Report at a Glance

Source: Rapid Biological Assessments of the Nakanai Mountains and the upper Strickland Basin: surveying the biodiversity of Papua New Guinea's sublime karst environments: 12

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EXPEDITION DATES

Kai-ingri and Wanakipa: July 5 – 30, 2008
Nakanai Mountains: April 2 – 27, 2009
Muller Range: September 2 – 27, 2009

DESCRIPTION OF EXPEDITIONS

Kai-ingri and Wanakipa

This 26-day RAP Expedition surveyed two areas: 1) montane habitats (~ 3,000-3,300 m) around Kai-ingri in the Kaijende Highlands, near Porgera in Enga Province, and 2) lower montane forests (~600-1,400 m) around Wanakipa in Southern Highlands Province, Papua New Guinea (PNG). Additional short forays were made to a series of 'sub-sites' around Porgera town including Paiam Forest behind Suyan Village (~ 2,200 m) and subalpine grasslands at Waile Creek and the Porgera Reservoir (3,000-3,200 m). Salticid spiders were also collected at Varirata Park (1-day), Port Moresby, and at Gahavisuka Park near Goroka during transit to and from the field.

Nakanai Mountains

This 26-day RAP Expedition surveyed three major sites in the Nakanai Mountains of East New Britain Province: 1) lowland forest in the vicinity of Lamas Camp (200 m), 2) hill forest at Vouvou Camp (859-900 m) and 3) lower-montane forest at Tompoi Camp (1,500-1,700 m). Additional collections were made at Palmalmal and Pomio townships on the coast of Jacquinot Bay during transit to and from the field, and some taxa were also sampled at Goroka and Gahavisuka Park in Eastern Highlands Province over several days following the survey.

Muller Range

This 26-day RAP Expedition surveyed three major sites in the Muller Range of Western and Southern Highlands Provinces: 1) lowland-hill forest around Gugusu Camp (~500 m) in Western Province. This site was unusual in having a number of plant taxa more typical of montane environments, presumably a result of the extremely wet and hence relatively cool conditions around the site, 2) lower montane forest around Sawetau Camp (1,300-2,000 m), a site on the border of Western and Southern Highlands Provinces that was remarkable for the near-complete lack of surface water, and 3) a montane fern-land/forest matrix at Apalu Reke Camp (2,875 m).

REASON FOR RAP SURVEYS

The flora and fauna of New Guinea's karst environments is probably less well known than that of any other habitat in Papua New Guinea. This lack of information is an impediment to the development of management strategies for these often dramatic and inhospitable landforms, a deficiency exemplified by the limited biological data available to support the 2006 listing of the Nakanai Mountains and Muller Range on the World Heritage Tentative List.

To redress this deficiency Conservation International initiated a series of RAP surveys that aimed to collect information about biodiversity in the poorly known karst environments of Papua New Guinea. With support from the Porgera Joint Venture (PJV) mining operation, the first of these surveys (Wanakipa 2008) documented data about the biodiversity of a poorly known region of the upper Strickland Basin. One of the major aims of this survey was to work closely with the Hewa people of Wanakipa to support the Papuan Forest Stewards initiative, and to learn from their traditional knowledge. That survey also collected additional data about biodiversity in the Kaijende Highlands to strengthen the case for its designation as a Conservation Area.

The next two sites surveyed, the Nakanai Mountains and Muller Range, were identified during a CI/CSIRO survey gap modelling process as being in dire need of biodiversity information. Both of these mountain ranges are predominantly karst environments, supporting the view that the biodiversity of New Guinea's karsts remains particularly under-documented. The Nakanai Mountains and Muller Range were included on the World Heritage Tentative List by the Papua New Guinea Government in 2006 in a submission titled 'The sublime karsts of Papua New Guinea'.

To address the lack of biological information, and to support nomination of these two areas as World Heritage Areas, Conservation International's Rapid Assessment Program (RAP), A Rocha International and the Papua New Guinea Institute of Biological Research (PNGIBR) formed a partnership to collect data on the species richness, endemism and conservation status of plants and animals in these two mountain ranges. The information collected during these RAP expeditions will be used to promote the conservation significance of these vast wilderness areas to local communities and to the PNG Government. It will also be used to inform and guide future conservation activities in the region by local communities, the PJV mining operation, and government agencies at the provincial and national levels including PNG Department of Environment and Conservation's World Heritage office. We hope that the outstanding biodiversity values of the spectacular karst environments documented during these surveys will provide impetus for their conservation.

MAJOR RESULTS

The three RAP surveys summarised here revealed an extraordinary diversity of animal and plant species in some of the most rugged and remote areas of Papua New Guinea. The karst environments of New Britain and mainland Papua New Guinea represent treasure troves of undiscovered biological diversity, living in landscapes of exquisite beauty. In total the RAP surveys documented around 2,000 species, including at least 350 species that are new to science (Table 1). The RAP team also recorded a large number of species that are listed under a conservation status category other than 'Least Concern' by the IUCN (see below), suggesting that all three regions surveyed are significant refuges for poorly-known and threatened taxa. Our observations in the Muller Range and in the Nakanai Mountains indicate that hunting pressure has not decimated the fauna there to the extent that it has over much of montane New Guinea. Furthermore, the Papuan Forest Stewards initiative with the Hewa people in the upper Strickland basin is an extremely positive force for conservation in that area. However serious concerns exist about the potential future impacts of fire on the montane environment of the Nakanai Mountains.

Species of conservation concern documented during these RAP surveys (excluding birds) are listed in Table 2.

KEY CONSERVATION RECOMMENDATIONS

The overwhelming conclusion from these surveys is that the karst environments of the Nakanai Mountains and the Muller Range are not only regions of sublime beauty and geomorphological interest, but they also harbour an exceptional diversity of poorly-known and endemic animal and plant species. ***The RAP team strongly supports the nomination of these areas for World Heritage status.***

Fire is a threat to the integrity of high-elevation forests in the Nakanai Mountains. Much of the montane forest on the Galowe Plateau has been impacted by growth of bamboo following cyclones, and devastating fires during the 1997-1998 El Nino weather pattern. We recommend that local communities be educated about the danger posed by wildfires in these unique montane forests.

Invasive species, including exotic ants, are a potential threat to biodiversity along the road inland from Marmar. Maintaining the integrity of the forest by preventing degradation of vegetation adjacent to the road margins will help to reduce these impacts.

Many species documented during these surveys are known to require relatively undisturbed, closed canopy forest for their survival. The principal threat to the survival of these species comes from habitat loss, especially from logging, gardening, and the development of oil palm plantations. Protecting the existing habitats at a range of elevations, or at least major, connected fragments of them, is the most effective way of ensuring the survival of the biodiversity in them.

For the Nakanai Mountains we believe that the above issues can best be addressed by assisting local communities to develop a management plan for the area that addresses a) restricting impacts to forest along existing roads, b) minimizes forest conversion for oil palm, gardens and timber extraction, and c) promotes awareness of the impact of fires on this environment.

We also suggest that targeted surveys be conducted for new and poorly-known species, particularly above ~1,500 m at other sites on the Galowe Plateau, to confirm the presence of these species in less impacted forest habitats.

The Muller Range represents a conservation priority of the highest international importance. Long-term preservation of its vast interconnected and uninhabited ecosystems across a pristine elevational gradient will benefit not only threatened species such as echidnas and tree-kangaroos which are declining under intense hunting pressure in many parts of their range, but also the exceptionally rich assemblage of endemic and poorly-known plants and animals found there.

The forests around Wanakipa are not as extensive as those in the nearby Muller Range but they support a substantially different assemblage of species and, significantly, the local community is actively engaged with the Papuan Forest Stewards initiative to promote conservation of their forests and wildlife. We anticipate that the 2008 RAP survey at Wanakipa will be the first of a series of similar surveys that engage the local Hewa people to continue their conservation activities, retain their traditional knowledge, and use that knowledge to educate more scientists and their own descendents about the biodiversity on their lands.

The Wanakipa RAP survey documented only a fraction of the species expected from this area. Additional surveys and targeted ecological studies in collaboration with the Hewa are needed to assess in greater detail the biodiversity of the region, and the distribution, abundance, and threats faced by "focal species" for conservation, especially the Long-Beaked Echidna (*Zaglossus bartoni*) and Goodfellow's Tree Kangaroo (*Dendrolagus goodfellowi*).

The survey at Kai-ingri confirms the Kaijende Highlands' tree fern savanna, tussock grassland, and adjacent upper montane forests as habitats of profound conservation value. The area of extent and environmental quality of these open alpine habitats and the status of the mammals they support are prime subjects for long-term monitoring studies in response to global warming. We recommend that 1) targeted ecological studies be undertaken to assess in greater detail the distribution, abundance, and threats faced by certain larger "focal species" in the region, such as echidnas (*Zaglossus*), tree kangaroos (*Dendrolagus*), and wallabies (*Dorcopsulus* and *Thylogale*) and 2) local communities be provided with information about the basic natural history of local biodiversity through dissemination of posters, fact sheets, and/or small field guides that illustrate local wildlife, discuss its significance to local communities, and emphasize such concepts as rarity and sustainable hunting.

Table 1. Number of species documented during three RAP surveys in PNG karst environments, 2008-2009. See text for site descriptions. N/A indicates taxon not sampled during that survey.

Survey/site	Plants	Ants	Katydids	Dragonflies	Spiders	Herpetofauna	Birds	Mammals	Grand Totals
Kai-ingri/Wanakipa 2008									
Number of species	371	N/A	N/A	18	128	21	51	17/22	**628**
(Estimated # of species new to science)	(5)	N/A	N/A	(1)	(50*)	(4)	-	-	(**70**)
Nakanai Mountains 2009									
Number of species	N/A	140	35	38	>100	39	64	26	**442**
(Estimated # of species new to science)	N/A	(40)	(12*)	(1)	(>50)	(4)	-	(3-4*)	(**>107**)
Muller Range 2009									
Number of species	520	237	90	36	>100	61	137	34	**1,215**
(Estimated # of species new to science)	(10)	(>30)	(>55)	(7)	(>50)	(25)	-	(1-2)	(**>178**)
Total species**	**757**	**377**	**125**	**~50**	**>328**	**80**	**>200**	**>60**	**1,977**
Estimated # species new to science	**15**	**>70**	**>67**	**9**	**>150**	**32**	-	**4-6**	**>350**

*results include at least one new genus

**Total numbers of species may be less than sum of rows due to overlap of taxa between sites

Table 2. Species of conservation concern documented during the 2008-2009 RAP surveys in the Nakanai Mountains and upper Strickland Basin, Papua New Guinea.

Species	Strickland 2008	Nakanai 2009	Muller 2009	IUCN Status*
Plants				
Aglaia agglomerata			X	NT
Ceratopetalum succirubrum	X			VU
Flindersia pimenteliana			X	EN
Intsia bijuga			X	VU
Dragonflies				
Hylaeargia magnifica	X			DD
Huonia moerens		X		DD
Rhinocypha liberata		X		DD
Frogs				
Austrochaperina novaebritanniae		X		VU
Asterophrys leucopus?			X	DD
Choerophryne burtoni			X	DD
Hylophorbus richardsi			X	DD
Litoria dorsivena	X		X	DD
Litoria majikthise			X	DD
Platymantis adiastolus		X		DD
Platymantis akarithymus		X		VU
Platymantis bufonulus		X		DD
Platymantis gilliardi		X		DD
Platymantis macrosceles		X		DD
Platymantis mamusiorum		X		DD
Platymantis nakanaiorum		X		DD
Platymantis nexipus		X		DD
Platymantis sulcatus		X		DD
Mammals				
Dasyurus albopunctatus (New Guinea Quoll)	X**		X	NT
Dendrolagus goodfellowi (Goodfellow's Tree-Kangaroo)	X			EN
Dendrolagus notatus (Central Ranges Tree-kangaroo)				EN
Miniopterus macrocneme (Small Melanesian Bentwing-bat)	X	X		DD
Nyctophilus microdon (Small-toothed Long-Eared Bat)	X**			DD
Rattus giluwensis (Giluwe Rat)	X**			DD
Uromys neobrittanicus (Bismarck Giant Rat)		X		NT
Zaglossus sp. (probably *bartoni*) (Eastern Long-beaked Echidna)	X		X	CR

*DD = Data Deficient, NT = Near-threatened, VU = Vulnerable, EN = Endangered, CR = Critically Endangered

**Kai-ingri only