

## Ecological observations on Sanford's Sea-Eagle *Haliaeetus (leucogaster) sanfordi*

Patrick Pikacha<sup>1,2,3</sup>, Myknee Sirikolo<sup>4</sup>, David Boseto<sup>1</sup> and Chris Filardi<sup>5</sup>

<sup>1</sup>Melanesian Geo, P.O. Box R36, Ranadi, Honiara, Solomon Islands

<sup>2</sup>Email: patrick.pikacha@gmail.com

<sup>3</sup>School of Animal Studies, Faculty of Agriculture and Science, University of Queensland, Gatton QLD 4343, Australia

<sup>4</sup>University of the South Pacific (Solomon Islands Campus), Honiara, Solomon Islands

<sup>5</sup>American Museum of Natural History, New York, NY 10024-5192, United States of America

**Summary.** Field observations of Sanford's Sea-Eagle *Haliaeetus (leucogaster) sanfordi* were obtained in the Solomon Islands (Choiseul, Tetepare, Rendova, Kolombangara, and Vella Lavella) from January 2006 to October 2011. Sanford's Sea-Eagles were encountered in coastal, lowland and montane forests (to 1100 m above sea-level), open human-modified habitats, and along a river through primary rainforest. Predation or attempted predation was observed on soaring Glossy Swiftlets *Collocalia esculenta*, Solomons Flying-foxes *Pteropus rayneri* leaving their roosts and a Prehensile-tailed Skink *Corucia zebrata*. Ecological release may explain this eagle's wide habitat and dietary niche in the Islands, but other evidence (morphology, vocalisations) suggests that lumping it with the White-bellied Sea-Eagle *H. leucogaster*, on limited DNA evidence, may be premature.

### Introduction

We present firsthand observations of Sanford's Sea-Eagle *Haliaeetus (leucogaster) sanfordi* that add to limited knowledge of the foraging habits and habitat requirements of this endemic raptor of the Solomon Archipelago. Records of it date back to 1568, in expedition journals of the first European explorers to reach the Solomon Islands (Mayr & Diamond 2001). However, it was reported as immatures of the White-bellied Sea-Eagle *H. leucogaster*, until it was afforded full species status in 1935 (Mayr 1935, 1936).

Recently, phylogenetic studies have reported very short genetic distances between the Australian taxon *H. leucogaster* and Sanford's Sea-Eagle, suggesting that *sanfordi* is a subspecies of *H. leucogaster* (Debus 2006; Christidis & Boles 2008). However, many authors retain species status for Sanford's Sea-Eagle based on differences in morphology, behaviour and geographic isolation, as well as the scant nature of most genetic studies (i.e. only partial sequences of single mtDNA gene regions: see Wink *et al.* 1996; Ferguson-Lees & Christie 2001; Wink & Sauer-Gürth 2004; Lerner & Mindell 2005; Birdlife International 2011).

Very little is known about the ecology of this elusive bird, a raptor with one of the most restricted ranges in the world and classified as vulnerable on the IUCN Red List (BirdLife International 2008). We present ecological observations from Choiseul, Tetepare, Rendova, Kolombangara and Vella Lavella, Solomon Islands. Observing Sanford's Sea-Eagle closely has been difficult, with limited firsthand

observation of its hunting behaviour. Our observations were made from January 2006 to October 2011.

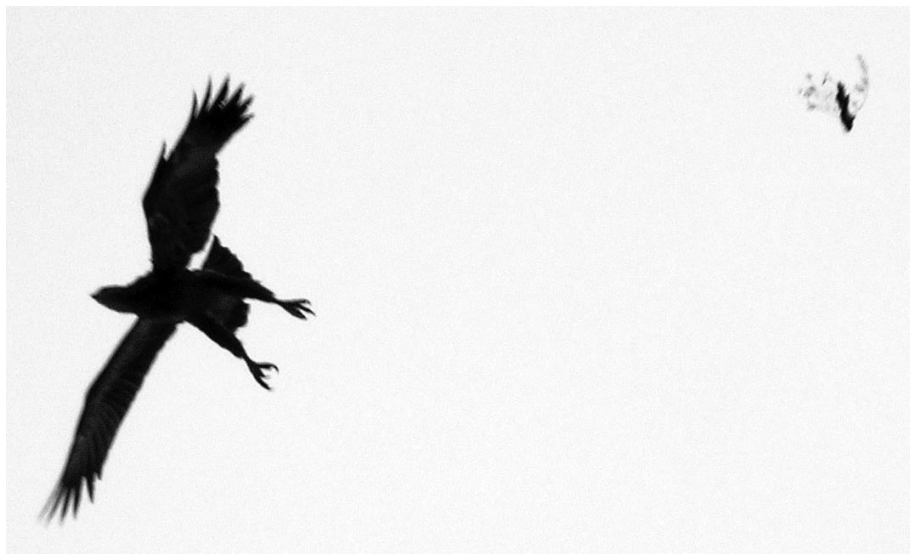
## Habitat

Local residents and ornithologists have reported sighting Sanford's Sea-Eagle across a variety of habitats: coastal forests, lowland rainforests, ridge forests, and montane forests (Olsen 1994, 1997; Mayr & Diamond 2001). Other observers have found it to behave like a typical sea-eagle in coastal environments (see Debus 1994; Olsen 1997; Hadden 2004). Consistent with some previous findings, we observed Sanford's Sea-Eagles across a wide range of terrestrial habitats: soaring in thermals at high elevations [1100 m above sea-level (asl) on Rendova, and 1060 m asl on Mount Maetambe, Choiseul], in coastal forests (Tetepare Island) and lowland forests (Vella Lavella Island), and in open human-modified habitats (Kolombangara Island). Locals reported Sea-Eagles along the Maisao River, where the primary rainforest is complex and dense, being undisturbed, wet and humid, with a great diversity of plants. The present findings suggest that the Sea-Eagle inhabits high-elevation forests that are not necessarily near freshwater lakes.

## Observations

In January 2006, a Sanford's Sea-Eagle was circling on the thermals above the summit of Mount Maetambe, Choiseul, on a clear day. Glossy Swiftlets *Collocalia esculenta* were also riding the air currents. The Sea-Eagle swooped down suddenly towards a Swiftlet, its legs and talons extended (Figure 1). The Swiftlet quickly descended, avoiding the initial attack, and then burst out on a tangent to escape. Similarly, in October 2010, a Sanford's Sea-Eagle was riding the thermals and calling with a sharp shrieking sound at ~0800 h above the summit of Rendova Island (1023 m asl); a group of Glossy Swiftlets was also riding the thermals. The Sea-Eagle was soaring above the Swiftlets, with wings outstretched and its head downward and shifting, as if inspecting these tiny swiftlets. Although we did not observe an attack, the Sea-Eagle was probably stalking these tiny birds, waiting for the right moment to swoop, as observed on Choiseul.

In January 2006, July 2007 and June 2009, we made observations at a disturbed lowland site on Kolombangara Island. At least three colonies of the endemic Solomons Flying-fox *Pteropus rayneri* were roosting in Coconut Palms *Cocos nucifera*, a Malay Apple *Syzygium malaccense* and a large Ngali Nut *Canarium salomonensis* tree. Between 0500 and 0900 h, a Sanford's Sea-Eagle was observed flying over these roosts. The fruit-bats were caught only in flight, when leaving their roosts, and not taken from their foliage roosts. If the Sea-Eagle was soaring above the roost-site when a bat left the tree, it swooped down, caught the mammal and flew to a perch to eat its prey. We observed more than 10 attacks, with a high incidence of predation between 0500 and 0900 h and between 1700 and 1900 h, coinciding with the times of day when the bats returned and departed, respectively. Two or three individual Sea-Eagles (age undetermined) consistently hunted in this way over several days. Local informants reported that during the day, the Sea-Eagle perched on top of



**Figure 1.** Sanford's Sea-Eagle stooping at Glossy Swiftlet, Choiseul, Solomon Islands, January 2006. Photo: Patrick Pikacha

the highest palm and occasionally flapped its wings vigorously; the loud beating noise flushed roosting flying-foxes, allowing the Sea-Eagle to swoop and capture the panicking bats.

In October 2009, at ~0930 h on the upper Leona River, Vella Lavella, MS and PP observed a juvenile Sanford's Sea-Eagle perched on a log on the river bank, and holding an endemic Prehensile-tailed Skink *Corucia zebrata* (the world's largest arboreal skink) in its talons. PP approached slowly clearly within sight of the Sea-Eagle and, although it watched nervously, PP observed it closely for ~10 minutes as its talons punctured the skink's soft abdomen (Figure 2a). Upon PP venturing closer, the Sea-Eagle flew to rest on a tree-branch above the log, leaving the injured skink behind. It later returned to eat the wounded skink, but was trapped by hunters (Figure 2b); we asked them not to sell the bird, but to release it.

## Discussion

Previous reports on the foraging habits of Sanford's Sea-Eagle have been confusing because recognition of it as a full species is based, in part, on its diet being different from that of the White-bellied Sea-Eagle, i.e. primarily cuscuses *Phalanger* spp. and large birds, rather than fish and carrion (Mayr 1936). However, subsequent reports challenged this finding, with observations that the two species' ecologies are similar, at least for Sanford's Sea-Eagle in coastal areas (Debus 1994; Hadden 2004). The White-bellied Sea-Eagle takes cuscuses and fruit-bats in the Bismarck Archipelago, and some arboreal or terrestrial mammals, birds and reptiles in the Australian tropics (Corbett & Hertog 2011). The wide diet and habitat of Sanford's



**Figure 2.** Juvenile Sanford's Sea-Eagle, Leona River, Vella Lavella, Solomon Islands, October 2009: (a) feeding on Prehensile-tailed Skink on log, (b) after capture by hunters (see text). Photos: Patrick Pikacha



Sea-Eagle may reflect ecological release, in the absence of the large forest eagles (Gurney's Eagle *Aquila gurneyi* and New Guinea Harpy Eagle *Harpyopsis novaeguineae*) that occur in nearby New Guinea. Similar ecological release appears to apply to the White-bellied Sea-Eagle in the Bismarck Archipelago (Heinsohn 2000).

The present observations show that the diet of Sanford's Sea-Eagle is variable, depending on the accessibility of prey, expand the known diet to include reptiles (a giant skink), and suggest that, at high elevations, forest birds (e.g. swiftlets) may be common prey species. They add more detail on the Sea-Eagle's diet, which includes Northern Common Cuscus *Phalanger orientalis*, fruit-bats *Pteropus* spp., domestic animals (dogs, cats, poultry), carrion, fish, ducks and pigeons (Debus 1994; Olsen 1997; Mayr & Diamond 2001). It is also apparent that Sanford's Sea-Eagles will return to familiar hunting grounds over a few days to pursue specific prey. This routine was evident on Kolombangara where individuals returned consistently to a fruit-bat roost-site, and on Vella Lavella where locals reported that a Sea-Eagle resided along the river valley, hunting along its banks and in adjacent forests. These observations lend firsthand accounts to the long-running debate about the diet of these eagles, and reveal a surprisingly variable hunter, capable of taking a wide array of prey species. Additional work quantifying sightings of eagles by habitat at systematic survey points over various habitats, and quantifying prey records by habitat type, may add to our understanding of the relative importance of prey types, and the habitat and prey requirements, of Sanford's Sea-Eagle.

Finally, our observations, and those of others (e.g. Olsen 1997; Webb 1997; Ferguson-Lees & Christie 2001) on the morphology and vocalisations of Sanford's Sea-Eagle, compared with the White-bellied Sea-Eagle, suggest that lumping the two as one species may be premature, pending further work on DNA. Such taxonomic work is required (Debus 2006).

### *Conservation status*

There is no legislation that protects Sanford's Sea-Eagle in the Solomon Islands. These eagles are regularly trapped by indigenous people and sold in the illegal pet trade. As the Sea-Eagle is a forest dweller, the country's high rate of deforestation by industrial logging, and by agriculture and traditional gardening, may eliminate habitat suitable for its roosting and hunting.

On some islands, like Malaita, Sanford's Sea-Eagles were once revered as totems and ingrained into traditional custom stories. Although our findings do not assess the impact of capturing eaglets or of hunting on the population of eagles, today the trend is such that, if nests are located, the eaglets are often captured and sold for high prices as pets to prospective buyers, mostly business people (especially in the capital city, Honiara). Consequently, it is critical to raise awareness of the importance of maintaining populations of this raptor in the wild.

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