

Status and conservation of raptors on the Masoala Peninsula, Madagascar

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ABSTRACT

Madagascar is the fourth largest island in the world and has a high degree of floral and faunal endemism. One hundred and seven (53%) of the 203 resident bird species are endemic, including 11 of the 22 diurnal and nocturnal raptor species. Since 1990, The Peregrine Fund has been conducting studies on the forest raptor community of the Masoala Peninsula in north-eastern Madagascar, where the largest intact lowland rainforest on the island exists. Of the 22 raptor species recorded for Madagascar, 19 have been found on the peninsula, with nesting records documented for Madagascar's two most endangered raptors, Madagascar Serpent-eagle and Madagascar Red Owl, plus Bat Hawk, Madagascar Harrier-hawk, Frances's Sparrowhawk, Madagascar Sparrowhawk, Henst's Goshawk, Madagascar Buzzard, Madagascar Kestrel, Banded Kestrel, Madagascar Long-eared Owl, White-browed Owl and Malagasy Scops Owl. Status, threats and conservation measures are discussed for each of the raptor species found on Masoala Peninsula. Information gathered on the Madagascar Serpent-eagle was important in the justification and size of the newly inaugurated Masoala National Park, encompassing 220,000 ha of pristine lowland rainforest.

INTRODUCTION

Madagascar is the fourth largest island and largest oceanic island in the world, with an area that comprises about 0.4% of the land surface of the planet Earth (Mittermeier 1997). Madagascar lies in the Indian Ocean, about 400 km off the eastern coast of continental Africa, and has been isolated for more than 150 million years. This long isolation has contributed to a high species endemism of plants and animals. Today, many ecosystems on Madagascar are threatened, by increasing human population pressure from slash-and-burn farming and fuelwood collecting, including what little natural forest remains.

The Masoala Peninsula was recognized by the government of Madagascar as a high-priority area for conservation of biological diversity, because of endemic flora and fauna such as the Madagascar Serpent-eagle *Eutriorchis astur*, isolation from the otherwise continuous north-south rainforests, and the occurrence of extensive lowland forest. In October 1997, the new Masoala National Park was inaugurated to protect the unique and endemic biological diversity of the Masoala Peninsula. The survival of many endemic fauna and flora will depend upon maintaining the intact primary forests of Masoala National Park.

Madagascar has 22 species of diurnal and nocturnal raptors, of which 11 are endemic to Madagascar: two are considered critically endangered, the Madagascar Fish-eagle and the Madagascar Serpent-eagle and one endangered, the Madagascar Red Owl (Collar *et al.* 1994). Both the Madagascar Serpent-eagle and Madagascar Red Owl are known from the eastern rainforest region (Langrand 1990), and recently from the Masoala Peninsula (Thorstrom & Watson 1997). Although some species of Malagasy raptors have benefited from the degradation of forests (e.g. Madagascar Kestrel), most forest species have been adversely affected. Other causes of species declines have been persecution by man for food, superstition and protection of poultry.

In this paper we will provide information on the status and threats, and make recommendations for conservation measures needed to preserve, the 19 raptor species occurring on the Masoala Peninsula of northeastern Madagascar.

SPECIES ACCOUNTS

Madagascar Cuckoo-falcon *Aviceda madagascariensis*

An endemic and sparsely distributed species throughout Madagascar. Reported to inhabit all types of forest, most often encountered at edge of forests or around clearings in forests, and ranges from sea level to 1800 m (Langrand 1990). Mainly feeds on lizards and insects. Its nesting and breeding biology poorly known but appears to be a forest- or woodland-nesting species. Reported to be in the Masoala forests by visiting bird enthusiasts but not substantiated. This species is easily confused with the common and highly variably-plumaged Madagascar Buzzard *Buteo brachypterus* (Langrand 1990; del Hoyo *et al.* 1994). The Madagascar Cuckoo-Falcon is an easily overlooked species throughout its broad range. If it does occur in Masoala forests it is extremely rare. This species is not under any great threat overall but declining forest is bound to negatively affect the species. Considered a near-threatened species and populations need to be identified and habitat protected against human disturbances and degradation.

Bat Hawk *Macheiramphus alcinus*

A rarely observed species in Masoala and throughout Madagascar. Probably breeds at an extremely low density throughout its range. One nesting pair was observed in the northeastern region of the Masoala Peninsula on 18 December 1993. Local villagers showed us this species, claiming it to be the Madagascar Serpent-eagle. The nest was in an isolated tree on a small hill surrounded on all sides by land cleared for subsistence agriculture. One individual was observed in 1992 perched in a tree at Tampolo, 7 km south of Andranobe Field Station, The Peregrine Fund's research station and 2 km from the ocean. One individual rarely seen every year near the AFS and probably an individual from Tampolo. Difficult to ascertain the status of this secretive species but forest felling may open up more habitat for it. Little is known about this species' breeding biology in Madagascar. A study on its ecological needs is warranted.

Black Kite *Milvus migrans*

Occasionally observed at Maroantsetra, the port to Masoala Peninsula, flying along the coastal beaches or along the rivers and, on the eastern side of the peninsula, flying over agricultural fields, villages and coastal beaches. During our raptor survey in 1992, we observed several individuals flying over a field at Nandrahanana north of the village of Ambanizana on the west coast of Masoala Peninsula. This species is abundant in the western region of Madagascar. Appears to be under no great threat but suspected that human persecution to protect poultry may frequently occur.

Madagascar Serpent-eagle *Eutriorchis astur*

An elusive, endemic and endangered bird of prey found only in primary forests. Virtually unknown until rediscovery, repeated sightings and capture in 1993-1994 (Thorstrom *et al.* 1995). A shy, secretive species, easily overlooked and confused with Henst's Goshawk. The ranging area of a radio-tagged individual was important for determining the size and justification of the Masoala National Park. Recently found nesting on the west and east side of the peninsula. One nesting pair, studied during

the 1997 breeding season, constructed a nest in an epiphytic fern. Both adults incubated, the female attended the nestling, and prey deliveries to the nest were mainly chameleons (*Furcifer* and *Calumna* spp.) and leaf-tailed geckos (*Uroplatus* spp.), plus some arboreal and terrestrial frogs. The nestling fledged at nine weeks of age.

We have located 15 different individuals of serpent-eagles at nine sites throughout the Masoala Peninsula. Currently, the new Masoala National Park and peninsular forest contain the greatest number of sightings and known density of serpent-eagles in Madagascar. We have estimated that about 104 territorial pairs may exist in the Masoala National Park and peninsula, with the assumption that the forested habitat is homogenous and the species' breeding density is saturated. The Madagascar Serpent-eagle is a forest-dependent species that relies on intact forest for its ecological needs. It is critical that the primary Masoala forest be maintained in this park for survival of one of the least known and most endangered raptors in the world. The loss of primary forests will definitely affect the survival of this species.

Madagascar Harrier-hawk *Polyboroides radiatus*

An endemic and common nesting species in the Masoala forests. Found from primary to degraded forest and wooded habitats. Easily observed and heard throughout the Masoala forests, soaring frequently above the forest canopy. Appears to breed at a low density throughout the Masoala Peninsula. We observed four nesting attempts during a 1992 raptor survey on the west coast of Masoala Peninsula (one at Rantabe, two at Ambanizana and one at Andranobe). The Andranobe pair has nested at the same site for 7 years, from 1991-1997, laying two eggs each year but fledging only one young in 1994 and 1996. This species has a broad diet and occasionally hunts by hanging on vegetation and thrusting its feet into holes. Diet consists of insects, amphibians, reptiles, birds and mammals (Langrand 1990; del Hoyo *et al.* 1994), and was observed feeding on Henst's Goshawk nestlings (Rene de Roland *et al.* 1996) and a dwarf lemur *Cheirogaleus* sp. (G. La Marca pers. comm.) on the Masoala Peninsula during the 1995 and 1997 breeding seasons, respectively. Local villagers on the east coast of Masoala Peninsula trapped, killed and ate a harrier-hawk because it preyed on their domestic fowl. Probably persecuted in areas where it preys on domestic livestock. In the future, this species could be impacted by human persecution as more local people raise and protect domestic fowl.

Madagascar Marsh-harrier *Circus maillardi*

A large harrier for an island species. May be a different species from the subspecies found on Réunion (R. Simmons pers. comm.). Uncommon and infrequently observed coursing over fallow rice fields and marsh or wetland habitat. Rarely observed on Masoala Peninsula, mainly on the east side where more forest alteration has taken place, and sighted once at the airstrip of Maroantsetra. As forests are converted to large rice fields on the peninsula this altered habitat will probably benefit this species to a slight degree. It may move along the coastal rice fields to more open habitat in north-western and eastern regions of the Masoala Peninsula. One of the main threats to this species is grassland fires that usually occur during the dry period, which is its nesting season (Pauven 1995).

Frances's Sparrowhawk *Accipiter francesii*

A small, common forest raptor on the Masoala Peninsula. This species inhabits any woodland and secondary or primary forests. It has a high nesting density in the Masoala forests, with six nests within 30 minutes by foot from Andranobe Field Station (Rene de Roland in press). Diet mainly insects, lizards and birds. At 14 nests under study on the Masoala Peninsula, 13 (93%) were successful in fledging at least one young (Rene de Roland in press). Normally changes nest site from one year to the next, with a mean internest distance of 105 m from 1994 to 1995 (n = 9 nests). Occasionally hunted for food by local villagers on the Masoala Peninsula (pers. obs.).

Madagascar Sparrowhawk *Accipiter madagascariensis*

An endemic, uncommon and secretive medium-sized forest accipiter. Inhabits mainly primary forest and rarely occurs in secondary vegetation. Confused easily with Frances's Sparrowhawk and

occasionally with Henst's Goshawk. Three nesting attempts were observed at two different nest sites from 1993-1996, north of Andranobe Field Station. Diet composed mainly of birds, and builds a small stick nest, slightly larger than Frances's Sparrowhawk but placed near the top of the tree. Vocalization similar to Frances's Sparrowhawk and appears to hunt in the upper canopy for birds. Rarely observed in the forest, except at its nest, and due to its secretiveness it is a difficult species to detect. Does not appear to be threatened but as forested habitat declines this will surely affect this species in the future.

Henst's Goshawk *Accipiter henstii*

The largest endemic accipiter in Madagascar and considered of near-threatened status. During the breeding season this raucous hawk is easy to find, which contrasts with its activity during the nonbreeding season. Occasionally heard and seen soaring above the forest canopy. Easily confused with the rare and endangered Madagascar Serpent-eagle. Most reports of serpent-eagles by local villagers are of this species. A rapacious hawk feeding on large birds and lemurs (*Avahi laniger* and *Eulemur* spp., Goodman *et al.* in press). Neighbouring nests in the interior of Masoala Peninsula were approximately 7-12 km apart. Breeds at a low density and estimated to be about 26 breeding pairs in the Masoala National Park. Probably lives at a lower population density in the Masoala forests than the Madagascar Serpent-eagle. We know of six past and present nesting territories found throughout the peninsula from 1991 to 1997. May use the same nest from previous nesting season or build a new nest 300-500 m from old nest. Occasionally persecuted by local villagers for attacking poultry. A forest-dependent species that needs a large area to survive. Maintaining the forest of the Masoala National Park is important for its protection.

Madagascar Buzzard *Buteo brachypterus*

Endemic and common hawk found in the Masoala forests, forest clearings, and secondary vegetation. An obvious buteo, heard and observed soaring above and perched in the forest canopy. Appears to be an adaptable species found in a wide range of habitats from degraded openings, woodlands and primary forests. In a study on the Masoala Peninsula, Berkelman (1996) found a high breeding density for the Madagascar Buzzard of a pair per 0.8 km² in 1991 and 0.5 km² in 1992 at Andranobe Field Station. This species is an opportunistic hunter that feeds on a wide range of prey species from invertebrates such as terrestrial crabs to lizards, snakes, birds and rodents (Berkelman 1994, Del Hoyo *et al.* 1994). Occasionally hunted for food by local villagers (pers. obs.).

Madagascar Kestrel *Falco newtoni*

Ubiquitous species in grasslands, croplands, secondary vegetation, and degraded woodland habitats, and in and around villages. Nests in tree cavities and large hollows on the Masoala Peninsula and is vocal at its nest. Six nests were observed during the 1997 breeding season. Feeds mainly on insects and lizards. A common raptor found in fields, slash-and-burn clearings and other human-altered habitat. This species has probably increased with deforestation, cultivation and urbanization. Found throughout the Masoala Peninsula in any vegetation-covered opening or slash-and-burn clearing. No antagonistic behaviour was observed between a nesting pair of Madagascar Kestrels and Banded Kestrels separated by 100 m, but it is frequently harassed by cavity-nesting Broad-billed Rollers *Eurystomus glaucurus*.

Banded Kestrel *Falco zoniventris*

An endemic and secretive species that lives on the forest edge or in woodland clearings. About twice the size of the Madagascar Kestrel. A difficult species to detect, even during the breeding season, because of its secretive and relatively non-vocal behaviour. Three nests have been discovered on Masoala Peninsula from 1995-1997. Stamps out a nest in the centre of a epiphytic fern situated in a large tree fork (Thorstrom in press). Feeds mainly on chameleons and insects. Considered a near-threatened species but probably more abundant than was once thought due to its secretive nature. An increase in deforestation may lead to a decline in the population status. Protection of forest edge and woodland habitat is critical for the survival of this species.

Eleonora's Falcon *Falco eleonora*

An austral migratory species usually arriving in December in Madagascar and in January to the Masoala Peninsula. Observed in groups or pairs feeding on large flying insects over the forest canopy. Common on the Masoala Peninsula from December to March but appears to have decreased from 1991 to 1997 (René de Roland pers. obs.).

Sooty Falcon *Falco concolor*

An austral migratory species usually arriving in December in Madagascar and in January to the Masoala Peninsula. Observed in groups or pairs feeding on large flying insects over the forest canopy. Uncommon on the Masoala Peninsula from December to March.

Madagascar Red Owl *Tyto soumagnei*

The endemic Madagascar Red Owl was first rediscovered in Marojejy in 1993 (Halleux & Goodman 1994). Peregrine Fund biologists then discovered this species at sea-level on the Masoala Peninsula in early 1994, which considerably extended its known range. A strictly nocturnal species that is extremely rare, one pair was studied on the Masoala Peninsula (Thorstrom *et al.* 1997). Nearly all the information known about this species comes from this one study pair. Radio-telemetry helped identify foraging habitat, which included secondary degraded forest, rice paddies, and day-roosts in exotic plantations of bananas and cloves. The study pair occurred on the forest edge and hunted in active and fallow rice fields, cattle pastures, slash-and-burn agriculture areas, and the forest edge. This species is not a forest obligate as previously believed, and may simply have been overlooked. The nest was located in a cavity of an isolated tree surrounded by subsistence agricultural lands (Thorstrom & René de Roland 1997). Feeds mainly on native insectivores and rodents (Thorstrom *et al.* 1997; Goodman & Thorstrom in press). This species has also been heard at three sites on the peninsula with all vocalizations coming from large subsistence agriculture plots along the main forest block (Thorstrom 1997). The study female was used as an important conservation practice, where birding enthusiasts were shown the day-roosting owl if they contributed funds to the building of a local school in the village nearest to the owl's territory (Thorstrom 1997). Over \$450 American dollars went to the building of the school. The creation of protected areas in eastern rainforest domain, such as Masoala National Park, may be sufficient to conserve the species (Watson & Thorstrom 1997). Basic research on the ecology of the Madagascar Red Owl is needed in areas where it occurs in primary forests.

Barn Owl *Tyto alba*

A common species living in towns, large villages and openings. Feeds mainly on introduced mammals (Goodman *et al.* 1993; Goodman & Thorstrom in press). Common in the town of Maroantsetra and infrequently at Ambanizana village. As deforestation continues the species will probably increase in areas of large clearings and openings, and where populations of introduced rodents become abundant.

Malagasy Scops Owl *Otus rutilus*

A common nocturnal species found in any forested or wooded area. Population status not known but probably affected by loss of wooded and forested habitat. Feeds chiefly on insects and nests in small tree cavities. The loss of forested habitat would decrease the availability of nesting sites. Basic research on the ecology of this scops owl is needed.

White-browed Owl *Ninox superciliaris*

A poorly-known endemic and nocturnal species, sometimes active during the crepuscular periods. Occupies a variety of habitats from towns to primary forests. Two nests have been observed on the peninsula in tree cavities, one in the forest interior and the other on the forest edge. A vocal species that calls sometimes during the day. Observed feeding on insects and lizards, with several prey deliveries to nests occurring during the early morning hours. Basic research on the ecology of this owl is needed to understand its habitat requirements.

Madagascar Long-eared Owl *Asio madagascariensis*

A large, poorly-known endemic owl found in degraded, secondary and primary forests. One nest, observed in a patch of littoral forest in November 1994, was in a large epiphytic fern. Two weeks after finding the nest we visited the site and found two fledglings 20 m from the nest. Feeds on rodents, small lemurs and birds (Langrand 1990; Goodman *et al.* 1993). Basic research is needed on the ecology of the Madagascar Long-eared Owl.

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