A rain-forest raptor in danger

Richard E. Lewis

Living in the rain forests of the Philippines is one of the largest and rarest eagles in the world, the Philippine eagle *Pithecophaga jefferyi*. This magnificent bird is in danger of extinction due to the pressures of land development and human persecution. The author spent three years, from 1982 to 1985, helping to study the eagle, both in the wild and captivity, as part of a team dedicated to its conservation. The eagle has become the symbol of the conservation movement in the Philippines, and linked with its survival are a host of endemic species that share the same forest habitat.

Previously known as the Philippine monkey-eating eagle, some consider this bird to be part of a relict group of large 'rain-forest' eagles together with the South American harpy eagle *Harpia harpyja*, Guiana crested eagle *Morphnus guianensis*, and the New Guinea harpy eagle *Harpyopsis novaeguineae* (Brown, 1976). It may be that the Philippine eagle is more closely related to certain Asian eagles, and certainly it seems to have evolved within the Philippine archipelago, with its historical distribution (Luzon, Samar, Leyte, Mindanao and perhaps certain satellite islands) closely reflecting the previous land connections that existed within the country (Inger, 1954).

The Philippine eagle was first discovered and collected by the English naturalist John Whitehead on an expedition to the island of Samar in 1896. Now, less than 100 years since that first discovery, the eagle is probably on the verge of extinction. The decline of its habitat and the effects of hunting have been the main reasons for the bird's demise.

A Philippine eagle *(Richard E. Lewis)*.

The eagle nests in large trees, on naturally occurring platforms such as epiphytic ferns, choosing platforms higher than 30 m off the ground in trees growing on valley slopes. Most of its time is spent hidden within the forest canopy, from which it hunts. The eagle is superbly adapted for hunting among trees, having comparatively short, broad wings and a long tail, which are ideal for bursts of speed and manoeuvrability. However, when it moves from one valley to another it soars above the canopy. A home range may cover 50 sq km or more (Kennedy, 1977; Rabor, 1968) depending on the amount of forest cover and the topography. A detailed study of the eagle's territory usage is being analysed from recent telemetry work (Kennedy, in press).

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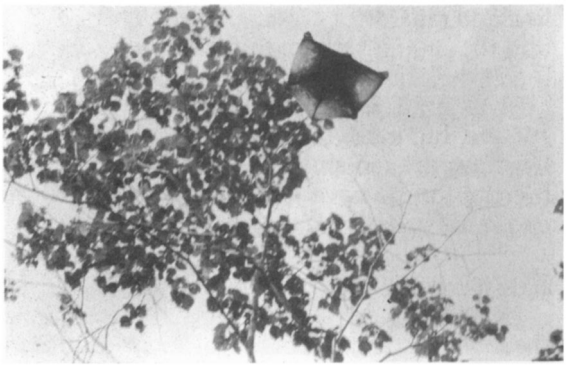
Their prey consists mainly of arboreal animals such as flying lemurs *Cynocephalus volans*, large snakes, hornbills, civet cats and monkeys *Macaca fascicularis*, which are all most abundant in the better forested areas (Kennedy, in press). Observations at different nests have shown that prey deliveries by the male to the female and chick are a lot less frequent (up to five days between deliveries) in poorer habitat. At one nest we watched in 1983, so little food was brought to the incubating female that she had to leave the egg to go and hunt for food herself; she finally deserted the egg after it had failed to hatch.

The life of the eagle is inextricably linked with the rain forest, which provides its food and nesting requirements. It has an extremely slow breeding rate, probably laying only one egg and rearing one young every two years. Nesting begins between October and December, incubation takes two months, and the chick fledges after a further four months. Even after fledging the young bird stays in its parent's home range for the next year, presumably being fed by them while it learns to hunt for itself. Nesting only takes place again after the young bird has left the area, but if it dies as a small chick, the parents will begin nesting in the following winter.

This slow breeding rate is typical of the very large tropical eagles and makes them vulnerable to hunting. They are also relatively easy targets, spending much time at the nest, and sometimes flying very slowly when soaring out of the forest. With a maximum of one young every two years, new recruitment to the population is slow. Thiollay (1984), working with the ecologically similar harpy eagle, noted that it disappears from an area when man colonizes it.

Decline

Any record of eagle decline is also a story of forest decline. Up until the twentieth century rain forest was still the predominant vegetation over most of the Philippine islands, and presumably before the arrival of man, covered all of the country except for the areas of pine forest in Luzon and Mindoro, coastal mangroves and areas disturbed by volcanic and cyclonic activity (McGregor, 1920). Before World War II 50–70 per cent of the



A flying lemur—main prey of the Philippine eagle. The lemurs are nocturnal and it is assumed that the eagle pulls them out of their tree-hole roosts *(Richard E. Lewis)*.

country was still covered by forests (Myers, 1980; Whitford, 1911), with the majority of this being rain forest. Figure 1 illustrates the probable range and decline of the eagle this century, assuming that it was found throughout most of the large tracts of rain forest. After World War II massive industrial and agricultural development of the rain forest began. Only 44 per cent was left by 1971, 38 per cent by 1976 (Myers, 1980), and perhaps only 20 per cent by 1982 (Anon., 1983a). It is estimated that by 1990 all virgin

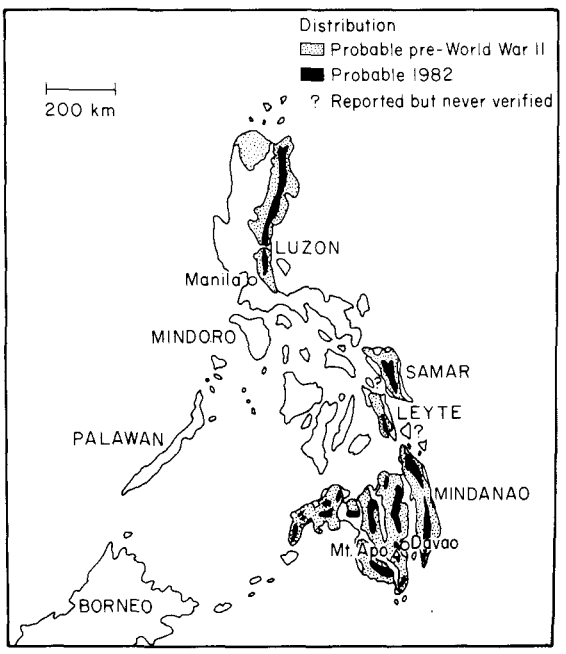


Figure 1. Distribution of the Philippine eagle.

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lowland rain forest will have gone (Myers, 1980), and that by the turn of the century all accessible forest will have been cleared (Secrett, 1985). High altitude (1700 m) mossy forest will probably survive, but this is unsuitable for eagle nesting as the trees are too small. By the time all the commercial forests have gone, in all probability the eagles will have gone too.

Forest conversion in the Philippines has followed a pattern typical of many areas in the tropics through the actions of illegal logging, undisciplined legitimate logging and shifting cultivation (slash-and-burn farmers) (Lechoncito, 1984). As much as 80 per cent of this forest conversion may be illegal (Anon., 1983a). Logging companies now practice selective logging whereby only a certain number of trees are extracted. The forest is then allowed to regenerate, which it is hoped will create a sustainable resource to be harvested every 20–40 years (Anon., 1984). Unfortunately, in many cases too many trees are extracted (Myers, 1980). Up to 40 per cent of the forest may be damaged by road construction and log hauling (Secrett, 1985), resulting in limited forest regeneration and the breakdown of the 40-year cycle. In this respect, Caufield (1982) suggests the alternative practice of total clearance of small forest strips, as compared to huge selectively logged-over areas. The undamaged surrounding virgin forest would allow natural regeneration to occur.

As logging proceeds, a network of roads is developed and along these settlers arrive, clearing the already thinned forest. In one logged area we found that within 10 years it had been cleared, cultivated and a substantial population established (Krupa *et al.*, 1984). Myers (1979) cites the example of a township that was established within Mt Apo National Park: a case of settlement following logging. Furthermore, an FAO report (Anon., 1981) gives an extreme case where a logging concessionaire encouraged settlers into logged-over areas in an effort to keep them away from the valuable timber of the virgin forest.

From the end of 1982 to mid-1983 a severe drought hit Mindanao. This was believed to be caused by the exceptional El Niño warm water event in the Pacific at that time, exacerbated by the already limited forest cover (Anon., 1983b). The dry conditions created an ideal situation for slash-and-burn farmers, who sparked off massive forest fires throughout Mindanao. In some areas we visited, the trees were dead, although still standing. The extent of damage will not be fully known until the aerial/satellite survey work by the government's Bureau of Forest Development (BFD) is complete, but certainly some areas illustrated on the map have shrunk considerably since 1982. Should another drought hit Mindanao, the effects could be equally catastrophic.

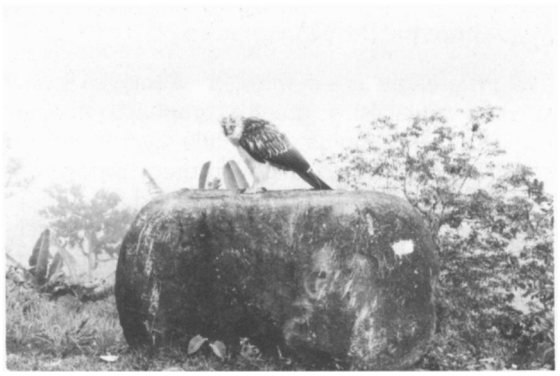
Originally the island of Mindanao was considered to be the eagles' stronghold, having the best tracts of forest in the country. Until recently the forests of Luzon largely escaped commercial logging, since the trees there are smaller than those of Mindanao, probably as a result of the onslaught of typhoons. The result is that in the last 40 years the forests of Mindanao have suffered severe fragmentation. The small populations of eagles left are made more vulnerable by their isolation, since it is believed that they cannot disperse over large open areas of land or water. The furthest an eagle has ever been recorded from a forest area is 10 km (Kennedy, 1977), and this was certainly a stray bird.

Kennedy (1977) estimated that in the early 1970s the eagle population on Mindanao was approximately 300 birds. His estimate was based on the forest cover at that time and the assumed territory size of nesting pairs. In 1985 it was believed by those working in the field that the whole population throughout the four islands was 300 birds or less, although until current forest surveys are completed and the bird's territorial requirements more fully understood, this remains only a tentative estimate. Survey work on Leyte in 1982 (Kennedy, in press) suggests that eagle numbers there are so low that a long-term sustainable breeding population is unlikely, and those eagles are too isolated from other populations on Samar and Mindanao to allow immigration of new birds. The forests on the Sierra Madre mountains in Luzon now represent the largest single area for the eagles. As yet, however, not a single nest has been studied there and, since the forest structure is different from that of Mindanao, habitat quality and eagle density may be different too.

Conservation measures

Even before World War II, the decline in rain forest extent and its effect on bird populations had been recorded (McGregor, 1920). Over a period of 30 years the Filipino biologist Professor Dioscoro S. Rabor travelled extensively throughout the archipelago. His alarm at the low number of eagles that he found led to international awareness of the problem (Rabor, 1968) and the first studies on the biology of the eagle (Gonzales, 1968).

In 1969 the Government created the Monkey-Eating Eagle Conservation Program (now the Philippine Eagle Conservation Program—PECP), under the control of the Bureau of Forest



Above: A female imprinted eagle.

Below: The sign at the entrance to the eagle centre *(Richard E. Lewis)*.

Local people who captured an eagle, and later gave it to the captive-breeding centre, with a poster given to them by the centre staff *(Richard E. Lewis)*.

Development, and directed by the Parks and Wildlife Director, Jesus B. Alvarez Jr, with consultation provided by Professor Tom Harrison (Cornell University), General Charles Lindbergh, World Wildlife Fund (WWF) and Richard Fyfe (Canadian Wildlife Service). This led to studies in the early 1970s by various American Peace Corps volunteers and the establishment of a captive-breeding centre on the edge of the forest, within Mt Apo National Park, on the outskirts of Davao City. The aim of the centre was to manage the birds that were being handed over to the Government, many of which had chronic injuries denying release back to the wild. This steady trickle of captive birds over the last 15 years has probably been a result of limited forest area pushing more birds into fringe habitat. They come into contact with man and are hunted for sport/collection, and also at times because it is claimed they take domestic livestock such as pigs, dogs and chickens.

It is hoped that the captive birds will eventually breed. The centre houses 10 of the known 14 captive birds in the world. Already three of the centre's five females have laid eggs, but all have been infertile. Attempts are being made to pair birds naturally, and also to use imprinted birds (sexually fixated on man) by co-operative artificial insemination (Grier, 1973). This species has never been bred successfully in captivity, but our observations indicate that this may soon be achieved.

The captive eagles represent a powerful education tool in motivating people towards the

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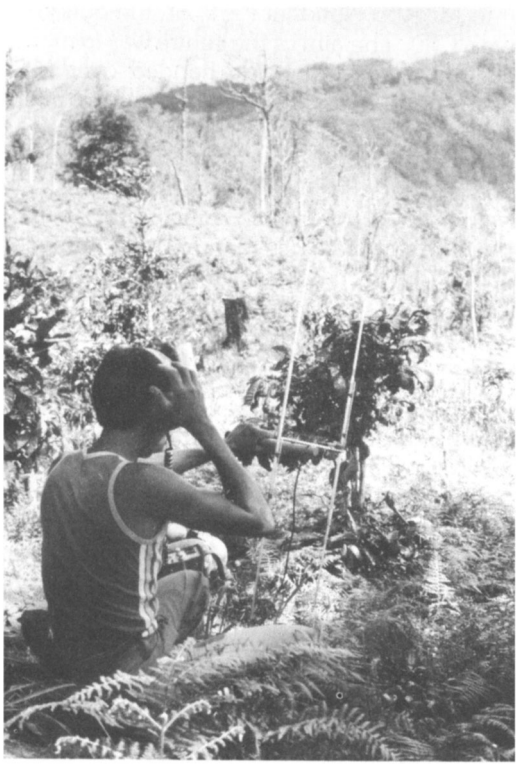
bird's plight and to forest conservation in general. When seen at close quarters, with its massive size and 'fright-mask' of long lanceolated head and neck feathers, it never fails to impress.

Above: A confiscated eagle being released back to the wild with a radio transmitter attached to its tail.

Below: Radio-tracking the released bird *(Richard E. Lewis)*.



In 1977 Free Inc. (Films and Research for an Endangered Environment) spent two years filming the life history of the eagle. They produced the film 'To Live and be Free' in both Pilipino and English, which is shown free of charge to interested groups by the PECP. Due to limited funds it is shown only around Davao as well as occasionally on various TV stations. We have found that the film has enormous impact, people becoming sympathetic to conservation once they realize that a problem exists. Education is one of the most important parts of the Program in getting across the message of the eagle's plight. Factors such as hunting can be alleviated by education; our conversations with hunters suggest that they are sympathetic to the eagle's conservation once they realize the problems it faces.

Using the eagle as a symbol, the Program is now moving towards a greater emphasis of how human well-being is intimately tied in to the forest. According to a government report, the country needs 46 per cent of its land area under forest for both economic and environmental well-being (Caufield, 1982), yet many of the farmers clearing the forest are lowlanders who not only have no knowledge of their new environment, but are also unaware of these facts.

The eagle has a unique position in the culture of the country, being well known to most people. It shares its habitat with many other endemic species. Should it survive on Luzon and Mindanao, then so will a majority of the Philippine vertebrates (Terborgh *et al.*, 1982).

The Government is not unmindful of the problem, but current financial constraints limit present forest conservation. Watershed areas are being defined in an effort to safeguard water supplies to the lowland paddy fields, and to prevent siltation problems with large dam projects. National parks exist, but sadly at present only two are likely to meet the IUCN criteria (Agaloos, 1984), and all are too small to hold large populations of eagles. Mt Apo National Park may hold at most five to ten pairs of eagles within its 50,000 ha. No park presently has an area equivalent to 200,000 ha, a size some believe to be required to maintain a healthy forest (Caufield, 1985).

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Selectively logged-over areas may yet prove to have a high conservation value, provided subsequent human settlement is prevented and forest regeneration takes place. It is known that eagles will remain and attempt to breed in such areas so long as the nest tree is undamaged, and disturbance minimized during the nesting season. Marsh and Wilson (1981) suggest a land-use system in which a virgin forest core is surrounded by an economic zone of logged-over areas in which both man and wildlife can live side by side.

It is to be hoped that schemes for financing park and forest conservation, with respect to both log producers and consumers, will help towards a system whereby consumers provide recompense towards forest reserves in accordance with the size of their consumption (Sutton *et al.*, 1983). Alvarez (1984) has also stressed the need for an Association of South-East Asian Countries (ASEAN) parks group to understand the particular needs and problems of parks in Thailand, Malaysia, Singapore, Indonesia and the Philippines.

The next 10 years will determine the future of the Philippine eagle and the other rain forest endemics. Conservation principles are not yet fully appreciated in the Philippines; the mountain people who live and exploit the forest consider it an inexhaustible resource, and the city dwellers rarely think of the mountains and their wildlife. The situation need not be irreversible. The work being done by the PECP clearly shows there is an interest in the wildlife ready to be nurtured. Conservation organizations need to work closely with the Filipinos, not just for the future of the wildlife, but for the very future of the people.

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