

Indicator
A measurable parameter or predictor of performance (in this case, of environmental performance)

Interested and/or affected party
Person or group concerned with or affected by the environmental performance of an organization

Internal audit
Systematic, independent and documented process for obtaining audit evidence and evaluating it objectively to determine the extent to which the environmental management system audit criteria set by the organization are fulfilled
NOTE In many cases, particularly in smaller organizations, independence can be demonstrated by the freedom from responsibility for the activity being audited.

Non-conformity
Non-fulfilment of a requirement or a discrepancy between SANAP's actual EHSMS activities and the procedures laid out in this manual (i.e., where the actual activities do not follow the procedures)

Organization
Company, corporation, firm, enterprise, authority or institution, or part or combination thereof, whether incorporated or not, public or private, that has its own functions and administration
NOTE For organizations with more than one operating unit, a single operating unit may be defined as an organization.

Preventative action
Action to eliminate the cause of a potential nonconformity prevention of pollution use of processes, practices, techniques, materials, products, services or energy to avoid, reduce or control (separately or in combination) the creation, emission or discharge of any type of pollutant or waste, in order to reduce adverse environmental impacts
NOTE Prevention of pollution can include source reduction or elimination, process, product or service changes, efficient use of resources, material and energy substitution, reuse, recovery, recycling, reclamation and treatment.

Procedure
Specified way to carry out an activity or a process
NOTE 1 Procedures can be documented or not.

Record
Document stating results achieved or providing evidence of activities performed

Root cause analysis
Systematic process to uncover underlying causes of a particular issue or problem

Significant environmental aspect (SEA)
An environmental aspect deemed by the SANAP as having, or potentially having, a significant impact on the environment

Stakeholder
Any person or organisation with a "vested interest" (need to define) in SANAP, e.g. Smit Marine, Titan, SAWS, Principal Investigators, etc.

SANAP Vision & Mission

The vision of SANAP includes the following policy principles:

By virtue of its geographical proximity immediately adjacent to the Antarctic[1], its position as a Southern Ocean[2] littoral State, its status as an original Antarctic Treaty Consultative Party, its membership of the Organisation of African Unity, and its sovereignty over the Prince Edward Islands, South Africa:

RECOGNISES the global and national importance of safeguarding the environment of the Antarctic and Southern Ocean and protecting the integrity of ecosystems, both marine and terrestrial, in the regions;

NOTES the presence of natural resources (both renewable and non-renewable) found in these regions and the increased interest in the possibilities offered by the utilization (both consumptive and non-consumptive) of their resources;

NOTES the perceived, and important, role played by the Southern Ocean in global climate processes, including change, and its implications for South Africa and the African Continent as a whole;

Also **NOTES** that Antarctica is a unique region for coupling phenomena in geospace and the atmosphere and their interactions with the region below;

Is **CONSCIOUS** of the urgency of ensuring the protection of the Antarctic and Southern Ocean environments and the conservation of their resources;

CONSIDERS that it is essential to increase knowledge of Antarctic and Southern Ocean ecosystems and their components so as to be able to base decisions on their management on the best scientific information available;

BELIEVES that the protection of the Antarctic and Southern Ocean natural environments and the conservation of their resources calls for international co-operation with due regard to the provisions of the Antarctic Treaty System[3] and with

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1 ***For the purposes of this document the "Antarctic" refers to the region ("Antarctica") south of the Antarctic Polar Front. The Polar Front is deemed to be a line joining the following points along parallels of latitude and meridians of longitude:***

50°S 0°; 50°S 30°E; 45°S 30°E; 45°S 80°E; 55°S 150°E; 60°S 150°E; 60°S 50°W; 50°S 50°W; 50°S 0°.

2 ***This area includes the Prince Edward Islands over which South Africa exercises undisputed sovereignty. Defined as the region south of Africa comprising the ocean and the sub-Antarctic Islands up to, and including, the Antarctic Continental Shelf Zone.***

3 ***The Antarctic Treaty System includes the Treaty itself, the Agreed Measures for the Conservation of Antarctic Fauna and Flora, the Conventions for the Conservation of Antarctic Seals and on the Conservation of Antarctic Marine Living Resources, as well the Protocol on Environmental Protection to the Antarctic Treaty.***

active involvement of all States engaged in scientific research or any other activities in Antarctica and the Southern Ocean;

RECOGNISES the prime responsibilities of the Antarctic Treaty Consultative Parties for the protection and preservation of the Antarctic environment and, in particular, their responsibility for the preservation and conservation of living resources in Antarctica, and

BELIEVES that it is in the interest of all humankind, including the people of South Africa, to preserve the Antarctic continent and the Southern Ocean for peaceful purposes only and to prevent their becoming the scene or object of international discord.

In light of the foregoing and its sovereignty over the Prince Edward Islands, South Africa recognises a need to sustain continuous national activities in Antarctica and the Southern Ocean, and has established a National Antarctic Programme to recommend, promote, decide upon and co-ordinate activities and scientific studies vital to the national interest.

"The mission of the South African National Antarctic Programme (SANAP) is to increase understanding of the natural environment and life in the Antarctic and Southern Ocean through appropriate science and technology. This is necessary in order to optimize present and preserve future options for South Africa in the region and to enhance predictive capability in areas of relevance nationally and internationally, and will also ensure that South Africa remains party to informed decision-making on matters in the national interest."

Its implementation gives due weight to scientific priorities and logistic constraints, while all activities are carried out in strict accordance with environmental principles espoused in the various instruments of the Antarctic Treaty.

South Africa's activities in Antarctica and the Southern Ocean are in direct accordance with accepted principles of international law. They are actively promoted through appropriate arrangements with other nations having similar geographical proximity to Antarctica or which subscribe to similar principles to those outlined above.

Environmental Health & Safety Mission

SANAP's EHS mission supports its core mission stated in the SANAP vision and mission statements. The EHS mission, which SANAP endeavours to achieve in all its activities, is as follows:

"It is our mission to ensure safe and healthy operational conditions for personnel, and to protect the Antarctic environment, its dependent and associated ecosystems, its intrinsic and aesthetic value as a wilderness, and its value as an area for conducting scientific research, in particular research with respect to the global environment."

(adopted from the Protocol on Environmental Protection to the Antarctic Treaty, 1991)

General Environmental Policy

The Constitution of the Republic of South Africa Act (Act No. 108 of 1996) and the National Environmental Management Act (NEMA) (Act No. 107 of 1998) state that everyone has the right to an environment that is not harmful to health or well-being and to have the environment protected for the benefit of present and future generations. It also states that all spheres of government and all organs of state (this includes SANAP), through legislative and other measures, must act reasonably in order to protect the environment by preventing pollution, promoting conservation and securing sustainable development and use of natural resources, while promoting justifiable economic and social development.

NEMA further requires compliance with the principles of cooperative governance (consultation and support) set out in this Act, including the national environmental management principles (Section 2), the objectives of integrated environmental management (Section 24), duty of care (Section 28) and the environmental management cooperative agreements (Section 35).

Environmental Health and Safety Policy

The core of SANAP's EHSMS is its EHS policy. This policy states in broad terms the principal environmental commitments of SANAP. It is signed by the Director: Antarctica & Islands of DEAT and has been communicated to all employees. The EHS policy is strategically posted throughout the programme and is available on request to any interested and affected parties. The EHSMS coordinator is responsible for ensuring that only the most recent version of the EHS policy is posted and available.

This policy shall be applicable to all participants in SANAP, whether stationed in Antarctica or South Africa. DEAT shall also encourage the adoption of EHS management systems by all stakeholders, suppliers and contractors associated with SANAP.

The EHS policy which SANAP has adopted and shall strive to achieve in all its activities reads as follows:

"It is our policy that the maintenance of a South African presence in Antarctica shall have no permanent negative consequence on the Antarctic environment, that every participant in SANAP 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."

ENVIRONMENTAL POLICY COMMITMENT

Definition of SANAP: SANAP is a scientific research programme, with extensive logistic support, operating from South Africa to bases in Antarctica and on Marion and Gough Islands.

As the managers of SANAP; DEAT, DST & NRF, are committed to implementing an EHSMS for SANAP that has identified the significant environmental aspects and impacts, and has developed objectives and targets and operational control procedures to minimise impacts on the environment and to prevent pollution.

The identification of environmental impacts included consideration of:

- air emissions
- water discharges
- waste management
- use of resources,
- use of energy
- energy emitted, and
- local environment (odour, noise, appearance and nuisance).

Through the ongoing environmental management of its activities, SANAP will achieve continual improvement in its environmental performance.

A measure of success in continual improvement will be, as a minimum, compliance with all relevant legal and other environmental requirements.

Our commitment to effectively managing and minimising impacts on the environment is understood by all of our stakeholders.

Signed:					
Name:					
Organisation:	DEAT	DST	NRF	NDPW	
Position:	D:A&I				
Date:					

1. PURPOSE

ISO 14001 requires SANAP to establish and maintain a procedure for identifying the environmental aspects and impacts associated with the programme.

2. SCOPE

This procedure will be used for identifying environmental aspects and evaluating them and their associated environmental impacts (actual or potential, arising directly or indirectly from SANAP operations) for significance.

This procedure provides instructions on:

- How to determine the environmental aspects;
- Recording of the environmental aspects;
- How to determine whether an aspect and its associated actual or potential environmental impact is to be considered significant; and
- Developing objectives and targets and an EMP for the significant aspects.

3. REFERENCE

ISO 14001:2004 (Element 4.3.1).

4. PROCEDURE

The following steps will be used for identifying the environmental aspects and impacts of activities and to provide the basis for rating their significance.

4.1 Aspects and Impacts Identification

The process of environmental aspects/ impacts identification shall include, where appropriate, consideration of:

- Legal requirements;
- Emissions to atmosphere (controlled and uncontrolled);
- Discharges to water, groundwater and land (controlled and uncontrolled);
- Contamination of land;
- Impact on local environment (noise, odour, aesthetics and nuisance);
- Management of waste;
- Management of environmentally hazardous materials;
- Use of natural resources; and
- Heritage and habitat issues.

4.2 Environmental Aspects and Impacts Register

The environmental aspects/ impacts register shall record each aspect and include:

- A short description of the activity, product or service;
- A short description of the event or process (aspect) which causes the environmental impact (actual or potential, adverse or beneficial);
- The (actual or potential) environmental impact resulting from the activity, product or service; and
- Significance rating of the impact (discussed in next section).

4.3 Significance

Environmental aspects/ impacts will be assigned ratings under the following "fields":

- Likelihood;
- Extent; and
- Significance

The following risk assessment matrices indicate the issues that contribute to defining the significance of environmental impacts.

Likelihood

KEY WORD	DESCRIPTION	VALUE
Very frequent / Continuous	Risk constantly present Occurs as part of process	32
Regular	Risk present more than once per month Known to have occurred during process	16
Occasional	Risk present more than once per year Not normally anticipated	8
Remote	Risk present less than once per year Could occur over lifetime of involved system	4
Rare	Risk should be present less than once per 50 years Highly unlikely	2

Extent

KEY WORD	PERIOD OF EXPOSURE	EXTENT OF EXPOSURE	NATURE OF ENVIRONMENT	VALUE
Extensive	>10 years	International	Unique	5
Widespread	1-10 years	Regional	Sensitive	4
Significant	6-12 months	Local	Uncontrolled	3
Restricted	>1 day but < 6 months	Immediate surroundings	Uncontained but resilient or controlled	2
Negligible	<1 day	Site	Controlled and contained	1

Significance

KEY WORD	NATURE OF INCIDENT	PUBLIC / LEGAL IMPLICATIONS	FINANCIAL IMPACTS	ECOLOGICAL AND SOCIAL IMPACTS	VALUE
Catastrophic	Catastrophic environmental event	International press / prosecution	Effect on international market standing	Irreversible ecological impacts, permanent impacts upon community	64
Disaster	Environmental emergency	National press / major fine	Corporate financial performance affected	Long-term ecological damage, extensive impacts on community	32
Serious	Reportable environmental incident	Local press / minor fine	Business unit financial performance affected	Significant impact on local ecology or community	16
Noticeable	Minor environmental incident	Community complaint / legal non-compliance	Departmental financial performance affected	Short-term, local ecological impacts, restricted impacts on local community	8
Minor	Environmental near-miss or environmental minor non-conformance	Individual complaint or potential for complaint / non-compliance with internal standard	Minor costs not easily quantifiable	Ecological stress Nuisance Usually contained but may cumulatively lead to ecological or social impacts	4
Positive	Positive impact on the environment	Positive on public image	Positive effect on business	Positive effect on local community and ecology	0

These 3 ratings are then combined to calculate a Significance Rating (SR).

4.4 Objectives and Targets & Environmental Management Programme(s)

The Significant Environmental Aspects (SEA) are managed through the development of environmental Objectives and Targets (O&Ts) and Environmental Management Programme(s) (EMPs) and/or procedural controls (Operational Control Procedures).

O&Ts and EMPs will be documented in a table that lists the SEA and its impact, an action plan or goal, responsible person and date to achieve.

In addition to SEAs, site environmental initiatives can be included as part of the O&Ts and EMPs.

4.5 Reducing level of significance

Some aspects may reduce in significance after being actioned under the O&Ts and EMPs. These aspects are to be removed from the register only after consultation with the EHSMS Coordinator. The reason for removal from the register is to be documented.

Management Reviews of the aspects/impacts, related procedures and action plans will enable items to be reviewed and signed off if complete and removed from the list, and allow for the addition of new items on the aspects/ impacts list.

The environmental aspects table and significant aspects registers will be reviewed regularly during the Management Review process to incorporate new aspects from new or changed activities/products and to remove obsolete aspects.

4.6 Ongoing identification

The identification of environmental aspects is to be an ongoing process for current operations and for new activities

All stakeholders are encouraged to identify aspects as part of their general work. These should be reported to the EHSMS Coordinator who will rate the impacts for significance.

4.7 Review of Aspects Register

Management Reviews of the aspects/impacts, related procedures and action plans will enable items to be reviewed and signed off if complete and removed from the list, and allow for the addition of new items on the aspects/ impacts list.

The environmental aspects table and significant aspects registers will be reviewed regularly during the Management Review process to incorporate new aspects from new or changed activities/products and to remove obsolete aspects.

5. FREQUENCY

Review and revision on an annual basis, or when the situation regarding an aspect changes or a new aspect comes to light.

6. DOCUMENTATION & RECORDS

03.1 Environmental Aspects and Impacts Register
05.1 Objectives and Targets Register

Identification of the most significant Aspects:

No.	Aspect	Activity	Control Method	Impact	Significance rating				Legal Reference
					L	E	S	SR	
1 - 3	**Items**								
1.1.1	Chemicals	Handling & Storage		Health & Safety	**16**	**2**	**8**	**256**	
1.1.2	Chemicals	Accidental Spillage During Transport		Health & Safety Soil & Water Contamination	**2**	**3**	**8**	**48**	
1.1.3	Chemicals	Disposal		Soil & Water Contamination	**2**	**1**	**4**	**8**	
1.2.1	Construction	Handling & Storage		Health & Safety	**2**	**1**	**4**	**8**	
1.2.2	Construction	Accidental Spillage During Transport		Health & Safety Soil & Water Contamination	**2**	**1**	**4**	**8**	
1.2.3	Construction	Disposal		Soil & Water Contamination	**4**	**2**	**4**	**32**	
1.3.1	Fluorescent Tubes	Handling & Storage		Health & Safety	**8**	**2**	**4**	**64**	
1.3.2	Fluorescent Tubes	Accidental Spillage During Transport		Health & Safety Soil & Water Contamination	**4**	**3**	**4**	**48**	
1.3.3	Fluorescent Tubes	Disposal		Soil & Water Contamination	**4**	**2**	**4**	**32**	
1.4.1	Food	Handling & Storage	*There are still risks.*	Health & Safety	**32**	**2**	**64**	**4096**	
1.4.2	Food	Accidental Spillage During Transport		Health & Safety Soil & Water Contamination	**4**	**2**	**4**	**32**	
1.4.3	Food	Disposal		Soil & Water Contamination	**4**	**2**	**4**	**32**	
1.5.1	Fuels	Handling & Storage	*The equipment and procedures are not yet foolproof enough.*	Health & Safety	**32**	**4**	**32**	**4096**	

No.	Aspect	Activity	Control Method	Impact	Significance rating				Legal Reference
					L	E	S	SR	
1.5.2	Fuels	Accidental Spillage During Transport & Transfer	*The tanks have given problems and there are many transfer operations going on on the ice.*	Health & Safety Soil & Water Contamination	16	4	16	1024	
1.5.3	Fuels	Disposal		Soil & Water Contamination	4	2	4	32	
1.6.1	Glass	Handling & Storage		Health & Safety	16	2	4	128	
1.6.2	Glass	Accidental Spillage During Transport		Health & Safety Soil & Water Contamination	4	2	4	32	
1.6.3	Glass	Disposal		Soil & Water Contamination	2	1	4	8	
1.7.1	Grey Water	Handling & Storage		Health & Safety	16	2	4	128	
1.7.2	Grey Water	Accidental Spillage During Transfer		Health & Safety Soil & Water Contamination	32	2	8	512	
1.7.3	Grey Water	Disposal		Soil & Water Contamination	32	3	8	768	
1.8.1	Hazardous Chemicals	Handling & Storage		Health & Safety	16	2	4	128	
1.8.2	Hazardous Chemicals	Accidental Spillage During Transport		Health & Safety Soil & Water Contamination	16	4	8	512	
1.8.3	Hazardous Chemicals	Disposal		Soil & Water Contamination	8	2	4	64	
1.9.1	Human Waste	Handling & Storage	*Procedures are in place but the equipment and systems are problematic*	Health & Safety	32	3	16	1536	
1.9.2	Human Waste	Accidental Spillage During Transport		Health & Safety Soil & Water Contamination	4	4	16	256	
1.9.3	Human Waste	Disposal		Soil & Water Contamination	4	2	4	32	
	LPG								
2.1.1	Human Waste (Field)	Handling & Storage		Health & Safety				0	

No.	Aspect	Activity	Control Method	Impact	Significance rating				Legal Reference
					L	E	S	SR	
2.1.2	Human Waste (Field)	Accidental Spillage During Transport		Health & Safety Soil & Water Contamination				0	
2.1.3	Human Waste (Field)	Disposal		Soil & Water Contamination				0	
2.2.1	Light Bulbs	Handling & Storage		Health & Safety				0	
2.2.2	Light Bulbs	Accidental Spillage During Transport		Health & Safety Soil & Water Contamination				0	
2.2.3	Light Bulbs	Disposal		Soil & Water Contamination				0	
2.3.1	Material Particles (Filtered)	Handling & Storage		Health & Safety				0	
2.3.2	Material Particles (Filtered)	Accidental Spillage During Transport		Health & Safety Soil & Water Contamination				0	
2.3.3	Material Particles (Filtered)	Disposal		Soil & Water Contamination				0	
2.4.1	Medical Waste	Handling & Storage		Health & Safety	8	1	4	32	
2.4.2	Medical Waste	Accidental Spillage During Transport		Health & Safety Soil & Water Contamination	2	1	4	8	
2.4.3	Medical Waste	Disposal		Soil & Water Contamination				0	
2.5.1	Medicines - Schedule 0-4	Handling & Storage		Health & Safety				0	
2.5.2	Medicines - Schedule 0-4	Accidental Spillage During Transport		Health & Safety Soil & Water Contamination				0	
2.5.3	Medicines - Schedule 0-4	Disposal		Soil & Water Contamination				0	
2.6.1	Medicines - Schedule 5-6	Handling & Storage		Health & Safety				0	

No.	Aspect	Activity	Control Method	Impact	Significance rating				Legal Reference
					L	E	S	SR	
2.6.2	Medicines - Schedule 5-6	Accidental Spillage During Transport		Health & Safety Soil & Water Contamination				0	
2.6.3	Medicines - Schedule 5-6	Disposal		Soil & Water Contamination				0	
2.7.1	Metal	Handling & Storage		Health & Safety				0	
2.7.2	Metal	Accidental Spillage During Transport		Health & Safety Soil & Water Contamination				0	
2.7.3	Metal	Disposal		Soil & Water Contamination				0	
2.8.1	Oils	Handling & Storage		Health & Safety	16	3	4	192	
2.8.2	Oils	Accidental Spillage During Transport & Use		Health & Safety Soil & Water Contamination	16	3	16	768	
2.8.3	Oils	Disposal		Soil & Water Contamination				0	
2.9.1	Paper	Handling & Storage		Health & Safety				0	
2.9.2	Paper	Accidental Spillage During Transport		Health & Safety Soil & Water Contamination				0	
2.9.3	Paper	Disposal		Soil & Water Contamination				0	
3.1.1	Plastics	Handling & Storage		Health & Safety				0	
3.1.2	Plastics	Accidental Spillage During Transport		Health & Safety Soil & Water Contamination				0	
3.1.3	Plastics	Disposal		Soil & Water Contamination				0	
3.2.1	Print Cartridges	Handling & Storage		Health & Safety				0	
3.2.2	Print Cartridges	Accidental Spillage During Transport		Health & Safety Soil & Water Contamination				0	
3.2.3	Print Cartridges	Disposal		Soil & Water Contamination				0	

No.	Aspect	Activity	Control Method	Impact	Significance rating				Legal Reference
					L	E	S	SR	
3.3.1	Redundant Equipment	Handling & Storage		Health & Safety				0	
3.3.2	Redundant Equipment	Accidental Spillage During Transport		Health & Safety Soil & Water Contamination				0	
3.3.3	Redundant Equipment	Disposal		Soil & Water Contamination				0	
3.4.1	Workshop Consumables	Handling & Storage		Health & Safety				0	
3.4.2	Workshop Consumables	Accidental Spillage During Transport		Health & Safety Soil & Water Contamination				0	
3.4.3	Workshop Consumables	Disposal		Soil & Water Contamination				0	
4.1	**Vehicle Emissions**								
4.1.1	Ship			Air Pollution				0	
4.1.2	Aircraft			Air Pollution				0	
4.1.3	Cats			Air Pollution				0	
4.1.4	Challengers			Air Pollution				0	
4.1.5	Bulldozers			Air Pollution				0	
4.1.6	Skidoos			Air Pollution				0	
4.2	**Power Plant Emissions**								
4.2.1	Portable			Air Pollution				0	
4.2.2	Fixed			Air Pollution				0	
4.3	**Other Emissions**								
4.3.1	Cigarette Smoke			Air Pollution				0	
4.3.2	Methane			Air Pollution				0	
4.3.3	Co2			Air Pollution				0	
4.3.4	Welding Gases			Air Pollution				0	
4.3.5	Ozone			Air Pollution				0	
	Petrol Vapour								
4.3.6	Material Particles			Air Pollution				0	
5	**Services**							0	

No.	Aspect	Activity	Control Method	Impact	Significance rating				Legal Reference
					L	E	S	SR	
5.1.1	Refrigeration - Refrigerant			Air Pollution				0	
5.2.1	Power Plant - Coolant			Soil & Water Contamination				0	
5.2.2	Power Plant - Heat Exchanger Cleaning			Soil & Water Contamination				0	
5.2.3	Power Plant - Used Oil			Soil & Water Contamination				0	
5.2.4	Power Plant - Filters			Soil & Water Contamination				0	
5.2.5	Power Plant - Consumables			Soil & Water Contamination				0	
5.2.6	Power Plant - Engine Cleaner			Soil & Water Contamination				0	
5.3.1	Medical Equipment			Health & Safety				0	
5.4.1	Vehicles - Coolant			Soil & Water Contamination				0	
5.4.2	Vehicles - Heat Exchangers			Soil & Water Contamination				0	
5.4.3	Vehicles - Used Oil			Soil & Water Contamination				0	
5.4.4	Vehicles - Filters			Soil & Water Contamination				0	
5.4.5	Vehicles - Consumables			Soil & Water Contamination				0	
5.4.6	Vehicles - Engine Cleaner			Soil & Water Contamination				0	
5.5.1	Effluent Plant - Concentrated Sludge			Soil & Water Contamination				0	
5.5.2	Effluent Plant - Sand Filters			Soil & Water Contamination				0	
5.5.3	Effluent Plant - UV Filters			Health & Safety				0	

No.	Aspect	Activity	Control Method	Impact	Significance rating				Legal Reference
					L	E	S	SR	
5.5.4	Effluent Plant - Cleaning of Holding Areas for Grey Water			Soil & Water Contamination				0	
5.6.1	Kitchen Equipment - Filters			Health & Safety				0	
5.6.2	Laundry Equipment			Health & Safety				0	
5.6.3	Holding Tanks			Health & Safety				0	
5.6.4	Building Maintenance			Health & Safety				0	
5.6.5	Installation of Equipment			Health & Safety				0	
5.6.6	Hospital			Health & Safety				0	
5.6.7	Hospital Equipment			Health & Safety				0	
6	**Cargo Handling**								
6.1.1	Ship - Lifting Gear			Health & Safety				0	
6.1.2	Ship - Storage On Board			Health & Safety				0	
6.1.3	Ship - Container Certification			Health & Safety				0	
6.2.1	Cats - Competency			Health & Safety				0	
6.2.2	Cats - Helo			Health & Safety				0	
6.3.1	Flight Operations - Strops			Health & Safety				0	
6.3.2	Flight Operations - Slings			Health & Safety				0	
6.3.3	Flight Operations - Nets			Health & Safety				0	
6.3.4	Flight Operations - Passengers			Health & Safety				0	
6.4.1	Protective Clothing - Contamination Specifications			Health & Safety				0	
6.4.2	Protective Clothing - Weather Specifications			Health & Safety				0	

No.	Aspect	Activity	Control Method	Impact	Significance rating				Legal Reference
					L	E	S	SR	
6.5.1	Personnel - Safe Working Procedures			Health & Safety				0	
6.5.2	Construction - Safe Working Procedures At Sites			Health & Safety				0	
6.5.3	Maintenance - Safety Gear			Health & Safety				0	
6.5.4	Manuals - Outdated, Creating A Risk			Health & Safety				0	
6.5.5	Training Material - Outdated, Creating A Risk			Health & Safety				0	
6.5.6	Drawings/Diagrams - Outdated, Creating A Risk			Health & Safety				0	
6.5.7	E-Base - Non-Existent At Present! Location?			Health & Safety				0	
6.5.8	Survival Equipment - Outdated, Not Certified, No Specs			Health & Safety				0	
6.5.9	Diseases - Communicable			Health & Safety				0	
6.6.1	Emergency Plan - For Takeovers & Overwintering Period, Must Be Tested			Health & Safety				0	
6.6.2	Base Rules - Conduct, Zones & Other Controlled Areas			Health & Safety				0	
6.6.3	Hygiene - Dishwashing, Investigate Alternatives			Health & Safety				0	
6.6.4	Structural Integrity Of Base			Health & Safety				0	

No.	Aspect	Activity	Control Method	Impact	Significance rating				Legal Reference
					L	E	S	SR	
6.6.5	Operators - Confirm Competence			Health & Safety				0	
7	**Operations**								
7.1.1	Research - Samples			Soil & Water Contamination				0	
7.1.2	Research - Installation Of Equipment			Health & Safety Soil & Water Contamination				0	
7.1.3	Research - Field Work			Health & Safety				0	
7.2.1	S&R			Health & Safety				0	
7.3.1	Navigation - GPS Backup			Health & Safety				0	
7.3.2	Navigation - Safe Operating Procedures			Health & Safety				0	
7.3.3	Mapping - Update			Health & Safety				0	
7.4.1	Base - Roles & Responsibilities			Health & Safety				0	
7.4.2	Base - Operational Management			Health & Safety				0	
7.5.1	Helicopter - Operational Procedures			Health & Safety				0	
7.5.2	Helicopter - Flight Profiles	*Empty Jet A1 fuel drums		Health & Safety				0	
7.5.3	Helicopter - Aircraft Configuration			Health & Safety				0	
7.6.1	Ship - Orientation, Conduct			Health & Safety				0	
7.6.2	Ship - Conduct			Health & Safety				0	
7.7.1	Water - Generation, Use Of, Saving			Depletion of a Resource				0	
7.7.2	Depots - Placement, Use, Access, Marking, Recording			Health & Safety Soil & Water Contamination				0	

No.	Aspect	Activity	Control Method	Impact	Significance rating				Legal Reference
					L	E	S	SR	
7.7.3	Aircon - Use, Savings, Heat, Humidify (Munster)			Depletion of a Resource				0	
7.7.4	Electricity - Savings & Safety			Depletion of a Resource				0	
7.7.5	Heating - Savings, Effective Use			Depletion of a Resource				0	
7.7.6	Sewage Plant - Contain Spills, Investigate Alternatives (Dry System)			Health & Safety Soil & Water Contamination				0	
7.7.7	Communication - Outside World, Bandwidth, External, Internal			Health & Safety				0	
7.7.8	Zones - Demarcation, Access, Control			Health & Safety Soil & Water Contamination Wildlife				0	
7.7.9	Field Operator - Support For Scientists			Health & Safety				0	
7.7.10	Vehicles - Use, Trained Operators, Cold Weather Procedures, Refuelling, Misuse			Health & Safety Soil & Water Contamination Wildlife				0	
8	**Emergency Preparedness**								
8.1.1	Fire							0	
8.1.2	Evacuation							0	
8.1.3	S&R							0	
8.1.4	Tracking							0	
8.1.5	Chemical Spills							0	
8.1.6	Effluent Discharge							0	

No.	Aspect	Activity	Control Method	Impact	Significance rating				Legal Reference
					L	E	S	SR	
8.1.7	Power Failure		*Still one of the most serious probable failures, although a lot of back-up systems exist.*		32	3	64	6144	
	Medical Intervention							0	
	Communication Failure							0	
	Inclement Weather		*Bad weather can disrupt nearly all of the operations and put everything at risk. Designing to eliminate these risks has not yet been extended to everything.*		32	5	64	10240	
	Oil Spills							0	
8.1.8	Fuel Spills							0	
8.2	**Alien Introductions**							0	
8.2.1	Propagules				8	2	4	64	
8.2.2	Invertebrates							0	
8.2.3	Vertebrates				8	4	16	512	
8.3	**Wildlife Disturbance**								
8.3.1	Noise							0	
8.3.2	People							0	

1. PURPOSE

The purpose of this procedure is to:

- identify the legislation and other requirements that SANAP subscribes to; and
- identify how SANAP will have access to and understand legal and other requirements relevant to its activities.

(Including construction, operation, maintenance and decommissioning).

2. SCOPE

The procedure details the process for identification, registration and appropriate dissemination of legal and other requirements throughout SANAP.

3. REFERENCE

ISO 14001:2004 (Element 4.3.2).

4. PROCEDURE

The EHSMS Committee will establish and maintain legal and other requirements in the form of:

- Hard copies of relevant documents located in the EHSMS Coordinator's office, and
- An electronic register containing hyperlinks to relevant websites.

4.1 Types of Documentation

The legal and other requirements register shall usually include but not be limited to:

- National environmental legislation, regulations, policies and guidelines; and
- Applicable International Legislation & Standards.

Stakeholders will be informed of where environmental legislation is kept or who to contact to discuss environmental legislation.

4.2 Maintaining and Accessing Legal and Other Requirements

Access to the applicable legislation and other requirements and maintaining the register of relevant requirements is achieved by:

- Looking at relevant web sites including:
  1. South African Legislation: http://www.acts.co.za, and
  2. Antarctic Legislation: http://www.ats.aq.

Hard copies of Legislation, Regulations, Policies and Guidelines, etc. will be kept in a labelled file and stored with various key personnel.

4.3 Review

A review of applicable legislative and other requirements may be achieved by:

- contacting government authorities (eg. DFA), the SABS; and environmental advisors, etc.,
- using internet access to relevant information sites
- reviewing and implementing international environmental trends through ATCM, CEP, COMNAP, SCALOP, SCAR, & AEON.

5. FREQUENCY

Review and revision on an annual basis, or when the situation regarding an aspect changes or a new aspect comes to light.

6. DOCUMENTATION & RECORDS

04.1 Environmental Legal Register
04.2 Health & Safety Legal Register
04.3 Environmental Publications Register

1. PURPOSE

SANAP sets O&Ts for environmental improvement and develops Action Plans, EMPs and/or Operational Control Procedures (refer to Document 10.0) to meet these objectives. These O&Ts are generally directly related to SANAP's SEAs (emanating from the EHS Aspects and Impacts Register) and follow from its environmental policy commitments.

2. SCOPE

The procedure details the process for setting O&Ts for improving environmental management throughout SANAP.

3. REFERENCE

ISO 14001:2004 (Element 4.3.3).

4. PROCEDURE

4.1. Environmental O&Ts for SANAP are set such that the programme has one or more environmental O&Ts at any one time. The current environmental O&Ts are recorded in Document 05.1. Where possible, environmental objectives are quantified and at least one target developed.

4.2. The EHSMS committee is responsible for developing and recommending potential new environmental O&Ts to SANAP management. In identifying potential new O&Ts, the committee considers the following:

- Applicable current and potential future legislation, regulations, policies, etc.,
- The SEAs of SANAP,
- Practical operational criteria, such as the potential costs and benefits of pursuing a particular environmental objective, and
- The views of employees, stakeholders and other interested and affected parties

4.3. Once environmental O&Ts are established, the EHSMS coordinator assigns responsibility to the manager of the operations in question, where appropriate, for developing Action Plans, EMPs and/or Operational Control Procedures to realize the O&Ts. The Action Plan, EMP or Operational Control Procedure that correspond to each objective are recorded by the responsible person in the Objectives and Targets Register.

4.4. For short term O&Ts, Action Plans will be developed and for long term O&Ts and, as prescribed, relevant EMPs and/or Operational Control Procedures will be developed.

4.5. For where potential emergencies beyond SANAP's control can occur, Emergency Preparedness & Response Plans has to be developed under document 11.

5. FREQUENCY

Environmental O&Ts are reviewed on a yearly basis. The Action Plans, EMPs and Operational Control Procedures are developed and revised as needed.

6. DOCUMENTATION & RECORDS

05.1 Objectives and Targets Register
05.2 Action Plans
05.3 Environmental Management Plans
10.0 Operational Control Procedures
11.0 Emergency Preparedness & Response

Objectives and Targets; Environmental Management Programme(s) – for management of "Significant" Environmental Aspects/Impacts:

Activity	Aspects (SEA)	Potential Environmental Impact	Action or Objective	Target	How: AP / EMP /OCP	Who/ When
Operating the Bases	Inclement Weather	Health and Life of participants		Better emergency plans Better emergency clothing	OCP – Emergency plans	
Operating the Bases	Power Failure	Health and Life of participants	Ensure that the equipment is in best possible condition Ensure competent technicians Ensure adequate spares		OCP	
Provisioning: Food: Handling & Storage	Food - Handling & Storage	Health of participants			OCP	
Provisioning: Fuels Handling & Storage	Fuels - Handling & Storage	Contaminate water, groundwater, sea, Fauna and Flora			OCP	
Operating the Bases Human Waste Handling & Storage	Human Waste - Handling & Storage	Contaminate water, groundwater, sea, Fauna and Flora		No Waste Spills from the Sewage System	OCP	
Provisioning: Fuels Accidental Spillage During Transport & Transfer	Fuels - Accidental Spillage During Transport & Transfer			No fuel spills during transfer and transport of fuels	Emergency Oil spill handling procedure	
Operating the Bases Grey Water Disposal	Grey Water - Disposal			Grey Water always within the regulatory specifications	OCP	

Activity	Aspects (SEA)	Potential Environmental Impact	Action or Objective	Target	How: AP / EMP /OCP	Who/ When

Action Plans for management of "Significant" Environmental Aspects/Impacts:

Objective & Target	KPI	Action Plan	Responsible	Budget	Target Date	Status

Environmental Management Plans have been developed for SANAP to achieve the required environmental performance on an ongoing basis. They are separate documents:

Doc no	Title	management authority	implementation status
6.3.1.	**Prince Edward Island Management Plan** Author: Version: Date: Available at: File name:	PEIMA	
6.3.2	**Management Plan for the Gough Island Wildlife Reserve** Author: Version: Date: Available at: File name:	Administrator of Tristan da Cunha	

1. PURPOSE

To assist with the effectiveness of environmental management, all personnel should understand their roles, responsibilities and authority (accountability) within the EHSMS.

Adequate resources including human, specialized skills, technology and financial are also essential to effectively maintaining the EHSMS.

2. SCOPE

The successful implementation of the EHSMS is the responsibility of all SANAP personnel and stakeholders (including management, operation and support, research activities, construction., maintenance and decommissioning).

3. REFERENCE

ISO 14001:2004 (Element 4.4.1).

4. PROCEDURE

Organograms outline the personnel involved in the management, administration and operation of SANAP, the various stakeholders involved and South Africa's international and national commitments.

The following organograms illustrate the highly complex and interrelated nature of SANAP:

1. DEAT / DST
2. SANAP & stakeholders
3. SANAP - Handovers
4. SANAP & international & national committees

A matrix has been developed to enable a quick check of employees and stakeholders' environmental responsibilities. The matrix consists of the job titles and/or organisations and a list of EHSMS-related tasks.

The relevant Job Descriptions and Work Plans for all SANAP personnel are in place, and the relevant Duty Sheets have/will be developed as and when the need arises.

5. FREQUENCY

The Roles, Responsibilities & Authorities Matrix is reviewed on a yearly basis, or as the need arises.

6. DOCUMENTATION & RECORDS

06.1 Organograms
06.2 Roles, Responsibilities & Authorities Matrix
06.3 Duty Sheets

DEAT ORGANOGRAM

1. PURPOSE

The purpose of this procedure is to specify an Environmental Training Needs Analysis Matrix and the basis for an ongoing training and awareness programme.

2. SCOPE

This procedure applies to all SANAP personnel and stakeholders.

3. REFERENCE

ISO 14001:2004 (Element 4.4.2).

4. PROCEDURE

4.1 Training Needs Analysis Matrix

A Training Needs Analysis Matrix identifying significant categories of environmental management will be maintained, along with the Training Register.

The training needs analysis provides a plan to ensure that employees and stakeholders have and maintain appropriate skills and competence to positively influence environmental quality within their work practices.

4.2 Training Plan

A Training Plan according to the needs analysis matrix is to be developed by the EHSMS Coordinator, and relevant Training Schedules drawn up and implemented by the responsible personnel according to the Roles, Responsibilities & Authorities Matrix.

4.3 Training Records

A Training Register, including personnel trained and details of the Training Plan and Schedules are to be maintained as per the Records Procedure. The Training Register will be maintained by the EHSMS Coordinator.

4.4 Reviews

A review of the effectiveness and completeness of the Training Plan and Schedules is to occur annually as part of the EHSMS review process. Additional training needs identified are to be included into the matrix and plan where deficiencies have been identified.

4.5 Importance of training

Any departure from procedures could result in contributing to environmental harm.

The training will emphasise the importance of the following specified operating procedures. Deliberate departure from procedures will be subject to disciplinary action and possibly termination of employment for serious offences. Individuals or stakeholders convicted of an offence relating to the commencement or continuation of a listed activity will be liable to a fine not exceeding R5 million or to imprisonment for a period not exceeding 10 years, or to both such fine and such imprisonment (NEMA, Section 24F).

5. FREQUENCY

The Training Needs Analysis Matrix and Training Plan are reviewed on a yearly basis.
The Training Register is completed on completion of every training session.
The Training Schedule is completed yearly when needs are brought to the attention of the responsible personnel.

6. DOCUMENTATION & RECORDS

07.1 Training Needs Analysis Matrix
07.2 Training Plan
07.3 Training Schedules
07.4 Training Register

1. PURPOSE

The objectives of this procedure are to:

- raise awareness of the environmental policy, objectives, targets and plans;
- demonstrate SANAP's commitment to environmental issues;
- liaise with external parties regarding environmental performance;
- manage concerns about environmental issues of SANAP's activities or services; and
- inform internal and external interested and affected parties about SANAP's environmental performance.

2. SCOPE

This procedure provides the framework for internal communication within the various levels and functions of SANAP, and receiving, documenting and responding to communications from external parties.

3. REFERENCE

ISO 14001:2004 (Element 4.4.3).

4. PROCEDURE

4.1 Communication techniques

Communication techniques to divulge information between the various levels of SANAP and external parties include *inter alia* the following:

- Emails;
- Memorandums,
- Submissions,
- Meetings;
- Notice boards;
- Websites,
- Publications.
- Media releases; and
- Site visits and tours.

4.2 Types of communication

Types of communication include:

- Promoting environmental policy and EMPs
- Exchanging information regarding environmental performance
- Understanding environmental issues
- Dealing with external parties;
- Handling of public concerns; and

- Responding to enquiries from interested and affected parties.

4.3 Authority Visits
Inspections to the various SANAP sites may be for routine compliance inspection, to investigate any complaints, to advise and recommend improvements or to advise of changes to legislation, regulations, guidelines, etc.

Alternatively, visits could be with the view of gathering evidence for prosecution purposes or incident investigation.

4.4 Liaison and Administration
The Director: Antarctica and Islands of DEAT and SANAP management is to be assisted by the EHSMS Coordinator with the provisioning of relevant information to respond to any enquiries/complaints received.

Any EHS complaints made to SANAP from internal or external parties are to be documented and investigated. The outcome of the investigation is to be documented and ~~to~~ relayed to the interested party.

All enquiries made will be followed up in the interest of good relations.

4.5 Media (radio, newspaper, television):
Enquiries from the media are to be directed to the relevant SANAP Manager (DEAT/DST/NRF) for response. Unless authorised by these people, no one is to make a media statement on behalf of SANAP.

5. FREQUENCY

Regular review and revision of SANAP Website.

6. DOCUMENTATION & RECORDS

08.1 Communications Register

Date/ time of contact	Source (internal or external)	Subject of communications	Caller name, address and contact number	Communications recipient	Action taken	Signed off

1. PURPOSE

This procedure has been developed to control and update all documentation generated under the SANAP EHSMS.

2. SCOPE

This procedure applies to all EHSMS documentation held at SANAP (DEAT East Pier Shed) relating to all SANAP operations.

3. REFERENCE

ISO 14001:2004 (Element 4.4.5).

4. PROCEDURE

4.1 Approval

All EHS documents shall be reviewed by the EHSMS Committee prior to issue. All relevant EHS documentation will be formally reviewed annually and approved for adequacy. Document control pages must be approved and signed by the relevant SANAP personnel and stakeholders.

4.2 Internal and External Documents

All documents will be controlled to ensure that the latest revision is available for use, and shall be listed on the Document Register.

Should a document be held for reference purposes only and does not require continual updating it shall be identified on the register as a reference document and the document shall be marked "reference only".

All internal EHSMS procedures and other documents consist of an "effective date" and "revision date" to ensure that the relevant document is in use.

The headings in the EHSMS procedures include:
Purpose
Scope
Reference
Procedure
Frequency
Documentation & Records

4.3 Document register
A register of authorised holders of the EHSMS documentation is held with the Document Controller. This also includes where the document can be found.

4.4 Computer documents
All EHSMS documentation can only be sourced from the Document Controller. Documentation printed out by individuals or stakeholders from CDs, DVDs or the SANAP Website of DEAT shall be marked *'COPY ONLY'*.

4.5 Document changes
New Documents:
Based on new processes, equipment or audits, new documentation will be developed. The EHSMS Coordinator will coordinate the drafting of new documentation to be included in the system. Draft documents will be stamped "draft only". Upon finalisation of the document, it will be included in the EHSMS.

Revised Documents:
The EHSMS Coordinator can make changes to existing documentation. Before the changes are included in the final working document changes have to be reviewed by the EHSMS Committee and endorsed by the relevant SANAP personnel and stakeholders prior to issue. As a result of any changes, the revision number and amendment date shall be updated on the document and in the Document Register. A minor set of revisions would change the number from, e.g. 1.1 to 1.2; a major revision would change the number from, e.g. 1.1 to 2.0.

4.6 Obsolete documents
After a document has been utilised or becomes obsolete, that document shall be clearly marked "obsolete" and filed for archive purposes. The document will be replaced with the revised version.

4.7 Document Formats
Documents will comply with the Standard Formats approved by the EHSMS Coordinator.

Format 1 – *ISO14001 overarching documents (Documents 01.0 – 17.0)*
The System Title is in Arial, font size 14, bold and the Document Title is in Arial Narrow, font size 14, upper case. Body Text for all documents (except publications and signs) is to be in Times New Roman, font size 12, with single line spacing and the text fully justified. It will be printed as double sided, except were impractical. Double spaces are to be used after full-stops. Page margins will be 2 cm for top and bottom and 2.5 cm for left and right. Headers and footers will be in Arial Narrow, font size 10.

Format 2 – *OCPs, Duty Sheets etc.*
The Document Title appearing only on the first page is in Arial Narrow, font size 14, between the South African Coat of Arms on the left and the SANAP logo on the right. Body Text is to be in Times New Roman, font size 12, with single line spacing and the text fully justified. It will be printed as double sided, except were impractical. Double spaces are to be used after full-stops. Page margins will be 2 cm for top and bottom and 2.5 cm for left and right. Headers and footers will be in Arial Narrow, font size 10, and will include the following document information; "SANAP EHSMS", title, number, version no, responsibility, effective and revision dates, page number of total page numbers as well as the file name.

4.8 Document Types

Documents in this EHSMS will only exist as one of the following document types:

- Policies, Manuals & Procedures;
- Registers & Records
- Forms; and Checklists.
- Work & Operational Instructions
- Plans & Programmes
- Publications

4.9 Document Issue Control

The Document Controller ensures that no employees or managers use outdated revisions of the EHSMS manual or other EHSMS documents.

5. FREQUENCY

The EHSMS and EHS documentation will be reviewed and revised on an annual basis.

6. DOCUMENTATION & RECORDS

09.1 Document Control Register
09.2 Document Development Register
09.3 Document & Role Application Matrix

1. PURPOSE

This procedure has been developed to control and update all documentation generated under the SANAP EHSMS.

2. SCOPE

This procedure applies to all EHSMS documentation held at SANAP (DEAT East Pier Shed) relating to all SANAP operations.

3. REFERENCE

ISO 14001:2004 (Element 4.4.5).

4. PROCEDURE

4.1 Approval

All EHS documents shall be reviewed by the EHSMS Committee prior to issue. All relevant EHS documentation will be formally reviewed annually and approved for adequacy. Document control pages must be approved and signed by the relevant SANAP personnel and stakeholders.

4.2 Internal and External Documents

All documents will be controlled to ensure that the latest revision is available for use, and shall be listed on the Document Register.

Should a document be held for reference purposes only and does not require continual updating it shall be identified on the register as a reference document and the document shall be marked "reference only".

All internal EHSMS procedures and other documents consist of an "effective date" and "revision date" to ensure that the relevant document is in use.

The headings in the EHSMS procedures include:
Purpose
Scope
Reference
Procedure
Frequency
Documentation & Records

4.3 Document register
A register of authorised holders of the EHSMS documentation is held with the Document Controller. This also includes where the document can be found.

4.4 Computer documents
All EHSMS documentation can only be sourced from the Document Controller. Documentation printed out by individuals or stakeholders from CDs, DVDs or the SANAP Website of DEAT shall be marked *'COPY ONLY'*..

4.5 Document changes
New Documents:
Based on new processes, equipment or audits, new documentation will be developed. The EHSMS Coordinator will coordinate the drafting of new documentation to be included in the system. Draft documents will be stamped "draft only". Upon finalisation of the document, it will be included in the EHSMS.

Revised Documents:
The EHSMS Coordinator can make changes to existing documentation. Before the changes are included in the final working document changes have to be reviewed by the EHSMS Committee and endorsed by the relevant SANAP personnel and stakeholders prior to issue. As a result of any changes, the revision number and amendment date shall be updated on the document and in the Document Register. A minor set of revisions would change the number from, e.g. 1.1 to 1.2; a major revision would change the number from, e.g. 1.1 to 2.0.

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Documents will comply with the Standard Formats approved by the EHSMS Coordinator.

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4.7 Document Types

Documents will in this EHSMS will only exist as one of the following document types:

- Policies, Manuals & Procedures;
- Registers & Records
- Forms; and Checklists.
- Work & Operational Instructions
- Plans & Programmes
- Publications

4.8 Document Issue Control

The Document Controller ensures that no employees or managers use outdated revisions of the EHSMS manual or other EHSMS documents.

5. FREQUENCY

The EHSMS and EHS documentation will be reviewed and revised on an annual basis.

6. DOCUMENTATION & RECORDS

09.1 Document Control Register
09.2 Document Development Register
09.3 Document & Role Application Matrix

1. PURPOSE

Some activities have been identified as significant EHS aspects. If not effectively controlled such aspects or impacts may impair SANAP's ability to meet commitments made in the environmental policy.

Such activities need to be identified, planned, controlled and where necessary, documented to ensure that they are conducted in an environmentally acceptable manner.

The purpose of this procedure is to specify Operational Control Procedures with the aim of ensuring operations are conducted in accordance with the work instructions at all times to meet environmental policy requirements.

2. SCOPE

Operational Control Procedures are applicable to all phases of the life cycle of SANAP's EHSMS, where potentially significant aspects and impacts have been identified.

The Operational Control Procedures will also ensure that SANAP personnel and stakeholders, contractors and suppliers are aware of appropriate procedures that will affect their activities and services.

3. REFERENCE

ISO 14001:2004 (Element 4.4.6).

4. PROCEDURE

As significant EHS aspects/impacts are identified, the necessary O&Ts, Action Plans, EMPs (refer to Document 05.0) and/or Operational Control Procedures are to be developed. SANAP will document all such procedures to ensure that all operations are performed in a manner consistent with the commitments contained in the environmental policy.

Operational Control Procedures will be developed to control on-going operations that have associated significant aspects and impacts. The procedures will follow the format set down in the Document Control Procedure (refer to Document 09.0).

5. FREQUENCY

Relevant documentation will be reviewed and revised on an annual basis.

6. DOCUMENTATION & RECORDS – order must be created here!!!

10.1 Voyage Planning (How to plan a voyage / flowchart / required forms / dates / etc)

10.2 Handover Manual (Participant's Handbook)
10.2.1 General Info Doc/Man &
10.2.2 Operations Manual

10.2.3 Base Rules
10.2.4 Organisation of Operations
10.2.5 Conduct of Participants in SANAP (letter), etc.)
10.2.6 Code of Conduct (+ Guidelines for Visitors)
10.2.7 Ship's Manual
- Passenger Information Brochure
- Fleet Instruction Manual
10.2.8 Helicopter Manual

10.3 Overwintering (or Year-) Team Manual
10.3.1 Going South with SANAP - brochure in progress
10.3.2 Define the Teams (participants)
10.3.3 Define Working Document Folder (WDF) for each member

10.4 HR Procedures & Policies
10.4.1 Overtime Policy (current Overtime Policy)
10.4.2 Communication Policy
10.4.3 Adventure Policy
10.4.4 Fleet Alcohol Policy
10.4.5 Disciplinary Procedure

10.5 Health & Safety Policies & Procedures
10.5.1 Safety Policy
10.5.2 Safety Manual

10.6 Vehicle & Equipment Procedures
10.6.1 Vehicle Usage Manual (incl. routes) (current Vehicle Policy)
10.6.2 Cargo Handling Manual (current Offloading Proc + Cargo Handl Pol)
10.6.3 Dinghy Use

10.7 Waste Management Manual (various)

10.8 Preventative Maintenance Procedures
10.8.1 Preventative Maintenance Policy
10.8.2 Preventative Maintenance Procedures
10.8.3 Weekly inspection checklist
10.8.4 Monthly inspection checklist

10.9 Provisioning Procedures
10.9.1 Purchasing
10.9.2 Storage
10.9.3 Specified Environmentally Friendly Chemicals
10.9.4 Clothing Specifications

10.10 Housekeeping
10.10.1 Delivery and storage of substances
10.10.2 Indoor Air Quality
10.10.3 Energy
10.10.4 Water

1. PURPOSE

To identify the potential EHS emergencies and to specify appropriate responses to the events to minimise the impact on the environment and human health and safety.

2. SCOPE

This procedure scopes the likely emergencies that may result in an adverse EHS impact, and outlines appropriate responses for these emergency situations that may contaminate the environment or create pollution or endanger human health and safety.

3. REFERENCE

ISO 14001:2004 (Element 4.4.7).

4. PROCEDURE

The identified emergency situations include:

- Search & Rescue (missing personnel or vehicles)
- Fire/Explosion & Evacuation
- Significant release or spill into water, land and/or air
- Medical emergencies
- Natural/environmental disasters;
- Disease/disasters pertaining to wildlife, and
- Other significant unplanned events or near misses potentially resulting in EHS impact.

All efforts will be made to protect human life and the environment. Environmental mitigation measures will not be implemented at the risk of human life.

4.1 Search & Rescue

In the event of a missing person or vehicle, the procedure as set out in the relevant SANAP Search and Rescue Procedure document shall be followed.

4.2 Fire/Explosion & Evacuation

Small Fires - those personnel on site trained in fire fighting will extinguish the fire with portable fire fighting extinguishers/fire hoses used appropriately. Personal protective clothing and equipment will be used as required and in accordance with instructions provided during training.

Large Fires - those personnel on site trained in fire fighting will attempt to extinguish the fire with portable fire fighting extinguishers/fire hoses used appropriately. Personal protective clothing and equipment will be used as required and in accordance with instructions provided during training. Should the fire become uncontrollable, the site is to be evacuated at the sound of

the emergency alarm in accordance with the site evacuation plan or, if not possible, the safest/most direct route.

No one is allowed to re-enter the building until the authorities give permission to do so.

Explosions - emergency response to explosions involves evacuation of the site via the site evacuation plan or, if not possible, the safest/most direct route.

4.3 Significant Spill or Release

Spills shall be managed using the relevant SANAP Contingency Procedures and available spill response equipment and in accordance with training provided.

The first person to notice a spill/leak/release is to initiate corrective action. When the substance that is leaking/being released can be identified, the personnel trained in spill response will immediately commence clean-up/corrective actions and protective measures to ensure that the water and air environment is not impacted on.

If the substance cannot be immediately identified, take caution to determine what the substance could be and then act on a response.

Any release into air or onto the ground shall be actioned immediately. Significant emissions to the air shall be reported to the relevant personnel as soon as possible indicating type of pollutant and proximity of people who may be impacted on.

4.4 Medical emergencies

Should the person have undergone first aid training, assistance should be rendered immediately to stabilise the patient. Thereafter the Medical Doctor/Orderly on site should be contacted. In the event that a person has not undergone first aid training, the Medical Doctor/Orderly on site should be contacted immediately.

In the event of a medical emergency in the field, the base should be contacted and (1) a helicopter (if available) should be deployed or (2) a S&R team should be deployed.

4.5 Natural/environmental disasters

After the event of a natural disaster, the Director: Antarctica and Islands (DEAT) must be contacted immediately. The safety of all personnel on site and the potential impact on the environment must be reported on.

Preventative controls must be maintained to minimise any impact on the environment should a natural disaster occur.

4.6 Disease/disasters pertaining to wildlife

Any such occurrence should be reported immediately to the relevant personnel in accordance with the reporting structure organogram. The occurrence must be dealt with in accordance with the relevant Contingency Plan.

4.7 Other significant unplanned events and near misses potentially resulting in EHS impact

All such events and near misses must be reported on to the relevant personnel in accordance with the reporting structure organogram. Such reports will also guide SANAP in setting up the necessary preventative measures.

5. FREQUENCY

The EHSMS and EHS documentation will be reviewed and revised on an annual basis.

6. DOCUMENTATION & RECORDS

11.1 Search & Rescue Procedures
11.1.1 Dronning Maudland – SANAE IV – Antarctica
11.1.2 Marion Island
11.1.3 Gough Island
11.2 FireFighting & Emergency Evacuation
11.3 Fuel/Oil Spill Continguency Plan (+ assoc new COMNAP document (2008))
11.4 Medical Emergencies
11.5 Environmental Disaster Preparedness & Recoveries
11.6 Other Reporting

1. PURPOSE

This procedure has been developed to monitor and measure:

- the key activities that can cause a significant environmental impact; and
- the general environmental performance of SANAP.

2. SCOPE

Monitoring and measurement of the EHSMS will be conducted over the whole of SANAP's operations.

3. REFERENCE

ISO 14001:2004 (Element 4.5.1).

4. PROCEDURE

SANAP will specify Key Performance Indicators (KPIs) for measuring environmental performance. The KPIs will be presented in a table format (Document 12.1) in order to measure compliance with legislative requirements and the EHS O&Ts. KPIs will be documented at the start of each year.

Any EHS monitoring and measurement equipment will be calibrated and maintained by SANAP and used to measure KPIs.

5. FREQUENCY

The KPI table will be reviewed on an annual basis.

6. DOCUMENTATION & RECORDS

12.1 Key Performance Indicators (KPI) Table

Key Performance indicators and environmental initiatives

PERFORMANCE	REVIEW	STATUS
Reducing waste going to landfill by 90% (recycling paper, plastic etc.)	Quarterly waste audit	
100% action with Objective and Target/ Environmental Management Programme (EMP) items within 3-5 years	Annually	
Meeting legal compliance and other obligations (Through weekly/ monthly inspections)	Weekly/ Monthly	
Reporting all non-conformance and incidents	Monthly	
Reducing greenhouse gas emission generation through reducing fuel/ energy use	Quarterly	
Reducing number of environmental incidents towards zero	Monthly	
All staff trained in environmental awareness within first year Annual review of training	Monthly	
Recycling and reuse programs – Dollar savings: Proportion of material being recycled Proportion of sourced materials recycled	Annually	
Staff survey outcomes	Annually	
Ongoing education on hot topic environmental issues	Monthly	

1. PURPOSE

Compliance assessment is undertaken to ensure that SANAP complies with all applicable EHS legislation, regulations, policies and procedures.

2. SCOPE

This procedure applies to all EHSMS requirements relating to all SANAP operations.

3. REFERENCE

ISO 14001:2004 (Element 4.5.2).

4. PROCEDURE

1. The EHSMS Coordinator maintains copies of applicable legal and other requirements (refer to Document 04.0). Based in this documentation, the EHSMS Committee compiles a list of questions as a Compliance Assessment Checklist. These questions are intended to be sufficient to the compliance status of SANAP, with regard to applicable EHS requirements (for administrative processes and performance of SANAP personnel and stakeholders).

2. The EHSMS Coordinator and another operations manager carry out the assessment by determining and recording the answers to the Compliance Assessment Checklist. On completion, they note any actual or potential non-compliance on the Compliance Tracking Log. Each actual and potential non-compliance issue is immediately referred to corrective action (refer to Document 14.0).

5. FREQUENCY

Compliance should be reviewed on a monthly/regular basis.

6. DOCUMENTATION & RECORDS

13.1 Compliance Assessment Checklist
13.2 Compliance Tracking Log

OPERATION / SITE:
RESPONSIBLE PERSON:

Legal or Other Requirement	Actual or Potential non-Compliance	STATUS referred to corrective action

EHSMS Coordinator

Date

another operations manager

Other Operation

date

COMPLIANCE TRACKING LOG

Person Responsible	Regulation	Root Cause	Compliance Check Date	Results	Corrective Action Date	Compliance Verified / Date

1. PURPOSE

The purpose of this procedure is to:

- identify and report non-conformance,
- investigate and determine cause of non-conformance,
- take action to correct non-conformance and mitigate impact,
- evaluate and implement appropriate preventive action to avoid recurrence,
- record results and review effectiveness of corrective and preventive actions.

It is a long-term method used to eliminate basic causes of non-conformance in environmental performance and the EHSMS.

2. SCOPE

This procedure is relevant to corrective actions required for all SANAP operations.

3. REFERENCE

ISO 14001:2004 (Element 4.5.3).

4. PROCEDURE

The Corrective Action Reporting Form is used by SANAP to identify the non-conformance, must be completed as follows:

4.1 Identification

Non-conformances may be identified during daily operations or during audit situations. As soon as a non-conformance has been detected, it must be reported on.

4.2 Investigation

All non-conformances (systems and legislative) will be investigated by the EHSMS Coordinator or designated personnel to determine why they occurred and how they can be prevented from occurring again.

4.3 Action

Evaluate the necessity of any action or preventive action to address the non-conformance. The immediate action (if necessary) aims to correct the problem and mitigate any impacts. If it cannot be solved immediately, the issue will be identified as a significant aspect and documented on the register.

The EHSMS Coordinator will consult as necessary and designate responsibility to correct the non-conformance (system, legal or operation).

4.4 Preventive action

Preventive action aims to prevent the non-conformance from reoccurring or potential non-conformances from occurring.

4.5 Record results and review

On completion of the actions, the results are to be recorded and reviewed for effectiveness and the relevant documentation (system, operating or monitoring) amended, if necessary, to prevent the future occurrence of non-conformance. This will be the responsibility of the EHSMS Coordinator, with input from the relevant responsible personnel.

5. FREQUENCY

The Corrective Action Reporting Register updated on the conclusion of each Corrective Action Reporting Form, which will be used as and when needed.

6. DOCUMENTATION & RECORDS

14.1 Corrective Action Reporting Register
14.2 Corrective Action Reporting Form

SANAP Environmental, Health & Safety Management System		
	CORRECTIVE ACTION REPORTING FORM	Document No: 14.1 Revision No: 0.1

Preliminary report:

(to be completed by person who discovered incident/ non-conformance)

Report number:	
Date of incident/ non-conformance:	Approx. time of incident/ non-conformance:
Plant, facility or department where incident/ non-conformance occurred:	
Problem: spill ☐ leak ☐ fire ☐ systems ☐	
Environment impacted: air ☐ land ☐ water ☐ other ☐	
Person reporting incident/ non-conformance:	
Witnesses:	
Description of incident/ non-conformance:	
Outcome of incident/ non-conformance (environmental impacts):	
People notified (Authorities, Managers etc.):	

Incident/ non-conformance investigation:

(to be completed by EHSMS Coordinator)

How did incident/ non-conformance occur? (list root causes):
What action was taken to immediately fix problem?
What actions are required to prevent recurrence in future?
Does incident/ non-conformance need to be included in aspects/ impacts register and have an operational control procedure developed to prevent recurrence? Yes: ☐ No: ☐
(Reason for not including on aspects register):
EHSMS Coordinator's sign off:
Date:

1. PURPOSE

To control and maintain environmental records generated within the SANAP EHSMS.

2. SCOPE

This procedure covers the identification, collection, filing, storage, maintenance and disposal of environmental records generated by SANAP.

3. REFERENCE

ISO 14001:2004 (Element 4.5.4).

4. PROCEDURE

4.1 Types and identification of records

Environmental records to be filed include:-

- Management Review and minutes
- Training records
- Corrective Action Reports
- Incident Reports
- Calibration, inspection & test records
- Codes and specifications
- Auditing Reports

EHS records will be identifiable by the label on the file.

4.2 Legibility and maintenance

All records should be as accurate and as neat as possible and of a permanent nature for indexing, filing and retention.

4.3 Storage

Hard copies of environmental records will be collected, filed and stored in a manner to prevent deterioration, damage or loss in filing cabinets.

Records on computer are to be backed up daily. Access to records on the computer system will be available to approved personnel only.

EHSMS and environmental records will be located in the DEAT Filing System at East Pier Shed Head Office.

4.4 Retention period

Environmental records will be retained for a period of 3 – 5 years, or as specified by government regulations.

Environmental records may be available to appropriate SANAP personnel on request.

4.5 Disposal of obsolete records
Environmental records outside of the DEAT retention period are sent to the State Archives or deleted from computer records.

5. FREQUENCY

Records should be filed on a weekly basis.

6. DOCUMENTATION & RECORDS

1. PURPOSE

To carry out EHSMS audits to verify the effectiveness of the SANAP EHSMS at the various sites.

2. SCOPE

The audits aim to determine whether the EHSMS conforms to the planned arrangements for environmental, health and safety management and to the ISO14001 standard. The audits will also determine if the system has been implemented and maintained correctly. Recommendations in the audit may include change to policy, objectives and targets, and other elements of the EHSMS.

3. REFERENCE

ISO 14001:2004 (Element 4.5.5).

4. PROCEDURE

4.1 Audit scope & methodology

Currently, audits are carried out on all SANAE and Marion voyages, and conform to a standardised compliance monitoring and audit format, including details such as: what is to be audited, key findings and recommendations, etc. The scope and methodology of the audit system will be modified when the ISO 14001-based system had been finalised and approved by SANAP management.

4.2 Reporting results

EHSMS audits must be documented, and the results of the audits brought to the attention of all SANAP personnel and stakeholders having responsibilities in the areas being audited so that everyone involved will have a clear understanding of the auditor's findings, with recommendations for appropriate corrective action

If partial or non-compliance/conformances are observed during the audit, the auditor shall take this up immediately via the channels of communication, for possible rectification prior to the completion of the audit.

The findings of the audit must be forwarded to SANAP management for review. Corrective and preventative action on the partial or non-compliance/conformances found by the audit should be addressed by the SANAP management.

Copies of audit reports should be filed and retained for future reference.

5. FREQUENCY

Each element of the EHSMS is audited at least once per year.

6. DOCUMENTATION & RECORDS

16.1 EHSMS Audit Schedule
16.2 EHSMS Audit Reports

1. PURPOSE

To review the EHSMS annually to ensure its continuing suitability, adequacy and effectiveness in satisfying the requirements of ISO 14001 : 2004 and SANAP's policies and objectives.

Management reviews also ensure management support throughout the EHSMS.

2. SCOPE

This procedure covers the plan, the frequency, method, extent and responsibility for conducting management reviews within SANAP.

3. REFERENCE

ISO 14001:2004 (Element 4.6).

4. PROCEDURE

4.1 General

The SANAP Management Review Team comprises the following:

DEAT: Antarctica and Islands:
Director
Deputy Director
Chief Engineer
DCO
ADCO

DEAT: Environmental Impact Evaluation:
Director
Deputy Director
Assistant Director
ECO

SANAP Managers:
DST
NRF
NDPW
Aerial Support Manager
Ships Master - SA Agulhas
SAWS
Science Team Leader

SANAP Management Review Team meetings will be held to ensure the effectiveness of the EHSMS, to plan objectives and targets, and assess the results of both internal and external environmental audits to ensure that changes in the interest of continual improvement are being implemented.

The following agenda items will be discussed at these meetings:

- Matters arising from previous management review meetings
- Audit results (16)
  Review to ensure that the EHSMS is implemented and functioning correctly.
- Status of non-conformance, corrective and preventative actions (14)
  Review to be carried out to ensure reports are being implemented and to monitor their effectiveness.
- Evaluation of compliance (13)
- Environmental performance of SANAP (12)
- Emergency preparedness and response (11)
- Operational control procedures (10)
- Pertinent communication and complaints (08)
- Achievement of O&Ts, Action Plans and EMPs (05)
- Legal and other requirements review (04)
  Evaluation of compliance with legal and other requirements.
- Policy review (02)
- Other changing circumstances
- Recommendations for improvement
- Final decisions for implementation

4.2 Review items

A review of the documentation, policies, objectives and procedures defined in the EHSMS will be conducted. Changing circumstances, national and international directives will also be considered. This will identify any need to amend policies, objectives, operating procedures, etc., resulting in ongoing commitment to continual improvement. The documented EHSMS will be reviewed periodically and updated as necessary.

4.3 Review of EHSMS

All reviews will be documented, records maintained and both record of reviews and minutes of meetings will be retained.

5. FREQUENCY

The EHSMS will be reviewed on an annual basis.

6. DOCUMENTATION & RECORDS

17.1 EHSMS Review Schedule
17.2 Minutes of Management Review Meetings

Doc 3.2B

public works

Department:
Public Works:
Republic of South Africa

MARION ISLAND: NEW RESEARCH BASE

MARCH - MAY 2008
CONSTRUCTION & TAKE-OVER
SAFETY PLAN

A.S.E xxl

INDEX

PROJECT DESCRIPTION:

History

The current base station at Marion Island has evolved over a period of 54 years. The buildings were constructed over a long period of time, representing various building technologies that were used at different times of construction. With adverse environmental and climate conditions, several of these buildings have deteriorated to the extent that they now need to be replaced. The life expectancy of some of the structures is uncertain and they may become dangerous to inhabit in the short term.

This prompted the Department of Environmental Affairs and Tourism (DEAT) to initiate a process for the replacement of the present facility with a new and modern research facility. A formal request to proceed with the planning and the construction of the new facility was lodged with the National Department of Public Works (NDPW).

Location

The Prince Edward Islands, consisting of the larger Marion Island and the smaller Prince Edward Island, lies approximately 2,180km southeast of Cape Town, South Africa, 1,770km south-southeast of Port Elizabeth, South Africa and 2,300km north of the Antarctic coastline

The closest landfall is Île aux Cochons (part of the Îles Crozet) about 950km to the east. Marion Island extends from 46°49'30"S to 46°58'30"S and from 37°35'00"E to 37°54'00"E. Prince Edward Island extends from 46°35'50"S to 46°39'55"S and 37°52'50"E to 38°00'45"E. Prince Edward Island is located approximately 19km northeast of Marion Island.

Requirement

The design approach and philosophy of the base were based on the following criteria:

- The new base must be a showcase for South Africa and should reflect South Africa's authority and sovereignty over the islands.

- The focus of the design must be on the scientific functions of the base. The design should reinforce the importance of the base as the centre for scientific research into the environment of the Prince Edward Islands.

- Visitors to the base should feel at home and experience a sense of South Africa, especially in view of the long time periods that the full time research teams will spend on the island. The base should also enable visitors to experience the natural surroundings of the island.
- The base must be a modern and technologically advanced facility that reflects the time of its construction and the technological context of those responsible for its construction.

Structural coverage

The total structural coverage of the new base, including all elements will be 8406m² and 4543m² of this will be buildings that house the functional accommodation requirements. The rest of the area will comprise of covered grid areas.

SAFETY PLAN:

Site description

The construction site, located on Marion Island, is exposed to extreme weather conditions. Ambient temperatures range from below freezing point to approximately 17°C, in which case the latter is seldom experienced during the construction phase. Constant rain, snow, hail, fog and catabatic winds (135 km/h gusts) are experienced. On numerous occasions the entire construction is covered with snow to a depth of approximately 300mm.

The soil consists of a wet marshy, peat like substance, situated on a bed of volcanic rock, which in turn makes it difficult to walk on. In order to overcome most of the sinking experience, when operating on the mires, timber walkways are laid across the ground surface.

SAFETY PROCEDURES:

Cape Town: *(Customs House storage depot)*

The services executed in this storage facility are the receiving and dispatching of construction materials and equipment. During the events of loading and offloading equipment and materials from the transport vehicles, the following protective equipment shall be utilised and safety procedures adhered to.

Fork lifting equipment and machinery

- ✓ The forklift operator shall be in possession of a valid operators permit.
- ✓ In order to operate the fork lift, the operator shall be fitted out with a hardhat, overalls, gloves and safety shoes.
- ✓ Pre-inspections shall be carried out prior to the operating of the fork lifting equipment. A logbook shall be kept in this regard.
- ✓ The operator will apply all the safety procedures applicable to the operation of the fork lifting equipment.

Marion Island:

Sailing vessel (SA Agulhas)

Construction personnel are not required to render any services on this vessel and therefore will be subjected to the ship's safety plan.

Inflatable landing crafts

In the event that construction personnel are transported via inflatable landing crafts, personnel will be clothed warmly and issued with the specified lifejackets. Personnel will be subjected to the maritime safety procedures. The Captain of the vessel will be responsible for the safety of all construction personnel onboard any sailing vessel.

Aircraft operations

Construction personnel (passengers) involved with flight operations will be briefed by the aircraft service provider, regarding standard safety procedures and emergency escapes. It will be the responsibility of the Captain/Group Leader) of the aircraft to ensure that all construction personnel are conversed with flight operations. Life jackets shall be issued to all passengers prior to boarding the aircrafts. Construction personnel will utilise the aircraft safety belts and ear muffs during flight.

Offloading: Onboard the ship

Construction personnel are not required to assist with on- or offloading operations onboard the ship.

Offloading: Aircraft

Prior to any aircraft operations, the aircraft service provider will provide a safety briefing in this regard. Any construction personnel involved with aircraft offloading operations will be briefed and guided by a NDPW group leader. The following safety procedures will apply:

- ✓ Construction personnel will be provided with highly visible protective clothing, hard hats, gloves, safety boots, ear muffs and eye protection (ski goggles).
- ✓ Construction personnel indicating to the aircraft by means of hand signals will utilise a luminous glove, visible to the pilots.
- ✓ Construction personnel must be aware and stay clear of the overhead loads (construction material) conveyed by the aircraft at all times.
- ✓ Static discharge sticks (SDS) will be provided to the construction personnel involved with the offloading operations. The purpose of the SDS is to eliminate the static on the loads, generated by the aircraft, prior to touching it.
- ✓ Construction personnel must be made aware of the down drafts generated by the aircraft, during the offloading operations and therefore stay clear of cliffs, rocky outcrops and hazardous objects, such as piles and construction material.

Radio communications

During the entire construction phase, on site, VHF communication will be utilised. All construction group leaders and key personnel will be issued with portable two-way radios. The site office will monitor all VHF communications by means of a base station. Channel one (152.325 MHz) will be the main VHF communication channel. Other channels will also be utilised as required. In the event of an emergency on site, channel one will be utilised for communication purposes. Construction personnel performing duties away from the main construction site, in the vicinity of the science huts will utilise the available HF (2006 KHz) communication system.

Diesel bunkering site

Operations required at the diesel bunkering site entail the insertion of piles and the construction of the support structures. The installation of the bulk fuel tanks and the piping works will follow. Equipment required to render services at this site, will be a pile driving machine, electrical powered hand tools, electrical extension leads, portable floodlights, inverter welding machines, gas cutting equipment (oxygen and acetylene), step ladders, scaffold boards and basic hand tools. The following safety equipment shall be utilised:

- ✓ Protective cold weather clothing, hard hats, safety boots, gloves, ear muffs and protective eyewear.
- ✓ All electrical power tools must be double insulated and protected by earth leakage units, in order to prevent electric shocks.
- ✓ Construction personnel must limit the exposure of power tools to wet weather conditions.
- ✓ During the offloading of construction material by aircraft, construction personnel must apply the safety procedures as depicted above in the *Offloading: Aircraft* section.

Roadway

Operations required on the roadway site entail the insertion of piles and the construction of the support structures. The installation of heavy duty steel grids will follow. Equipment required to render services on this site, will be a pile driving machine, electrical powered hand tools, electrical extension leads, portable floodlights, inverter welding machines, gas cutting equipment (oxygen and acetylene), step ladders, scaffold boards and basic hand tools. The following safety equipment shall be utilised:

- ✓ Protective cold weather clothing, hard hats, safety boots, gloves, ear muffs and protective eyewear.
- ✓ All electrical power tools must be double insulated and protected by earth leakage units, in order to prevent electric shocks.
- ✓ Construction personnel must limit the exposure of power tools to wet weather conditions.
- ✓ During the offloading of construction material by aircraft, construction personnel must apply the safety procedures as depicted above in the *Offloading: Aircraft* section.

Walkways

Operations required on the walkways entail the insertion of piles and the construction of the support structures. The installation of light duty steel grids (catwalks) will follow. Equipment required to render services at this site, will be a pile driving machine, electrical powered hand tools, electrical extension leads, portable flood lights, inverter welding machines, gas cutting equipment (oxygen and acetylene), step ladders, scaffold boards and basic hand tools. The following safety equipment shall be utilised:

- ✓ Protective cold weather clothing, hard hats, safety boots, gloves, ear muffs and protective eyewear.
- ✓ All electrical power tools must be double insulated and protected by earth leakage units.

- ✓ Construction personnel must limit the exposure of power tools to wet weather conditions, in order to prevent electric shocks.
- ✓ During the offloading of construction materials by aircraft, construction personnel must apply the safety procedures as depicted above in the *Offloading: Aircraft* section.

Main base: Technical Block and landing pad

Operations required at the technical block entail the insertion of piles and the construction of support structures. The installation of floor panels and heavy duty steel grids will follow. Equipment required to render services at this site, will be a pile driving machine, electrical powered hand tools, electrical extension leads, portable flood lights, inverter welding machines, gas cutting equipment (oxygen and acetylene), step ladders, scaffolding, -boards and basic hand tools. The following safety equipment shall be utilised:

- ✓ Protective cold weather clothing, hard hats, safety boots, gloves, ear muffs, safety harnesses and protective eyewear.
- ✓ All electrical power tools must be double insulated and protected by earth leakage units.
- ✓ Construction personnel must limit the exposure of power tools to wet weather conditions, in order to prevent electric shocks.
- ✓ During the offloading of construction material by aircraft, construction personnel must apply the safety procedures as depicted above in the *Offloading: Aircraft* section.

Living Quarters

Operations required at the living quarter site entail the insertion of piles and the construction of support structures. The installation of floor panels and heavy duty steel grids will follow. Equipment required to render services at this site, will be a pile driving machine, electrical powered hand tools, electrical extension leads, portable flood lights, inverter welding machines, gas cutting equipment (oxygen and acetylene), step ladders,

scaffolding, -boards and basic hand tools. The following safety equipment shall be utilised:

- ✓ Protective cold weather clothing, hard hats, safety boots, gloves, ear muffs, safety harnesses and protective eyewear.
- ✓ All electrical power tools must be double insulated and protected by earth leakage units.
- ✓ Construction personnel must limit the exposure of power tools to wet weather conditions, in order to prevent electric shocks.
- ✓ During the offloading of construction materials by aircraft, construction personnel must apply the safety procedures as depicted above in the *Offloading: Aircraft* section.

Central Hub

Operations required at the central hub site entail the provision of holes in the lower wooden helipad, the insertion of piles and the construction of support structures. The installation of floor panels and light duty steel grids will follow. Equipment required to render services at this site, will be a pile driving machine, electrical powered hand tools, electrical extension leads, portable flood lights, inverter welding machines, gas cutting equipment (oxygen and acetylene), step ladders, scaffolding, -boards and basic hand tools. The following safety equipment shall be utilised:

- ✓ Protective cold weather clothing, hard hats, safety boots, gloves, ear muffs, safety harnesses and protective eyewear.
- ✓ All electrical power tools must be double insulated and protected by earth leakage units.
- ✓ Construction personnel must limit the exposure of power tools to wet weather conditions, in order to prevent electric shocks.
- ✓ During the offloading of construction materials by aircraft, construction personnel must apply the safety procedures as depicted above in the *Offloading: Aircraft* section.

Sleeping Quarters

Operations required at the sleeping quarter site entail the insertion of piles and the construction of the support structures. The installation of floor panels and light duty steel grids will follow. Equipment required to render services at this site, will be a pile driving machine, electrical powered hand tools, electrical extension leads, portable flood lights, inverter welding machines, gas cutting equipment (oxygen and acetylene), step ladders, scaffolding, -boards and basic hand tools. The following safety equipment shall be utilised:

- ✓ Protective cold weather clothing, hard hats, safety boots, gloves, ear muffs, safety harnesses and protective eyewear.
- ✓ All electrical power tools must be double insulated and protected by earth leakage units.
- ✓ Construction personnel must limit the exposure of power tools to wet weather conditions, in order to prevent electric shocks.
- ✓ During the offloading of construction material by aircraft, construction personnel must apply safety procedures as depicted above in the *Offloading: Aircraft* section.

Recreation Centre

Operations required at the living centre site entail the insertion of piles and the construction of support structures. The installation of floor panels and heavy light steel grids will follow. Equipment required to render services at this site, will be a pile driving machine, electrical powered hand tools, electrical extension leads, portable flood lights, inverter welding machines, gas cutting equipment (oxygen and acetylene), step ladders, scaffolding, -boards and basic hand tools. The following safety equipment shall be utilised:

- ✓ Protective cold weather clothing, hard hats, safety boots, gloves, ear muffs, safety harnesses and protective eyewear.

- ✓ All electrical power tools must be double insulated and protected by earth leakage units.
- ✓ Construction personnel must limit the exposure of power tools to wet weather conditions, in order to prevent electric shocks.
- ✓ During the offloading of construction material by aircraft, construction personnel must apply the safety procedures as depicted above in the *Offloading: Aircraft* section.

Science Centre

Operations required at the science centre site entail the insertion of piles and the construction of support structures. The installation of floor panels and light duty steel grids will follow. Equipment required to render services at this site, will be a pile driving machine, electrical powered hand tools, electrical extension leads, portable flood lights, inverter welding machines, gas cutting equipment (oxygen and acetylene), step ladders, scaffolding, -boards and basic hand tools. The following safety equipment shall be utilised:

- ✓ Protective cold weather clothing, hard hats, safety boots, gloves, ear muffs, safety harnesses and protective eyewear.
- ✓ All electrical power tools must be double insulated and protected by earth leakage units.
- ✓ Construction personnel must limit the exposure of power tools to wet weather conditions, in order to prevent electric shocks.
- ✓ During the offloading of construction material by aircraft, construction personnel must apply safety procedures as depicted above in the *Offloading: Aircraft* section.

Hanger Site

Operations required at the hanger site entail the insertion of piles and the construction of support structures. The installation of steel floor panels, heavy duty steel grids, timber flooring, glazing and roofing will follow. The installation of the hanger doors is also required. Equipment required to render services at this site, will be a pile driving machine, electrical powered hand tools, electrical extension leads, portable flood lights, inverter welding machines, gas cutting equipment (oxygen and acetylene), step ladders, scaffolding, -boards and basic hand tools. The following safety equipment shall be utilised:

- ✓ Protective cold weather clothing, hard hats, safety boots, gloves, ear muffs, safety harnesses and protective eyewear.
- ✓ All electrical power tools must be double insulated and protected by earth leakage units.
- ✓ Construction personnel must limit the exposure of power tools to wet weather conditions, in order to prevent electric shocks.
- ✓ During the offloading of construction material by aircraft, construction personnel must apply the safety procedures as depicted above in the *Offloading: Aircraft* section.

COLD WEATHER CONSTRUCTION:

Safety clothing:

All protective clothing to be worn on the Marion Island construction site shall conform to the *"Environmental Regulations for workplaces 1987"*. All standard and specialised safety and protective equipment are available on site. It will be compulsory for all construction personnel to utilise the safety equipment and to adhere to safety procedures as applied by the managers.

Emergency Lighting:

All construction personnel are requested to provide a hand-held battery operated torch, to be utilised on site, due to the fact that flood lighting at night, is prohibited on the Island, because of bird strikes. Additional torches are available on site. All construction personnel are issued with a chemically operated safety "light stick" (12-hour) and are to be used in a case of an emergency.

MEDICAL ASSISTANCE:

Cape Town

In case of accident at the storage facilities in Cape Town, medical support will be available at the nearest medical institution.

Marion Island on site

In case of accident on site, a **medical orderly (or doctor when available)** will provide medical support throughout the construction and take-over period. A fully equipped medical (trauma centre) and dental facility is available in the old Marion Base complex.

Medical evacuation plan

In event of a medical evacuation from the Island, the following procedures will apply:

- ✓ Should the medical staff, on site require external assistance; an airdrop will be arranged, in order to provide for medical equipment and medicines.
- ✓ In the event of an evacuation, the assistance of the SA Navy will called in, in order to provide a sailing vessel, to transport the patient to the closest SA port.
- ✓ Should the *SA Agulhas* be available, her assistance will be called upon.
- ✓ Any foreign vessel in the vicinity of Marion Island will be contacted via their shipping agents, in order to assist.

EMERGENCY FIRE PLAN:

Old Marion Base Complex

Purpose

- ✓ To manage and contain the fire.
- ✓ The effective evacuation of all construction and take-over personnel from the base.

Procedures

- ✓ All personnel will be familiar with procedures and operation of the local fire fighting equipment.
- ✓ In the event of a fire, the person discovering the fire shall raise an alarm, by means of shouting "fire, fire, fire" and activating the fire alarm system (sirens and bells).
- ✓ If the fire is of manageable size, the person discovering the fire will extinguish it by means of the closest fire extinguisher or fire hydrant.
- ✓ Should the fire be of great magnitude, all doors, vents and windows will be closed, in order to delay the rapid spread of fire.
- ✓ The exiting deputy year team leader will take control of the operation and assume the role of Fire Chief.
- ✓ The medical orderly/doctor at the base will be the Chief Medical Officer and will render medical assistance when required.
- ✓ The exiting year team Radio Technician will assume the role of Chief Communications Officer.
- ✓ All other personnel not involved with fire fighting process will evacuate the base and proceed to the "Brown Store" complex and await further instructions.
- ✓ On conclusion of a fire event, the Fire Chief must submit a full report, regarding the cause of the fire.

Construction site

Purpose

- ✓ To manage and contain the fire.
- ✓ The effective evacuation of all construction personnel from a fire situation.

Procedures

- ✓ All personnel will be familiar with procedures and operation of the local fire fighting equipment on site.
- ✓ In the event of a fire, the person discovering the fire shall raise an alarm, by means of shouting "fire, fire, fire".
- ✓ If the fire is of manageable size, the person discovering the fire will extinguish it by means of the closest fire extinguisher or fire hydrant.
- ✓ The Construction Manager will take control of the operation and assume the role of Fire Chief.
- ✓ The medical orderly/doctor at the base will be the Chief Medical Officer and will render medical assistance when required.
- ✓ The Construction Manager (**Mr. M. Murphy**) will assume the role of Chief Communications Officer.
- ✓ The Building- and Logistical Team Leader will account for all construction personnel on site.
- ✓ All other personnel, not involved with fire fighting process will evacuate the site and proceed to the "Brown Store" complex and await further instructions.
- ✓ On conclusion of a fire event, the Construction Manager must submit a full report, regarding the cause of fire.

EMERGENCY CONSTRUCTION TEAM EVACUATION:

Emergency base

In the event of an emergency evacuation, the "Brown Store" will serve as an emergency base for the construction personnel until such time a ship reaches the island and alternatives can be made.

Natural Disaster

In the event of a volcanic eruption and the base or site should be threatened then the procedure will be to equip the construction personnel with protective safety clothing and emergency food rations. Thereafter they will have to proceed to the most stable location, at the time, on the island and await rescue from external sources. The same procedure will apply as in the medical evacuation plan section.

References:

- **Occupational Health and Safety Act and Regulations**
- **Government Gazette: Republic of South Africa: No. 25207 *vol. 456, 18 July 2003***
- **Marion Island Base: Emergency Plan for Construction- and Year team members**

Construction Safety document compiled and drafted by:

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G.E.G. Louw **Date: 27 October 2008**

Logistic Manager (PM)
Marion Island: New research base project

Annexure 1

Marion Island Base: Emergency Plan for Construction - and take-over members for March - May 2008

(This section compiled by: DEAT)

Introduction

It is important that an evacuation and fire fighting team is identified by the DCO/Marion Team Leader. It is Standard Operation Procedure (SOP) that the Marion Island Team Leader identifies the year team as the fire fighting and/or medical evacuation team before a construction/annual relief voyage in consultation with the DEAT Project Leader/DCO.

The team must consist of the following:

- **Fire fighting - three members**
- **Search and Rescue party – Four members**
- **Medical evacuation – Medical doctor and Medical orderly.**

The procedure in an event of emergency will be discussed during the house meeting therefore preparing everyone for the inevitable should an emergency occur.

A. Fire fighting and escape plan for the old Marion Base complex

1. Primary Goals

- Containment of fire
- Evacuation of personnel if necessary

Containment of fire

- Once a fire is discovered and small enough to contain the person first on the scene should proceed to put the fire out using the nearest available fire extinguisher or fire hose. (See Marion Island Base – Schematic layout for fire hoses and fire extinguishers).
- In cases too large to control, close all doors and windows successfully to slow down the spread of fire.
- Evacuate the area immediately and sound the fire alarms if not already sounded. (Put the following clothing on: Beanie, thermals, tracksuit, gloves, waterproof clothing , thick socks and gumboots)
- Keep low to the ground and leave through the nearest exit! Evacuate the building to the catwalk area next to the flammable store.
- The year team leaders will take "roll call" of the year team members present, the Science Coordinators of all the relief voyage scientists and the Assistant DCO of all support personnel will report to the DEAT DCO/Search and Rescue Co-ordinator.

- The **NDPW logistics manager** will take "roll call" of the construction personnel and report to the Construction Manager who will report to the DEAT DCO/Search and Rescue Co-ordinator.
- The exiting Year Team leader will resume the responsibilities of a Chief Fire Officer and the DEAT DCO will assume the responsibilities of a Search and Rescue co-ordinator. The doctor/medic will decide on a proper location for the medical casualties for treatment and evacuations.

2. Duties of Chief Fire Officer
Evacuation of personnel

- First priority is to determine the exact location of the fire and to organize all available hands to fight the fire. Establish a control area somewhere safe, but from where accurate and constant monitoring of the problem is possible.
- Medical doctor/orderly must immediately ensure that emergency equipment is removed to safe area and prepare for related injuries. The Meteorologist on duty must report to the hospital exit door to help carry emergency equipment.
- Use fire hoses to cool down the structure to prevent spread of fire by radiation.

The following personnel will control the fire hoses:

- a) **Mr. Martin Haupt** fire hose outside on the cat walk, situated in the area between Sea View and the lounge (NDPW)
- b) **Mr. Johnny Heath** – fire hose in the passage next to the internet café (NDPW)
- c) **Mr. Gideon van Zyl** – fire hose inside the passage by Squatters (NDPW)
- d) **Mr. Dieter Braun** – fire hose inside the passage by exit of Sandton (M63)

- If in the early stages of fire it is clear that it cannot be contained, proceed to remove as many personal belongings as possible to safety.
- Protect your airways to the best of your abilities i.e. wrap a wet cloth over the mouth and nose. Smoke can cause serious inhalation burns and poisonous gasses omitted from burning materials are potentially very dangerous.
- Following the instructions of the fire commander and other designated co-coordinators fight fires directly using fire extinguishers and fire hoses.
- If the fire in a particular area cannot be contained the area must be evacuated as soon as possible.
- Due to the construction and the hollow walls the fire can spread in the interstitial spaces. Once the fire is under control, the wall has to be opened to extinguish the smaller fires in the cavities.
- Be aware of possible back drafts and/or flash/roll over.

- If it is clear that the fire can in no way be contained, evacuate the area immediately and report to the fire commander.
- Fire commander is to ensure all members are present and in case anyone is missing, assess the situation and organize search and rescue procedures.

3. **Important points to remember**
   - In case you are overwhelmed by smoke, stay as close to the floor as you can and attempt to evacuate the area immediately.
   - If you catch fire fall down immediately and roll.
   - **DO NOT ATTEMPT TO BE A HERO!!!!! WORK AS A TEAM AND ENSURE NOT ONLY OF YOUR OWN SAFETY, BUT ALSO THOSE OF OTHER BASE PERSONNEL.**

Duties of Search and Rescue Co-ordinator:
(DEAT PROJECT LEADER / DCO)

- The year team, NDPW Logistics manager, Assistant DCO and Science Coordinator will take "roll call" at the general meeting place, in the Brown store. They will report any missing persons to the DEAT Project leader/DCO/ Search and Rescue Co-ordinator who in turn will manage the Search and Rescue team.
- If there are missing persons, a search and rescue attempt, only by instruction from the SAR co-ordinator, shall be launched by the following Search and Rescue teams:

- **a) Mr Shiraan Watson (DEAT)**
- **b) Mr Shadrack Podile (M65)**
- **c) Me Carol Jacobs (DEAT)**
- **d) Mr Charl. van Aardt (M64)**
- **e) Mr G Fortuin (NDPW)**
- **f) Mr Steven Phakula (M64)**

Debriefing after a fire incident

- Full debriefing in order to determine:
  - Reasons for the occurrence of the incident.
  - How similar incidents can be avoided in future.
  - Further course of actions.

B. EVACUATION PROCEDURES IN CASE OF STORM DAMAGE TO BUILDINGS

Primary goals

- Safe evacuation of teams in case of damage to buildings.

Procedures

- First person to discover the damage shall sound the alarm.
- The year team leader will take control.
- Evacuate to a safe area in the Brown store.
- Ensure all members are present and in case anyone is missing organize search and rescue teams to find the missing member(s). *(Refer to Fire control)*
- Medical Orderly/Doctor must prepare for the handling of possible burns and other injuries. *(Refer to Fire control)*
- If possible remove your most important personal belongings to safe areas and evacuate immediately.

Remember your life is more important than your belongings!!!!

Conclusion

1. Determine if all personnel are present and if anybody is injured, there after determine the extent of the damage.
2. Alert the local authorities as soon as possible.
3. Organize clean-up operation
4. Full debrief to determine further course of action until help arrives.

C. SEARCH AND RESCUE PROCEDURES

Primary goals

1. The quickest possible location of a live but immobilized patient, or location of lost person.

NB!!! It must be recognized that a small search group will probably not find a patient, who is unable to attract attention, in poor conditions. Hence the rescue efforts must concentrate on getting parties as quickly as possible along the most likely routes, and these parties should be attempting to attract the attention of the injured or lost person. The initial aim is not to search the whole route.

2. The quickest possible provision of medical treatment to the injured person.
3. The safe return of the rescue group. All rescue efforts must take place in such a way as to keep risks of further injury minimal.

Rescue procedures

(a) Preparations:

- Rescue parties must be organized as quickly as possible. Each group must include a person who is familiar with the area. People who do not know the area must join a group of people who are familiar with the

area. This person will act as leader of the respective search party and will be responsible for communication with the main base and other search parties and also coordinate the effort of the specific group. (See Search and Rescue protocol for fire)

- In order to minimize the risk to rescuing parties:
- Each party must consist of at least two people, preferably three people.
- Groups must consist of people who are matched in terms of pace. This is particularly the case when some members of a group are unfamiliar with the area
- At all costs, someone else getting left behind and lost must be avoided.
- Each person within the rescuing party must be equipped to spend a night out without being added to the casualty list, i.e. full waterproofs, polar fleece, a couple of bars of chocolate, black sleeping bag outer and a sleeping bag.
- Each party must be equipped with means to communicate with other search parties and base, i.e. a handheld radio, pencil flares and whistles. Members of each search party must be in constant contact with the coordinating base and each other (preferably visual contact, but in bad weather by sound will be acceptable).
- Search party members must recognize that a search is likely to last for protracted period of time; therefore it is essential that everyone eats before leaving or takes food with them. Rescuers must ensure that they are not added to the casualty list or slow down the rescue because they are exhausted due to not eating.
- Summary of what must be carried by each group:
  - **Handheld radio**
  - **Pencil flares**
  - **At least one sleeping bag**
  - **Basic first aid kit**
  - **Map and compass**

- Summary of what must be carried by each rescue party member:
  - **Full waterproofs**
  - **Good torch and spare batteries (preferably a spare torch)**
  - **Polar fleece**
  - **Black sleeping bag outer**
  - **Whistle**
  - **Two bars of chocolate**
  - **Sleeping bag is useful if search is a long way from base**

(a) *Rescue Procedures:*

- From the time the rescue commences the base radio room must be manned continuously until the missing person has been found and brought to safety or the mission are officially called of HF frequencies and VHF channels will be confirmed before departure.

- Rescue parties must follow most likely routes as quickly as possible, attempting to attract attention of the injured/lost person. The initial idea is not to search the whole area.
- The medic must be in a position that whichever party is a quick as possible. However, it is more important to find the person as quickly as possible and therefore if the medic can accompany a searching party without slowing it down, he/she should accompany centrally located party. If the medic is likely to slow a search party down, then they must be teamed up with someone who knows the area, and they must follow as quickly as possible. A central route should be followed.
- As soon as the injured person(s) are located the main base and other search parties must be notified. In case the medic is not present he/she must be notified of the location of the patient immediately.
- <u>Important points to remember:</u>
    - Contact with base and other rescue parties should be maintained as regularly as possible, especially the party containing the medic. However, parties moving quickly must not waste time attempting to get communications: it does not matter if a search continues for slightly longer than absolutely necessary. However, it is priority for the team containing the medic to be in very frequent radio contact with the base and other parties.
    - Flares should be used only on finding a patient and to call the medic if no other means is possible. In addition, flares should not be used if a person is found who does not require medical attention. The medic must assume (subject to direct contradiction by other means) that medical treatment is required at the site where a flare is seen, and must proceed there as quickly as possible even if no other communications occurs.
    - Whistles and light provide the best way of maintaining contact within search groups, and of attracting the attention of the injured person. Search parties must whistle regularly, followed by a few seconds of complete silence. It is no use making a noise all the time, which is likely to drown out any response. In addition, it is worth stopping every few minutes to listen.

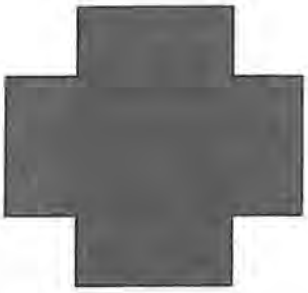
- <u>Rescues where the injured party is not found quickly:</u>

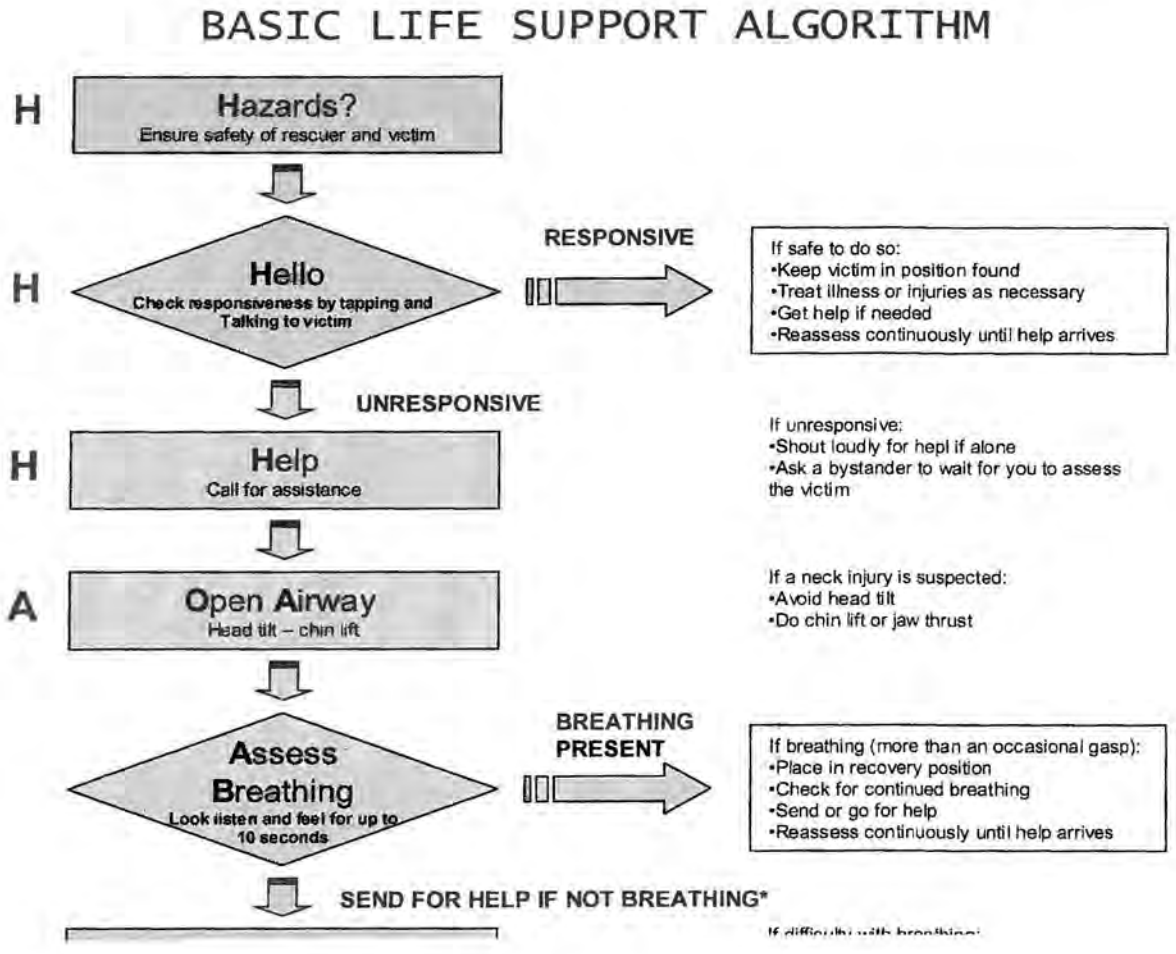
    - It is inefficient and dangerous for searches to continue indefinitely in bad weather or dark when someone is not found in the first four or five hours, and once the likely routes and areas have been covered.

- Rests must be taken and hot food eaten, as soon as rescuers are stumbling around due to tiredness, they are likely to become victims themselves.
- Depending on the condition of the rescuers a decision should be made as to whether it would be better and safer to continue the search in daylight.
- Arrangements should be made to get hot food and drink to rescue parties as they come in. This is particularly important when searches last for longer than a day.

D) **Medical evacuation – The Doctor and Medical orderly**

During an evacuation the fire alarm will sound. The Meteorologist/s on duty has/have to report to the Hospital outside door immediately to help the medical staff to evacuate the medical stock and spine board to the evacuation site. Here the doctor and medic will decide where to put up the medical station for treatment of injured people.





- Assume a cervical spine injury with any unconscious patient or patient that has sustained an injury above the collar bone.
- If the patient is able to communicate verbally the airway is likely to be patent.

2. B. Breathing and bleeding.
   - Airway patency alone does not insure adequate ventilation
   - Ventilation requires adequate function of the lungs, chest wall and diaphragm.
   - Put your ear to the patient nose and mouth and listen for airflow whilst observing the cheat for movement.
   - Rapid, external blood loss is managed by direct manual pressure to the area.
   - Tourniquets should not be used as it promotes tissue damage and impairs blood flow to extremities.
   - Only use a tourniquet in the event of a complete amputation. Do not leave on for longer than 20 minutes.

3. C. Circulation.
   - Apply two fingers over carotid area and feel for pulse for at least 5 seconds.
   - Remember that cardiac massage should only be initiated if patient is found to be pulseless.

4. D. Disability.
   - A rapid evaluation of the patient's level of consciousness should be done.
   - The AVPU method can be used:
     - A Alert
     - V Responds to voice
     - P Responds to pain.
     - U Unresponsive

5. E. Environment/Exposure.
   - Always keep patient warm.
   - Take care that methods used to warm patient does not compromise the airway or breathing

6. Continue basic life support until help arrives. It can only be stopped before advanced support arrives if you are too tired to continue, if there is no positive response despite your effort or if patient recovers.

7. When patient is stable (awake, breathing and has a pulse) examine the patient for any wounds or fractures without moving the patient. Wounds can be dressed and fractures splinted. If any fracture is present with additional dislocation, splint in position found.

8. Do not give water to any injured patient.

Conclusion

- ***At the end of the search it must be ensured that all searchers have returned to base.***
- ***Full debrief to determine:***
    - ***Reasons for the occurrence of the incident.***
    - ***How similar incidents can be avoided in future***
    - ***Suggestions for refinement of search and rescue procedures.***
    - ***A DETAILED REPORT SHALL BE SUBMITTED TO THE RELEVANT DEPARTMENTS REGARDING ANY EMERGENCY OPERATION.***

Document distributed to:

1. NDPW: Construction Manager
2. DEAT: Project Leader
3. DEAT: DCO
4. M64: Year Team Leader
5. M65: Year Team Leader
6. Document posted to main entrance, at Seaview and Sandton entrances.

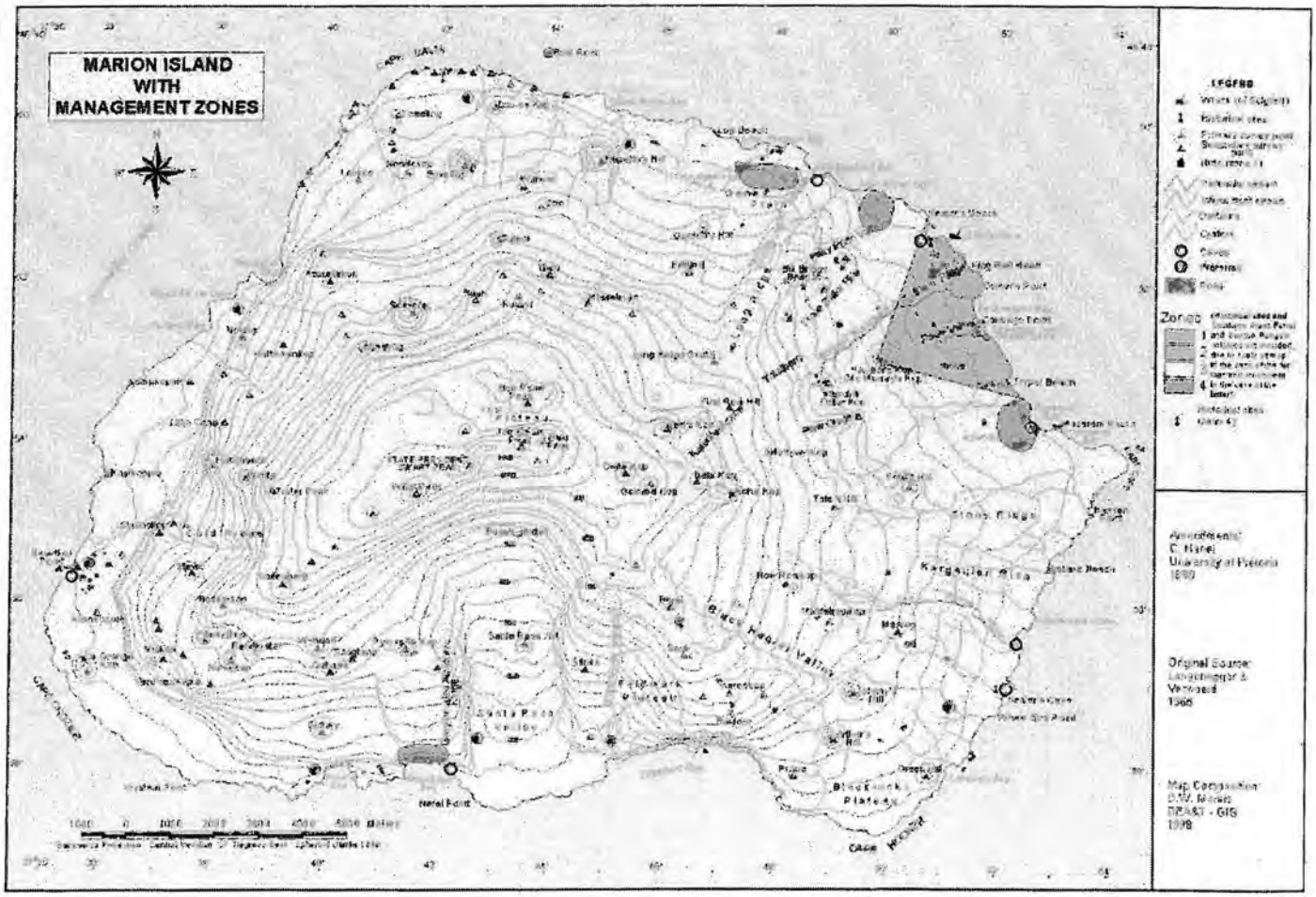
Doc 3.2 Bw

environment & tourism

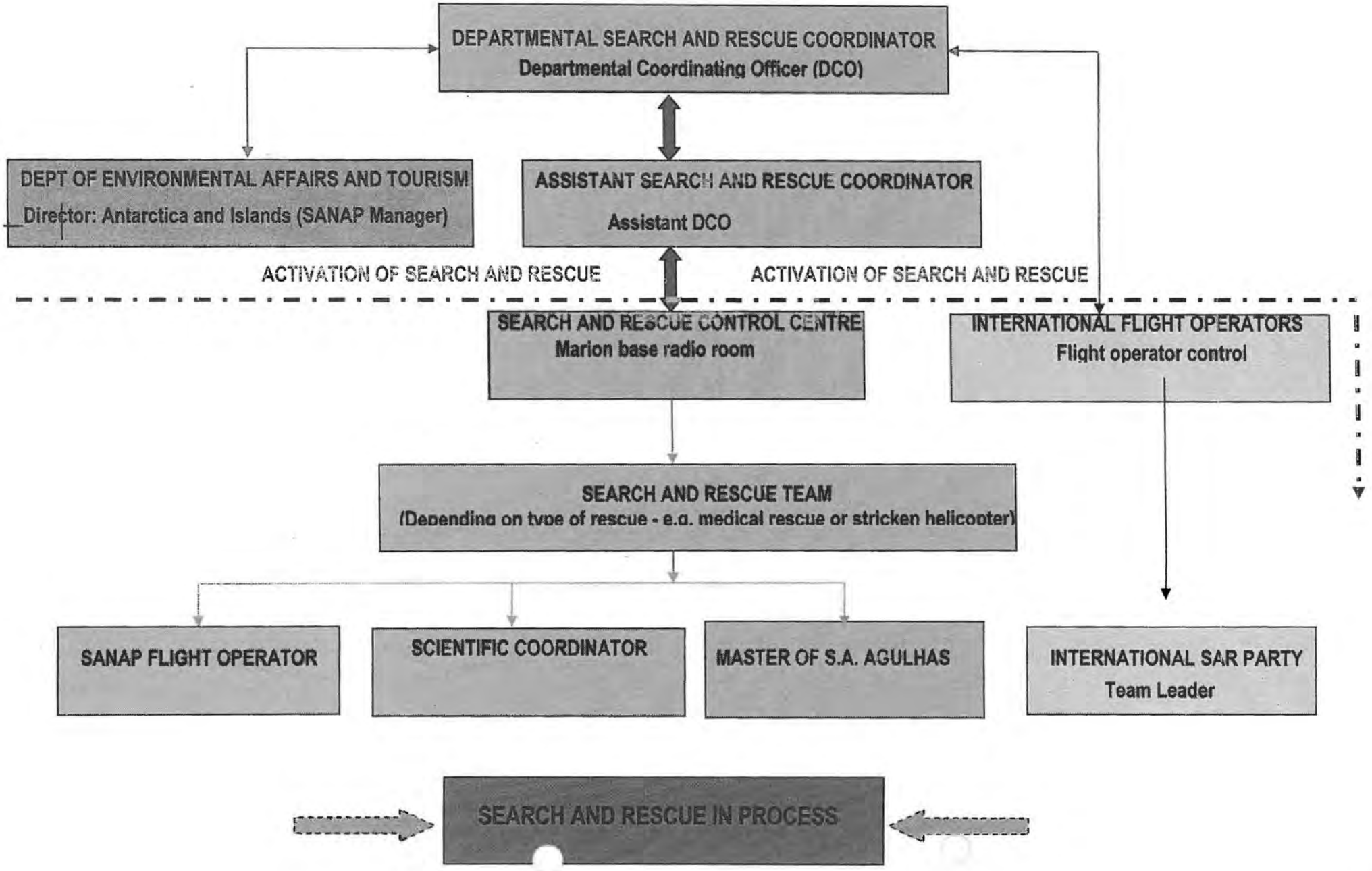
Department:
Environmental Affairs and Tourism
REPUBLIC OF SOUTH AFRICA

MARION ISLAND

SEARCH AND RESCUE (SAR) AND COMMUNICATIONS PROCEDURES



SEARCH AND RESCUE PLANNING ORGANOGRAM



INDEX

1. FIELD PARTIES

Any group away from the Marion base for a day trip or hut trip, will be regarded as a field party. All **day trips** must be indicated on the day trip log sheet outside the radio room before leaving base and all **hut trips** on the overnight hut booking board in the radio room, and must be approved by the Group/Team Leader. *Please refer to the "Marion Island Field Visits - Safety Procedures" (Appendix 1) for further information.*

2. SAR FOR FIELD PARTIES

It is of utmost importance that all field parties report to the radio room daily. The radio room at Marion must monitor field operations at all times and should an incident occur, the SAR Coordinator should be informed immediately so that a search and rescue can then be activated.

Scheduled radio communication times (scheds) on 2006 MHz

- **18:45**
- **08:00**

When reporting to the radio room, the following information must be given to the communications officer on duty:

- Confirm that operations are normal ("ops normal")
- Intentions for that day, if calling in at 08:00
- Intentions for the following day, if calling in at 18:45
- Operating areas
- Proposed route to be tracked if moving between areas
- Any other information which could prove useful

Once the communications officer has confirmed that all field parties have reported that operations are normal, only then can field parties sign off.

3. SAR CATEGORIES FOR FIELD PARTIES

Category Green

- This is when all field parties report that **operations are normal**.
- Should a field party not call in at 18:45, the radio room will remain on standby until 20:00 before activating *Category Yellow*.
- All field parties should be requested to standby until 20:00 for possible assistance, until such time as communications have been established with the missing party or informed to stand down by the communications officer.
- The radio room will monitor HF and VHF.

Category Yellow

- This category is **activated at 20:00, if no contact has been established** with a field party.

- If still no contact has been established after the 08:00 sched the next morning, the field team/s closest to the missing party will be requested by the SAR Coordinator to go to investigate at the last known position of the missing party.
- The search party must call the radio room with updated information hourly or when new information is available.
- The SAR Coordinator will place the Air Support Group on standby, where this is possible.
- Emergency teams will be assembled and remain on standby.

Category Red

- This category is **activated at 12:00 the next day** (after Category Yellow). (i.e. 16 hours after missing field party has failed to acknowledge operational status).
- SAR operation will be activated.
- SAR teams of three personnel each, with one knowledgeable field guide and one medic/first aid trained person, should be sent out where no air operations are available.
- SAR teams should be prepared to have to stabilize the casualty in the field, to record the casualty's position accurately, and to be able to travel to a hut for communications with the radio room.
- SAR teams should understand fully the difficulty of stretcher operations over even relatively easy terrain and the likelihood that inexperienced stretcher carriage of the casualty may be more endangering than stabilization *in situ*.

4. HELICOPTER OPERATIONS

Once a helicopter is airborne, communication between the helicopter and the SA Agulhas or Marion base must be maintained. During all flying operations the dedicated and alternative frequencies, as set out in item 11, must be manned and kept free from general use.

- Operations normal calls must be reported every 15 minutes after departure.
- Safe calls must be made on arrival at destination.
- The communications officer must record all operations normal and safe calls.
- When any helicopter is airborne, the second helicopter must be on standby for search and rescue.

5. SAR FOR HELICOPTERS

HF/VHF communication must be established to determine:

- Weather conditions in the area
- Change in tasking
- Advice on estimated time of departure (ETD) and arrival (ETA)
- Operation status

Due to frequent weather changes and icing conditions in the area of operations, it is essential to do proper SAR planning before each flight:

- The helicopter on standby must only be prepared for SAR once the SAR Coordinator has declared Category Yellow.
- If only one helicopter is serviceable, single helicopter operations may take place.

In the unlikely event that a helicopter should declare an emergency, the radio room must initiate the following procedure:

- Obtain the position (longitude and latitude) of the helicopter.
- Note the type of emergency.
- Immediately inform the Departmental Coordinator, as well as the helicopter Group Leader and Air Support Group, so that the SAR can be initialized.
- Maintain communications with stricken helicopter in order to get more updated information of the situation.
- The Departmental Coordinator will inform the Director: Antarctica and Islands should additional air/ground/communication support be required.
- Intention of the helicopter.

If the standby helicopter is not positioned at the same location/base from where the SAR originated, the following information is to be passed on to the communications officer on Marion:

- Route that will be flown, ETD and ETA, number of crew and passengers and fuel endurance.
- Weather conditions at point of departure and destination.
- Weather at location of standby helicopter to be within limits.
- SAR plan to be discussed.

Towards the end of the season when darkness starts to set in earlier, affecting SAR operations, the following points should be considered:

- No flying will take place after dark.
- Flying time for tasked helicopter to and from destination.
- Time delay before SAR can be activated.
- Flying time to and from search area, time in search area, etc.

6. SAR CATEGORIES FOR HELICOPTERS

Any SAR operation involving a downed helicopter will be activated by the helicopter Group Leader and the SAR Coordinator.

Category Green

- This is when the helicopter commander reports **operations normal** *en route* (every 15 minutes) and safe call on arrival at destination.
- If two consecutive operations normal calls are missed, the communications officer must inform the SAR Coordinator who will activate Category Yellow.
- The second helicopter will be either on the Island or the ship until such time that Category Yellow is declared.

Category Yellow

- This category is **activated when two consecutive operations normal calls have been missed** or it becomes apparent that an **emergency situation** exists with the helicopter.
- If there is still no contact with the missing helicopter after the third missed operations normal call, the standby ground crew will prepare the rescue helicopter and the rescue mission will be planned and finalized between the SAR Coordinator and the helicopter Commander.

Category Red

- This category is **activated an hour after the first missed call** (4 missed operations normal calls) is recorded.
- If it is known that the **helicopter is down.**
- If the helicopter has **exceeded its fuel endurance**.
- If the aircraft is **more than 30 min overdue at destination** (direct leg, no landing in between).

7. COMMUNICATIONS

Communication forms an important and integral part of a relief voyage, as well as operations throughout the overwintering period on Marion Island. HF (high frequency) and VHF (very high frequency) communications are used extensively.

All field parties on day trips and field trips must adhere strictly to the radio procedures and safety regulations when traversing. It is of utmost importance that all field parties report to the communications at the scheduled times. The radio room at Marion base must monitor all field parties at all times and, should an incident occur, a SAR can then be activated.

Field Parties – Hut trips (HF communication):

Field parties should call on 2006 (or 4059) kHz for the first ten minutes of the schedule. Should no communication be established with the base, start from the beginning and try to obtain communication with other field parties in order to relay the required message.

Field Parties – Day trips (VHF communication):

Field parties close to the base can communicate with the radio room and each other on Channel 1 or 4 on the VHF hand-held radios.

Helicopter Operations (VHF communication):

- Supplying weather conditions to the helicopter Commander prior to any flight.
- Maintaining radio contact at all times during flight operations and recording the operations normal call every 15 minutes, as well as position (if provided).
- During inbound flights to field huts, supplying the helicopter Commander with QNH, weather conditions, visibility, contrast, definition, wind direction and speed.

- If the helicopter is outbound from Marion to a controlled airspace destination, for example the SA Agulhas, the helicopter must call that station informing them of the helicopter's movement and intentions, as well as the Marion radio room.
- Inform the Departmental Coordinator of all helicopter progress.
- Log all flight operations.

8. FREQUENCY ALLOCATION CHART

It must be noted that all DEAT, VHF frequencies will operate on VHF radios from channel **1** to channel **8.**

Channel	Frequency	Allocation
1	152.325 kHz	Marion base /SA Agulhas/Field parties
2	TX – 154.250 kHz RX – 147.200 kHz	Currently not in use (repeater station)
3	TX – 154.300 kHz RX – 147.400 kHz	Currently not in use (repeater station)
4	156.450 kHz	Fuel pumping team and field parties close to base
5	156.550 kHz	NDPW team
6	156.800 kHz	Marine channel 16
7	156.650 kHz	Field parties
8	TX – 161.300 kHz RX – 154.350 kHz	Currently not in use (repeater station)

9. GPS POSITIONS (LATITUDES AND LONGITUDES)

GPS Positions for Marion Island:

NO	NAME	LATITUDE	LONGITUDE
	BASE		
1	Marion old base	46° 52.615' S	37° 51.581' E
2	Marion new base		
	HUTS		
3	Kildalkey hut	46° 57.288' S	37° 51.198' E
4	Watertunnel hut	46° 57.726' S	37° 44.924' E
5	Grey-headed hut	46° 57.715' S	37° 42.514' E
6	Rook's hut	46° 58.014' S	37° 39.601' E
7	Swartkops hut	46° 55.464' S	37° 35.735' E
8	Mixed Pickle hut	46° 52.330' S	37° 38.336' E
9	Cape Davis hut	46° 49.700' S	37° 42.517' E
10	Repetto's hut	46° 50.302' S	37° 45.204' E
11	Katedraalkrans hut	46° 53.890' S	37° 36.491' E
12	Old Long Ridge hut site	46° 51.185' S	37° 47.845' E
13	Old Kampkoppie hut site	46° 52.992' S	37° 37.828' E
14	Old Laekop hut site		

	PEAKS		
15	Fred's		
16	Middel Rooi		
17	Karookop		
18	Snok		
19	Junior's Kop		
20	La Grange Kop	46° 56.831' S	37° 35.704' E
21	Kaalkoppie	46° 54.430' S	37° 36.051' E
22	Azorella Kop		
23	Laekop	46° 50.807' S	37° 40.417' E
24	Repetto's Hill	46° 50.553' S	37° 44.765' E
25	Lou se Kop	46° 49.903' S	37° 42.829' E
26	Bomkop	46° 50.598' S	37° 42.323' E
27	Kleinkoppie	46° 56.260' S	37° 35.705' E
28	Ned's Kop	46° 53.874' S	37° 45.990' E
29	First Red	46° 53.622' S	37° 47.099' E
	OTHER		
30	Van den Boogaard Dam		
31	Hydro-shack		
32	Long Ridge		
33	Black Haglet Valley		
34	Skua Ridge		
35	Amphitheatre	46° 55.566' S	37° 35.490' E
36	Swartkops Cave	46° 55.656' S	37° 35.416' E
37	La Grange Kop (nek)	46° 56.772' S	37° 35.914' E
38	Rook's Cave	46° 58.113' S	37° 39.807' E
39	Grey-headed ladder (top)	46° 57.701' S	37° 42.389' E
40	Stony Ridge		
41	Duiker's Point		

environment & tourism

Department:
Environmental Affairs and Tourism
REPUBLIC OF SOUTH AFRICA

MARION ISLAND FIELD VISITS

SAFETY PROCEDURES

REMEMBER TO BE SAFE AND AWARE AT ALL TIMES
AND ENJOY YOUR STAY IN THE FIELD

1. DAY TRIPS:

1.1 Log your trip on the day trip log sheet outside the radio room before leaving base.

1.2 There are foot paths to certain areas on the island, please remain on the foot paths whenever possible. If you plan not to follow the paths, please indicate this to your Group Leader and indicate the direction and route you will be heading.

1.3 Always wear/take along the necessary protective gear - gumboots, wet weather clothing, whistle and a torch. The weather on the island is very unpredictable and it is of utmost importance that you are always prepared for a day out in the field. Please speak to the experienced personnel for more advice in this regard, e.g. hypothermia, due to excessive sweating and chilling if dressed too warmly.

1.4 Collect a hand held radio from the Team Leader or Radio Technician before leaving base to take with you to the field. If there is not a radio available, please make certain that your Group Leader is aware of your route.

1.5 Newcomers to the Island, please ensure that you have an experienced field assistant or team member with you to guide you to your destination and back.

1.6 Upon your return, please complete your day trip log sheet at the radio room.

1.7 If you are going to arrive back at the base after the time indicated on the day trip log, contact the radio room to inform them of your revised arrival time.

2. HUT TRIPS:

2.1 Please ensure that your hut nights are scheduled on the hut board in the radio room.

2.2 Ensure that you have a GPS with charged batteries and the correct coordinates to take to the field.

2.3 Ensure that you have been briefed by the Radio Technician regarding the operation of the radios in the huts.

2.4 Ensure that you have your protective clothing, a sleeping bag, a waterproof sleeping bag cover or emergency blanket, a whistle, a torch and enough food for the trip to the hut.

2.5 Take at least two pencil flares to the field. These can be obtained from the Team Leader.

2.6 Upon arrival at the hut, ensure that the frequency of the radio is set on 2006 - this is the transmission frequency to the base. Place the batteries on charge for at least 30 minutes before and after use, and switch the radio OFF after use.

2.7 Communication with base is at 18:45 every night for the duration of your stay in the field.

2.8 Speak slowly, loudly and clearly. Follow correct radio procedures.

2.9 If you are unable to establish contact with base at 18:45, remain on air until 20:00.

2.10 If you have not established contact by 20:00, then try again at 08:00 the next morning.

2.11 If this still remains unsuccessful, try again at 12:00. If you are not in difficulty please try to make alternative arrangements to let base know this.

2.12 A search party will be sent out to you if no communication has been established by 12:00.

2.13 Always leave a message in the hut book (even if you are only passing by), regarding your well-being and plans for the next day (i.e. route/s to be traversed and an indication of any deviations).

Doc 3.3

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Department:
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REPUBLIC OF SOUTH AFRICA

SANAE IV

GUIDE FOR SCIENCE COORDINATORS (SC) DURING RELIEF VOYAGES

BACKGROUND

Relief voyages to SANAP stations are usually short periods of intense activity. The number of people at the station usually more than doubles for the period, placing great pressure on domestic, laboratory and field facilities, as well as air and dinghy support, etc. Prior to every relief voyage, a Shore- and/or Ship-based Science Coordinator (SC) are appointed by the Department of Environmental Affairs and Tourism (DEAT).

APPOINTMENT

1. During relief periods, there are numerous teams of people and, therefore, also various Group Leaders living and working at or from the station and/or ship (e.g. two over-wintering expedition teams, National Department of Public Works (NDPW) team, Helicopter team, ship's crew etc.). There are also scientific groups from the various SANAP-approved projects, some participants forming part of the over-wintering expedition teams. A division amongst the relief and over-wintering scientists during relief voyages is unsatisfactory, and to provide a better management and reporting structure, all shore- and/or ship-based scientists fall under the respective SC. This system places the scientists on the same cohesive organizational basis as the other groups of people present.

2. However, it should be remembered that, with respect to general domestic responsibilities, scientists who are in the expedition teams remain responsible to their over-wintering expedition Team Leaders, while relief scientists remain responsible to the SC, through their respective Group Leaders.

3. Overall control of relief voyages and the coordination of the logistics and support facilities required by all groups, including scientists (e.g. air support, field equipment, offloading and back-loading etc.), is the responsibility of the Departmental Coordinating Officer (DCO) appointed by DEAT. To assist and advise him/her, all groups have their various Group Leaders, and all scientists are represented by the Shore- and/or Ship-based SC. The SC collates all the support requests for the shore- and/or ship-based scientists, prior to discussion and approval with the DCO.

4. Shore- and/or ship-based scientists collectively require a single channel of communication and a representative spokesperson for all matters related to the conduct of research during relief periods. The Shore- and/or Ship-based SC are appointed to facilitate this.

5. It should be noted that the Shore- and Ship-based SC have equal status, unless otherwise specified in the Sailing Instructions (SI).

RESPONSIBILITIES

1. The SC represents the shore- and/or ship-based scientific groups' interests in all matters bearing on a successful relief period. This includes liaison with the DCO (and other Group Leaders) on off- and back-loading, domestic arrangements, communication with home, discipline, support in the field, use of laboratories, etc.

2. The DCO, other Group Leaders and Shore- and/or Ship-based SC comprise the management team which promotes the harmonious existence of all persons present during the relief period.

3. The SC discusses the approved research plans of the various scientific groups with the DCO, so that he/she is fully informed on what lies ahead, before the ship arrives at the station. When considered desirable, the NDPW and Helicopter Group Leader and the over-wintering expedition Team Leaders should also be invited (by the DCO) to attend such discussions.

4. It is recommended that the SC call together all shore- or ship-based scientists, or at least Group Leaders of the various scientific groups, on one or more occasions during the outward voyage to keep them informed of developments and schedules or have them participate in the above-mentioned discussions.

5. The Shore- and/or Ship-based SC must brief the DCO fully on the research plans and objectives so that he/she will be able to understand the implications of any decisions he/she makes as to the availability of helicopters, changes in the ship's route or schedule or relief programme, etc.

6. The SC must check that all scientists have received their clothing and field equipment from the SANAP Warehouse and have handed in their passports at least 24 hours before sailing or at time stipulated in the SI.

7. The SC should obtain a list of cabin defects, if any, from all scientific groups aboard, as soon as possible after sailing, and submit these to the DCO.

8. If a rapid deployment into the field is expected upon arrival at the station, the SC arranges with the DCO, Store Manager at the SANAP Warehouse and the Master or Chief Officer of the SA Agulhas for the placement of containers on the ship in such a way that they can be easily reached on arrival at the station.

9. If applicable, the SC makes all the necessary arrangements for short research visits to Prince Edward Island, Bouvet Island, etc., in consultation with the DCO. Ensure

that all necessary precautions are taken by all persons involved to adhere to the applicable environmental guidelines and provisions for the conservation and management of the islands to be visited.

10. The SC obtains a list of laboratory defects from the scientific groups for later transmission to DEAT (see Report below). Any ideas/suggestions from scientists relating to the station/ship and/or their environs should be discussed on the spot with the DCO and, if worth pursuing further, should be reported on the SC Report.

11. The SC ensures that all parties adhere to the SANAP Standard Operating Procedures (SOP) for environmental management, waste management, safety, operating the inflatable dinghy, etc., applicable to the station/ship in question.

12. If ship-based scientists wish to go ashore, either to visit or to conduct research, the Ship-based SC will communicate with the DCO, Master and Shore-based SC on the matter. Normally such visitors may spend only the day(s) ashore. If overnight stays are planned, the DCO must advise the Ship-based SC whether and when accommodation is/will be available. Any visits may only be authorized by the DCO. While ashore, ship-based scientists fall under the authority of the Shore-based SC. Those coming ashore are not permitted to wander into the field unless accompanied by someone familiar with local conditions, safe routes, etc. The Shore-based SC must ensure that an experienced guide is assigned for trips into the field. All visitors to a station are ultimately under the command of the DCO.

13. The SC submits a report (see below) to DEAT within four weeks of returning to South Africa.

14. It is the SC's responsibility to ensure that all scientific projects are being completed as soon as possible, and to inform the DCO regarding the progress with all projects.

REPORT

1. A report on the relief period, focusing on the scientific programmes, must be submitted to DEAT within four weeks of returning to South Africa. The report should contain a section on recommended improvements that could be made to the station/ship or its environs and/or any of the available facilities, procedures, etc.

2. If deemed necessary, a separate, confidential report may also be submitted on any matter which has a negative influence on parts of or the whole scientific effort. This report is seen only by DEAT authorities in positions from which the necessary action can be taken.

DISCIPLINARY POWERS

1. Available disciplinary measures are limited. The SC may consider:

   a. recommending to DEAT that the voyage bonus be partially or wholly withheld;

b. withdrawing permission to use facilities, such as the inflatable dinghy, air support, laboratories, etc.;
c. withdrawing permission to visit other islands or field stations; and
d. banishing the person(s) back to the ship, if it is in the vicinity.

2. Disciplinary measures must be applied with great care and discretion. Before implementing or recommending any, the SC should first liaise with the DCO. The entire case history, with separate written and signed submissions from the SC and penalized party, must be properly documented and accompany the SC's confidential report to DEAT.

3. As a last resort, the SC and DCO may recommend, in a confidential letter, signed by both and giving reasons, that a scientist/s be in future refused permission to work at or from the ship/station/s.

AIR AND DINGHY OPERATIONS

1. Operations involving the helicopters and the dinghy are inherently dangerous. The SC must spare no effort to ensure that all scientists making use of either comply fully with the regulations pertaining to their use and exercise the greatest care and responsibility. Accidents simply cannot be afforded.

2. When helicopter support is required, a summary of all groups' requirements will need to be approved and written into the SI. However, DCO, SC and Helicopter Group Leader should discuss and plan the details of all operations beforehand in the light of local circumstances, so that all are absolutely clear on matters such as which scientists will be flying, when and where the sortie/s will take place, the flight route, range/s, altitude, equipment to be installed or transported, and objectives of the flight/s. If necessary, the NDPW Group Leader should be included in these discussions.

3. Prior arrangements as to rendezvous sites and times must be rigidly adhered to, unless there has been an accident, or radio contact is made to confirm alterations to these before take-off. If for some reason a field party is unable to be recovered at the pre-arranged site or time, and radio contact to confirm this cannot be made, a note giving reasons (and, if necessary, requests for new supplies or assistance) must be left for the air crew at the originally agreed rendezvous site, in a visible place. In case of emergency, directions for the air crew to find the field party should also be given in the note.

4. Please see attached Annexure G for the use of the Department of Environmental Affairs and Tourism's (*DEAT*) inflatable dinghy for scientific research and/or logistical/environmental support in the South African National Antarctic programme (*SANAP*).

GENERAL

1. During relief voyages, the SC and his/her groups are expected to cooperate with the DCO regarding off- and back-loading and to assist with these operations, where required. The DCO will control these operations from the shore side and support from all scientific groups is expected. The SC, after consultation with and approval from the DCO, may exempt specific scientists from these duties for *bona fide* medical reasons only. In essence, scientists are considered to be an integral part of the total manpower pool available for off- and back-loading of the ship during relief voyages. The more hands available the sooner it will be completed.

2. All research, and the scientists who conduct it, are an integral and important component of SANAP, as are the SA Agulhas' officers and crew, the over-wintering expedition teams, NDPW and Helicopter teams, etc. In an overall context, all these teams are working towards the same goal, which is the effective implementation of South Africa's Antarctic and sub-Antarctic effort. Therefore, unnecessary and/or counter productive division of manpower and resources must be avoided. The SANAP management team, including the SC, must ensure that full cooperation and assistance is obtained from all groups participating in the voyage.

3. At SANAE IV, the SC's responsibilities will focus on the day-to-day activities and, when they are at base, the earth sciences group/s form part of the scientific groups at SANAE, reporting to the SC. When the earth sciences group operates independently in the field, a separate Field Operations Manager will function on behalf of the earth scientists, and will be directly responsible to the DCO.

4. Suggestions for improving this guide will be appreciated, and should be sent to:

The Director
Department of Environmental Affairs and Tourism
Directorate: Antarctica and Islands
P O Box 52126
V&A WATERFRONT
CAPE TOWN
8002

LABORATORY OCCUPATION

I..... hereby declare that the SANAE / Marion / Gough / Ship

.....laboratory was left in a:

☐ Satisfactory condition

☐ Unsatisfactory condition (see below)

If unsatisfactory, please provide reasons/comments:

_____

_____

_____

_____

_____

_____

_____

.....
SCIENCE COORDINATOR

.....
DATE

.....
GROUP LEADER

.....
DATE

.....
OCCUPANT

.....
DATE

environment & tourism

Department:
Environmental Affairs and Tourism
REPUBLIC OF SOUTH AFRICA

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Directorate: Antarctica and Islands
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E-mail : Adreyer@deat.gov.za

ORGANISATION OF OPERATIONS AND CONDUCT OF PARTICIPANTS IN THE SOUTH AFRICAN NATIONAL ANTARCTIC PROGRAMME *(SANAP)*

1. This document outlines formal policy on organisation of operations and conducts of participants in the SANAP voyages, whether these participants are on board the *S.A. Agulhas* or any other vessel on a SANAP operation and at bases, and is issued in the interest and well being of all.

2. A Departmental Coordinating Officer *(DCO)*, nominated by the Department of Environmental Affairs and Tourism *(DEAT)* will assume overall responsibility for co-ordinating the voyage activities, personnel and discipline onboard the vessel and at the base stations. Whilst the Master of the vessel is responsible for the safety and well being of the vessel and all persons aboard in terms of the S.A. Merchant Shipping Act, the DCO will be responsible for ensuring that the voyage instructions are carried out efficiently and effectively. He/She will achieve this by regular discussions with the recognised Group Leader of each group e.g. the Helicopter Company, NDPW, Scientists, Master, Expedition Leaders, etc. These Group Leaders shall be nominated by their own organisations before the vessel's departure and the DCO will keep the Master fully informed of the day's plans and arrangements where the vessel is involved.

3. Each Group Leader will be responsible for the well-being and conduct of his/her team. Any problems, complaints, reports of misbehaviour, etc. aboard the vessel or at the base stations/field camps are to be dealt with by the relevant Group Leaders, through or in consultation with the DCO. In the case of persons aboard the vessel, they are NOT to approach the Master directly regarding such matters and *vice versa.* Nothing less than normal, civilised, home standards of self-discipline and respect for others will be expected throughout the period of absence from South Africa. The Master is responsible for the conduct of the vessel's officers and crew.

4. Any disciplinary matters, which cannot be satisfactorily resolved through these channels, may be directed in writing to the DCO with copies to the relevant Group Leader(s) and his/her/(their) organisation(s). The latter and

DEAT together will decide on whether, and if so, what subsequent action should be taken. Neither DEAT nor these organisations will tolerate any form of misbehaviour or irresponsibility which might bring them or the SANAP into disrepute, or which might jeopardize the safe and successful completion of each individual's work programme, especially that emanating from over-indulgence in the consumption of alcohol and/or negligence.

5. Attention is also drawn to the vessel's standing orders, especially those concerning safety, dress and the cleanliness of cabins.

6. The DCO will normally reside at the base station during relief voyages, but may move between the station and the vessel and/or field camps as necessary. He/She will always maintain communication with the other operational centres and in his/her absence will appoint his/her assistant and/or one of the on-site Group Leaders to supervise operations at the other centre(s). **The DCO's decisions will be final** and will be taken after consultation with as many of the Group Leaders as possible or necessary under the circumstances. The DCO and Group Leaders will undertake detailed planning of operations during the voyage to the base station. Whenever the DCO remains ashore while the vessel proceeds on its voyage schedule from the base, he/she will ensure that his/her assistant is specified to co-ordinate activities in his/her absence.

7. The success of a relief/research/construction voyage depends on the development and maintenance of a congenial and harmonious working atmosphere aboard the vessel and at the base stations/field camps. This requires a spirit of co-operation and reasonableness from each individual at all times. It is hoped that these guidelines will engender such a spirit.

8. DEAT and the other organisations sharing in the overall management of the SANAP will not hesitate to stop or prevent the recurrence of unacceptable practices/behaviour by/from individuals or groups.

9. It is expected of all persons to assist with any particular duty, which may become necessary in the interests of the safety and well-being of all concerned during the voyage or at the base stations/field camps. Such duties may include skiving, ice look-outs, snow/ice clearance from the decks, cargo work, radio work etc. These requirements will be clearly defined by the DCO who will be responsible for the appropriate allocation of work.

10. On behalf of the Minister of Environmental Affairs and Tourism we trust that you will enjoy participating in the Antarctic Programme.

H R Valentine
Director: ANTARCTICA AND ISLANDS
For DIRECTOR-GENERAL

Doc 3.3B

environment & tourism

Department:
Environmental Affairs and Tourism
REPUBLIC OF SOUTH AFRICA

SANAP VOYAGE PARTICIPANTS

GEAR CHECKS

Dear SANAP Voyage Participant

One of the most serious threats to the conservation of our sub-Antarctic islands and Antarctica is the introduction of alien plants and invertebrates. Alien species are often able to out-compete local, more vulnerable species, rapidly invading and seriously altering natural communities. The harmful effects of cats and rodents on the naturally-occurring birds on oceanic islands are well-known, but deleterious effects have been shown from the introductions of alien plants and invertebrates as well. Introduced diseases could also be potentially disastrous for the islands' wildlife, particularly seabirds and seals.

SANAP is trying its best to avoid introducing new species to the Antarctic and sub-Antarctic, but for this to be successful a determined and continued effort is required by all involved. YOU can help to protect our islands and Antarctica by doing the following when packing your personal effects for SANAP voyages:

GEAR (Footwear & Clothing):

- Please carefully check all footwear (inside, soles, laces) and remove any encrusted dirt or mud and any plant material, especially seeds, which you may find. Try to avoid packing or taking footwear which has Velcro strapping. Please check and thoroughly clean both your field and indoor footwear.
- In the same way, check the hems, pockets and Velcro strips of all clothing that you intend to take ashore, including socks, gloves and jerseys, for seeds and other plant material, and remove anything found using tweezers or forceps. Preferably do not take clothing with Velcro (unless unused). All clothing should be washed before packing, and the piece of luggage properly sealed once it is full.

GEAR (Luggage):

- Also, carefully check all your luggage containers, e.g. "trommels", personal kitbags, suitcases, backpacks, day packs, camera and video bags or any other bags or containers, which you plan to take ashore, for seeds, other plant material and invertebrates (organic matter). Be especially careful when checking between seams, in "hidden" pockets, underneath stiffeners and liners and all Velcro material.

- It is advisable to spray luggage containers with a domestic pyrethrin-based insecticide before packing – preferably the night before so that they can air. Moth balls can be placed in luggage containers, however, they have a strong odour.

GEAR (Equipment & Other):

- Ensure that all equipment you are taking ashore is free of invertebrates, e.g. spiders have been known to live inside desk-top computer cases and in lab equipment. Also check any items such as camera tripods, surveying poles, walking sticks, hiking ("trek") poles, etc. for adhering soil and mud and ensure these are properly cleaned.
- Other: Check books, video cassettes, etc. for fish-moths, cockroaches or any other invertebrates.

PACKING & PACKAGING:

- It is necessary to pack indoors during the day, and preferably off the floor (e.g. on a low table or bed) to avoid any invertebrates getting into your belongings. However, if you have to pack at night, it is essential that you pack in a closed room (with all windows and doors shut) to avoid contamination. Avoid packing directly under strong lights, as flying invertebrates (such as moths) are attracted to these areas.
- Do not take any loose polystyrene packaging material ("beads" and "chips" are specifically banned, as they can easily "escape" into the environment), cardboard or unnecessary plastic wrapping to the island. Cockroaches favour corrugated cardboard boxes, and may lay their eggs between the cardboard layers. Use reusable plastic "tote" bins for gear and reusable plastic bubble-wrap to protect fragile items. Remove as much packaging as possible from your belongings, as this minimises waste carried to the island (which then needs to be returned to South Africa).

FOOD:

- No fresh produce of any description, including fruit, vegetables and meat (even though they are available on the ship) may be taken ashore to the islands.
- If you are packing any personal food items, such as energy bars containing seeds, ensure that they are well-sealed, cannot germinate and do not carry live organisms (e.g. moulds, fungi, weevils, worms, etc.).

PERSONAL PACKAGES:

- If you are an overwintering expedition member and are expecting personal packages from colleagues, friends or relatives to be sent to the island after you have arrived there, then you have an important responsibility to inform them carefully to follow these guidelines. In these ways you will be contributing to keeping the islands as pristine as possible.

"BOOT-WASHING CEREMONY":

- On the southbound voyage, all who are going ashore (including ship-based personnel making day visits only) must take part in a compulsory "Boot-washing Ceremony", where a register will be signed.
- Your gear (footwear, outer clothing, bags, etc.) will then be checked by the Environmental Control Officer/Conservation Officer and you will be required to scrub the soles of all your footwear (not only your field boots) in a disinfectant solution, such as bleach or Virkon S, to prevent the transmission of fungi and diseases to the islands.

BIODEGRADABLE/ENVIRONMENTALLY FRIENDLY PRODUCTS:

- There is a wide variety of biodegradable/environmentally friendly products available. Where possible, try and buy these rather than conventional products when choosing your toiletries, etc.

MANY THANKS FOR YOUR CO-OPERATION
WE HOPE YOU ENJOY YOUR VISIT

SANAP Management
August 2008 (Version 3)