

# A lost world in Timor-Leste

## Mount Mundo Perdido

A profile of its biodiversity and conservation

Mount Mundo Perdido — literally, 'Lost World' in Portuguese — has the finest montane forests in Timor-Leste and perhaps the whole of Timor island. Its importance was almost unknown until recent surveys, but these have clearly shown that it merits consideration for management as a new Protected Area, as part of the national network being established by the Government of Timor-Leste.



## Site details

District: Viqueque; Baucau  
Coordinates: 8°43'S 126°20'E  
Area: 16,100 ha  
Altitude: 750-1,760 m



## Site description

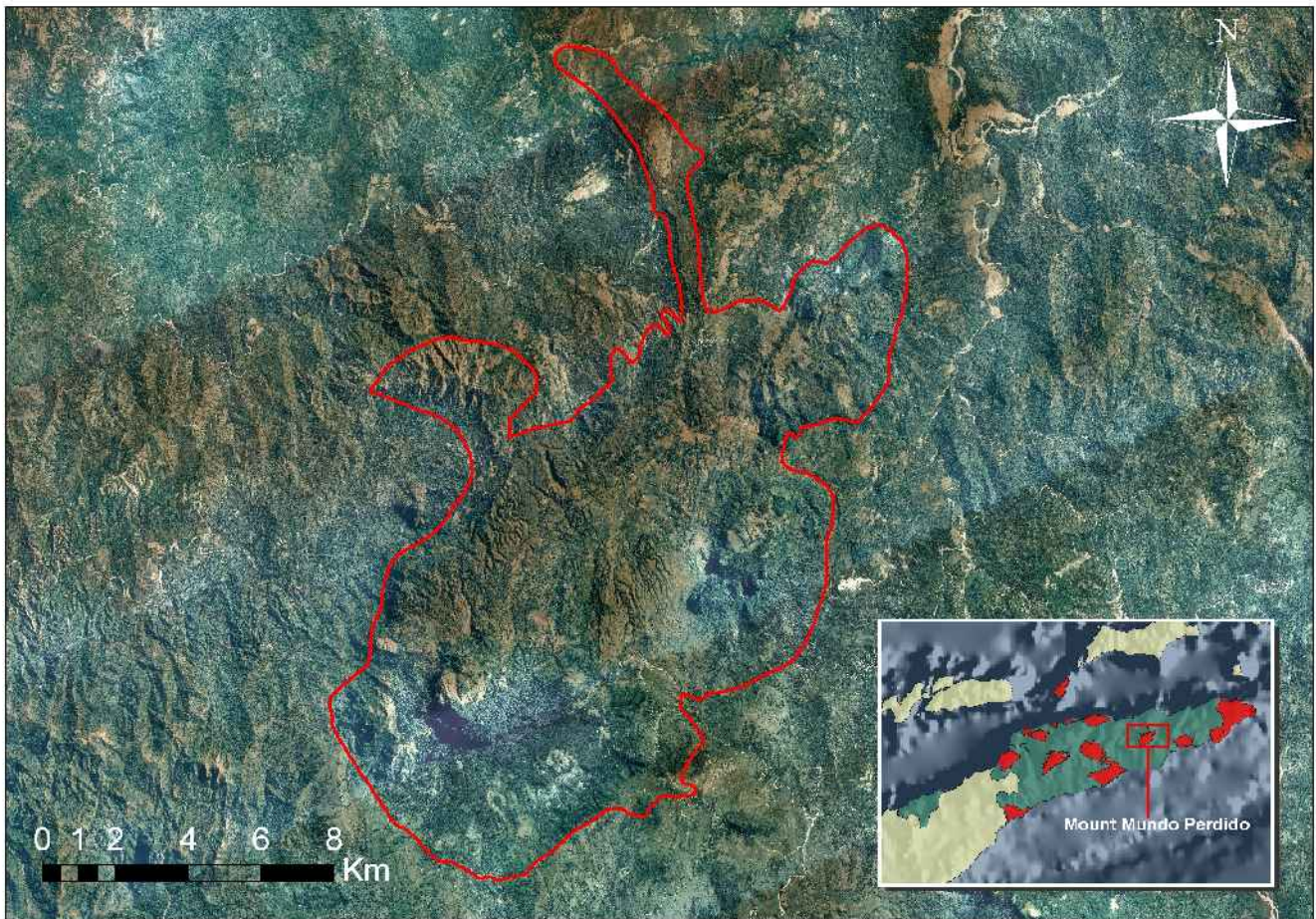
The Mount Mundo Perdido Important Bird Area (IBA) comprises an isolated mountain massif in central-east Timor-Leste. It rises to a maximum altitude of 1,760 m, with about 3,600 ha of land above 1,000 m, and the lower boundary has been defined using the 750 m contour (although this could be modified in the future to include any areas of high-quality forest below this altitude and to exclude any significant areas of human habitation or agricultural land). Most of the IBA is in Ossu sub-district, at the northern edge of Viqueque district, but it also includes Mount Laritame (c.1,390 m), which lies 5 km to the north-east of the peak of Mount Mundo Perdido in Vemasse and Venilale sub-districts, at the southern edge of Baucau district. There are four villages in the area: Ossu de Sima, Luihuno, Builalae and Liaruca. The Builo range (c.1,200 m, with an area of c.3,000-4,000 ha) in Uagua village, to the south-east of Mundo Perdido, is not currently included in the IBA, but might be added in the future if it proves to support significant biodiversity.

Mount Mundo Perdido has been protected from agricul-



The IBA is characterised by its rocky terrain, which is comprised mostly of karst limestone with skeletal soils.

tural development by its steep and rocky terrain. It is comprised mostly of karst limestone with skeletal soils, although there are deep organic soils in the forested areas and heavy clay on some of the slopes and plains. Based on data for nearby Ossu, the IBA has a highly seasonal climate with a wet season running from December to May-June, and a 4-5 month dry season from June-July to October. The annual rainfall at Ossu is 1,956 mm (more than double that of Dili), and the higher parts of Mount Mundo Perdido presumably receive substantially greater precipitation (perhaps 2,500-3,000 mm/yr), with additional moisture



**Map of Mount Mundo Perdido.** The red line delineates the region that qualifies as an Important Bird Area, IBA, as defined by BirdLife International (see Table).



**Table 1. Threatened and restricted-range bird species recorded in the Mount Mundo Perdido IBA.** The site clearly meets the criteria to be considered as an Important Bird Area, as defined by BirdLife International, under criterion A1: Globally threatened species, and criterion A2: Restricted-range species

English name	IUCN/ EBA
Dusky Cuckoo-dove <i>Macropygia magna</i>	-/RR
Slaty Cuckoo-dove <i>Turacoena modesta</i>	NT/RR
Timor Imperial-pigeon <i>Ducula cineracea</i>	EN/RR
Yellow-crested Cockatoo <i>Cacatua sulphurea</i>	CR/-
Olive-headed Lorikeet <i>Trichoglossus euteles</i>	-/RR
Iris Lorikeet <i>Psitteuteles iris</i>	NT/RR
Cinnamon-banded Kingfisher <i>Todiramphus australasia</i>	NT/RR
Plain Friarbird <i>Philemon inornatus</i>	-/RR
Yellow-eared Honeyeater <i>Lichmera flavicans</i>	-/RR
Red-rumped Myzomela <i>Myzomela vulnerata</i>	-/RR
Plain Gerygone <i>Gerygone inornata</i>	-/RR
Fawn-breasted Whistler <i>Pachycephala orpheus</i>	-/RR
Timor Figbird <i>Sphecotheres viridis</i>	-/RR
Olive-brown Oriole <i>Oriolus melanotis</i>	-/RR
Timor Stubtail <i>Urosphena subulata</i>	-/RR
Timor Leaf-warbler <i>Phylloscopus presbytes</i>	-/RR
Spot-breasted White-eye <i>Heleia muelleri</i>	NT/RR
Chestnut-backed Thrush <i>Zoothera dohertyi</i>	NT/RR
Orange-banded Thrush <i>Zoothera peronii</i>	NT/RR
Black-banded Flycatcher <i>Ficedula timorensis</i>	NT/RR
Timor Blue-flycatcher <i>Cyornis hyacinthinus</i>	-/RR
Red-chested Flowerpecker <i>Dicaeum maugei</i>	-/RR
Timor Sparrow <i>Padda fuscata</i>	NT/RR

#### Key

IUCN Threat Status: CR = Critically Endangered; EN = Endangered; NT = Near threatened;  
Restricted range species (EBA 164: Timor and Wetar) are indicated by RR

from near-nightly cloud-fall. Daytime temperatures average about 26-28°C at 1,200-1,400 m (18°C at night), and perhaps 20-22°C at 1,700 m (10°C at night).

Although it is not a particularly large massif, Mount Mundo Perdido is thought to include the largest remaining area of closed-canopy tropical montane forest in Timor-Leste and on Timor Island. The montane vegetation varies in structure with elevation and disturbance regime, but it is typically dominated by evergreen trees and shrubs (of up to 35 m tall), with numerous epiphytes (especially ferns, orchids and climbing pandan *Freycinetia* sp.). The forest above 1,450 m is of lower stature (15-25 m) and above 1,600 m it has a more open canopy, with a dense shrub layer and a ground layer of ferns (tree ferns *Cyathea* and king fern *Angiopteris evecta*) and mosses. Below 1,000 m there are remnants of tropical evergreen forest and small patches of *Casuarina junghuhniana* and open *Eucalyptus urophylla* forest. Historically, large areas on the lower slopes of Mount Mundo Perdido were converted to agriculture, and these have been maintained as grassland patches

by intensive livestock grazing and burning. Mount Laritame comprises a few hundred hectares of montane forest, with old agricultural fields and grassland.

Mount Mundo Perdido is the source of numerous springs and creeks, and all of the villages below the mountain are dependent on these watercourses for irrigating their rice-fields, watering their livestock, and for drinking, cleaning and cooking. Water is piped from several springs directly to the villages in Ossu sub-district, and also to Venilale which is 15 km to the north. The main human livelihoods in the Mount Mundo Perdido area are cultivation of rice and vegetable crops, raising livestock (buffalo, banteng, horses, pigs, goats and chickens), and harvesting of timber, rattan, orchids and ferns. There is a long history of agricultural use, with many of the cultivated areas having been cleared for vegetable gardens during Portuguese occupation 40-100 years ago. Coffee plantations covering about 200 ha were established in about 1900-1910, but the coffee bushes have not been maintained for the past 40 years because of security issues, although the coffee is sometimes harvested for local use. Large herds of horses, banteng and buffalo are owned and managed by local villagers and these graze the grassy lower slopes of the mountain. In addition to these, many feral (unowned) banteng roam the forested areas, having been abandoned by pro-Indonesian families who fled the region in 1999 and did not return.

#### Birds

Mount Mundo Perdido is considered to be the richest tropical montane forest site in Timor-Leste, and is therefore highly complementary to the recently-established lowland Nino Konis Santana National Park. To date, 22 of the restricted-range species of the Timor and Wetar Endemic Bird Area have been recorded on the mountain, of which one is globally threatened and eight are Near Threatened. Small numbers of the Critically Endangered Yellow-crested Cockatoo are also present. The IBA almost certainly hosts the largest, or among the largest, populations on Timor Island of a suite of hill and montane bird species. Most notable of these is the Endangered Timor Imperial Pigeon *Ducula cineracea*, which was found to be abundant during a dry season survey, but was much less vocal in the wet season. Several other pigeons are also abundant, including the restricted-range Slaty Cuckoo-dove *Turacoena modesta*.



The IBA includes Mount Laritame, which lies 5 km to the north-east of Mount Mundo Perdido



During recent surveys a total of 63 bird species were recorded in the Mount Mundo Perdido region and on Mount Laritame, including 61 that are presumed to be breeding residents and two northern migrants. Eleven of the resident species are hill and montane forest specialists, all of which appear to be abundant in the IBA. The most notable discovery was a population of Pygmy Blue-flycatcher *Muscicapella hodgsoni* on the upper slopes of the mountain, 1,700 km or more from the nearest known populations in Kalimantan and Sumatra; the taxonomic status of this isolated population is currently being investigated. Timor Bush-warbler *Bradypterus timorensis* was the only montane bird species known from Timor Island that was not found during the surveys. It is possible that this poorly-known species was overlooked, or is present in non-forest habitat that was not visited or in the open canopy forest and dense fern near the mountain summit (that was barely surveyed).

### Other biodiversity

At least 24 non-volant mammal species are known from Timor Island, but 22 of these are presumed to have been introduced and the two native species (Thin shrew *Crocidura tenuis* and Timor Rat *Rattus timorensis*) are very poorly known. Nine of the introduced mammal species were recorded at Mount Mundo Perdido during recent surveys: Common Spotted Cuscus *Phalanger orientalis*, Long-tailed Macaque *Macaca fascicularis*, Common Palm Civet *Paradoxurus hermaphroditus*, Domestic Pig *Sus domesticus*, Rusa Deer *Cervus timorensis*, Banteng *Bos javanicus*, Domestic water buffalo *Bubalis bubalis*, Polynesian rat *Rattus exulans* and House rat *R. tanezumi*. The IBA may support significant bat populations, particularly associated with caves: Goodwin (1979) identified Geoffroy's Rousette *Rousettus amplexicaudatus*, Sunda Fruit Bat *Acerodon mackloti* (Vulnerable), Western Naked-backed Fruit Bat *Dobsonia peronii*, and Indonesian Short-nosed Fruit Bat *Cynopterus titthaechilus*, and the recent surveys found Canut's Horseshoe Bat *Rhinolophus canuti timorensis* (Vulnerable).

Reptiles were rarely recorded during the recent surveys of Mount Mundo Perdido and the only snakes observed were a tree snake *Dendrelaphis pictus* and an unidentified colubrid. No Reticulated Pythons were observed, but they are reported to be fairly common by local people. Lizards also appear to be generally uncommon, but a Timor-endemic



A Timor-endemic skink, *Glaphyromorphus timorensis*, was one of the few reptiles recorded at Mount Mundo Perdido during recent surveys.



The Mount Mundo Perdido IBA is considered to have the richest tropical montane forests in Timor-Leste, with numerous epiphytes, including ferns, orchids and climbing pandans.

skink, *Glaphyromorphus timorensis*, was caught in a pit trap and observed under rocks.

A total of 14 ant (Hymenoptera: Formicidae) species, from 9 genera and 4 sub-families, were collected opportunistically from Mundo Perdido and Mount Laritame during the surveys. These comprise two widespread introduced species, an ant in the genus *Iridomyrmex* which is of Australian origin, and 11 South-East Asian rainforest ants. The low species total is a result of the very low survey intensity, and it is estimated that the total ant fauna in the area is probably about 40-50 species.

Several hundred plant specimens have been collected on Mount Mundo Perdido during recent surveys but many of these are yet to be identified, and the botanical richness of the IBA is not yet fully understood. It is considered to be one of the three most important sites in Timor-Leste for the conservation of orchids, the others being Mount Tata Mailau (IBA TL02) and Mount Fatumasin (IBA TL03). Several new orchid species have been collected on the mountain and a leguminous shrub in the genus *Tephrosia* (family Fabaceae) that was recently found there may also be an undescribed species. Two tree species in the Podocarpaceae (southern hemisphere conifer) family, *Sundacarpus amara* and *Dacrycarpus imbricatus*, are common, both of which widespread in the mountains of South-East Asia and the western Pacific. Other dominant tree species include *Elaeocarpus* sp, *Artocarpus pomiformis*, *Drypetes* sp, *Olea paniculata* and *Putranjiva roxburghii*.





Recent surveys have recorded 22 restricted-range bird species, including (from left) Chestnut-backed Thrush, Island Thrush, and Pygmy Blue-flycatcher; the latter is newly discovered, far from the nearest known population, which is in Borneo.

## Protection status

The “Monte Mundo Perdido and the surrounding forest, an area of approximately 25,000 hectares” was recognised by UNTAET (2000) as a Protected Wild Area under Regulation Number 2000/19. Mount Mundo Perdido therefore has legal protection but is not managed as a Protected Area; however, it has good potential as such. Several local villagers who were interviewed during recent survey visits were in favour of the mountain being included in a protected area, and they responded positively towards government plans to improve the management of livestock there.

## Conservation issues

### Biodiversity surveys

There have been three recent surveys of the IBA. In September 2006 (dry season) a four-day survey of birds, mammals and plants was conducted in tall evergreen montane forest at 1,250 m on Mount Mundo Perdido, and birds were surveyed there at 1,200-1,500 m over a four day period in December 2007. In April 2008, bird and vegetation surveys were conducted for eight days at Mount Mundo Perdido and for four days at Mount Laritame.

### Threats

*Timber extraction:* One of the main threats to the forests on Mount Mundo Perdido is unmanaged selective harvesting of timber for house construction and maintenance, and for sale. The greatest intensity of timber cutting is currently in secondary forest at lower elevations. Poles of 4 m by 10 cm are sold for US\$2 and poles of 3 m by 20 cm are sold for US\$5; a new house requires 38 poles, and further poles are needed for house maintenance every 5-7 years.

*Non-timber forest products:* The harvesting of non-timber forest products is also unmanaged, and the levels of collection of bamboo, rattan and orchids are of concern. There is a high local demand for bamboo, which is used to construct house walls, fences, beds, backpack, water carriers and *tuac* wine carriers. About five bamboo species occur on the mountain, some of which were probably planted there hundreds of years ago. They are intensively exploited and there is not currently enough bamboo to meet local demand. Three types of rattan are collected by many local people, and are used to make fences, with 1 m lengths sold for US\$0.30. Large numbers of orchids are collected from the forest and sold at roadside stalls. The young leaves of at least four types of ferns are collected as a vegetable by

many local families for personal use and for sale.

*Livestock grazing, fire maintained grasslands and erosion:* Historically, the forest was cleared from many of the slopes of Mount Mundo Perdido, and these areas have been maintained as grasslands by intensive livestock grazing and burning. Large areas of these grasslands have been degraded by intensive grazing by banteng, cattle, buffalo and horses, causing erosion, soil slumping and presumably reduced water quality, and these animals also graze inside the montane forests.

*Hunting and trapping:* Local people hunt many of the introduced mammals, including deer (using snares, clubs, dogs and bow and arrow), pigs and cuscus (which are both abundant), macaques and palm civets (hunted with dogs). Some native bats are also taken, including a large black and white fruit bat and a medium-sized bat (caught using barbed rattan dangling at cave entrances). Reticulated Python is not hunted at Mount Mundo Perdido, but a few local men at Mount Laritame catch them and sell the meat, oil and skin. The larger species of pigeons are shot with dart pipes at Mount Laritame, and a few local people shoot them using air rifles. Swiftlet nests have historically been collected from three caves, including a 2 km long cave at Mount Mundo Perdido named *Gua Pusuk*, but they are not currently being taken. In the past, several wild bird species were captured and sold to the Indonesian military, including Yellow-crested Cockatoo (which were worth US\$20 each), other parrots (US\$10), Helmeted Friarbird (US\$5), Plain Friarbird (US\$4) and Red Junglefowl (US\$5, but currently sold for US\$15 for a male and US\$10 for a female).

*Coffee plantations:* Re-initiation of rights to maintain and grow the abandoned coffee plantations (which have grown wild for about 40 years) is a potential threat to the forest habitat as areas of native vegetation would be pruned and cleared.

### Conservation measures taken

Mount Mundo Perdido was recognised by UNTAET (2000) as a Protected Wild Area under Regulation Number 2000/19, and this regulation passed automatically into national law at restoration of independence in 2002. It is therefore a protected area, although this has not yet led to any direct conservation action on the ground. The forests have survived because of the steep and rocky terrain in parts of the mountain, and they are considered *lulic* (sacred areas) by the local people which may have conferred some



Mount Mundo Perdido: the richest montane forest in Timor-Leste and perhaps all of Timor.

protection through local concepts of ownership and resource management. During the Indonesian period, Mount Mundo Perdido was a dangerous place to visit because it was an operational area for the Indonesian military, which prevented tree cutting and hunting, and at that time there were no cattle, horses or buffalo on the mountain.

#### Conservation measures proposed

Mount Mundo Perdido meets the criteria to be recognised as an Important Bird Area by BirdLife International, based on the numerous threatened and restricted-range species it supports. The site has good potential for establishment and management as a protected area. The following management recommendations have been proposed.

- Hold meetings in each village and hamlet in and around the mountain to explain the government regulations on timber harvesting, livestock grazing and the extraction of non-timber forest products.
- Implement government plans to regulate the management of livestock, by penning the animals and hence removing them from the forests and upper slopes of the mountain; systems need to be developed to provide feed for the penned livestock.
- Trap or shoot several hundred of the feral banteng that were abandoned by pro-Indonesian families in the late

1990s, possibly using a bounty scheme and/or holding traditional hunting festivals.

- Once the feral livestock have been removed, plant trees and re-afforest eroded gullies and slopes, to reduce erosion, sustain and improve water supplies, and benefit biodiversity.
- Assess the quantities of timber needed by local village for house construction, house maintenance and sale, and the areas where timber is currently being extracted from the mountain.
- Investigate the extraction of non-timber forest products from the mountain, particularly bamboo, rattan and orchids.
- Develop a village forestry program in collaboration with NGOs, to plant the hardwood trees that are currently used for house construction and sale.
- Explore the issue of coffee plantations, which are considered by local communities as evidence of their rights to the land, to determine whether compensation may be needed to relinquish those rights.

#### Sources and further reading

This site profile is based primarily on surveys by the authors from 9-19 April 2008 and in September 2006 and December 2007. Additional information is provided from the following sources:

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