

Repeated sightings and first capture of a live Madagascar Serpent-eagle *Eutriorchis astur*

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The Madagascar Serpent-eagle *Eutriorchis astur* is considered one of the rarest birds of prey in the world (Langrand & Meyburg 1984). Until recently it was known from only eleven museum specimens (Ferguson-Lees *et al.* in press), the last of which were collected in 1930 (Dee 1986). Raxworthy & Colston (1992) identified *Eutriorchis astur* from a skull and three primary feathers collected from a decomposed carcass found in Ambatovaky Reserve (16°51'S, 49°08'E). There have been several possible sight records in recent decades from Marojejy Reserve (14°21'S, 49°38'E), including a detailed account of a sighting made in 1988 by Sheldon & Duckworth (1990).

The Peregrine Fund began ecological studies focused on raptors on Masoala Peninsula, Madagascar in August 1991 (Watson & Lewis in press). Studies have involved fourteen people in the field for about 140 person-months, as follows: two field seasons (September through February) studying the Madagascar Buzzard *Buteo brachypterus* (Berkelman 1993), two seasons testing raptor survey techniques (René de Roland & Watson 1993), two seasons of a nest reward program among local villagers (Borge 1993), one season of avian community studies (Watson & Strzalkowska 1993), and one season of peninsula-wide avian inventory (Thorstrom 1994) as well as winter season (approximately March through August) studies on other taxa.

During a bird inventory of Masoala Peninsula conducted by RT from 1 September 1993 to 28 February 1994, RT and colleagues sighted Madagascar Serpent-eagles four times and captured the species once. On 2 November 1993, RT sighted a Madagascar Serpent-eagle for the first time on Masoala Peninsula at Sarahandrano/Ambanivony (15°17'S, 50°17'E) at 50 m elevation. The species was sighted again on 2 November by RT and BD, and on 11 November by VB at the same locality on the east side of the peninsula. Then on 14 January 1994, FT and MB captured a Madagascar Serpent-eagle in a mist-net on the west side of the peninsula, about 60 km from the November 1993 sightings. On 27 January 1994, DB flushed a Madagascar Serpent-eagle at Antafononona (15°43'S, 50°10'E) at 230 m elevation, 30 km east of the January capture site.

Description of sightings on east side of peninsula

At 05.40 h on 2 November RT heard an unfamiliar vocalization, a three-note coua-like (*Coua caerulea* or *C. serriana*) or frog-like call, a nasal *waah-waah-waah* that was repeated. RT observed a large raptor fly and perch in the vicinity of the unknown call. The bird was observed with 10 × binoculars at a distance of 30 m as it perched about

20 m above the ground. The first apparent characteristic was the bright yellow iris. Other observable characteristics included: large and long eagle-like head; bill dark grey/black, upper mandible large; no noticeable cere colour; white-edged feathering on darker crown and nape presenting a scalloped appearance; no distinct white supercilium (present in the Henst's Goshawk *Accipiter henstii*); medium brown colour on back; underparts of breast and belly white with fairly broad dark brown bars that thinned out towards lower belly and flanks. Brown bars were fairly widely spaced and spacing increased toward belly and flanks. Upper tarsi were yellowish; tail long in proportion to body with, on dorsal side, broad dark-brown tail bands, narrow dark-brown terminal band, separated by lighter bands of approximately equal width. The bird was observed for 45 seconds moving its head and scanning the middle to lower canopy. It then walked 0.5 m along the limb and flew lethargically across a ravine disappearing into a large vine tangle approximately 40 m away.

On the same day at 11.30 h RT and DB flushed a large raptor that was perched along a trail, 25 m up slope from the previous sighting. The bird had the same characteristics as the above description. It flew down the trail flapping slowly and landed on a branch 15 m above ground; then hopped 0.5 m onto an epiphytic plant attached to the side of a tree, and proceeded to walk and thrust a foot into the epiphytic plant, apparently trying to flush prey. After 20 seconds of walking and foot-thrusting, the bird hopped 1 m up to a branch, walked along the branch and then flew out of view. RT and BD relocated the serpent-eagle perched 30 m away in clear view for a further 15 sec. The tarsus length and thickness were similar to a Henst's Goshawk. The feathers on the nape were longer than other head feathers, giving an elongated appearance to the head.

On 11 November 1993 at 16.00 h, while at camp, VB was alerted by alarm calls of Broad-billed Rollers *Eurystomus glaucurus*, a Madagascar Kestrel *Falco newtoni*, and Crested Drongos *Dicrurus forficatus*. They were mobbing a Madagascar Serpent-eagle, with the same characteristics as the earlier description, perched 25 m above ground in a large tree (*Canarium* sp.) situated on the edge of a rice paddy. The serpent-eagle remained motionless while being attacked by the smaller birds. It moved once to another branch during 30 minutes of observation; then flew, rolled over to defend itself against a stooping Madagascar Kestrel, and disappeared into the forest at canopy level.

We returned to Sarahandrano/Ambanivony from 28 November to 17 December 1993, to capture for radio-tagging and begin studying this serpent-eagle. During this period tavy (slash-and-burn agriculture) activity had increased in the area where we had observed it. We searched, placed traps baited with chicken on the ground and in the trees at the serpent-eagle sighting sites, and asked local people if they knew of any nest locations of this bird. Two nests were reported to us which we identified as nests of a Henst's Goshawk and a Bat Hawk *Machaeramphus alcinus*. The serpent-eagle was not relocated.

On 27 January 1994 at 07.14 h, BD flushed a Madagascar Serpent-eagle that was perched 1 m above the ground along a trail. It

flew to small tree 15 m away and was observed for 15 minutes. As it flew BD noticed that some tail feathers were worn and broken. The bird had the same characteristics as the previous descriptions; larger than the Madagascar Buzzard; brown colour; brilliant yellow iris; barring on breast and belly broader and separated more than Henst's Goshawk. The bird flew again and perched 20 m above ground in a large tree where it was mobbed by a Crested Drongo, a Rufous Vanga *Schetba rufa*, and two Madagascar Bulbuls *Hypsipetes madagascariensis*. After perching for 10 minutes it called twice *waa-waa-waa-waa-wa-wa-wa-wa*, then flew out of sight.

Description of capture on west side of peninsula

A Madagascar Serpent-eagle was captured in a mist net on the west coast of Masoala Peninsula c. 250 m east of The Peregrine Fund's Andranobe Field Station (AFS) (15°40'S, 49°50'E). AFS is about 6 km south of the village of Ambanizana on the creek known locally as Andranobe but marked on the map (FTM X-39/Ambanizana) as Lohatrozo. The Andranobe drainage supports minimally disturbed primary forest from sea level to 700 m. The trap site was at an elevation of 90 m, about 200 m from the sea and 10 minutes walk from AFS. The nearest tavy, 500 m east of the trap site, was used in 1992, but not active in 1993. The nearest active tavy was 700 m south.

The bird was captured at 07.42 h on 14 January 1994, in the bottom pocket of one of ten mist-nets. The nest (7 × 2 m, mesh size 30 mm) had been set on that day since 04.30 h, at ground level, below the forest canopy. The locality was on a ridge within 200 m of Andranobe River. At the time of capture we had completed 35 days of mist-netting (2650 net-hours) between 04.30 h and 17.00 h since September 1993. The bird was removed from the net, measured, weighed, banded, and photographed; then released after attaching a radio-telemetry transmitter (weight 6 g, Holohil Inc., Ontario, Canada) to its back.

Specimen description

The bird was identified in the field by FT and MB as *Eutriorchis astur* (Fandrasalambo in the local Betsimisaraka language) using the *Guide to the Birds of Madagascar* (Langrand 1990) and photographs of *Eutriorchis astur* museum skins. The identity was later verified from photographs taken of the bird in the hand (Fig. 1).

The following measurements were taken: weight 770 g, bill length 30.9 mm, wing length 430 mm, tail length 296 mm, body length 560 mm, tarsus length 79 mm, inside toe length 49 mm, inside talon length 21.5 mm. The iris was bright yellow, bill dark grey/black, legs and toes yellow, talons black.

Diagnostic features included small (about 5 mm diameter), vertically elongated hexagonal multiple scalation on the tarsus (contrary to Henst's Goshawk which has horizontally banded scalation on the tarsus); very long tail, with broad white bands on the under side between narrower brown bands; 'heavy' build to head, and bulging



Figure 1. Madagascar Serpent-eagle captured 14 January 1994 on Masoala Peninsula, Madagascar. The bird was released after weighing, measuring and attaching a radio-tag.

upper bill giving a 'Roman nose' look; and elongated feathers of nape. On release the bird was placed on the ground where it walked several steps then flew out of view.

Discussion

The Madagascar Serpent-eagle is evidently secretive and difficult to detect. Despite our focus on raptor studies and the considerable time and effort invested in the field by our biologists since we began studies on Masoala Peninsula, the first sighting was only made after about 100 person months of effort. The first capture was made accidentally, very close to our field station at the centre of much of our field work. Now for the first time we are in a position to learn about the behaviour and biology of the Madagascar Serpent-eagle. With a better understanding of its behaviour we may be able to detect the species more readily. With this ability we aim to begin studies of its distribution and abundance and factors affecting them.

Preserving the Madagascar Serpent-eagle and its rain forest habitat remains one of the biggest challenges to conservationists working in Madagascar. The most effective conservation measure must be to protect extensive areas of primary forest within its known range (between latitudes 14° and 19°S). Although much activity is centred on this aim, there remains significant concern that continued forest loss and habitat fragmentation will reduce available habitat to below the critical minimum. Understanding the species' spatial requirements and the effects of forest fragmentation on nesting density will help us determine minimum areas required for viable populations of this species.

All previous records of this species were in minimally disturbed primary forest. While the site of the eagle's capture conforms to this pattern, the three sightings made in November 1993 (probably of the same bird) were in forest within 100 m of tavy activity. The fourth sighting was in undisturbed primary forest 3 km from the last tavy up the Anovandrano River drainage.

Since inception of The Peregrine Fund's studies on Masoala in 1991 we have had a policy of accommodating only authorized project participants in the study area and at the field station in order to minimize researcher impact on the undisturbed forest. This policy will continue.

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