Ethno-ornithology

Birds, Indigenous Peoples, Culture and Society

Edited by
Sonia Tidemann and Andrew Gosler

earthscan
publishing for a sustainable future

London • Washington, DC

2010

17

Everyone Loves Birds: Using Indigenous Knowledge of Birds to Facilitate Conservation in New Guinea

William H. Thomas

One of the greatest barriers confronting programmes that attempt to conserve both indigenous life and biodiversity is the confusion over the relationship between tradition and biodiversity. Because indigenous practitioners do not typically communicate in the genus and species parlance of Western science, it has been difficult to integrate indigenous knowledge within conservation planning. However, indigenous naturalists have been accumulating their knowledge unencumbered by the philosophical shifts of Western thought, developing a dynamic view of nature that incorporates connectedness, disturbance and recovery as a normal course of events in the natural world. Since Western science has only recently moved toward this non-linear view, the indigenous view of nature has, in a sense, been ahead of the emerging scientific consensus. Communication between conservationists and indigenous peoples can be facilitated by using indigenous knowledge of birds to identify the impacts of tradition upon biodiversity. Because indigenous peoples have a long-range perspective on the effects of human activity on avian diversity, they can provide a perspective vital to conservation planning. The Hewa of Papua New Guinea describe their traditions and traditional activities as playing a significant role in shaping the environment by creating a mosaic of habitats of varying diversity. While the current lifestyle of the Hewa may not necessarily be a template for future sustainability, the Hewa view of the natural world provides insights into the potential of indigenous peoples to conserve their resources.

Introduction

> *We, the Indigenous Peoples, have been an integral part of the Amazon Biosphere for millennia. We have used and cared for the resources of that biosphere with a great deal of respect because it is our home, and because we know that our survival and that of our future generations depends on it. Our accumulated knowledge about the ecology of our home, our models for living with the peculiarities of the Amazon Biosphere, our reverence and respect for the tropical forest and its other inhabitants, both plant and animal, are the keys to guaranteeing the future of the Amazon Basin, not only for our peoples, but also for all humanity.* (COICA, 1989)

The above statement was issued in 1989 by the Coordinating Body of Indigenous Organizations of the Amazon Basin (COICA) in an effort to reach out to conservation and development organizations. It plays to the most important of our remaining stereotypes concerning indigenous peoples and their relationship with the land – namely, that indigenous peoples have a special relationship with their land, a relationship that has prevented them from destroying their biological heritage. According to this stereotype, this relationship will enable them to continue to conserve their lands for future generations. When it was issued, the initial reaction to COICA's statement was enthusiastic (Chapin, 2004). It coincided with a surge in the interest in traditional ecological knowledge (TEK) that some had hoped would become a breakthrough for applied anthropology (Sillitoe, 1998). However, in the intervening years, enthusiasm for partnerships with indigenous communities has waned among conservationists (Chapin, 2004). I hope to re-ignite enthusiasm for creating such partnerships, using traditional knowledge of birds to reframe the discussion of the relationship between traditional societies and biodiversity.

The willingness of the Hewa people of Papua New Guinea (see Figure 17.1) to share their knowledge of their forests suggests that by focusing on the effect of human activity on birds, it is possible to establish common ground for the conservation of their lands and a template for others to follow.

Indigenous societies are often portrayed as stewards of their environment. Today their homelands contain much of the planet's remaining biological heritage (Robles, 2002). This, combined with their reverence for nature, has led many to believe that they are natural conservationists and has been the rationalization for combining sustainable development with conservation. Why not capitalize on these sustainable traditional land management techniques to conserve biodiversity (Posey, 1985)? The realization that the traditional lives of indigenous peoples could be compatible with biological diversity opened the possibility of cooperation between two groups that might seem to be natural allies: conservationists and indigenous peoples (Nabhan, 2001). Advocates for this alliance had essentially assumed that indigenous

Figure 17.1 *The largest and most diverse forest in the Pacific*

societies learned to minimize their impact upon the land (Smith, 1984). The apparent compatibility of tradition with biological diversity has, in turn, spawned an interest in understanding traditional management systems (Barrett et al, 2001), collecting TEK (Ludwig et al, 2001; Folke, 2004) and potentially using traditional practices as templates for biodiversity conservation (Posey, 1988).

Yet, the importance of local involvement in conservation may have blinded advocates to the realities of traditional life. Once it became apparent that their work was being cited as evidence that traditional societies had been conserving biodiversity, historical ecologists were quick to point out that such assumptions might be faulty (Sillitoe, 1996). In general, traditional systems seemed to be incapable of conserving species that serve as game (Redford, 1991). Although traditional forest use must be taken into account by modern managers, they cannot assume that these management practices will be compatible with conservation (Posey and Balée, 1989). It is a question of intent (Parker, 1992) because the conservation of biodiversity by traditional societies may have been their intention or a side effect of small-scale gardening by mobile peoples moving over a vast landscape. The fate of the alliance between conservationist and indigenous societies may hang in the balance.

While many agree on the need for local participation, the 20-year experiment of combining conservation with sustainable development is proving to be a disaster for both nature and participating indigenous societies (Soulé, 2000; Chapin, 2004). Prior to embarking on these partnerships for conservation, no consensus had emerged concerning the relationship between traditional life and biological diversity (West and Brechin, 1991). As a result, the inclusion of indigenous peoples in the conservation process has been problematic (Chatty and Colchester, 2002). This, in turn, has caused a backlash among parties who can usually be counted on as advocates for indigenous peoples. For example, some have questioned the usefulness of TEK in the face of global change (Terborgh, 2001; du Toit et al, 2004). Others have pointed to the discrepancy

between the Western perception of a traditional conservation ethic and reality (Salim et al, 2001). Advocates for this alliance may also be labouring under erroneous assumptions concerning the practicality of local participation in the face of national laws that negate local input in the conservation process (Pierce and Wadley, 2001). In general, the non-critical acceptance of the compatibility of traditional life with conservation has led to the failure of many conservation-based development schemes in the tropics and prompted conservationists to call for the reconsideration of the partnerships that lie at the heart of conservation-based development schemes (Soulé, 2000; Terborgh, 2001).

Untangling the relationship between biodiversity and traditional life

It has been assumed that the most biologically diverse ecosystems were the most stable (Reice, 1994); but natural systems have proven to be complex and difficult to define. Ecosystems are rarely, if ever, in a state of equilibrium.

This has led ecologists to abandon the equilibrium model and concentrate on the dynamic components of an ecosystem (Pickett et al, 1991); but the shift has gone unrecognized by many anthropologists (Smith, 1984). Authors continue to portray traditional societies as 'in balance' or describe a practice as 'adaptive'. Yet, this use of terms drawn from ecology and evolutionary biology is often outmoded (Hames, 1991).

Traditional societies can act as stewards of their biological inheritance, even under the stress induced by globalization. By factoring disturbance into the relationship between tradition and biodiversity, researchers have moved beyond the stereotypes of the 'noble savage' and are beginning to unravel the archaeological evidence of humanity's role in both historic and prehistoric extinctions (Diamond, 1986; Denevan, 1992). The continued disappearance of wild lands coupled with the coexistence of traditional cultures with biological diversity, often referred to as bio-cultural diversity (Maffi, 2001), has forced conservationists to reconsider notions concerning the nature of wilderness (Mittermeier et al, 2003).

The Hewa

The Hewa are a traditional society of swidden horticulturalists whose homeland is one of the island of New Guinea's most important wilderness areas. Because conservation programmes in Papua New Guinea must be generated by the local people, the Hewan understanding of the relationship between tradition and avian/biological diversity is linked to the conservation of this area.

In order to use the Hewa TEK of birds to describe the relationship between traditional activities and biological diversity so that it is intelligible to both the Hewa and conservationists, it was necessary to develop an ethno database that would go beyond species inventories (see also Nabhan, 2001).

New Guinea is one of the world's most significant centres of biodiversity and contains large tracts of intact forest (Myers et al, 2000). The Hewa live in one of New Guinea's most important wilderness areas, the headwaters of the Strickland River in the Central Range (142° 30'E, 5° 10'S, elevation 500m to 3000m). They number fewer than 2000 people and inhabit roughly 65,000ha of hilly and sub-montane forest in the uppermost Strickland River. These forests are located on the eastern verges of the 'Great Rivers Headwaters', a rain-soaked upland zone in the centre of New Guinea, the richest in biodiversity in this island (Beehler, 1993). Here, the four great river systems of New Guinea converge (Sepik, Fly, Digul and Idenburg). The Strickland is the major tributary of the Fly and the Hewa inhabit the forests where the Strickland meets the Laigaip River. The forests in this region are extensive and the land is dominated by a mosaic of primary and secondary growth forest. While there have been no previous studies of the forests in the Hewa territory, the area surrounding the headwaters of the Strickland River has been identified as a 'major terrestrial unknown' and has no formal conservation status (Swartzendruber, 1993).

While other societies in New Guinea have been described as developing traditions that enable them to coexist with biological diversity (Sillitoe, 1996). The Hewa describe their traditional activities as creating a mosaic of *Agwe* garden, *Poghali* grassland, *Agwe Teli* old garden, *Agwe Teli Popi* old garden 'true', and *Nomakale* primary forest – each with a set of pollinators and seed dispersal agents that are affected by the Hewa cutting the forest to establish and maintain gardens. The microclimate associated with altitude and terrain effectively confines Hewa horticulture between the altitudes of 500m at the riverbank and the base of the mountain wall at 1500m, with the majority of these gardens below 1000m. The Hewa raise their gardens, relying primarily on sweet potato (*Ipomoea batatas*), yams (*Dioscorea* sp.), banana (*Musa* sp.) and, to a lesser degree, cassava (*Manihot esculenta*) and pumpkin (*Cucurbita maxima*) as food crops. Scattered throughout the area are several species of *Pandanus* sp. and *Pangium edule* trees that the Hewa claim individually. The seasonal ripening of these trees, as well as gathering other wild foods and hunting, provides the Hewa with some sustenance, though gardens are the primary source of food. Like many New Guineans, the Hewa reuse their gardens. In order to use as much of the fence surrounding an old garden as possible, the Hewa cut new gardens adjacent to previous ones, thereby creating a chain of old and new gardens. The established gardens seldom lie fallow for more than 25 years, at which time their secondary forest cover is cut, burned and cleared and a new garden planted. The result is a mosaic on the surrounding hillsides comprised primarily of primary forest interspersed with small plots of land in the garden/fallow cycle. This mosaic of new gardens, grasslands, succession and primary forest increases the number of environments and, hence, is one measure of the biodiversity of this territory.

Because New Guinea is east of the Wallace line, the island lacks many of the mammalian agents of seed dispersal found to the west in Indonesia. In order to assess the compatibility of the traditional Hewa lifestyle with biodiver-

sity, informants were asked to describe the impact of traditional gardening upon New Guinea's primary agents of seed dispersal: birds. Well known to both local and international naturalists, birds are the key to forest conservation in New Guinea (Schodde, 1973).

Through a combination of structured interviews, transects and station surveys, the Hewa TEK concerning the impact of traditional activities upon birds was recorded. Working with the field guide *Birds of New Guinea* (Beehler et al, 1986), each informant was asked to identify the birds found in their territory, as well as the altitude and habitat that each bird favoured. Habitats were broadly defined using the above Hewa categories for garden. The old garden/old garden true distinction described their perception of the differences between the bird life found in secondary forest growth that was younger than 20 years (old garden) and secondary growth with more than 20 years (old garden true). The information obtained in interviews was then checked against four months of field surveys (see Beehler et al, 1987 for an example of the protocols used) (see Table 17.1). This gardening cycle is the most important factor in shaping this environment and has the greatest implications for conservation of these forests.

Like Western ornithologists, the Hewa associate species with altitude and habitat. Although the Western genus and species classifications do not correspond to the Hewa folk taxa (to date the 179 Western species correspond to 128 folk taxa), it was more important that the Hewa informants recognized the impact that human disturbance of the primary forest will have upon avian diversity. As expected, the Hewa were keenly aware of the linkage between birds and habitat. They indicated that some species are associated exclusively with primary forest and that others can make use of forests that the Hewa describe as the oldest secondary forest growth – that is, forest that has been growing for 20 or more years. Experience has taught the Hewa that cutting the primary forest will eliminate at least 33 per cent of birds (56 species) that can only live in primary forest. The effect of gardening on the habitat preferences of fruit- and nectar-eating birds is particularly important to biodiversity conservation because if the scale of habitat modification/disturbance is of sufficient magnitude, the Hewa will compromise the forest's ability to regenerate by limiting the habitats preferred by the agents of regeneration: fruit- and nectar-eating birds.

According to the Hewa, frugivores are rare in secondary forest growth that is younger than 20 years. Their gardens create an environment that is hostile to the fruit-doves *Ptilinopus* sp. and some species of lorikeets *Charmosyna* spp. Both species are vital to forest regeneration. In general, the Hewa report that human disturbance creates environments that are hostile to many species identified exclusively with New Guinea's forests. The Vulturine Parrot *Psittrichas fulgidus*, Pheasant Pigeon *Otidiphaps nobis*, Blue-collared Parrot *Geoffroyus simplex*, Wattled Brush-turkey *Aepypodius arfakianus*, Papuan Hornbill *Rhyticeros plicatus*, Flame Bowerbird *Sericulus aureus* and Purple-tailed Imperial-pigeon *Ducula rufigaster* are just a few of the species that the Hewa say will find secondary growth incompatible with their needs.

Table 17.1 *Hewa names of birds and their Western equivalents*

Hewa name	*Common name*	*Scientific name*	*Habitat*	*Diet*	*Altitude*
Masual	Grey Goshawk	*Accipiter novaehollandiae*	B	V	N, C
Masual	Black-mantled Goshawk	*Accipiter melanochlamys*	B	V	N, C
Masual Wuliai	Grey-headed Goshawk	*Accipiter poliocephalus*	B	V	N, C
Yalipap	Feline Owlet-Nightjar	*Aegotheles insignis*	B	I	A
Yalipap	Mountain Owlet-Nightjar	*Aegotheles albertisi*	B	I	A
To	Wattled Brush-turkey	*Aepypodius arfakianus*	B	G	N, C
Ke/Lalkai	Papuan King-parrot	*Alisterus chloropterus*	B	S	N, C
Labinam	Macgregor's Bower-bird	*Amblyornis macgregoriae*	B	F/I	C
Tolual	Gurney's Eagle	*Aquila gurneyi*	B	V	N, C
Fautal	Crested Hawk	*Aviceda subcristata*	B	V	A
Orlau	Josephine's Lorikeet	*Charmosyna josefinae*	B	N	N, C
Orlau	Little Red Lorikeet	*Charmosyna pulchella*	B	N	A
Orlau Meamea	Red-flanked Lorikeet	*Charmosyna placentis*	B	N	A
Orlau	Pygmy Lorikeet	*Charmosyna wilhelminae*	B	N	C
Ititali	White-eared Bronze Cuckoo	*Chrysococcyx meyerii*	B	I	N, C
Pabuka	Shovel-billed Kingfisher	*Clytoceyx rex*	B	A/V	A
Akupana	Northern Scrub Robin	*Drymodes superciliaris*	B	I	A
Muf	Purple-tailed Imperial-pigeon	*Ducula rufigaster*	B	F	N, C
Wipinam	Wattled Ploughbill	*Eulacestoma nigropectus*	B	I	N, C
Masual	Brown Falcon	*Falco berigora*	B	V	N, C
Pialu	White-bibbed Ground-dove	*Gallicolumba jobiensis*	B	F	N, C
Klaikal/Kulakula	Blue-collared Parrot	*Geoffroyus simplex*	B	S	N, C
Klaikal	Red-cheeked Parrot	*Geoffroyus geoffroyi*	B	S/F	N, C
Talifefa	Papuan Mt Pigeon	*Gymnophaps albertisii*	B	F	N, C
Fautal	Long-tailed Buzzard	*Henicopernis longicauda*	B	V	A
Paite Aliainam	Black-billed Cuckoo-dove	*Macropygia nigrirostris*	B	F	N, C
Wem	Common Scrubfowl	*Megapodius freycinet*	B	G	N, C
Fautal	Doria's Hawk	*Megatriorchis doriae*	B	V	A
Itali	Ornate Melectides	*Melectides torquatus*	B	N/A	N, C
Kun	Belford's Melectides	*Melidectes belfordi*	B	N/A	C
Kun	Yellow-browed Melectides	*Melidectes rufocrissalis*	B	N/A	C
Itali	Common Smoky Honeyeater	*Melipotes fumigatus*	B	F	N, C
Lekio	Black-winged Monarch	*Monarcha frater*	B	I/A	A
Ititapi	Red Myzomela	*Myzomela cruentata*	B	N/I	C
Ititapi	Red-throated Myzomela	*Myzomela eques*	B	N/I	C
Ititapi	Mountain Red-headed Myzomela	*Myzomela adolphinae*	B	N/I	C
Ititapi	Papuan Black Myzomela	*Myzomela nigrita*	B	N/I	C
Nilawi	Rufous Owls	*Ninox rufa*	B	V	A
Kawa	Pheasant Pigeon	*Otidiphaps nobis*	B	S/F	N, C
Atupupe	Dwarf Whistler	*Pachycare flavogrisea*	B	I	N, C
Wapintoa	White-eyed Robin	*Pachycephalopsis poliosoma*	B	I	N, C
Kwai	Short-tailed Paradigalla	*Paradigalla brevicauda*	B	A/F	C
Yaipof	Crested Pithoui	*Pithoui cristatus*	B	A	A
Ime	Palm Cockatoo	*Probosciger aterrimus*	B	S/V	A
Awia/Itap	Vulturine Parrot	*Psittrichas fulgidus*	B	F	N, C
Malkun	King of Saxony BOP	*Pteridophora alberti*	B	F/I	C
Tsai	White-breasted Fruit-dove	*Ptilinopis rivoli*	B	F	N, C
Fatula	Pink-spotted Fruit-dove	*Ptilinopus perlatus*	B	F	A
Fatula	Ornate Fruit-dove	*Ptilinopus ornatus*	B	F	A
Waliap	Dwarf Fruit-dove	*Ptilinopus nanus*	B	F	A
Nisuau	Spotted Babbler	*Ptilorrhoa leucosticta*	B	A	A
Nisuau	Chestnut-backed Jewel-babbler	*Ptilorrhoa castanonotus*	B	A	A

Table 17.1 *continued*

ewa name	Common name	Scientific name	Habitat	Diet	Altitude
suau	Blue Jewel-babbler	*Ptilorrhoa caerulescens*	B	A	A
ekowa	Great Cuckoo-dove	*Reinwardtoena reinwardtii*	B	F	A
lime	Hornbill	*Rhyticeros plicatus*	B	F/G	A
pap	Flame Bowerbird	*Sericulus aureus*	B	A/F	C
nia	Brown-collared Brush-turkey	*Talegalla jobiensis*	B	G	A
amyali Topela	Little Paradise Kingfisher	*Tanysiptera hydrocharis*	B	A/V	N, C
amyali Topela	Common Paradise Kingfisher	*Tanysiptera galatea*	B	A/V	N, C
leaunatal/					
onaiem	White-faced Robin	*Tregellasia leucops*	B	I	A
ilawi	Grass Owls	*Tyto capensis*	B	V	A
lilawi	Sooty Owls	*Tyto tenebricosa*	B	V	A
eteta	Pygmy Honeyeater	*Oedistoma pygmaeum*	B, Lg	N/I	A
eteta	Dwarf Honeyeater	*Oedistoma iliolophus*	B, Lg	N/I	A
akatul	Satin Flycatcher	*Myiagra cyanoleuca*	Lgt, B	I	A
Meanalu Hot	New Guinea Flightless Rail	*Megacrex inepta*	K	I/G	H, N
Mopagalalo	Willie Wagtail	*Rhipidura leucophrys*	K	I	A
ai Tai Nok	Spotless Crake	*Porzana tabuensis*	K, Kt	I/G	H
hilopatu	Fairy Gerygone	*Gerygone palpebrosa*	K, Lg	I	A
hilopatu	Green-backed Gerygone	*Gerygone chloronotus*	K, Lg	I	A
el	Greater Black Coucal	*Centropus menbeki*	K, Lg, B	A/V	H
eta	Black Cuckoo-shrike	*Coracina melaena*	K,Lg,B	A/F	A
ul	Butcher Bird	*Cracticus cassicus*	K, Lg, B	A/F	H, N
Keketia	Black-browed Triller	*Lalage atrovirens*	K, Lg, B	A/F	A
Sisinek	Long-billed Honeyeater	*Melilestes megarhynchus*	K, Lg, B	F/I	A
Niatili	Scrub White-eared Meliphaga	*Meliphaga albonotata*	K, Lg, B	F/I	A
Krifau	Brown Oriole	*Oriolus szalayi*	K, Lg, B	F/I	A
Krifau	Helmeted Friarbird	*Philemon buceroides*	K, Lg, B	F/I	A
Labinam	Rusty Pithoui	*Pitohui ferrugineus*	K, Lg, B	F/I	A
Kokoma	Red-necked Rail	*Rallina tricolor*	K, Lg, B	I/G	A
Kokoma	Forbes' Forest Rail	*Rallina forbesi*	K, Lg, B	I/G	A
Toblaibak	Tawny-breasted Honeyeater	*Xanthotis flaviventer*	K, Lg, B	G	A
Satid	Grey Wagtail	*Motacilla cinerea*	K, Lg, Ng	I	A
Luakanalu	Long-tailed Nightjar	*Caprimulgus macrurus*	K, Ng, Lg, B	I	H, N
Yamyali					
Manepnam	Azure Kingfisher	*Alcedo azurea*	Lg, B	A/V	A
Yamyali					
Manepnam	Dwarf Kingfisher	*Ceyx lepidus*	Lg, B	A/V	A
Puka	Black Butcherbird	*Cracticus quoyi*	Lg, B	G	A
Paiepe	Oriental Cuckoo	*Cuculus saturatus*	Lg, B	I	A
Kalapanau	Dollarbird	*Eurystomus orientalis*	Lg, B	I/V	A
Petapeten	Yellow-bellied Gerygone	*Gerygone chrysogaster*	Lg, B	I	A
We	Western Black-capped Lory	*Lorius lory*	Lg, B	N	A
Teti	Trumpet Manucode	*Manucodia keraudrenii*	Lg, B	F	A
Teti	Crinkle-collared Manucode	*Manucodia chalybata*	Lg, B	F	A
Mogalpupe	Golden Monarch	*Monarcha chrysomela*	Lg, B	I/A	A
Noanimano	Black-headed Whistler	*Pachycephala monacha*	Lg, B	I	A
Noloplopnam	Rusty Whistler	*Pachycephala hyperythra*	Lg, B	I	A
Ponaitetela	Island Leaf-warbler	*Phylloscopus trivirgatus*	Lg, B	I	N, C
Isinam	Hooded Pithoui	*Pitohui dicrous*	Lg, B	A/F	A
We	Dusky Lorikeet	*Pseudeos fuscata*	Lg, B	N	A
Taunam	Beautiful Fruit-dove	*Ptilinopus pulchellus*	Lg, B	F	A
Metaghalip	Northern Fantail	*Rhipidura rufiventris*	Lg, B	I	A

Table 17.1 *continued*

Hewa name	Common name	Scientific name	Habitat	Diet	Altitude
We	Rainbow Lorikeet	*Trichoglossus haematodus*	Lg, B	N	A
Faghal	Double-eyed Fig-parrot	*Cyclopsitta diophthalma*	Lgf, B	F	A
Yamyali Compata	Mountain Kingfisher	*Halcyon megarhyncha*	Lgf, B	A/V	A
Yamyali Compata	Forest Kingfisher	*Halcyon macleayii*	Lgf, B	A/V	A
Yamyali Compata	Sacred Kingfisher	*Halcyon sancta*	Lgf, B	A/V	A
Yau	Raggianna BOP	*Paradisaea raggiana*	Lgf, B	A/F	A
Mok	Papuan Frogmouth	*Podargus papuensis*	Lgf, B	I/V	A
Yaiptauf	Marbled Frogmouth	*Podargus ocellatus*	Lgf, B	I/V	A
Meanalu Cold	Spotted Catbird	*Ailuroedus melanotis*	Lgt, B	A/F	N, C
Meanalu Hot	Bush-hen	*Amaurornis olovaceus*	Lgt, B	I/G	N, C
Numa	Sulphur-crested Cockatoo	*Cacatua galerita*	Lgt, B	S	A
Winiainam	Pheasant Koel	*Centropus phasianinus*	Lgt, B	G	A
Awoo Pital	Magnificent BOP	*Cicinnurus magnificus*	Lgt, B	A/F	A
Nanam	King BOP	*Cicinnurus regius*	Lgt, B	A/F	A
Yaulo	Little Shrike Thrush	*Colluricincla megarhyncha*	Lgt, B	A	A
Osaunam	Bi-coloured Mouse Warbler	*Crateroscelis nigrorufa*	Lgt, B	I	A
Osaunam	Rusty Mouse Warbler	*Crateroscelis murina*	Lgt, B	I	A
Yamyali Uwowla	Rufous-Bell Kookabura	*Dacelo tyro*	Lgt, B	A/V	H, N
Wanainam	Common Koel	*Eudynamys scolopacea*	Lgt, B	I/G	A
Unkau	New Guinea Harpy Eagle	*Harpyopsis novaeguineae*	Lgt, B	V	A
Sisifu/Palu	New Guinea Bronzewing	*Henicophaps albifrons*	Lgt, B	S/F	A
Maunal	Papuan Hanging-parrot	*Loriculus aurantiifrons*	Lgt, B	N/F	A
Masitu	Buff-faced Pygmy-parrot	*Micropsitta pusio*	Lgt, B	L	N, C
Pakatu	Spot-winged Monarch	*Monarcha guttula*	Lgt, B	I	A
Uwaisia	Sclater's Whistlers	*Pachycephala soror*	Lgt, B	I	A
Eli Hot	Spotted Berrypecker	*Rhamphocharis crassirostris*	Lgt, B	F	A
Pusisa	Black Fantail	*Rhipidura threnothorax*	Lgt, B	I	H, N
Wisinep	Scrub-wren	*Sericornis virgatus*	Lgt, B	I	A
Wisinep	Beccari's Scrub-wren	*Sericornis becarii*	Lgt, B	I	A
Wisinep	Grey-green Scrub-wren	*Sericornis arfakianus*	Lgt, B	I	A
Nipalia	Thick-billed Ground-pigeon	*Trugon terrestris*	Lgt, B	S/F	H
Yenuk	New Guinea White-Eye	*Zosterops Novaeguinneae*	Lgt, B	G	A
Yenuk	Black-fronted White-Eye	*Zosterops artifrons*	Lgt, B	G	A
Yenuk	Western Mountain White-Eye	*Zosterops fuscicapillus*	Lgt, B	G	A
Teliam	Dwarf Cassowary	*Casuarius bennetti*	Lgtf, B	F	A
Yatini	Black-bellied Cuckoo-shrike	*Coracina montana*	Lgtf,B	A/F	A
Yatini	Black-shouldered Cuckoo-shrike	*Coracina morio*	Lgtf, B	A/F	A
Yatini	Stout-billed Cuckoo-shrike	*Coracina caeruleogrisea*	Lgtf, B	A/F	A
Yatini	Boyer's Cuckoo-shrike	*Coracina boyeri*	Lgtf, B	A/F	A
Yatini	Grey-headed Cuckoo-shrike	*Coracina schisticeps*	Lgtf, B	A/F	A
Neki	Zoe Imperial-pigeon	*Ducula zoeae*	Lgtf, B	F	A
Yalio	Eclectus Parrot	*Eclectus roratus*	Lgtf, B	S/F	N,C
Meapulu	Cinnamon Ground-dove	*Gallicolumba rufigula*	Lgtf, B	S/W	A
Paite Fiwow	Brown Cuckoo-dove	*Macropygia amboinensis*	Lgtf, B	F	A
Telivi	Black Berrypecker	*Melanocharis nigra*	Lgtf, B	F	A
Polipata/ Momio	Yellow-legged Flycatcher	*Microeca griseoceps*	Lgtf, B	I	A
Polipata /Momio	Olive Flycatcher	*Microeca flavovirescens*	Lgtf, B	I	A
Yaunam	Yellow-bellied Sunbird	*Nectarina jugularis*	Lgtf, B	N/A	A
Wal	Blue-breasted Pitta	*Pitta erythrogaster mackloti*	Lgtf, B	I/A	A
Walwala	Hooded Pitta	*Pitta sordida*	Lgtf, B	I/A	A
Walwala	Noisy Pitta	*Pitta versicolor*	Lgtf, B	I/A	A
Alualu	Wompoo Fruit-dove	*Ptilinopus magnificus*	Lgtf, B	F	A

Table 17.1 *continued*

Hewa name	*Common name*	*Scientific name*	*Habitat*	*Diet*	*Altitude*
Luapa	Superb Fruit-dove	*Ptilinopus superbus*	Lgtf, B	F	A
Yaunam	Slaty-chinned Longbill	*Toxorhamphus poliopterus*	Lgtf, B	N/A	A
Masual Tetia	Chinese Goshawk	*Accipiter soloensis*	Ng, Lg, B	V	H, N
Awenam	Brush Cuckoo	*Cacomantis variolosus*	Ng, Lg, B	I	A
Awenam	Chestnut-breasted Cuckoo	*Cacomantis castaneiventris*	Ng,Lg,B	I	A
Wesanalu	Papuan Flowerpecker	*Dicaeum pectorale*	Ng, Lg, B	A/F	A
Tetikal	Spangled Drongo	*Dicrurus hottentottus*	Ng, Lg, B	I	H, N
Simapanal	Whistling Kite	*Haliastur sphenurus*	Ng, Lg, B	A/V	A
Itain	Moustached Tree-swift	*Hemiprocne mystacea*	Ng, Lg, B	I	A
Isisapi	Emperor Fairy-wren	*Malurus cyanocephalus*	Ng, Lg, B	I	H, N
Isisapi	Broad-billed Fairy-wren	*Malurus grayi*	Ng, Lg, B	I	H, N
Tualiko	White-shouldered Fairy-wren	*Malurus alboscapulatus*	Ng, Lg, B	I	H, N
Pelapela	Blue-tailed Bee-eater	*Merops philippinus*	Ng, Lg, B	I	H, N
Simapanal	Black Kite	*Milvus migrans*	Ng, Lg, B	A/V	A
Atupe	Golden-backed Whistler	*Pachycephala aurea*	Ng, Lg, B	I	A
Telian /Wuaitula	Mountain Peltops	*Peltops montanus*	Ng, Lg, B	I	A
Anapf	Chestnut-bellied Fantail	*Rhipidura hyperthra*	Ng, Lg, B	I	A
Anapf	Rufous-backed Fantail	*Rhipidura rufidorsa*	Ng, Lg, B	I	A
Kghai Ke	Channel-billed Cuckoo	*Scythrops novaehollandiae*	Ng, Lg, B	I/G	H, N
Talinema	Wallace's Fairy-wren	*Sipodotus wallacii*	Ng, Lg, B	I	H, N
Apumat	Salvadori's Teal	*Anas waigiuensis*	W	W	A
Apumat	Plumed Whistling-Duck	*Dendrocygna eytoni*	W	W	A
Abf	White-faced Heron	*Egretta novaehollandiae*	W	V	A
Abf	Pied Heron	*Egretta picata*	W	V	A
Abf	Little Egret	*Egretta garzetta*	W	V	A
Abf	Great Egret	*Egretta alba*	W	V	A
Efaneni	Torrent Flycatcher	*Monachella muellerianna*	W	I	A
Pialimatal	Brahminy Kite	*Haliastur indus*	W, Ng	A/V	A
Aiabli	Swift	*Collocalia esculenta*	W, Ng, K, Lg, B	I	A

Notes: Common names: BOP = Bird of Paradise. Habitat codes: B = primary forest; Lgt = forest 20 years +; Lgtf = few found in forest 20 years +; Lg = secondary forest; Lgf = few found in secondary forest; Ng = new garden; K = grassland; Kt = old grassland; W = water.
Diet codes: V = vertebrates; I = insects; G = generalists; F = fruit; A = arthropods; S = seeds; N = nectar; L = lichen; W = feeds on waterborne vegetation an creatures. Altitude codes: A = all elevations; C = 1000m +; N/C = 800m +; H = 500m–800m.

By gathering TEK on the impacts of human activity, conservationists can obtain information on forest dynamics that is verifiable using site surveys but would require decades to gather by conventional research methods. The Hewa informants have put their land use in a context that illustrates the perils of combining the conservation of their forests with development. Rather than portraying themselves as capable of performing a super-human balancing act, the Hewa describe their traditional gardening purely as a source of disturbance on this landscape. At the current level of gardening, the Hewa increase the biodiversity of their lands. By felling the forest, they create a mosaic of primary forest, secondary forest, grasslands, gardens and the various phases of succession growth (gamma diversity). They also create habitats for organisms that cannot survive in the primary forest (alpha diversity). They are a living

example of the biological diversity that can be produced by a small human population with limited technology continually moving while cutting gardens (Balée, 1998). By gardening in the forest, it is possible for the Hewa to create a landscape that contains more organisms and more habitats than an unaltered landscape. In this sense, the Hewa are inextricably linked to the biological diversity found in their homeland.

A forest containing the type of small-scale gardening currently practised by the Hewa is a mosaic of many types of biological communities. The combination of gardens, grasslands, the various stages of forest regrowth and primary forest are more biologically diverse than the climax forest alone. The Hewa are creating habitats, each of which is less diverse (beta diversity) than the primary forest. While the current mosaic is more diverse than mountains covered exclusively in undisturbed primary forest, the total replacement of primary forest by secondary growth will diminish the biodiversity of the Hewa homeland. Their knowledge of this dynamic provides an important insight into the ability of indigenous humans to use the environment without compromising biological diversity.

Although it is always dangerous to generalize to other cultures, the Hewa have put their land use in a context that illustrates the perils of conflating a small-scale disturbance regime with sustainable management. If the relationship between traditional human activity and biodiversity is one of disturbance rather than balance, this has important implications for the ability of local people to conserve biological diversity in the face of changing conditions. The current diversity surrounding most forest-dwellers is a by-product of traditional land use by a small mobile society (Smith and Wishnie, 2000). Activities that at one time were sustainable and actually served to increase the number of species to be found in an area could, under slightly different conditions, diminish biodiversity. One needs look no further than the highland valleys to the south of the Hewa to find examples of the inability of tradition to curb habitat destruction when faced with novel circumstances. These societies, living in the valleys surrounding Lake Kopiago, Mount Hagen and Wabag, simplified their environments long before the arrival of Europeans. They took advantage of the bounty that accompanied the introduction of the sweet potato in the 16th century to grow in numbers and spread across these valleys. As their gardens increased, they transformed and simplified these once diverse landscapes. Their remaining biological diversity has been relegated to those areas too steep or too cold to be gardened profitably.

Finally, and most importantly, by using TEK in this manner, indigenous peoples can have a seat at the negotiating table as equals. Once assumptions concerning stability, balance and biodiversity are jettisoned, it is possible to understand how traditions can both promote biodiversity and cause extinctions under varying conditions. While societies such as the Hewa remain intact and their traditions are compatible with biological diversity, the knowledge exists to develop a land-use plan that is truly sustainable. This will not require super-computers, satellite imagery or an exotic research protocol. Using only

traditional knowledge of birds, it is possible to establish the connection between disturbance and biological diversity for other cultures in other areas. In so doing, indigenous landowners and conservation organizations can develop partnerships based on mutual understanding and trust for the sake of the planet's remaining 'good news areas'.

Acknowledgements

The author wishes to express his thanks to the National Geographic Society, Conservation International, the Barrick Corporation, Porgera Joint Venture and the Explorers Club for their support of this research.

References

Balée, W. (1998) *Advances in Historical Ecology*, Columbia University Press, New York, NY

Barrett, C. B., Brandon, K., Gibson, C. and Gjertsen, H. (2001) 'Conserving tropical biodiversity amid weak institutions', *Bioscience*, vol 51, pp497–502

Beehler, B. (1993) *A Biodiversity Analysis for Papua New Guinea – With an Assessment for Conservation Needs*, Biodiversity Support Program, Washington, DC

Beehler, B., Pratt, T. and Zimmerman, D. (1986) *Birds of New Guinea*, Princeton University Press, Princeton, NJ

Beehler, B., Krishna Raju, K. S. R. and Ali, S. (1987) 'Avian use of man-disturbed forest habitats in the Eastern Ghats, India', *Ibis*, vol 129, pp197–211

Chapin, M. (2004) 'A challenge to conservationists', *World Watch Magazine*, November/December 2004, pp17–31

Chatty, D. and Chochester, M. (2002) 'Introduction', in Chatty, D. and Colchester, M. (eds) *Conservation and Mobile Indigenous Peoples*, Berghahn, New York, NY

COICA (Coordinadora de Organaciones Indigenous de la Cuenca Amazonia) (1989) 'Two agendas for Amazonian development', *Cultural Survival Quarterly*, vol 13, no 4, pp75–78

Denevan, W. (1992) 'The pristine myth: The landscape of the Americas in 1492', *Annals of the Association of American Geographers*, vol 82, no 3, pp369–385

Diamond, J. (1986) 'The environmentalist myth', *Nature*, no 324, pp19–20

du Toit, J. T., Walker, B. H. and Campbell, B. M. (2004) 'Conserving tropical nature: Current challenges for ecologists', *Trends in Ecology and Evolution*, no 19, pp12–17

Folke, C. (2004) 'Traditional knowledge in socio-ecological systems', *Ecology and Society*, vol 9, no 3, p7

Hames, R. (1991) 'Wildlife conservation in tribal societies', in Oldfield, M. and Alcorn, J. (eds) *Biodiversity Culture, Conservation and Ecodevelopment*, Westview Press, Boulder, CO

Ludwig, D., Mangel, M. and Haddad, B. (2001) 'Conservation and public policy', *Annual Review of Ecology and Systematics*, no 32, pp481–517

Maffi, L. (2001) *On Biocultural Diversity: Linking Language, Knowledge and the Environment*, Smithsonian Institute Press, Washington, DC

Mittermeier, R., Mittermeier, C., Brooks, T. M., Pilgrim, J. D., Konstant, W. R., da Fonseca, G. A. B. and Kormos, C. (2003) 'Wilderness and biodiversity conservation', *Proceedings National Academy Science*, vol 100, no 18, pp10,309–10,313

Myers, N., Mittermeier, R., Mittermeier, C., da Fonseca, G. and Kent, J. (2000) 'Biodiversity hotspots for conservation priorities', *Nature*, no 403, pp853–858

Nabhan, G. (2001) 'Cultural perceptions of ecological interactions: An endangered people's contribution to the conservation of biological and linguistic diversity', in Maffi, L. (ed) *On Biocultural Diversity: Linking Language, Knowledge and the Environment*, Smithsonian Institute Press, Washington, DC

Parker, E. (1992) 'Forest islands and Kayapo resource management in Amazonia: A reappraisal of the Apete', *American Anthropologist*, vol 94, pp406–428

Pickett, S., Parker, V. and Fiedler, P. (1991) 'The new paradigm in ecology', in Fiedler, P. and Jain, S. (eds) *Conservation Biology*, Chapman and Hall, New York, NY

Pierce, C. J. and Wadley, R. L. (2001) 'From "participation" to "rights and responsibilities" in forest management: Workable methods and unworkable assumptions in West Kalimantan, Indonesia', in Pierce, Colfer, C. J. and Byron, Y. (eds) *People Managing Forests: The Links between Human Well-Being and Sustainability*, Resources for the Future, Washington, DC

Posey, D. A. (1985) 'Indigenous management of tropical forest ecosystems: The case of the Kayapó Indians of the Brazilian Amazon', *Agroforestry Systems*, no 3, pp139–158

Posey, D. A. (1988) 'Native and indigenous guidelines for new Amazonian development strategies: Understanding biological diversity through ethnoecology', in Hemming, J. (ed) *Change in the Amazon*, Manchester University Press, Manchester, UK

Posey, D. A. and Balée, W. (1989) 'Resource management in Amazonia: Indigenous and folk strategies', *Advances in Economic Botany*, vol 7, New York Botanical Gardens, Bronx, NY

Redford, K. H. (1991) 'The ecologically noble savage', *Cultural Survival Quarterly*, vol 13, no 1, pp46–48

Reice, S. R. (1994) 'Nonequilibrium determinants of biological community structure', *American Scientist*, vol 82, no 5, pp424–435

Robles, G. (2002) *Wilderness*, Toppan, Japan

Salim, A., Brocklesby, M. A., Tiani, A. M., Tchikangwa, B., Sardjono, M. A., Porro, R., Woelfel, J. and Pierce Colfer, C. J. (2001) 'In search of a conservation ethic', in Pierce Colfer, C. J. and Byron, Y. (eds) *People Managing Forests: The Links between Human Well-Being and Sustainability*, Resources for the Future, Washington, DC

Schodde, R. (1973) 'General problems of faunal conservation in relation to the conservation of vegetation in New Guinea', in Costin, A. B. and Groves, R. (eds) *Nature Conservation in the Pacific*, ANU Press, Canberra

Sillitoe, P. (1996) *A Place against Time: Land and Environment in the Papua New Guinea Highlands*, Harwood Academic, Amsterdam, The Netherlands

Sillitoe, P. (1998) 'The development of indigenous knowledge', *Current Anthropology*, vol 39, no 2, pp223–252

Smith, E. A. (1984) 'Anthropology, evolutionary ecology and the explanatory poverty of the ecosystem concept', in Moran, E. (ed) *The Ecosystem Concept in Anthropology*, Westview Press, Boulder, CO

Smith, E. A. and Wishnie, M. (2000) 'Conservation and subsistence in small-scale societies', *Annual Review of Anthropology*, vol 29, pp493–524

Soulé, M. (2000) 'Does sustainable development help nature?', *Wild Earth*, vol 10, no 4, pp56–63

Swartzendruber, J. F. (1993) *Conservation Needs Assessment*, USAID, Biodiversity Support Program, Washington, DC

Terborgh, J. (2001) 'Why conservation in the tropics is failing', in Rothenberg, D. and Ulvaeus, M. (eds) *The World and the Wild: Expanding Wilderness Conservation Beyond Its American Roots*, University of Arizona Press, Tucson, AZ

West, P. and Brechin, S. (1991) 'Introduction', in West, P. and Brechin, S. (eds) *Resident Peoples and National Parks*, University of Arizona Press, Tucson, AZ