

REPUBLIC OF MAURITIUS

Ministry of Agriculture, Food Technology & Natural Resources

*Development of a Management Plan for the Conservation and Management of
Offshore Islets for the Republic of Mauritius*

Management Plan for Serpent Island

Foreword

This report represents a conservation management plan for the Northern Islet, Serpent Island. Serpent Island is designated as a Nature Reserve under the Forests and Reserves Act 1983. It has been proposed by the Islets Task Force that Serpent Island be included in the Islets National Park. The Islets National Park Strategic Plan proposes that the islet has a Closed Reserve status.

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The present document is the result of extensive consultations and visits to the various islets by a consultant team from the Belgium firm AGRER, which visited Mauritius from November 2003 through February 2004 and conducted a series of workshops, which considered the various aspects of the Strategic Plan for the 16 Islets that comprise the Islets National Park.

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**For the National Parks And Conservation Service,
Ministry of Agriculture,
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Executive Summary

Serpent Island is 19ha and the most northerly of the northern group of islets. It is 2.5km north of Round Island.

Serpent is a volcanic cone, which reaches 162 m in elevation and has mostly steep sides. It is largely covered by bare rock, used by the seabirds for nesting.

Compared with the other Northern Islets, Serpent has a very different seabird fauna, including; the sooty tern, the masked booby, the brown noddy, lesser noddy and the red tailed tropicbird. Total seabird numbers are approximately 250 – 350,000.

There are populations of Bojer's skink, as well as reports of large centipedes, unidentified large "tarantula" spiders and the Serpent Island Night Gecko; the last two of these species may be confined only to Serpent Island.

The islet is one of the few "untouched" islets and has immense value as an area to protect a unique blend of species. It has no other value other than conservation.

Due to the fishing pressures in the region, it is proposed that seabird numbers should be monitored every 3 years.

It is proposed that a 1km Marine Buffer Zone should be set up around the islet, to minimize disturbance and aid enforcement authorities. This could be extended to encompass Round Island in the future.

Access to the islet should be totally restricted by the statutory agency excepting expeditions which will have considerable scientific value and long-term conservation management applications.

When technological developments have improved it is proposed that a solar powered web-cam unit be set up on the islet, this would have three benefits:

- Provide a remote monitoring system for the seabirds.
- Provide a remote system for enforcing the 1km Marine Buffer Zone.
- Provide a direct link to the educational centre in the Islets National Park, which is planned for Ile d'Ambre, in which a description of the unique system on the islet can be enhanced by live views of Serpent Island.

1. General Description

1.1 Introduction & General Information

1.1.1 Location

Lying 2.5 km north of Round Island, Serpent Island is the most northerly of the group of islets. It covers 19 ha. Whereas the neighboring Round Island has been intensely studied, Serpent Island is less well documented. It is very difficult to land and is inhospitable

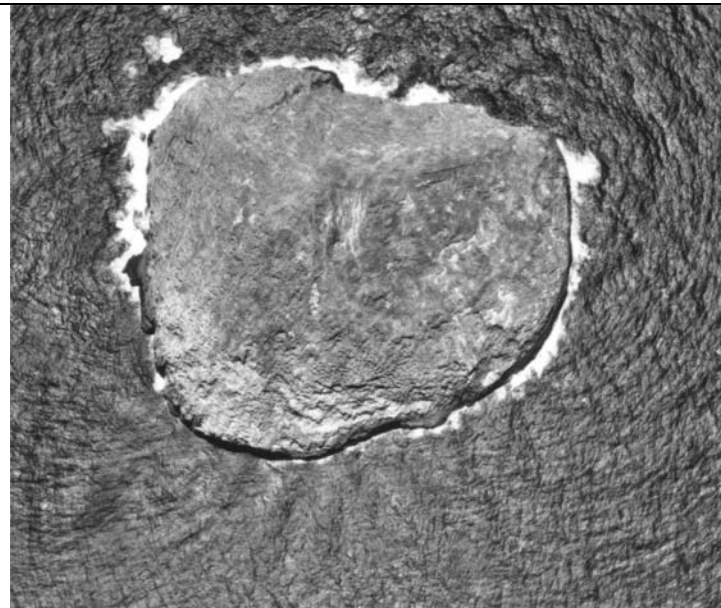
1.1.2 Map Coverage

The islet has been mapped and can be found on the 1: 100,000 Series Y682 (DOS 529) edition 5-OS 1994, and 1:25,000 Series Y881 (DOS 329) SHEET 14 edition 6-OS 1991.

1.2 Environmental Information

Serpent is a volcanic cone on the same submarine platform as the mainland Mauritius. It is roughly circular with a domed shape (Fig. 1.) It reaches 162 m in elevation and has mostly steep sides.

Fig. 1. Aerial photograph of Serpent Island.



The ecology of Serpent Island is unique. It is best known for its large colony of nesting seabirds: it has the highest density of seabirds in the Mascarenes. The seabird species include the sooty tern (*Sterna fuscata*), the masked booby (*Sula dactylatra*), the brown noddy (*Anous stolidus*) and lesser noddy (*Anous tenuirostris*) plus the red tailed tropicbird (*Phaethon rubricauda*). Although the red tailed tropicbird was recorded by Vinson (1950), Newton (1960) and Temple (1976), a visit by MWF in 2003 did not observe this species. In addition, data from MWF, suggest the presence of a small number of wedge-tailed shearwaters (*Puffinus pacificus*) (Table 1.).

Compared to the other Northern Islets, Serpent Island has a very different seabird fauna (Table 1). This is primarily due to the available areas of bare rock for nesting and maybe also partly associated with the lack of terrestrial mammal predators. This unique seabird component is one of the prime reasons for the high conservation value of the islet.

Table 1. Seabird species found on the Northern islands and the estimated number of breeding pairs (MWF, 2003 and 2004).

SPECIES		Round Island	Flat Island	Gabriel Island	Gunner's Quoin	Serpent Island	Pigeon Rock
Latin name	Common name						
<i>Pterodroma arminjoniana</i>	R.I. Petrels	150-200					
& <i>P. neglecta</i>							
<i>Bulweria bulweria</i>	Bulwers Petrels	>2					
<i>Puffinus pacificus</i>	Wedge-tailed Shearwater	40000-80000	10-20	250-400	3000-5000	5-10	3000-5000
<i>Phaeton rubricauda</i>	Red-tailed tropic bird	1000-2000	15-30		200-300		200-300
<i>Phaeton lepturus</i>	White-tailed tropic bird	+750-1500	5-10	15-30	50-100		50-100
<i>Sula dactylatra</i>	Masked (Blue footed) Booby					40-60	
<i>Sterna fuscata</i>	Sooty Tern					200000-300000	
<i>Anous stolidus</i>	Brown Noddy					20000-30000*	
<i>Anous tenuirostris</i>	Lesser Noddy					20000-30000	

* 2003 estimate from MWF of 40,000

Recent work on the Masked Booby, has suggested that the Serpent Island individuals are genetically unique compared to the closest related colony at Cosmoledo Atoll, suggesting that gene flow is restricted between these populations in the Western Indian Ocean (reported in MWF, 2004). This means that the Serpent Island population has specific conservation importance due to the population's unique genepool compared to other populations.

In addition to the considerable concentration of seabirds, Serpent Island also supports a reptile fauna. The Serpent Island night gecko *Nactus serpensinsula* was reported by Vinson in 1953, collected by Barnwell & Booker, 1948 and reported in Loveridge (1951); this species being found only on Serpent Island. In 1952, Vinson reports capturing this same species on Round Island, however, the taxonomists have subsequently proposed that it is a different subspecies from that which presently exists on Round Island and named it *Nactus serpensinsula serpensinsula*, as opposed to the *N. s. durrelli* of Round Island (Arnold & Jones, 1994). Recent estimates of densities found encounter rates for the Serpent Island *Nactus* of 11 geckos per hour of searching, compared to the *Nactus* on Round Island (*N. serpensinsula durrelli*) of 17.5 per hour.

Safford looked for the night gecko but did find it on his visit to the islet in 1992. He did find the ubiquitous Bojer's skink (*Scelotes bojeri* now renamed *Gongylomorphus bojeri*) which is found on all the northern islets (Table 2). Furthermore, Safford also reported large centipedes (Myriapoda) and a single large "tarantula" spider.

Table 2. Reptile species found on the northern islets. Ex = Extinct; E = Endemic; / = not recorded; + = present.

SPECIES		Round Island	Flat Island	Gabriel Island	Gunner's Quoin	Pigeon Rock	Serpent Island
Latin name	Common name						
<i>Leiolopisma telfairii</i>	Telfair's skink	+E	Ex	/	Ex	/	/
<i>Gongylomorphus bojerii</i>	Bojer's skink	+	+	+	+	+	+
<i>Gongylomorphus</i> sp.	Orange-tailed skink	/	+E	/	/	/	/
<i>Cryptoblepharus boutonii</i>	Bouton's skink	+	+	+	+	/	/
<i>Phelsuma ornata</i>	Ornate day gecko	+	+	+	+	/	/
<i>Phelsuma guentheri</i>	Gunther's gecko	+E	/	/	/	/	/
<i>Nactus serpensinsula durrelli</i>	Durrell's night gecko	+E	/	/	/	/	/
<i>Nactus serpensinsula serpensinsula</i>	Serpent I. night gecko	/	/	/	/	/	+E
<i>Nactus coindemirensis</i>	Lesser night gecko	/	/	/	+	+	/
<i>Casarea dussumieri</i>	Keel-scaled Boa	+E	Ex	/	Ex	/	/
<i>Bolyeria multocarinata</i>	Burrowing Boa	/ E (Ex?)	Ex	/	Ex	/	/

The islet also has an invertebrate fauna, with insects, a spider and centipedes. The insect fauna includes the native cockroach, houseflies, beetles, moths, caterpillars, earwigs and two species of ant. One ant species was small red/brown and is morphologically similar to an ant species found on other islets, however, the taxonomy and distribution of the black ant is less clear. It is not known whether these species are restricted to this island, or are introduced through various expeditions or fishermen.

There are a number of small species of spider on the islet, however of more apparent interest is an undescribed tarantula species. Two individuals were recently observed during the MWF 2003 expedition. The faeces from one of the specimens contained feather barbs, suggesting that the spiders are consuming bird chicks. The taxonomic status of the spider is presently unknown; however, the Natural History Museum (UK) presently has specimens for description.

The islet also has the centipedes *Cryptops decoratus* and *Scolopendra abnormis*. These species hide under rocks or dead seabirds during the day and then commence foraging as night falls. The densities are high; the 2003 MWF expedition reported a density of 9 per m², which is reported to mean that the islet has a total population of nearly 3 million.

The seabird colonies nesting sites dominate the land cover; there is little vegetation cover other than occasional tussocks of grass (*Brachiaria repens*), a ground creeping Portulacaceae (*Portulaca oleracea*) and an unknown grass species that was recorded by Safford (1992) but not observed by the recent MWF expedition. An experienced botanist has as yet to visit the islet. The 2003 MWF expedition also found a single individual of the first reported exotic plant species (*Amaranthus dubius*); this individual was destroyed. The source of this introduction is unclear, but probably related to islet visitors, as the seed is not a wind dispersed.

2 Evaluation and Impact Assessment

The main features of relevance to conservation are shown below:

<i>Character</i>	<i>Comments</i>
<i>Size</i>	The 19ha of Serpent Island, means that it is relatively small, however, it supports high population densities of a number of species.
<i>Biodiversity</i>	The floral biodiversity is very low. There is a range of faunal species, which appear to have sustainable populations.
<i>Naturalness</i>	Serpent Island has been rarely visited and is probably a pristine environment with no direct anthropogenic impacts. However, it is possible that lowering of fish stocks through fishing could impact upon the seabird community indirectly.
<i>Rarity</i>	The islet is unique. It contains two Mauritius endemic species, one of which maintains a subspecies endemic to Serpent Island itself (the Serpent Island Night gecko); furthermore it probably contains another endemic subspecies ("tarantula" spider).
<i>Fragility</i>	The islet ecosystem is well adjusted to its precarious position and as such natural influences are unlikely to impact heavily upon the consistent species. However, the system is based on the ongoing requirement for fish for the seabirds, which can be impacted by human activities.
<i>Potential Value</i>	The islet has immense value as an area to protect a unique blend of species. It has no other value other than conservation.
<i>Public use</i>	The islet is remote, very difficult to access and unpleasant (noise and smell of guano) to visitors. It presently does not have any public use, or could possibly be deemed to have in the future. Disturbance of the system should be minimised and this should be strictly enforced.

3 Management Strategies

The Islet National Park Strategic Plan proposes a “Closed Reserve” status for the islet due to its unique fauna.

The importance of the islet lies in a number of features:

- ☐ It is the largest islet which appears to have been unimpacted directly by human activities;
- ☐ Evidence suggests that it has never experience any major exotic species invasion;
- ☐ It has a large and different seabird community compared to the other Northern Islets;
- ☐ There is evidence that it has two taxa (Serpent Island Night Gecko and an unidentified “tarantula” spider) whose global distribution might be limited to Serpent Island.

The management strategy must take these factors into account.

The primary objective must be the protection of this unique biological resource. It is recommended that no intervention management takes place on the islet. The islet has previously not been significantly impacted by humans, and this status should be maintained. However, in light of the possible impact of fishing activities on seabird numbers, it is proposed that monitoring takes place of the seabird numbers every 3 years. This should be through landing on the islet and visual survey. Disturbance is inevitable due to landing on the islet, besides the pure disturbance factor, it appears to be likely, due to the terrain, that chicks will be displaced from their nests and eggs broken during this survey.

It is not recommended that ringing studies take place. This is for two reasons:

- ☐ Greater disturbance and impact upon the islet of further research activities.
- ☐ Unclear value of further studies.

Although Serpent Island is a unique system, any potential for future conservation management of the islet remains obscure. The system is adapted to its precarious position, and to periodic cyclones and any present intervention management techniques are unlikely to improve the functional state of the islet, especially as indirect effects would be unclear. Clearly, the uniqueness of the islet makes it an interesting site for scientific research, e.g. specific species studies, nutrient dynamics etc. However, in light that at present this would be “knowledge for knowledge’s sake” and have no clear applied value, and also would have a negative impact upon the islet community, proposed research programmes should be critically reviewed in relation to this context.

In light of the recent MWF expedition (Nov. 2003), and survey of the Serpent Island night gecko it is possible that a collection of individuals is made and a captive breeding population maintained elsewhere. This could act as an insurance policy against loss of the subspecies (i.e. global extinction) on Serpent Island, as well as having an educative value. Whether this is feasible remains to be seen given the unusual habitat in which these species have evolved.

It is proposed that presently a 1km Marine Buffer Zone be set up around the islet. Any unauthorised access into this Buffer zone would be prohibited. This would be to keep recreational and tourist boats from disturbing the bird colonies, as well as facilitating enforcement by the Coastguard. However, it might be more prudent, in terms of enforcement to designate a Marine Buffer Zone encompassing both Serpent Island and Round Island. This should be considered in the Management Plan for Round Island, carried out as part of the Islets National Park planning process.

It is proposed that in a few years, when technological developments have improved and satellite access is cheaper, that a solar powered web-cam unit be set up on the islet, which is linked to the internet. This approach has been successfully used in islet seabird communities in the Scotland, U.K. e.g. Bass Rock, Firth of Forth, UK (<http://www.outercam.co.uk/html/webcam.html>).

Some consideration would have to be made of the prevention of the build up of guano on the solar panels.

This would have three benefits:

- Provide a remote monitoring system for the seabirds.
- Provide a remote system for enforcing the 1km Marine Buffer Zone.
- Provide a direct link to other educational centres in the Islets National Park (e.g. Ile d'Ambre, Ile aux Aigrettes), or elsewhere, in which a description of the unique system on the islet can be enhanced by live views of Serpent Island.

Given the unavoidable disturbance of the nesting seabird populations, any access to the island for conservation reasons by any group should be closely considered by the statutory agency (NPCS, as identified in the Islets Task Force), prior to mounting an expedition. Access to the islet should only be granted for expeditions, which will have both considerable scientific value and long-term conservation management applications.

List of Organizations Consulted

1st, 2nd and 3rd Workshop delegates.

WORKSHOP ON DEVELOPMENT OF A STRATEGY & MANAGEMENT PLAN FOR THE CONSERVATION & MANAGEMENT OF OFFSHORE ISLETS FOR THE REPUBLIC OF MAURITIUS

Hilton Mauritius Resort, Flic en Flac, Thursday 19th February 2004

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