The conservation of Silhouette Island, Seychelles

II. Animals

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Abstract: Silhouette is the third largest of the granitic islands of Seychelles and, as such, supports a wide variety of localised plants and animals. The extensive ecological damage by forest clearance that occurred historically on other Seychelles islands has been prevented by the steepness of the terrain on Silhouette. Recent studies of the island's habitats have confirmed its great conservation value. The status of the species of animals recorded on the island are discussed below and specific conservation problems are described.

Introduction

The Seychelles group of islands is situated in the western Indian Ocean, some 800km east of the African coast. They support a wide range of habitat types which have been isolated since the break-up of Gondwanaland. With a surface area of approximately 1600 hectares Silhouette is the third largest of the granitic islands. It is approximately 19km north-west of the largest island, Mahé (see Map 1), is the second highest in the group (maximum height 740m above sea level) and consequently is one of only two islands to support high altitude forests including extensive areas of primary montane forest. It is the least developed of the larger islands and has a population of fewer than 200 people in two small coastal settlements.

The island has important populations of rare animals. The flora includes several species that are now rare on other islands in Seychelles and a number of species are confined to Silhouette only, including a forest dominated by the endemic tree *Pisonia sechellarum* which was discovered in 1987 (Friedmann 1987). Low altitude forests were almost all cleared in the 1930s but the forests above 400m remain intact, as a consequence the best remaining areas of montane forest in Seychelles are found on Silhouette.

The establishment of the Silhouette Marine National Park in 1987 gave legal protection to the marine environment to a distance of 1km from shore, an area of 2,000 hectares. The effectiveness of the park in protecting the off-shore zone has not been documented, though anecdotal reports indicate that the reefs around Silhouette have been extensively damaged as a result of coral heads being tangled in fishing and mooring lines. The

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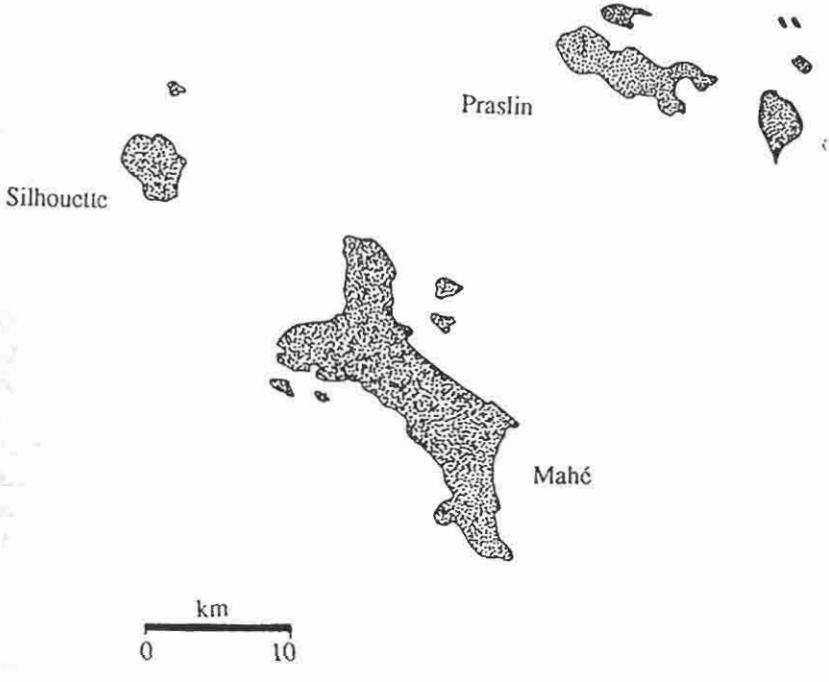
terrestrial environment is not officially protected although the island is managed in a non-intensive manner reflecting the current management's (Island Development Company) interest in preserving the existing ecosystems of Silhouette.

In 1990 the ecology of the *Pisonia sechellarum* forest on Silhouette was studied by the Oxford University Silhouette Expedition. This provided the first quantitative account of the ecology of the island. Observations made in 1991 and the findings of the expedition are combined in the following account of the status of the fauna of Silhouette.



Map 1. Silhouette; areas mentioned in the text and location within Seychelles

Invertebrate fauna

In common with the other islands of Seychelles very little is known of the invertebrates of Silhouette. Most of the terrestrial species recorded occur predominantly in the leaf litter, such as the two species of leech endemic to Silhouette (*Idiobdella seychellensis* and *I. daubani*). The limited information on the terrestrial invertebrates is summarised in table 1.

Table 1. Invertebrates recorded on Silhouette

Group	Number of species	% of Seychelles endemics	% endemic to Silhouette
Nemertines	1	100	0
Leeches	2	66	100
Molluscs	33	66	24
Schizomids	1	?	0
Spiders	31	?	?
Opilionids	2	?	0
Pseudoscorpions	2	?	0
Scorpions	1	100	100
Isopods	2	?	0
Millipedes	6	?	?
Centipedes	6	?	?
Insects	?	?	?

Molluscs

The only invertebrate group for which accurate species lists exist are the terrestrial molluscs. Silhouette supports a greater number of species than any other island in Seychelles. Most indigenous species occur and are secure and only one, *Edentulina moreleti*, has not been recorded since 1972. Surveys of the mollusc fauna are continuing and it is hoped that *E. moreleti* can be relocated, if so it is essential that no live specimens are collected (this is also true for *Gulella* sp., *Imperturbatia praetumida*, *Priodiscus serratus*, *P. spinosus* and *Pilula mahesiana*, all of which are very uncommon or localised). The Seychelles endemic freshwater snail *Paludomus ajanensis* is very common and widespread on Silhouette whilst it is restricted and very rare on Mahé (Brown & Gerlach 1991).

Arthropods

The small endemic scorpion, *Lychas braueri*, is known only from Silhouette where two specimens have been found (one in 1908 and another in 1990). It is almost certainly naturally rare and is best protected by conservation of the natural forest habitats. Other very rare arthropods include an undescribed species of centipede (*Scutigera* sp.) which is known from very few specimens (3 were found in 1990). The pill millipede *Sphaerotherium forcipatum*, though rarely collected is not uncommon in the montane forest. Although it was first recorded on Marianne in 1892 (where it is probably extinct) and also occurs on Mahé (one specimen recorded by the author in 1991), Silhouette is the only island where it is not extremely rare, and can thus be considered the stronghold of the species.

The insect fauna contains many uncommon species. In general these are all best protected by forest conservation. Several taxa have rarely been recorded and probably occur

in very low numbers, although apparent rarity reflects a lack of collection in most cases. Of the rare endemic species the stick insect endemic to Silhouette, *Carausius scotti*, depends upon the birds nest fern, *Asplenium nidus*, for its food. As this is notably abundant on Silhouette the species is not in danger despite being believed to be extinct until 1990 (Matyot 1990a&b). All insect groups require further research in all areas of the island. Studies on the introduced species, particularly the ants *Anoplolepis longipes* and *Technomyrmex albipes* (although this may possibly be an indigenous species), would be of interest as these may influence the abundance and distribution of indigenous taxa. The seed eating Platypodid beetles should also be studied to determine their effects on the vegetation dynamics of the island. Particular attention should be paid to possible predators of exotic plants (especially of *Clidemia hirta*), and also to predators of the rarer endemics.

Freshwater and littoral crustacea do not appear to be at risk, all recorded species still persist. The only species that could be threatened by human exploitation, the freshwater crayfish *Macrobranchium lar* is still common in some freshwater pools. The carapaces of marine crustacea are very common at Grande Barbe and Silhouette residents confirm the persistence of large numbers of edible marine crustacea around Silhouette. This is virtually unique in Seychelles, where stocks of such species have been seriously depleted.

Vertebrate fauna

Most of the species of vertebrate recorded in Seychelles occur on Silhouette; the numbers of species of amphibians and reptiles are summarised in table 2.

Table 2. Number of species of amphibians and reptiles recorded on Silhouette

		Seychelles total	Silhouette
Amphibians			
caecilians (all endemic)		7	5
frogs -	endemic	3	3
	introduced	1	1
Reptiles			
chameleon (endemic)		1	1
snakes -	endemic	2	2
	introduced	1	0
skinks (all endemic)		4	3
geckoes -	endemic	4-5*	4
	introduced	2	1
terrapins (indigenous)		2-3	1?
marine turtles		2	2
tortoises (endemic)		1 (extinct)	1 (extinct)

* The taxonomy of the *Phelsuma* geckoes is confused

Amphibians

The amphibian fauna of Silhouette is of particular importance. The island supports 9 of the 11 species found in Seychelles (Nussbaum 1984). Of these 8 are endemic to the

group. Only Mahé has more species (10). 4 caecilian species are recorded from Silhouette. They are rarely seen and little is known of their status.

Reptiles

Of the 17 terrestrial and freshwater reptiles of Seychelles 15 have been found on Silhouette. Little is known of their status, although most species appear to be abundant. The bronze house gecko, *Ailuronyx sechellensis*, was believed to have become extinct on the island until it was relocated in 1990, 4 individuals were found suggesting that it is not as rare as was believed. Research into the effect of rats on this species should be carried out as rats are generally believed to be the main cause of its rarity on many islands (Cheke 1984). Its coexistence with rats on Silhouette may cast some doubt on this idea, suggesting that more subtle habitat factors may be more relevant. With the current absence of any concrete evidence identifying rats as predators of reptiles in Seychelles it is not appropriate to place excessive stress on this threat.

An unidentified terrapin, *Pelusios* sp., has been recorded on Silhouette (Bour 1984). The distribution and identity of the Silhouette terrapins need to be determined and an assessment of numbers made. As the three species recorded from Seychelles are very rare on all the islands, and declining as the marshy habitat they require is drained, their conservation on Silhouette is of great importance. Rehabilitation of the marsh at Mare aux Cochons would help to improve their prospects.

Of the marine turtles the hawksbill, *Eretmochelys imbricata*, still nests on the beaches. Little is known of the numbers using Silhouette as a nesting ground and nothing is known of the hatching success. It is probable that considerable human disturbance of suitable nesting areas makes Silhouette a poor site for this species; it has been estimated that only 25 females use Silhouette for nesting beaches each year (Frazier 1984, Mortimer 1984). The green turtle *Caretta caretta* was recorded nesting on the island at the beginning of the century but has not done so for many years (Frazier 1984). The Seychelles giant tortoise *Geochelone arnoldi* used to occur on Silhouette (recorded in 1771 and 1787) until it was exterminated there in the 1800s (Bour 1984). A captive group of four adult Aldabra giant tortoises *Geochelone gigantea*, is held at La Passe.

Fish

Two species of indigenous freshwater fish are found in Seychelles; the rough-backed kill-fish, *Pachyplanchax playfairi*, and the eel *Anguilla bicolor*. Both occur on Silhouette but have probably declined with the loss of the fresh-water marshes. *P. playfairi* still occurs in the drainage ditches at Mare aux Cochons. In the mangroves there are a large number of juvenile marine fish and mudskippers, *Periophthalmus* spp. The nursery these habitats provide for marine fish makes them extremely important economically as well as ecologically. It is important that the relatively good condition of Silhouette's mangroves is maintained.

Mammals

The Seychelles sheath-tailed bat (*Coleura seychellensis silhouettae*) was recorded on Silhouette in 1915 and the 1980s (Nicoll & Suttie 1982). Recent sightings have not been confirmed. The roosts of the species on Praslin and La Digue are in caves. Suitable areas for the presence of roost caves occur around Mt. Dauban, Mt. Pot a Eau and at Gratte Fesse. The

latter area was explored by the Oxford University Silhouette Expedition 1990 and although it seemed possible that suitable sites might exist in the granite massif no traces of a bat population were found. Observations around the rocks were made at dusk in addition to searching for easily accessible caves, neither method provided any sightings. It seems that this species is very rare on Silhouette, as it is on the other islands. One possible cause of a decline may have been the drainage of the marsh at Mare aux Cochons. A fast flying bat with relatively little manouverability would seem more adapted to hawking for insects over open areas of mountain marsh or mangrove than feeding within structurally complex woodland.

Seychelles fruit bats (*Pteropus s. seychellensis*) are distinctive on Silhouette for their frequently diurnal habits. On other islands they are almost entirely nocturnal whereas on Silhouette fruit bats can frequently be seen flying and feeding throughout the day and night. It is probable that this is due to a general lack of disturbance. The low human population causes little disturbance to the forest habitats where the bats are most frequent and although bats are frequently shot with catapults for food the scale of hunting is certainly far less than on Mahé. A survey of the numbers of fruit bats on Silhouette would be of interest as it appears that population density, and possibly total population size, is far higher on Silhouette than elsewhere in Seychelles.

Introduced black rats (*Rattus rattus*) are very common all over Silhouette. They appear to feed primarily on jack fruit (*Artocarpus heterophyllus*) and there is no evidence of them attacking other fruit or seedlings on Silhouette, thorough studies are required to validate these observations. Small numbers of the snail *Stylodonta unidentata* are eaten by rats, other animals are also probably only rarely attacked (this is deduced from the rarity of snail predation - such predation is typically extremely high where rats occur in any numbers; personal observation). Studies of diet and abundance are a priority. Rats are generally held to be responsible for the declines in a great variety of animal and plant populations, despite this the data for such a role are usually very poor. Cats (*Felis cattus*) do occur both around settlements and in the forest and it is not know what proportion of these are feral. Cats are known to hunt rats at night at Jardin Marron and have been observed in the forest by day, although only rarely. Tenrecs (*Tenrec ecaudatus*) are absent from the island. These introduced predators of invertebrates and small vertebrates are found on Mahé and Praslin, their effects on the native fauna are not known.

Birds

The avifauna of Silhouette is relatively low in species diversity. None of the endangered birds of Seychelles are definitely known to occur on the island. Despite this the bird life is of interest, due primarily to the abundance of indigenous species; of the land birds Seychelles kestrels (*Falco araea*), bulbuls (*Hypsipetes crassirostris*), sunbirds (*Nectarinia dussumieri*) and blue pigeons (*Alectroenas pulcherrima*) are abundant. White-tailed tropic birds (*Phaethon lepturus*) are the most numerous sea-bird. The tropic bird population is clearly the highest found on any of the larger islands of the group and Silhouette's breeding population may rival the well known population on Aride. Other sea-birds are uncommon, fairy terns (*Gygnis alba*) breed in low numbers and most of the other terns regularly occurring or breeding in Seychelles occur as non-breeding visitors to the island.

Of the rarer land bird species green parakeets (*Psittacula eupatria wardii*) formerly occurred on Silhouette until their extinction in the late 1880s. The introduced grey- headed

lovebird (*Agapornis cana*) is also extinct. Other species have not been definitely recorded by ornithologists but reports of scops owl (*Otus insularis*) and a species of white-eye (*Zosterops* sp.) seem reliable. The owl is reputed to have been heard frequently by the islanders until the 1950s or 60s but is no longer encountered and playback of tape lures in 1990 failed to provide any evidence of continued persistence, however these were only carried out in a very limited area. In the light of the considerable uncertainty regarding all aspects of the biology of this species it is not useful to speculate as to possible causes of apparent extinction. Further surveys should be carried out to determine if it is possible that a small population may survive. White-eyes (*Zosterops* sp.) have been reported several times but the identity of the species never confirmed. The species seems to have been abundant in the 1920s but declined as the plantations were extended in the 1930s and 40s. They have not been reported recently although they may have been heard in 1979 (Greig-Smith pers. comm.). Much suitable habitat exists, most of it is very rarely visited and populations may persist.

Cattle egrets (*Bubuculus ibis sechellarum*) have recently colonised the island, in 1991 there was a population of 7 at La Passe. It is not known if these will form a permanent breeding population. Green-backed herons (*Butoroides striatus degens*) are very common around the coast, the total population probably comprises several hundred pairs. Small numbers of moorhens (*Gallinula chloropus meridionalis*) occur around the marshy areas of Grande Barbe.

Of the introduced land-birds feral pigeons (*Columba livia*) are very common at La Passe. The barn owl (*Tyto alba*) has a small resident population on the island. Indian mynahs (*Acridotheres tristis*) are common in lowland areas, particularly around settlements. They also occur in the mountain forests but do not appear to be resident in these areas. In most places where mynahs are common they have been blamed for declines in indigenous land-bird populations. There is no evidence for this in Seychelles, although they are often cited as a conservation problem. On Silhouette they do not appear to be a cause for concern. The Indian house crow (*Corvus splendens*) was recorded on the island in 1978/9 (Greig-Smith 1986) but there have not been any subsequent records. It is to be hoped that their continued rarity on Mahé will prevent colonisation of other islands. Madagascar fodies (*Foudia madagascariensis*) and barred ground doves (*Geopelia striata*) are uncommon on the island and are generally restricted to relatively open lowland areas. The Madagascar turtle dove (*Streptopelia p. picturata x rostrata*) is not common on Silhouette as the forest clearings it requires are scarce. Silhouette does not attract large numbers of migrant waders but a variety of species have been recorded recently.

Conclusions

Development of the island has been almost entirely limited to the costal plateaux due to the steepness of its interior. The high-forest areas have remained largely intact although the clearance of lowland forest was extensive in the early years of this century (H. Dauban pers. comm.). The agricultural area around La Passe has expanded in recent years but it is unlikely that this will spread much beyond its current boundaries.

The main threats to Silhouette's ecosystems are from tourism and invasion of habitats by introduced plants. Due to the extreme fragility of the montane habitats occurring on very steep slopes tourism could cause damage if a large increase in numbers was accompanied by a significant proportion of visitors using the paths crossing over Jardin Marron. Such an

increase in tourist numbers is unlikely to occur due to the limited availability of tourist accommodation on the island, the concentration of the Silhouette Island Lodge Hotel on quiet, secluded holidays should help to safeguard against significant ecological damage being caused by tourism. The more sensitive paths such as along the ridge of Mt. Dauban are very susceptible to erosion but are fortunately too difficult to attract more than one or two visitors a year.

The most serious threat is posed by the invasion of sensitive habitats by introduced plants. Currently available species lists include 104 introduced plant species out of a total of 270 plants recorded from the island. Several species have spread widely over the island and dominate many areas (some of these are considered in detail in Gerlach 1993), these include *Clidemia hirta, Psidium littorale, Paraserianthes falcataria* and *Artocarpus heterophyllus.* Control of these species is the most important step that can be taken to preserve the island's ecosystems.

Silhouette is the most natural and diverse of the granitic islands of Seychelles and as such its preservation must be considered a high priority if the biodiversity of the western Indian Ocean region is to be maintained. None of the vertebrates recorded are endemic to the island but appear to be present in larger numbers and more natural habitats than on the other Seychelles islands. The information on the invertebrate fauna indicates that many species are endemic to Silhouette, many of those found on other islands seem to be most secure on the island. If control of invading plant species can be achieved the rare plant and animal species of Silhouette should not be at any serious risk of extinction. Extension of the legal protection currently afforded to the off-shore zone around Silhouette to cover the terrestrial environment would further enhance the security of this important island.

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