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### The Avifauna of Mt. Kitanglad, Bukidnon Province, Mindanao, Philippines

#### A. Townsend Peterson

*The Field Museum, 1400 South Lake Shore Drive  
Chicago, IL 60605-2496, U.S.A.*

*Present address:*

*Natural History Museum*

*The University of Kansas, Lawrence, KS 66045, U.S.A.*

#### Thomas Brooks

*Center for Applied Biodiversity Science  
Conservation International, 1919 M Street NW  
Suite 600, Washington, D.C. 20036, U.S.A. and  
Department of Environmental Science, University of  
Virginia Charlottesville, VA 22904, U.S.A.*

*Present address:*

*Center for Applied Biodiversity Science Conservation  
International, SEARCA, House A  
Doña Aurora Street, UPCO  
University of the Philippines  
Los Baños College, Laguna, 4031, Philippines*

#### Anita Gamauf

*Konrad Lorenz-Institute for Comparative Ethology  
Austrian Academy of Sciences, Savoyenstraße 1A  
A-1160 Vienna, Austria*

*Present address:*

*Museum of Natural History Vienna  
Department of Vertebrate Zoology-Bird Collection  
Burgring 7, A-1014 Vienna, Austria*

#### Juan Carlos T. Gonzalez

*Animal Biology Division, Institute of Biological  
Sciences College of Arts and Sciences  
University of the Philippines-Los Baños College  
Laguna 4031, Philippines*

#### Neil Aldrin D. Mallari

*Environmental and Geographical Sciences Department  
John Dalton Building, Manchester Metropolitan  
University, Manchester, U.K.*

#### Guy Dutson

*1 High Way, Broadstone, Dorset BH18 9NB, U.K.*

#### Sarah E. Bush

*Department of Biology, University of Utah, 257 South  
1400 East, Salt Lake City, UT 84112, U.S.A.*

#### Dale H. Clayton

*Department of Biology, University of Utah  
257 South 1400 East, Salt Lake City, UT 84112  
U.S.A.*

#### Renato Fernandez

*Samar Island Biodiversity Project, SSPC-SRSF  
Complex Barangay Mercedes, Catbalogan, Samar 6700  
Philippines*

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# The Avifauna of Mt. Kitanglad, Bukidnon Province, Mindanao, Philippines

A. Townsend Peterson,<sup>1</sup> Thomas Brooks,<sup>2</sup> Anita Gamauf,<sup>3</sup>  
Juan Carlos T. Gonzalez, Neil Aldrin D. Mallari, Guy Dutson,  
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## Abstract

Intensive inventory work on the Mt. Kitanglad massif of north-central Mindanao, Bukidnon Province, Republic of the Philippines, revealed a diverse avifauna. In all, 198 bird species were detected, of which about 172 were likely breeding in the area, placing the mountain among the most diverse sites that have been surveyed in the country. Three migratory species (*Luscinia calliope*, *Turdus chrysolais*, and *Motacilla alba*) were detected on the island for the first time by contributors to this summary, and known ranges of several species were extended. The massif holds populations of at least 17 of the 18 species narrowly endemic to Mindanao—more than any other site yet studied—as well as almost half the species endemic to the entire Philippine archipelago. Endemic species are concentrated at higher elevations, whereas migrants and widespread species are more frequent in the lowlands. The Kitanglad massif, however, has been modified severely below about 1200 m, with removal of almost all lowland forest habitats. Records and data accumulated by historical collectors, recent collectors, and recent observers are compared and contrasted to reflect on the biases, strengths, and omissions in each. The importance of the Kitanglad region to effective conservation of biodiversity in the southern Philippines is particularly emphasized.

## Introduction

The study of regional patterns of biological diversity is a complex challenge. Patterns of geographic distribution, species limits, variation, and differentiation—alpha-taxonomy—must be studied and defined for each species. Single-site inventories must be conducted to determine local levels of diversity and integrated into a regional view of spatial variation in diversity and endemism (Colwell & Coddington, 1994). These patterns can then be compared with features of the physical and biological environment to produce a synthetic understanding of determinants of patterns of biological diversity. Obviously, this process is labor intensive and time consuming, but completion of such syntheses of regional patterns of biological diversity is crucial both to conservation action and to many

scientific questions regarding the process of biological diversification.

The many islands that make up the Republic of the Philippines have an odd history of ornithological exploration (Dickinson et al., 1991). The earliest collections from the region were the occasional and opportunistic samples that characterize those of much of the Tropics, with a few more comprehensive expeditions by European and American groups (summarized in Dickerson, 1928). In-depth, systematic sampling did not begin until after World War II, when D. S. Rabor initiated a long series of inventories of sites throughout the Philippines (Dickinson et al., 1991). Rabor's collections are immense (perhaps 60,000+ bird specimens, widely dispersed around the world's museums) (Kennedy & Miranda, 1998) and could constitute a foundation for thorough documentation of

many aspects of Philippine biological diversity if properly evaluated and interpreted. Recent landmark detailed studies (Goodman & Gonzales, 1989; Goodman et al., 1995) and country summaries (Dickinson et al., 1991; Collar et al., 1999; Kennedy et al., 2000) have provided synthesis of knowledge accumulated to date.

These studies have become especially relevant because of the crisis of conservation of tropical forests and their biological diversity, with the Philippines ranking among the countries with greatest threat of forest destruction and with the most biological diversity to lose (Brooks et al., 1997; Heaney & Regalado, 1998; Myers et al., 2000). No longer are such studies of interest only to systematic biologists. Now, each study must be placed in a perspective of faunal composition and levels of endemism because the results should form the basis for decisions regarding the relative importance of different sites for conservation action.

The present contribution thus has 2 chief objectives: (1) We present an inventory of the birds of a single mountain range—the Mt. Kitanglad massif in north-central Mindanao—which can stand with other such studies as points of reference for interpreting patterns at sites not yet studied, and (2) we compare the results of our studies with those of past workers in the region (Ripley & Rabor, 1961) both to understand changes that have occurred in the avifauna and to begin to provide a general yardstick to aid in understanding Rabor's surveys elsewhere.

## History of Ornithology in Bukidnon Province

The earliest scientific explorations of Mindanao were in the 1770s by Sonnerat, in the Zamboanga Peninsula, but the Mindanao highlands were not visited until more than a century later, when Montano climbed Mt. Apo in the 1880s (Dickinson et al., 1991). Many new species endemic to Mt. Apo, Mindanao as a whole, or Greater Mindanao (the group of islands that joined in the Pleistocene to form 1 large island) (Heaney, 1986) were discovered on these early explorations.

The ornithological exploration of northern Mindanao began with work by Everett in the 1870s and Zimmer's visit in 1915 to Mailag and Sumilao in Bukidnon Province (Zimmer, 1918). The Danish Philippine Expedition of 1951–1952 was first to climb high into the Mt. Kitanglad

massif (Salomonsen, 1953). D. S. Rabor and R. Gonzales followed with a series of expeditions into the Kitanglad region in the early 1960s that revealed a new species, *Erythrura coloria*, and the only known Philippine populations of *Serinus estherae* (Ripley & Rabor, 1961). Aside from brief visits by Gonzales during studies of *Pithecophaga jefferyi* (Gonzales, 1968), our own fieldwork, and a 1996 survey by NORDECO and DENR (1998), the region has not seen attention from museum-based ornithologists in recent decades.

Starting in the early 1980s, Kitanglad became a focus of activity for bird-watchers. Numerous organized groups, often guided by T. Fisher and organized through KingBird (B. King) and Bird-Quest (S. Harrap, N. Redman, and P. Morris), have visited the mountain, along with increasing numbers of independent bird-watchers. Many of these bird-watchers have kindly provided us with trip reports (Table 1; Lambert, 1993; Hornskov, 1995); others kindly provided information on their observations as well (e.g., G. Anderson, R. Timmins, I. Gardner, N. Bostock, P. Heath, A. Long, M. Heath, S. Hayhow, C. Bell, A. Pierce, M. Fehlow, P. Thompson, J. Gregory, and A. Barnwell). This information, although not substantiated by specimen vouchers, nonetheless serves to enrich the picture of local bird diversity greatly. Overall, although Kitanglad is remote, this rich history of ornithological exploration invites a thorough review and avifaunal analysis.

## Study Area and Methods

The Kitanglad range has an area of about 31,300 ha and is centered at about 8°7.2'N, 124°54.6'E, approximately 70 km southeast of Cagayan de Oro and 20–30 km west of Malaybalay, Bukidnon. It consists of several mountain peaks of 1500–2938-m elevation surrounded by plains at 500–600 m. Much of the lowland forest has been disturbed or cleared through extensive logging and conversion to agriculture; the little that is left is under heavy pressure from shifting agriculture and illegal logging. While forests on several major peaks in the range have burned, either because of lightning or anthropogenic causes (e.g., Mt. Kitanglad Peak, 2899 m), important parts of the range (e.g., Mt. Dulang-Dulang, 2938 m) still support some primary lowland and extensive primary montane and mossy forests. The importance of the massif in a

TABLE 1. Summary of unpublished bird reports incorporated in this study.

	Observers	Year	Title
a	Fairbank, R.	1996	Philippines Trip: Apr. 1996
b	Gee, B.	1997	The Philippines, Winter 1996/97
c	Gonzales, J. C. T., and N. A. D. Mallari	1993	The Transitional Montane-mossy Forest Avifauna of Mount Kitanglad National Park, Bukidnon, Mindanao Island, Philippines
d	Greensmith, A.	1990	The Philippines, 4 Mar.–9 Apr. 1990
e	Heaney, L. R., E. A. Rickart, B. R. Tabaranza, J. C. T. Gonzales, N. A. D. Mallari, and A. T. Peterson	1993	Survey of Vertebrate Diversity in Kitanglad Nature Park, Mindanao. Final Report for 1992 and 1993.
f	Hornbuckle, J.	1994	Birdwatching in the Philippines. Trip Report for Jan.–Feb. 1994 and Definitive Guide to Key Sites
g	Ishøi, F., and M. Trasborg	1999	Mount Kitanglad. 2/12–10/12 1998
h	Jakobsen, M. K., and N. S. Andersen	1999	Complete Systematic List of Birds Seen on Mount Katanglad. Friday 3 April–Friday 10 April 1998.
i	Jensen, S., and J. Hornskov	1992	The Philippines, Feb. 17–July 5 1987
j	Jensen, S., and J. Hornskov	1993	The Philippines
k	Jones, L.	1992	Bird List for the Philippines. 17 February to 11 March 1992
l	King, B. F.	1983	King Bird Tour April/May 1983
m	Lewis, I.	1991	The Philippines: 23rd February–16th March 1991
n	Mark, T.	1994	Philippines: Three Sites 15 Sept. to 26 Sept. 1994
o	Simpson, B.	1995	The Philippines (Mindanao, Dinagat, Bohol, Cebu, Siquijor, Palawan, Olango Island, Ursula Island and Manila). 14th December '94 to 9th February '95

number of respects is clear: besides its potential for biodiversity conservation, it is a major watershed, with more than 20 rivers flowing from the range in all directions.

ATP, JCTG, NADM, and RF conducted fieldwork and collected specimens at elevations of 500–2250 m on Kitanglad (Fig. 1) in 1992–1993. In Apr.–May 1992, 3 sites were surveyed in detail (1100-m camp, 1600-m camp, 1800-m ridge) along an elevational transect up the northwest face of Mt. Imbayao (Table 1e). At the base of this transect (500 m), a local settlement, Camp Roa, was less than 5 years old, creating disturbance along the road from San Vicente, a larger town a few kilometers distant. Disturbed midmontane dipterocarp forest extended from about 700 to 1100 m, followed by primary midmontane forest to approximately 1600 m. Primary montane forest was present up to the transitional montane-mossy forest at the 1800-m peak. In Mar.–Apr. 1993, JCTG, NADM, and RF surveyed 2 higher sites (1900 m and 2250 m) on the north face of Mt. Nangkabulos, which were in primary upper montane forest and lower mossy forest, respectively (Table 1c). Details of the 5 intensively studied sites are as follows:

**1100-m Camp**—Mindanao, Bukidnon Province, Mt. Kitanglad Range, Mt. Imbayao Peak, 15 km S, 6 km E Baungon, 1100 m, 8°11'N, 124°44.5'E, 16 Apr.–1 May 1992.

This site was in primary midmontane forest along a broad ridge with steep sides. Canopy height was 20–25 m, with emergent trees reaching ca. 30 m; tree diameters ranged 25–60 cm. Canopy vines, climbing bamboo, pandans, and epiphytes including orchids, ferns, and moss, were present but not common. A thin layer of leaf litter covered most of the ground. The soil was weathered volcanic ash, with some small stones; a thin layer of humus covered most of the ground, reaching a maximum depth of ca. 5 cm. Fallen logs were common, and large exposed rocks were present along the ridgetop and streams.

**1600-m Camp**—Mindanao, Bukidnon Province, Mt. Kitanglad Range, Mt. Imbayao Peak, 15 km S, 7 km E Baungon, 1600 m, 8°10'N, 124°45'E, 28 Apr.–21 May 1992.

This site was located on a broad ridge in primary montane forest, with gentle slopes on the ridgetop, and 30–60° slopes on the sides. Emergent trees, including a conifer (*Agathis*), had an average height of 20 m with diameters

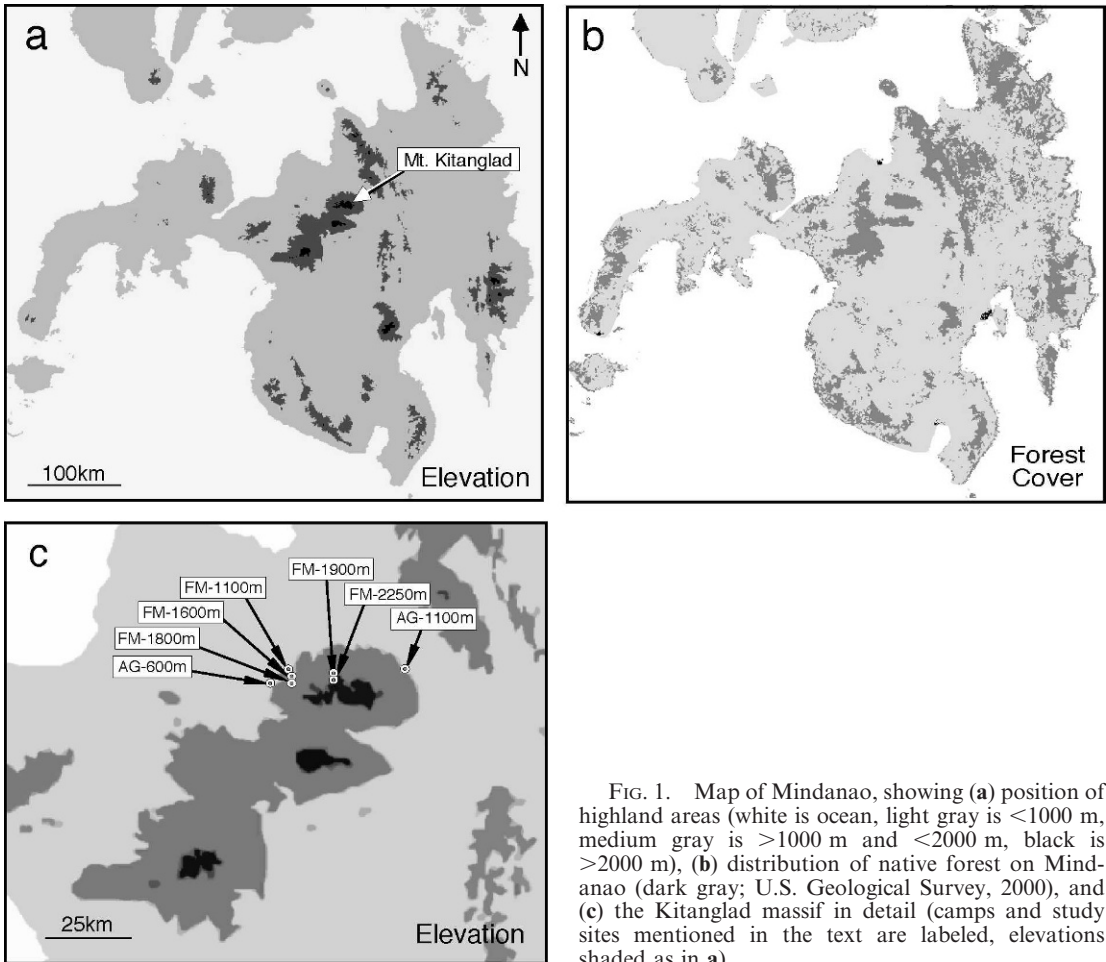


FIG. 1. Map of Mindanao, showing (a) position of highland areas (white is ocean, light gray is <1000 m, medium gray is >1000 m and <2000 m, black is >2000 m), (b) distribution of native forest on Mindanao (dark gray; U.S. Geological Survey, 2000), and (c) the Kitanglad massif in detail (camps and study sites mentioned in the text are labeled, elevations shaded as in a).

of 30–60 cm. Canopy trees, including some oaks and a *Cinnamomum*, were about 15 m tall, with diameters of about 30 cm. Common epiphytes included ferns (including bird’s-nest ferns), orchids, and hanging moss. Canopy vines (pandans and rattans) were moderately common. The understory was dominated by saplings, a few tree ferns (*Cyathea*), erect screw-pine *Pandanus*, and some *Melastoma*. Occasional patches of tall “sawgrass” were present. *Ficus* density was low, but other fruiting trees were fairly common, both in the canopy and in the understory. Density of moss was low to moderate, found on tree trunks, logs, and old trees and some on the ground. The ground surface was covered by 2–6 cm of leaf litter, on top of a humus layer typically 4–8 cm deep. Disturbance consisted of a few scattered tree falls.

**1800-m Ridge**—Mindanao, Bukidnon Province, Mt. Kitanglad Range, Mt. Imbayao Peak, 15 km S, 7 km E Baungon, 1800 m, 8°9’N, 124°45’E, 7–21 May 1992.

This site was in primary transitional montane/mossy rain forest, near a small grass-covered peak. The moderately open canopy included trees up to 15 m tall on the ridge sides and 10 m on the ridgetops. Undergrowth was heavy, and fallen logs were common. Moss grew on tree trunks, limbs, and twigs from the ground to the canopy, thickly on the trunks and ground but thinner elsewhere. Ferns, orchids, and other plants grew abundantly as epiphytes, and pandan vines were abundant. Leaf litter was profuse, and the humus layer was thick (more than 1 m in most places) and spongy. A thick root mat on the surface gave the ground a springy resilience. Long strings of

epiphytes similar to Spanish moss hung from many trees. Fog was quite common.

**1900-m Camp**—Mindanao, Bukidnon Province, Mt. Kitanglad Range, Mt. Nangkabulos Peak, 16.5 km S, 4 km E Camp Phillips, 1900 m, 8°10.5'N, 124°51'E, Mar.–Apr. 1993.

This site was in primary upper montane rain forest, in an area characterized by steep slopes and fairly narrow ridgetops. Canopy height was typically 15–20 m, but emergents reached 20–25 m; none of the trees had buttresses. Tree diameters averaged 20–30 cm. Oaks and laurels were common, and a few strangler fig trees were present but no dipterocarps. Ferns and moss were common epiphytes; “Spanish moss” and orchids were less common. Canopy vines (especially pandans) were common. Fallen logs, often rotten, were common. Ground cover consisted of ferns, climbing ferns, small shrubs, wild raspberry, and moss. Leaf litter covered virtually the entire ground surface, usually 1–2 cm deep, underlain by a layer of moist humus 10–30 cm deep on top of weathered volcanic ash.

**2250-m Camp**—Mindanao, Bukidnon Province, Mt. Kitanglad Range, Mt. Nangkabulos Peak, 15.5 km S, 4 km E Camp Phillips, 2250 m, 8°9.5'N, 124°51'E, Mar.–Apr. 1993.

This site was located in primary lower mossy rain forest characterized by steep slopes (typically 20–45°). The incomplete canopy averaged 7–10 m high, with emergents reaching 12–15 m on ridgetops and 14–18 m on ridge sides. None of the trees had buttresses; DBH averaged 20–50 cm, but a few reached 110 cm. The trees largest in diameter were gymnosperms of at least 2 species, including *Podocarpus* sp. Moss, “Spanish moss,” ferns, and orchids were common epiphytes; canopy vines were nearly absent. Fallen logs, many quite rotten, were common. Understory and ground cover plants were abundant, including *Rhododendron* as a common element, fruit-bearing shrubs, saplings, ferns, and climbing ferns. Moss was common on and near the ground, 1–3 cm thick on trunks and fallen logs, but was scarce more than 2 m above the ground. Leaf litter covered virtually the entire ground to a depth of 5–20 mm, lying on top of a layer of humus 10–50 cm in thickness that lay over weathered volcanic ash with scattered large rocks (up to 4 m in diameter) that protruded through the humus and leaves.

The Field Museum inventories were carried out during 2 separate trips to the mountain massif. At each site, lines of 3–15 mist nets (12 m long, 3-cm mesh, set 0–2 m above ground) were set crossing each major microhabitat type (ridgetops, valleys, streams); these lines were checked 3–8 times daily; birds captured were identified to species and either marked (to prevent double counting in estimates of abundance) and released or preserved as voucher specimens. A total of 174 net-days was accumulated on the 1100–1200-m ridges, 297 on the 1700-m ridge, 68 on the 1800-m ridge, 66 at 1900 m, and 57 at 2250 m. These nets were set to maximize bat as well as bird captures (e.g., with nets in more open areas, ridgetops, and so on than would have been used otherwise). Additional avian specimens were collected from snap-traps during intensive mammal trapping on the 1100–1300-m, 1700–1850-m, and 1900–2250-m ridges; many terrestrial, invertebrate-eating species were collected, especially at higher elevations, where traps were baited principally with earthworms. Additional records were accumulated by extensive daily observations, by surveys with tape recorders later analyzed with reference to work elsewhere in the Philippines, and by limited hunting with an air rifle. Specimens were prepared as either study skins, skeletons, or skin/skeleton preparations or were preserved whole in formalin and were deposited at the Philippine National Museum and the Field Museum of Natural History (Appendix). Frozen tissues were preserved from all specimens.

The 700–1850-m and 1900–2250-m portions of the Field Museum transect were carried out in different sectors of the mountain range. The lower portion was done on the northwest slopes (climbing up from Cagayan de Oro along the Baungon River to the settlements of San Vicente and Camp Roa), where lowland forest was most extensive. That extreme of the mountain range, however, has its peak at 1850–1900 m, so additional studies had to be carried out farther east, on the north face, where higher-elevation forest was available. However, given near-asymptotic species discovery curves and a high degree of coincidence between the results of the 2 portions of the transect in terms of species' elevational limits, we feel confident that the 2 field seasons can indeed be combined to provide a picture of altitudinal changes along the slopes of Mt. Kitanglad.

SEB and DHC worked at several sites (particularly at 10.7 km S, 2.9 km W Sumilao,

8°11'20"N, 124°55'20"E) on the massif on 25 Apr.–4 May 1999 in the course of studies of ectoparasite faunas associated with Philippine birds (e.g., Clayton & Johnson, 2000); focus was on collection of specimens (particularly of swiftlets) for ongoing ectoparasite studies, resulting in 123 net-days (at 1440–1525 m), and 106 specimens of 31 species. Nets were set principally for birds, as contrasted with some of the “bat” nets in the Field Museum work, and no specimens were obtained using firearms.

In the course of studies of Philippine raptors (Gamauf et al., 1998a,b), AG and colleagues conducted fieldwork in 2 areas on Kitanglad in 1993–1994. The northeast foothills (Dalwangan site) were visited 3 times (13–21 Mar. 1993, 2–23 Jan. 1994, and 30 Mar.–11 Apr. 1994, a total of 43 days), and the northwest flank (Kalawaig site) of the massif was visited twice (25–30 Mar. 1993 and 17–29 Apr. 1994, a total of 19 days). The 2 study sites were as follows:

**600-m Camp**—Mindanao, Bukidnon Province, northwest slope Mt. Kitanglad Range, up the Kalawaig River and its surroundings; study area covers about 45 km<sup>2</sup>, 4.5 km east-southeast of San Antonio (440 m), 1.5 km E Lantud (700 m), 8°9'N, 124°42'E, 25–30 Mar. 1993 and 17–29 Apr. 1994.

The group worked at elevations between 600 m and 1000 m, occasionally up to 1200 m. The broad, gently inclined slopes were mainly covered by disturbed lowland dipterocarp forest (average canopy height ca. 25 m, with emergents occasionally reaching 35 m; tree diameters ranged from 20 to 40 cm; dense understory). The area was selectively logged in the early 1980s. The residual forest line was at an elevation of ca. 550 m and the primary forest line at ca. 900–1100 m on the broad slopes but as low as 650 m in the narrow Kalawaig River valley. The indigenous people practice agriculture, which is relatively protective of the forest, with cultivated areas divided into 5–7 portions of equal size. Only 1 of these portions is cultivated each year; the other areas are left fallow to regenerate successively. In this way, each portion is used at 5–7-year intervals for a variety of crops (e.g., vegetables, bananas). Older trees are left standing at the edge of these areas, often providing birds with attractive “fruit trees.” This agricultural strategy is the reason why forest fragments are still found

at lower elevations. Human disturbance was heaviest in the vicinity of settlements and became lighter as elevation increased.

The main camp was located on the Kalawaig River; however, excursions were made a great distance upriver, to the Tagiti River in the northeast and beyond the Tulohan River in the south. The valleys become increasingly narrow upriver, and valleys are deep and slopes very steep toward the peak of Mt. Imbayao. In the rivers themselves, large exposed rocks are common. The slopes are not generally suited for cultivation, and timber exploitation is very difficult, permitting the persistence of primary forest at low elevations. At the camp, the valley was >1 km wide and ca. 300 m deep at the slopes' shoulders; at the mouth of the Andalawi River, the Kalawaig valley is less than 700 m wide.

**1100-m Camp** (Philippine Eagle Conservation Project lodgehouse and areas to the west and southwest, at higher elevations)—Mindanao, Bukidnon Province, northeast slope Mt. Kitanglad Range, ca. 9 km west of Dalwangan, size of study area about 38 km<sup>2</sup>, 1100 m, 8°11'N, 125°1'E, 13–21 Mar. 1993, 2–23 Jan. and 30 Mar.–11 Apr. 1994.

This site is in a gently sloping, wide, and relatively dry area between river valleys. The forest was clear-cut or heavily reduced in the early 1970s, mainly for planting coffee. Over the years, the forest boundary has been pushed farther upslope by intensive agriculture by small farmers in the area. Several degraded wooded patches still exist between the cultivated fields and fallow areas. Only along the small rivers (Lalawan River, Sawaga River) did closed forest descend to lower elevations (ca. 900 m).

The agricultural areas (potatoes, sweet potatoes, vegetables), cultivated primarily by the Ifugao people (recent immigrants from Luzon), reach up to ca. 1400 m, even within the protected natural park area. Some cultivated areas (kaingins) were even close to the mossy forest line (ca. 1700 m, on slopes of Mt. Tuminungan). Even the narrow floor of the Lalawan River valley was seeing increased cultivation. This valley was ca. 400 m wide at the shoulders and had steep slopes. The gently inclined slope south of the Lalawan River toward Mt. Dulang-Dulang was selectively

logged in 1974–1975, but the “Twin Peaks” of Mt. Dulang-Dulang were completely covered with primary forest. Upriver toward Kitanglad, broad forested areas burned because of lightning years ago; they were covered with high grass and charred remains of trees. Work was concentrated at 1000–1600 m, occasionally up to 2100 m.

TB and GD visited the Dalwangan area on 3–6 Oct. 1991, making extensive opportunistic observations up to 1600 m; other information was kindly provided by visiting birdwatchers.

Finally, we summarize records from historical natural history museum collections (abbreviations provided when specific specimens are cited in the text): Academy of Natural Sciences of Philadelphia (ANSP), Bell Museum of Natural History, California Academy of Sciences, Delaware Museum of Natural History (DMNH), Field Museum of Natural History (FMNH), Florida State Museum (FSM), Los Angeles County Museum of Natural History, Museum of Vertebrate Zoology, Philippine National Museum (PNM), Silliman University Natural Science Museum (SUNSM), University of Kansas Natural History Museum (KUNHM), Western Foundation of Vertebrate Zoology, Yale Peabody Museum (YPM), Naturmuseum Senkenberg (SMF), and Zoological Museum of the University of Copenhagen (ZMUC). The seasonal distribution of collecting and birding trips reviewed here is given in Figure 2.

When recent survey data were sufficiently extensive, we evaluated the completeness of our inventories using quantitative methodologies (Soberón & Llorente, 1993; Peterson & Slade, 1998). These approaches consist of extrapolation from known fauna sizes to predicted fauna sizes and then use of both figures to arrive at estimates of percent completeness of inventory data. In particular, we used the bootstrapped Chao equation approach (Peterson & Slade, 1998), in which species richness is predicted as

$$S_{\text{exp}} = S_{\text{obs}} + \frac{a^2}{2b},$$

where  $S_{\text{obs}}$  is the number of species actually observed in the study,  $a$  is the number of species observed in just 1 sampling period (here, a day of sampling), and  $b$  is the number of species observed in exactly 2 sampling

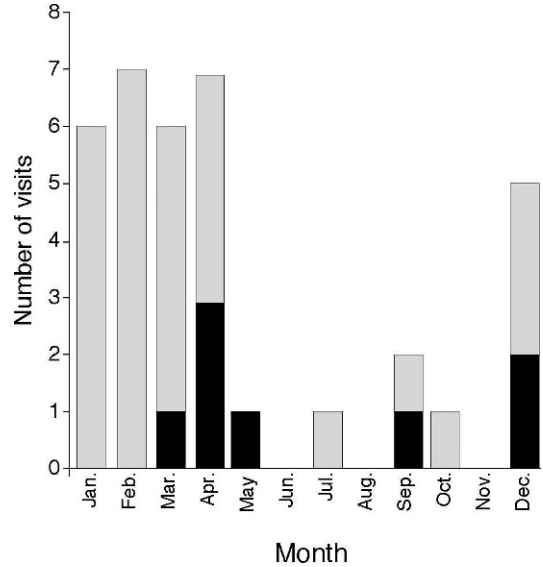


FIG. 2. Seasonality of fieldwork on Mt. Kitanglad, including our own. Collecting expeditions are shaded black (Salomonsen, 1953; Ripley & Rabor, 1961; NORDECO and DENR, 1998, table 1c and e); visits by other ornithologists (without voucher specimens) are gray. Given that Kitanglad has strongly seasonal rainfall, the concentration of visits in the relatively dry months of December–April is clear.

periods.  $S_{\text{obs}}/S_{\text{exp}}$ , then, can be used as a measure of the completeness of the actual inventory of species (Peterson & Slade, 1998).

## Results

### Species Accounts

In this section, we present in-depth information about selected species that have been documented on Mt. Kitanglad that are of special interest either from an ornithological perspective or in terms of conservation. We discuss species falling into 1 or more of 5 categories: (1) species classed as globally threatened or near threatened (BirdLife International, 2004), (2) species not previously documented from the Kitanglad region, (3) species that have apparently declined on Kitanglad or across broader regions, (4) species for which we noted unusual ecological or behavioral characteristics, or (5) species for which current information updates previous understanding of status on Kitanglad. Nomenclature and systematic order follow Kennedy et



al. (2000), with exceptions dictated by more recent work indicated by a “†.” It should be noted that species accounts are provided only for species of special interest (see above)—the complete list of species known from the Kitanglad massif is summarized in Table 2 (residents) and Table 3 (migrants).

***Anas luzonica* Philippine Duck VULNERABLE**

Sighted flying over the northeast flank of the mountain in 1994 by P. Heath (F. Verbelen, *in litt.*, 1998). This taxon was recently up-listed from near threatened (Collar et al., 1994) to vulnerable (Collar et al., 1999), although Kitanglad clearly would not constitute a priority site for its conservation.

***Pernis celebensis* Barred Honeybuzzard**

Although only a single specimen of this species exists from Kitanglad (SMF 47343), numerous recent sightings from the northeast flank also document its presence at the site: an adult seen by N. Redman on 7 Mar. 1990 (Gretton, 1990), 1–2 daily on 12–14 Mar. 1990 (Table 1d), 1 on 6 Oct. 1991 [TB, GD], several on 28–29 Feb. 1992 (Table 1k), regular sightings [AG] of 2 pairs between 1180 m and 1550 m in 1993–1994 (Gamauf & Preleuthner, 1998), 2 on 2 Apr. 1996 (Table 1a), and 2 at 1250 m on 6 Dec. 1998 (Table 1g). The only sightings away from Dalwangan are of 3–4 pairs regularly seen at 600–800 m on the northwest flank [AG] in 1993–1994 (Gamauf & Preleuthner, 1998).

***Circus spilonotus* Eastern Marsh-harrier**

Only 1 specimen exists of this species from Mindanao (Dickinson et al., 1991), but an adult male was observed hunting over short grass (ca. 50 cm tall), and apparently displaying over tall grass on 13–19 Mar. 1993 at 930–1030 m on the Dalwangan slope [AG], even though this species does not breed in the Philippines (Dickinson et al., 1991). The only other Kitanglad sighting is of 1 seen on 26 Feb. 1991 (Table 1m).

***Pithecophaga jefferyi* Philippine Eagle  
CRITICALLY ENDANGERED**

Although Kitanglad is the best-known locality for *P. jefferyi*, its status there is difficult to interpret, as most records derive from a single nest site in the Lalawan Valley, above Dalwangan on the northeast flank. The first records were from 1500 to 1800 m at Malaybalay (8°09'N, 125°5'E) in 1959–1964 (Rabor, 1965, 1968, 1971; Gonzales, 1968), with other records (including 4

shot) through the 1960s (Gonzales, 1971). Nesting was recorded at Kinubalan (8°13'N, 124°59'E) in 1984 and at Dalwangan (8°14'N, 125°2'E) in 1982–1993 (Krupa, 1985). This pair is almost certainly the same as that recorded nesting on 30 Dec. 1989 at 1350 m (Lambert, 1993), 12–16 Mar. 1990 (Table 1d), and Feb.–Mar. 1993 (I. Gardner, *in litt.*, 1993, AG). It was also reported that young were visible in the nest in Nov.–Apr. 1990–1991 and 1992–1993 (Table 1f) and that the pair laid a single egg on 28 Nov. 1992 [AG].

It was reported to AG that this pair's eyrie has been pushed farther up the valley (ca. 3 km in the last 20 yr), presumably because of increasing habitat disturbance: disturbed areas (kaingin) reached to within 200 m of the eyrie by 1992. Apparently, the eyrie was at ca. 1100 m in the late 1970s, at ca. 1200 m by the mid-1980s, and at 1330 m by 1993–1994 [AG]. Sight records of individuals presumably from the Dalwangan pair include adults frequently observed hunting at 1150–1700 m, occasionally up to 7 km from the nest, in 1993 [AG]. Further records are from 1987–1998 (Table 1a, b, f–h, j, k, m–o) and R. J. Timmins (pers. comm., 1992).

Away from Dalwangan, Krupa (1985) reported a bird captured at Libona (8°20'N, 124°44'E) on the north flank in 1982; 1 recorded soaring over primary forest at 800 m on the northwest flank (8°9'N, 124°42'E) on 28 Mar. 1994 [AG]; several further reports are available from the Philippine Eagle Working Group (Collar et al., 1999). These records, from up to 30 km from Dalwangan, suggest that at least a few other pairs of eagles persist on Kitanglad, especially given that the species' home range is now suspected to be smaller than traditionally assumed (Collar, 1997a,b). Nevertheless, increasing human pressure on Kitanglad's forest, pushing the eagles into what may be suboptimal higher elevation habitat, surely indicates that the species is under extreme threat here, as elsewhere in its range.

***Spizaetus cirrhatus* Changeable Hawk-eagle**

This species is known on Mindanao from a single specimen (Dickinson et al., 1991) but has been sighted several times on Kitanglad. Hornskov (1995) sighted a pale individual, probably an immature, on 14 Mar. 1987. AG obtained breeding records in Apr. 1994 at 600–1120 m on the northwest slope, as well as observations of a first-year individual seen hunting over fragmented

forest, and at least 3 pairs observed regularly engaging in territorial displays (Gamauf et al., 1998a).

### *Spizaetus philippensis* Philippine Hawk-eagle

#### VULNERABLE

Although Dickinson et al. (1991) reported only 1 specimen from Mindanao, AG has traced 3 further skins from other sites on the island. At 1100–1650 m on the northeast slopes of Kitanglad, 3 pairs and 1 independent juvenile were sighted over 38 km<sup>2</sup> in 1993–1994 [AG]. On the northwest slopes, sightings include individuals seen by TB and GD in Sep. 1991 (Evans et al., 1993), by R. J. Timmins (pers. comm., 1992) in Jan. 1992, on 27–29 Feb. 1992 (Table 1k), Feb. 1994 (Table 1f), Apr. 1998 (Table 1h), pairs in Sep. 1994 (Table 1n) and Dec. 1996 (Table 1b), and up to 3 on 2–12 Dec. 1998 at 1250–1520 m (Table 1g). Collar et al. (1999) noted sightings from D. Cedeno, G. Balaquit, and C. Gayamara in Nov. 1994 and from P. Morris of a juvenile in Jan. 1994. Southern populations of the species have recently been recognized as distinct sub-specifically (Preleuthner & Gamauf, 1998), and separation of the species from *S. cirrhatus* in the field has been discussed (Gamauf et al., 1998a).

### *Falco tinnunculus* Eurasian Kestrel

The only previous Mindanao record of this species was a sight record by Mearns on 31 Mar. (Dickinson et al., 1991). One was seen on 19 Mar. 1993 at 880–1000 m over pastureland on the northeast slope of Kitanglad [AG].

### *Falco severus* Oriental Hobby

This species is known from Kitanglad from only 2 specimens, a female collected on 3 May and a male on 22 Dec. 1960 (YPM 61572, 62268) (Ripley & Rabor, 1961). The absence of recent records is intriguing.

### *Falco peregrinus* Peregrine Falcon

Although large, dark birds of the race *F. p. ernesti* breed on steep cliffs at a few sites in the Philippines, the only previously suspected breeding locality on Mindanao is Mt. Apo (Dickinson et al., 1991). On Kitanglad, adult peregrines were seen on 3 Apr. 1994 (1180–1250 m) on the northeast slope and on 28 Mar. 1993 (640 m) and 23 Apr. 1994 (600–700 m) on the northwest slope [AG]. In addition, sightings exist for an adult on 11 Jan. 1995 (Table 1o), a “rather pale grey” bird in early Apr. 1996 (Table 1a), and 1 on 3 Dec. and 2 on 5 Dec. 1999 at 1520 m

(Table 1g). We assume that these individuals were wintering, although the possibility remains that a breeding population exists high on Kitanglad.

### *Gallus gallus* Red Junglefowl

This species may have been introduced into the Philippines (Parkes, 1962), and Philippine populations have apparently been contaminated secondarily by crossing with domestic chickens (Peterson & Brisbin, 1998). Records from the mountain include 3 specimens from the 1960s (DMNH 2989, YPM 61573, 62269) (Ripley & Rabor, 1961), and birds seen and heard fairly commonly in 1993–1994 at 630–950 m on the northwest slope [AG]. On the west slope, it was detected only uncommonly at 1100–1300 m, while at 1500 m it was heard calling almost every morning in Apr.–May 1992 [ATP, RF]; junglefowl were also sighted at 1900–2250 m on Mt. Nangkabulos in Mar.–Apr. 1993 [JCTG, NADM]. On the northeast flank, sightings include a male on 15 Mar. 1987 (Table 1j), individuals heard on 14–15 Mar. 1990 (Table 1d), several individuals seen at 1390 m in secondary forest on 18 Mar. 1993 and at 1800 m in mossy forest on the east flank of Mt. Tuminungan on 9 Apr. 1994 [AG], a male “sitting c20 ft up a tree noisily feeding ... 1 mile or so away from the nearest houses” on 17 Dec. 1994 (Table 1o), and a sighting “in remote forest” in Apr. 1996 (Table 1a). Hence, a considerable buffer of uninhabited forest separates Kitanglad junglefowl populations from human influence, suggesting that lower-elevation populations have been hunted out or that this species avoids human presence.

### *Turnix sylvatica* Small Buttonquail

The single Kitanglad report of *T. sylvatica*, the only *Turnix* known from Mindanao (Dickinson et al., 1991), is from grasslands on Kitanglad on 11 Mar. 1990 (Table 1d). A buttonquail not specifically identified but presumably pertaining to this species was seen at 520 m on the northwest slope on 29 Apr. 1994 [AG].

### *Gallinago megala* Swinhoe's Snipe

Although a common winter visitor to the Philippines (Dickinson et al., 1991), the difficulties of separating this species from Pintail Snipe *G. stenura* and Common Snipe *G. gallinago* (Carey & Olsson, 1995) suggest that records should require specimen vouchers for confirmation. One specimen (SMF 47128) documents this

TABLE 2. Summary of presumed resident bird species known from the Mt. Kitanglad massif. Species taxonomy follows Dickinson et al. (1991), except as indicated by recent taxonomic treatments. Conservation status from Collar et al. (1999), restricted-range status is from Stattersfield et al. (1998), recent records (since 1983) as observed and summarized herein, recent specimens (1992–1993, 1999) deposited at PNM and FMNH, and historical specimens (pre-1970; Acknowledgments). For endemism, P = endemic to the Philippines, GM = endemic to Greater Mindanao, and M = endemic to Mindanao. For conservation status, CR = critical, VU = vulnerable, NT = near threatened, and DD = data deficient. † denotes exceptions dictated by more recent work.

Taxon	Endemism	Conserva- tion status	Restricted range	Recent records	Recent specimens	Historical specimens
Family Ardeidae						
<i>Butorides striatus</i> Little Heron	—	—	—	X	—	—
<i>Dupetor flavicollis</i> Black Bittern	—	—	—	X	—	—
Family Anatidae						
<i>Anas luzonica</i> Philippine Duck	—	—	—	—	—	—
Family Accipitridae						
<i>Accipiter trivirgatus</i> Crested Goshawk	—	—	—	X	—	X
<i>A. virgatus</i> Besra	—	—	—	X	X	X
<i>Elanus caeruleus</i> Black-shouldered Kite	—	—	—	X	—	—
<i>Haliastur indus</i> Brahminy Kite	—	—	—	X	—	—
<i>Hieraaetus kienerii</i> Rufous-bellied Eagle	—	—	—	X	—	X
<i>Pernis celebensis</i> Barred Honeybuzzard	—	—	—	X	—	—
<i>P. pitloryncus</i> Oriental Honeybuzzard	—	—	—	X	—	X
<i>Pithecophaga jefferyi</i> Philippine Eagle	P	CR	—	X	—	—
<i>Spilornis holospilus</i> Philippine Serpent-Eagle†	P	—	—	X	—	X
<i>Spizaetus cirrhatus</i> Changeable Hawk-eagle	—	—	—	X	—	—
<i>S. philippensis</i> Philippine Hawk-eagle	P	VU	—	X	—	—
Family Falconidae						
<i>Falco severus</i> Oriental Hobby	—	—	—	—	—	X
<i>Microhierax erythrogenys</i> Philippine Falconet	P	—	—	X	X	X
Family Phasianidae						
<i>Gallus gallus</i> Red Junglefowl	—	—	—	X	—	X
Family Turnicidae						
<i>Turnix sylvatica</i> Small Buttonquail	—	—	—	X	—	—
Family Rallidae						
<i>Amaurornis olivacea</i> Plain Bush-hen	P	—	—	X	—	—
<i>A. phoenicurus</i> White-breasted Waterhen	—	—	—	X	—	—
<i>Gallirallus philippensis</i> Buff-banded Rail	—	—	—	X	—	—
<i>G. torquatus</i> Barred Rail	—	—	—	X	—	—
Family Scolopacidae						
<i>Scolopax bukidnonensis</i> Bukidnon Woodcock†	P	—	X	X	X	X
Family Columbidae						
<i>Chalcophaps indica</i> Common Emerald-dove	—	—	—	X	X	X
<i>Columba vitiensis</i> Metallic Pigeon	—	—	—	X	—	X
<i>Ducula carola</i> Spotted Imperial-pigeon	P	VU	—	X	—	X
<i>D. poliocephala</i> Pink-bellied Imperial-pigeon	P	NT	—	X	—	—
<i>Geopelia striata</i> Zebra Dove	—	—	—	X	—	—
<i>Macropygia tenuirostris</i> Philippine Cuckoo-dove	—	—	—	X	X	X
<i>Phapitreron amethystina</i> Amethyst Brown-dove	P	—	—	X	X	X
<i>P. brunneiceps</i> Mindanao Brown-dove†	GM	VU	X	X	X	?
<i>P. leucotis</i> White-eared Brown-dove	P	—	—	X	X	X
<i>Ptilinopus occipitalis</i> Yellow-breasted Fruit-dove	P	—	—	X	X	X
<i>Streptopelia bitorquata</i> Island Turtle-dove	—	—	—	—	—	X
<i>S. chinensis</i> Spotted Dove	—	—	—	X	—	—
Family Psittacidae						
<i>Bolbopsittacus lunulatus</i> Guiabero	P	—	—	X	—	—
<i>Loriculus philippensis</i> Colasisi	P	—	—	X	—	X
<i>Prioniturus discurus</i> Blue-crowned Racquet-tail	P	—	—	X	—	X
<i>P. waterstradti</i> Mindanao Racquet-tail†	M	NT	X	X	X	X
<i>Trichoglossus johnstoniae</i> Mindanao Lorikeet	M	NT	X	X	—	X
Family Cuculidae						
<i>Cacomantis sepulchralis</i> Indonesian Cuckoo†	—	—	—	X	X	X
<i>Centropus bengalensis</i> Lesser Coucal	—	—	—	X	—	—
<i>C. melanops</i> Black-faced Coucal	GM	—	—	X	—	—

TABLE 2. *Continued.*

Taxon	Endemism	Conservation status	Restricted range	Recent records	Recent specimens	Historical specimens
<i>C. viridis</i> Philippine Coucal	P	—	—	X	—	X
<i>Cuculus fugax</i> Hodgson's Hawk-cuckoo	—	—	—	X	X	X
<i>Surniculus lugubris</i> Drongo Cuckoo	—	—	—	X	—	X
Family Tytonidae						
<i>Tyto capensis</i> Grass Owl	—	—	—	X	—	—
Family Strigidae						
<i>Mimizuku gurneyi</i> Giant Scops-owl	GM	VU	X	X	—	X
<i>Ninox philippensis</i> Philippine Hawk-owl	P	—	—	—	—	X
<i>Otus megalotis</i> Philippine Scops-owl	P	—	—	X	X	X
<i>O. mirus</i> Mindanao Scops-owl	M	NT	X	X	X	X
Family Podargidae						
<i>Batrachostomus septimus</i> Philippine Frogmouth	P	—	—	X	—	X
Family Eurostopodidae						
<i>Eurostopodis macrotis</i> Great Eared Nightjar	—	—	—	X	—	X
Family Caprimulgidae						
<i>Caprimulgus manillensis</i> Philippine Nightjar	—	—	—	X	X	X
Family Apodidae						
<i>Collocalia amelis</i> Island Swiftlet	P	—	—	—	—	X
<i>C. esculenta</i> Glossy Swiftlet	—	—	—	X	X	X
<i>C. mearnsi</i> Philippine Swiftlet	P	—	—	X	X	X
<i>C. troglodytes</i> Pygmy Swiftlet	P	—	—	X	—	—
<i>Hirundapus celebensis</i> Purple Needletail	—	—	—	X	—	—
<i>H. giganteus</i> Brown-backed Needletail	—	—	—	—	—	X
<i>Mearnsia picina</i> Philippine Needletail	P	NT	X	X	—	—
Family Hemiprocnidae						
<i>Hemiprogne comata</i> Lesser Treeswift	—	—	—	X	—	X
Family Trogonidae						
<i>Harpactes ardens</i> Philippine Trogon	P	—	—	X	X	X
Family Coraciidae						
<i>Eurystomus orientalis</i> Dollarbird	—	—	—	—	—	X
Family Alcedinae						
<i>Actenoides hombroni</i> Blue-capped Woodkingfisher	M	VU	X	X	—	X
<i>Alcedo argentatus</i> Silvery Kingfisher	P	VU	X	X	—	X
<i>A. atthis</i> Common Kingfisher	—	—	—	—	—	X
<i>Halcyon capensis</i> Stork-billed Kingfisher	—	—	—	—	—	X
<i>H. chloris</i> White-collared Kingfisher	—	—	—	X	—	—
<i>H. smyrnensis</i> White-throated Kingfisher	—	—	—	X	—	X
Family Meropidae						
<i>Merops philippinus</i> Blue-tailed Bee-eater	—	—	—	X	—	—
<i>M. viridis</i> Blue-throated Bee-eater	—	—	—	X	—	X
Family Bucerotidae						
<i>Aceros leucocephalus</i> Writhed Hornbill†	GM	NT	X	X	—	X
<i>Buceros hydrocorax</i> Rufous Hornbill	P	NT	—	X	—	—
<i>Penelopides affinis</i> Mindanao Hornbill†	P	—	X	X	—	X
Family Capitonidae						
<i>Megalaima haemacephala</i> Coppersmith Barbet	—	—	—	X	—	X
Family Picidae						
<i>Chrysocolaptes lucidus</i> Greater Goldenback Woodpecker	—	—	—	X	X	X
<i>Dendrocopos maculatus</i> Philippine Pygmy Woodpecker	P	—	—	X	X	X
<i>Dryocopus javensis</i> White-bellied Woodpecker	—	—	—	X	—	X
Family Eurylaimidae						
<i>Eurylaimus steerii</i> Mindanao Broadbill	GM	VU	X	—	—	X
Family Pittidae						
<i>Pitta erythrogaster</i> Red-bellied Pitta	—	—	—	X	—	—
Family Hirundinidae						
<i>Hirundo tahitica</i> Pacific Swallow	—	—	—	X	—	X
Family Campephagidae						
<i>Coracina mcgregori</i> McGregor's Cuckoo-shrike	M	NT	X	X	—	X
<i>C. morio</i> Black-shouldered Cuckoo-shrike	P	VU	—	—	—	X

TABLE 2. *Continued.*

Taxon	Endemism	Conservation status	Restricted range	Recent records	Recent specimens	Historical specimens
<i>C. striata</i> Bar-bellied Cuckoo-shrike	—	—	—	X	—	X
<i>Lalage melanoleuca</i> Black-and-white Triller	P	—	—	—	—	X
<i>L. nigra</i> Pied Triller	—	—	—	X	—	X
<i>Pericrocotus flammeus</i> Scarlet Minivet	—	—	—	X	—	X
Family Chloropseidae						
<i>Chloropsis flavipennis</i> Philippine Leafbird	P	VU	—	—	—	X
Family Pycnonotidae						
<i>Hypsipetes everetti</i> Yellowish Bulbul	P	—	X	—	—	X
<i>H. philippinus</i> Philippine Bulbul	P	—	—	X	X	X
<i>Pycnonotus goiavier</i> Yellow-vented Bulbul	—	—	—	X	X	X
<i>P. urostictus</i> Yellow-wattled Bulbul	P	—	—	—	—	X
Family Dicuridae						
<i>Dicurus hottentottus</i> Spangled Drongo	—	—	—	X	—	X
Family Oriolidae						
<i>Irena cyanogaster</i> Philippine Fairy-bluebird	P	—	—	X	—	—
<i>Oriolus chinensis</i> Black-naped Oriole	—	—	—	X	—	X
<i>O. steerii</i> Philippine Oriole	P	—	—	—	—	X
Family Corvidae						
<i>Corvus macrorhynchos</i> Large-billed Crow	—	—	—	X	—	X
Family Paridae						
<i>Parus elegans</i> Elegant Tit	P	—	—	X	X	X
Family Sittidae						
<i>Sitta oenochlamys</i> Sulphur-billed Nuthatch†	—	—	—	X	X	X
Family Rhabdornithidae						
<i>Rhabdornis inornatus</i> Stripe-breasted Rhabdornis	P	—	—	X	X	X
<i>R. mystacalis</i> Stripe-headed Rhabdornis	P	—	—	X	—	X
Family Timaliidae						
<i>Leonardina woodi</i> Bagobo Babbler	M	—	X	X	X	X
<i>Macronous striaticeps</i> Brown Tit-babbler	P	—	—	X	X	X
<i>Micromacronous leytensis</i> Miniature Tit-babbler	GM	DD	X	X	—	—
<i>Ptilochlora mindanensis</i> Streaked Ground-babbler	GM	—	X	X	—	X
<i>Stachyris capitalis</i> Black-capped Babbler	P	—	—	—	—	X
<i>S. plateni</i> Pygmy Babbler	GM	NT	X	X	—	X
Family Turdidae						
<i>Brachypteryx montana</i> White-browed Shortwing	—	—	—	X	X	X
<i>Copsychus saularis</i> Oriental Magpie robin	—	—	—	X	—	—
<i>Saxicola caprata</i> Pied Bushchat	—	—	—	X	—	—
<i>Turdus poliocephalus</i> Island Thrush	—	—	—	X	X	X
<i>Zoothera andromedae</i> Sunda Ground-thrush	—	—	—	X	—	X
Family Sylvidae						
<i>Bradypterus caudatus</i> Long-tailed Ground-warbler	P	—	X	X	X	X
<i>Cisticola exilis</i> Zitting Cisticola	—	—	—	X	—	X
<i>C. juncidis</i> Golden-capped Cisticola	—	—	—	X	—	X
<i>Gerygone sulphurea</i> Golden-bellied Flyeater	—	—	—	X	—	—
<i>Megalurus palustris</i> Striated Grassbird	—	—	—	X	—	X
<i>M. timoriensis</i> Tawny Grassbird	—	—	—	X	—	X
<i>Orthotomus frontalis</i> Rufous-fronted Tailorbird†	GM	—	—	X	?	X
<i>O. heterolaemus</i> Rufous-headed Tailorbird†	M	—	X	X	?	X
<i>O. nigriceps</i> Black-headed Tailorbird	GM	—	X	—	—	X
<i>Phylloscopus olivaceus</i> Philippine Leaf-warbler	P	—	—	X	X	X
<i>P. trivirgatus</i> Mountain Leaf-warbler	—	—	—	X	X	X
Family Muscicapidae						
<i>Culicicapa heliantha</i> Citrine Canary-flycatcher	—	—	—	X	X	X
<i>Eumyias panayensis</i> Mountain Verditer-flycatcher	—	—	—	X	X	X
<i>Ficedula hyperythra</i> Snowy-browed Flycatcher	—	—	—	X	X	X
<i>F. westermanni</i> Little Pied Flycatcher	—	—	—	X	X	X
<i>Hypothymis azurea</i> Black-naped Monarch	—	—	—	X	—	X
<i>Rhinomyias goodfellowi</i> Goodfellow's Jungle-flycatcher	M	NT	X	X	X	X

TABLE 2. *Continued.*

Taxon	Endemism	Conservation status	Restricted range	Recent records	Recent specimens	Historical specimens
<i>Rhipidura nigrocinnamomea</i> Black-and-cinnamon Fantail	M	—	X	X	X	X
<i>R. superciliaris</i> Blue Fantail	GM	—	—	X	X	—
Family Pachycephalidae						
<i>Pachycephala philippensis</i> Yellow-bellied Whistler	P	—	—	X	X	X
Family Motacillidae						
<i>Anthus rufulus</i> Paddyfield Pipit	—	—	—	X	—	X
Family Artamidae						
<i>Artamus leucorhynchus</i> White-breasted Wood-Swallow	—	—	—	X	—	X
Family Laniidae						
<i>Lanius schach</i> Mountain Shrike	P	NT	X	X	X	X
<i>Lanius validirostris</i> Long-tailed Shrike	—	—	—	X	—	—
Family Sturnidae						
<i>Aplonis minor</i> Short-tailed Glossy Starling	—	—	—	X	—	X
<i>A. panayensis</i> Asian Glossy Starling	—	—	—	X	—	X
<i>Basilornis miranda</i> Apo Myna	M	NT	X	X	X	X
<i>Sarcops calvus</i> Coledo	P	—	—	X	—	X
Family Nectarinidae						
<i>Aethopyga boltoni</i> Apo Sunbird	M	NT	X	X	X	X
<i>A. primigenius</i> Grey-hooded Sunbird	M	NT	X	X	X	X
<i>A. pulcherrima</i> Metallic-winged Sunbird	P	—	—	—	—	X
<i>A. shelleyi</i> Lovely Sunbird	P	—	—	X	—	—
<i>Anthreptes malacensis</i> Plain-throated Sunbird	—	—	—	X	—	X
<i>Arachnothera clarae</i> Naked-faced Spiderhunter	P	—	—	X	—	X
<i>A. longirostra</i> Little Spiderhunter	—	—	—	—	—	X
<i>Nectarinia jugularis</i> Olive-backed Sunbird	—	—	—	X	—	X
<i>N. sperata</i> Purple-throated Sunbird	—	—	—	—	—	X
Family Dicaeidae						
<i>Dicaeum aeruginosum</i> Striped Flowerpecker	P	—	—	X	—	—
<i>D. anthonyi</i> Flame-crowned Flowerpecker	P	NT	X	X	X	X
<i>D. australe</i> Red-keeled Flowerpecker	P	—	—	X	—	—
<i>D. bicolor</i> Bicolored Flowerpecker	P	—	—	X	X	X
<i>D. hypoleucum</i> Buzzing Flowerpecker	P	—	—	X	X	X
<i>D. ignipectus</i> Fire-breasted Flowerpecker	—	—	—	X	X	X
<i>D. nigrilore</i> Olive-capped Flowerpecker	M	—	X	X	X	X
<i>D. proprium</i> Whiskered Flowerpecker	M	NT	X	X	—	—
<i>D. pygmaeum</i> Pygmy Flowerpecker	P	—	—	X	—	X
<i>D. trigonostigma</i> Orange-bellied Flowerpecker	—	—	—	X	—	X
<i>Prionichilus olivaceus</i> Olive-bellied Flowerpecker	P	—	—	X	—	X
Family Zosteropidae						
<i>Hypocryptadius cinnamomeus</i> Cinnamon Ibon	M	—	X	X	X	X
<i>Lophozosterops goodfellowi</i> Black-masked White-eye	M	—	X	X	X	X
<i>Zosterops everetti</i> Everett's White-eye	P	—	—	X	—	—
<i>Z. montanus</i> Mountain White-eye	—	—	—	X	X	X
Family Ploceidae						
<i>Passer montanus</i> Eurasian Tree Sparrow	—	—	—	X	—	—
Family Estrildidae						
<i>Erythrura coloria</i> Red-eared Parrotfinch	M	NT	X	X	X	X
<i>Lonchura leucogastra</i> White-bellied Munia	—	—	—	X	—	X
<i>L. malacca</i> Chestnut Munia	—	—	—	X	—	X
<i>L. punctulata</i> Scaly-breasted Munia	—	—	—	X	—	—
Family Fringillidae						
<i>Pyrrhula leucogenys</i> White-cheeked Bullfinch	P	—	X	X	X	X
<i>Serinus estherae</i> Mountain Serin	—	—	X	X	—	X

TABLE 3. Summary of information on migratory bird species known from Mt. Kitanglad. Shown are early and late dates for each species, plus A: recent specimens (1992–1993); B: historical specimens (Rabor and colleagues).

Taxon	Earliest date	Latest date	A	B
Family Accipitridae				
<i>Accipiter gularis</i> Japanese Sparrowhawk	late Sep. (Table 1n)	15 Mar. (Table 1d)	—	—
<i>A. soloensis</i> Chinese Goshawk	late Feb. (Table 1m)	3 Apr. [AG]	—	—
<i>Butastur indicus</i> Grey-faced Buzzard	7 Dec. (Table 1g)	15 Mar. (Table 1d)	—	X
<i>Circus melanoleucos</i> Pied Harrier	3 Oct. [TB, GD]	early Apr. (Table 1a)	—	—
<i>C. spilonotus</i> Eastern Marsh-harrier	26 Feb. (Table 1m)	13 Mar. [AG]	—	—
Family Falconidae				
<i>Falco tinnunculus</i> Eurasian Kestrel	—	19 Mar. [AG]	—	—
<i>F. peregrinus</i> Peregrine Falcon	3 Dec. (Table 1g)	23 Apr. [AG]	—	—
Family Scolopacidae				
<i>Gallinago megala</i> Swinhoe's Snipe	6 Oct. [TB, GD]	8 Apr. [AG]	—	—
Family Cuculidae				
<i>Cuculus saturatus</i> Oriental Cuckoo	19 Mar. [AG]	May [ATP, RF]	X	X
Family Hirundinidae				
<i>Hirundo rustica</i> Barn Swallow	4 Oct. [TB, GD]	8 Apr. [AG]	—	X
<i>H. striolata</i> Striated Swallow	—	early Apr. (Table 1a)	—	X
Family Turdidae				
<i>Luscinia calliope</i> Siberian Rubythroat	late Sep. (Table 1n)	—	—	—
<i>Monticola solitarius</i> Blue Rock-Thrush	10 Oct. (ZMUC 176)	—	—	X
<i>Turdus chrysolaus</i> Brown-headed Thrush	—	13 Mar. (Table 1i)	—	—
<i>T. obscurus</i> Eye-browed Thrush	2 Dec. (Table 1g)	21 Apr. [AG]	X	—
Family Sylviidae				
<i>Acrocephalus arundinaceus</i> Great Reed-warbler	Dec. (SMF 47194)	—	—	X
<i>Locustella fasciolata</i> Gray's Grasshopper-warbler	—	2 Jan. [AG]	—	—
<i>Phylloscopus borealis</i> Arctic Warbler	late Sep. (Table 1n)	24 May (Ripley & Rabor, 1961)	—	—
Family Muscicapidae				
<i>Ficedula mugimaki</i> Mugimaki Flycatcher	late Sep. (Table 1n)	15 Mar. (Table 1j)	X	—
<i>Muscicapa griseisticta</i> Grey-streaked Flycatcher	late Sep. (Table 1n)	1 May (Ripley & Rabor, 1961)	X	—
Family Motacillidae				
<i>Anthus gustavi</i> Pechora Pipit	29 Feb. (Table 1k)	19 Apr. [ATP, RF]	X	X
<i>A. hodgsoni</i> Olive Tree-pipit	15 Dec. (Table 1o)	6 Apr. (YPM)	X	—
<i>Motacilla alba</i> White Wagtail	20 Apr. [AG]	25 Apr. [AG]	—	—
<i>M. cinerea</i> Grey Wagtail	late Sep. (Table 1n)	1 May (Table 1l)	X	—
<i>M. flava</i> Yellow Wagtail	4 Dec. (Table 1g)	Apr. [ATP, RF]	—	—
Family Laniidae				
<i>Lanius cristatus</i> Brown Shrike	late Sep. (Table 1n)	1 May (Table 1l)	X	—

species from Kitanglad. Birds probably of this species were reported on 6 Oct. 1991 [TB, GD], 14 Mar. 1993, 15 Jan. 1994, and 8 Apr. 1994 (2 birds) at 860–1020 m in grasslands on the northeast slope [AG] and on the lower slopes in Feb. 1994 by M. Archer (Table 1f).

#### *Scolopax bukidnonensis* Bukidnon Woodcock†

Woodcocks have recently been discovered on Kitanglad. Several individuals have been collected from the mountain as well as from elsewhere in the Philippines, and the form has recently been described as a species new to science (Kennedy et al., 2001). In addition to the small series of

specimens on which the species description was based, another (SMF uncataloged) is from Bo Kaatuan, at about 1500 m.

Birds were first seen in Jan. 1992 (R. Timmins, pers. comm., 1992), seen well on 18–20 Feb. 1993 (Robson, 1993; Harrap & Fisher, 1994), and tape-recorded in late Feb. 1993 (Harrap & Fisher, 1994). Subsequent sightings include birds seen in Mar. 1993 and Jan. 1994 [AG, TB], Jan.–Feb. 1994 (Harrap & Fisher, 1994; Table 1f), Apr. 1994 [AG, TB], 15–20 Dec. 1994 and 11–12 Jan. 1995 (Table 1o), Dec. 1996 (Table 1b), and 2–12 Dec. 1998 (Table 1g). The lack of sightings from other months suggests that peak display

period may be Dec.–Feb. (T. Fisher sought it specifically but did not see or hear birds, on 25–27 Mar. 1994; Harrap & Fisher, 1994). At higher elevations on the northeast slope, AG saw a bird in a burned area at 1800 m on the east slope of Mt. Tuminungan in Apr. 1994 and noted an individual (tentatively identified as *S. rusticola* but probably also referable to this taxon) at 1450 m on a grassy shoulder on 7 Jan. 1994. SEB and DHC collected 2 at 1455–1465 m in Apr. 1999, 1 in the evening and 1 at dawn, both in canopy nets.

Descriptions indicate that the birds' call is a "distinctive 'rattle' repeated continuously in flight as it displayed over the same route every day ... regularly heard giving rapid bursts of high pitched 'machine-gun fire' of ca. 1.5 second duration, separated by gaps of 3 seconds" (Harrap & Fisher, 1994; Table 1o). It usually flew too low against dark vegetation and in too low light levels to be seen. Display flights were between 05:15 and 05:20 h most mornings and 17:50 and 18:05 h on only 2 evenings in late December (Table 1b).

#### ***Phapitreron leucotis* White-eared Brown-dove**

The genus *Phapitreron* presents a complex situation on Kitanglad. *Phapitreron leucotis* is well represented in collections (DMNH, FMNH, PNM, YPM, SMF) (Ripley & Rabor, 1961) from the mountain. In Apr.–May 1992, ATP, JCTG, and NADM found it at low elevations around San Vicente and at 1100–1300 m (FMNH 357397–357400); in 1993 and 1994, it was found frequently at 590–900 m on the northwest slope and regularly between 1100 and 1200 m and occasionally up to 1450 m on the northeast slope [AG]. SEB and DHC collected 3 at 1555–1570 m in Apr.–May 1999. Other sight records of this species, which is common elsewhere in the Philippines (Dickinson et al., 1991), are few: individuals on 29 Apr.–1 May 1983 (Table 1l) and several in Dec. 1996 (Table 1b). Possibly these birds are hunted in the accessible forest above Dalwangan.

#### ***Phapitreron amethystina* Amethyst Brown-dove**

Like the preceding species, this species is well represented in collections from Kitanglad (DMNH, FMNH, PNM, YPM, SMF) (Ripley & Rabor, 1961) but less well by sight records. We found it at 1100–1800 m (FMNH 357401–9) in 1992 [ATP, RF], mist-netted 2 at 1900 m and sighted others up to 2250 m on Mt. Nangkabulos in Mar. 1993 [JCTG, NADM], and found birds regularly in secondary

montane and mossy forests between 1300 and 1780 m on the northeast slope and at 900–1100 m on the northwest slope in 1993–1994 [AG]. SEB and DHC collected 5 at 1465–1570 m in Apr.–May 1999. The only other sight records are from 29 Apr.–1 May 1983 (Table 1l) and Dec. 1996 (Table 1b), so possibly this species also suffers from heavy hunting pressure above Dalwangan.

#### ***Phapitreron brunneiceps* Mindanao Brown-dove† VULNERABLE**

The Mindanao populations of this rare species, which are restricted to montane areas (Dickinson et al., 1991), have recently been split from the lowland populations of the Sulu Islands (Collar et al., 1999). The species was reported from Kitanglad (duPont, 1971), but the specimen available from the mountain (DMNH 68709) in the Delaware Natural History Museum was rejected as a viable voucher by Dickinson et al. (1991). Additional individuals were collected (FMNH 357410–2) at 1100–1500 m in Apr. 1992 [ATP, JCTG, NADM], and it was also sighted in 1995 (A. Long and M. Heath, *in litt.*, 1995). Hence, recent work confirms the presence of this species on the Kitanglad massif.

#### ***Ducula poliocephala* Pink-bellied Imperial-pigeon NEAR THREATENED**

This species is known from Kitanglad from our sightings only: at 1100–1800 m in Apr.–May 1992 [ATP, RF] and at 1260–1540 m on the northeast slope between Jan. and Apr. 1994 and on Mt. Tuminungan at 1780 m on 10 Apr. 1994 [AG]. Local people reported that the species is hunted heavily, and our observations of its extreme flightiness suggest that such is indeed the case. This may explain the paucity of records and also supports the inclusion of this previously unlisted species as near threatened (Collar et al., 1999).

#### ***Ducula carola* Spotted Imperial-pigeon VULNERABLE**

Several historical specimens place this species on the mountain in 1960 (DMNH 13621–13622, YPM 61608–61612) (Ripley & Rabor, 1961) and 1965 (SMF 47095), but only 1 recent report exists, from Feb. 1991 (Table 1m). The species may be partially nomadic (Collar et al., 1999), which might explain its presence in reasonable numbers in March–April (Ripley & Rabor, 1961). However, given that recent visits to Kitanglad were concentrated in these same months, this species may have declined on the mountain.



### ***Columba vitiensis* Metallic Pigeon**

This species was collected on Kitanglad in 16 Apr.–9 May 1960 (FMNH 422617, YPM 61613–61619) (Ripley & Rabor, 1961), but the only recent records are sightings of 1 on 13 Mar. 1990 (Table 1d) and 2 on 10 Feb. 1994 (Table 1f). The paucity of recent records suggests that this species, along with many of the Philippines' large forest pigeons, is in rapid decline.

### ***Streptopelia bitorquata* Island Turtle-dove**

The only Kitanglad record of this species is a specimen from 20 Dec. 1960 (YPM 62294), with no recent records. This species appears to be in serious decline, perhaps because of competition from Spotted Doves (*S. chinensis*), which are spreading explosively in the Philippines (Waldbauer & Waldbauer, 1982).

### ***Trichoglossus johnstoniae* Mindanao Lorikeet**

#### **NEAR THREATENED**

Numerous specimens place this species on Kitanglad (ANSP, FMNH, PNM, YPM) (Ripley & Rabor, 1961); sight records are as follows: 12–15 birds on 13 Mar. 1987 (Table 1j), 2 on 15 Mar. 1990 (Table 1d), and sightings [GD] on 4 Oct. 1991 (Evans et al., 1993), in Feb. 1993 (I. Gardner *in litt.*, 1993), at 1900 m on Mt. Nangkabulos in Mar. 1993 [JCTG, NADM], single individuals or pairs at 1160–1300 m on the Dalwangan site and at 590–720 m in the Kalawaig valley in both 1993 and 1994 [AG], and several at 1250 m on 8 Dec. 1998 (Table 1g). Hence, the species may have declined on Kitanglad, given that lorikeets should be fairly easily to observe (Juniper & Parr, 1998). Its status elsewhere on Mindanao, though, appears more secure than previously thought, and Collar et al. (1999) down-listed the taxon to near threatened from vulnerable.

### ***Bolbopsittacus lunulatus* Guiabero**

This Philippine lowland endemic species is generally common (Dickinson et al., 1991) but is known from Kitanglad only from a handful of sight records: on fruit-bearing trees in the Lalawan valley at 900 m (16 Mar. 1993) and 1290 m (4 Jan. 1994) on the northeast slope and at 650–840 m on the northwest slope in Apr. 1994 [AG] and in Mar. 1990 (Table 1d).

### ***Prioniturus discurus* Blue-crowned Racquet-tail**

This species is scarce on Kitanglad, where forests are principally at or above the upper limit of its altitudinal range (Dickinson et al., 1991).

Elsewhere in the Philippines, it appears more common than previously thought and so is no longer considered near threatened (Collar et al., 1999). It has been found mostly at middle elevations: at 1200–1460 m on the northeast slope in 1993–1994 [AG], a group of 4 individuals in lowland forest at 650 m on the northwest slope on 19 Apr. 1994 [AG], and “17+ in flocks 15 Mar” in 1987 (Table 1j). Several old specimens also exist from the mountain (PNM 10126–10129, YPM 62307–62309), including several from a high 1400–1500 m (e.g., FMNH 258646).

### ***Prioniturus waterstradti* Mindanao Racquet-tail†** **NEAR THREATENED**

Mindanao populations of this taxon are considered a species separate from *P. montanus* of Luzon by some workers (Sibley & Monroe, 1990; Juniper & Parr, 1998). At least 11 specimens exist from Kitanglad (YPM 61660–61665; SMF 47008–47009, 47011–47012, 48161; FMNH 262472, 357417–357419, 392241) (Ripley & Rabor, 1961), and we noted 2–5 individuals daily on 4–6 Oct. 1991 [TB, GD], flocks daily at 1100–1800 m in Apr.–May 1992 [ATP, RF], at 2250 m on Mt. Nangkabulos in Mar.–Apr. 1993 [JCTG, NADM], and 2–6 at 1420–1800 m on the northeast slope in Apr. 1993 and 1994 [AG]. SEB and DHC collected 1 at 1465 m in Apr. 1999. Other sightings include small groups on 29 Apr.–1 May 1983 (Table 1l), 13–14 Mar. 1987 (Table 1j), 11–14 Mar. 1990 (Table 1d), late Sep. 1994 (Table 1n), 17 Dec. 1994 and 11 Jan. 1995 (Table 1o), 4 Apr. 1996 (Table 1a), Dec. 1996 (Table 1b), 6–7 Apr. 1998 (Table 1h), and 2–10 Dec. 1998 (Table 1g). This frequency of records suggests that Collar et al. (1999) were right to down-list this taxon to near threatened from vulnerable (Collar et al., 1994).

### ***Cuculus saturatus* Oriental Cuckoo**

The species appears to be a shy and silent winter resident on Kitanglad, as most records have involved birds caught in mist-nets. A female was collected on 7 Apr. 1960 (YPM 61673) (Ripley & Rabor, 1961) at <1670 m, and birds were mist-netted (FMNH 357422–357423) in Apr. 1992 at 1100 m and in May 1992 at 1500 m [ATP, RF]. The only other records are from 19 Mar. 1993 at 1460 m on the northeast slope and from 25 to 26 Mar. 1993 and 25 Apr. 1994 at 590–610 m on the northwest slope [AG].

### ***Surniculus lugubris* Drongo Cuckoo**

Perhaps because of its elusiveness, this species is known on Kitanglad from only 1 specimen

from Cabanglasan at the mountain's foot from 19 Oct. 1951 (ZMUC 1672), 1 specimen from 9 May 1960 (YPM 61680) (Ripley & Rabor, 1961), and 1 probable sighting in primary forest at 1580 m on the northeast slope on 4 Apr. 1994 [AG]. Philippine populations of this species have most recently been treated as a separate species, *S. velutinus* (Payne, 1997).

#### ***Centropus melanops* Black-faced Coucal**

This Greater Mindanao endemic is generally considered a lowland species—Dickinson et al. (1991) gave its maximum elevation as 1200 m. However, we never saw it on the 1300-m ridge or below, but it was heard daily at 1500–1800 m in Apr.–May 1992 [ATP, RF] and sighted briefly and at long distances on several occasions. It was also sighted regularly at 1420–1560 m on the northeast slope in 1993 and 1994 [AG]; Jensen and Hornskov (Table 1j) heard 1 on 15 Mar. 1987. No specimens are—to our knowledge—available of this taxon from the Kitanglad region. The contrast in apparent altitudinal ranges begs further investigation into the ecological characteristics of the Kitanglad population, which could conceivably represent a population distinct from the lowland forms.

#### ***Otus mirus* Mindanao Scops-owl**

##### **NEAR THREATENED**

This Mindanao endemic was previously known only from Mt. Hilong-Hilong and Mt. Apo (Dickinson et al., 1991) but in May 1992 was found to be common and vocal from 1500 m upward on Kitanglad, with numerous individuals (FMNH 357428–357430) mist-netted [ATP, RF]. It was subsequently found at 1900–2250 m on Mt. Nangkabulos in Mar.–Apr. 1993 [JCTG, NADM], calling at 1200 m at a single site in the Lalawan valley on the northeast slope in 1993 and 1994 [AG], and at 1455 m in Apr. 1999 [SEB, DHC]. It was also reported heard in Feb. 1991 (Table 1m), in Feb. 1992 (Table 1k), and probably in late Sep. 1994 (Table 1n). The odd “dove-like couplet” call of the species, described by J. T. Marshall (Dickinson et al., 1991), is occasionally replaced by a more typical *Otus tremulo* in the hand [ATP]. Collar et al. (1999) down-listed the species to near threatened from vulnerable, and the discovery of this Kitanglad population adds strength to this decision.

#### ***Otus megalotis* Philippine Scops-owl**

*Otus megalotis* appears uncommon and retiring on Kitanglad, as it was detected on only on

5 days in Apr.–May 1992 at 1100–1500 m [ATP, RF], including adults mist-netted at 1100 m and a fledgling collected at 1400 m (FMNH 357431–357433). In Mar. 1993 and Apr. 1994, it was heard calling at 1150–1270 m at the Dalwangan site, where it was also seen on 5 Jan. 1994 [AG]. Another sight record comes from 22 Apr. 1994 near Landut, at 980 m on the northwest flank [AG]. The only other records are sightings on 26–28 Feb. 1992 (Table 1k) and specimens collected in 1960 at 1400 m (YPM 61681–2) (Ripley & Rabor, 1961) and in 1964–1965 at 1500 m (SMF 47037–42).

#### ***Mimizuku gurneyi* Giant Scops-owl**

##### **VULNERABLE**

This rare species is known on Kitanglad from a few specimens collected at 1300 m on 6 May 1960 (YPM 61683) (Ripley & Rabor, 1961) and at 1500 m in 1964–1965 (SMF 47027–47028, 81991). Many recent sightings exist, however, including birds calling at 600–630 m on the northwest slope on 23–25 Apr. 1994 [AG]. On the northeast flank of the mountain, records include birds seen and heard on 13–16 Mar. 1990 (Table 1d), 28 Feb. 1991 (Table 1m), 27–28 Feb. 1992 (Table 1k), in Feb. 1993 (I. Gardner, *in litt.*, 1993), calling at 20:00–21:00 h and 01:00 h and seen once at 1200–1250 m in both 1993 and 1994 [AG], Jan. 1994 and Feb. 1997 by P. Morris and Apr. 1994 by P. Davidson (Collar et al., 1999), 18 Dec. 1994 (Table 1o), Dec. 1996 at 1250 m (Table 1b), 3 Dec. 1998 at 1250 m (Table 1g), and aural records from TB and GD on 4 Oct. 1991 (Evans et al., 1993), 7 Feb. 1994 (Table 1f), and in Apr. 1996 (Table 1a). Although presumably at the upper limits of its “low and middle elevation” altitudinal range on Kitanglad (Miranda et al., 1997), the frequency of records from the site support the judgment of Collar et al. (1999) to list the species as vulnerable rather than endangered.

#### ***Ninox philippensis* Philippine Hawk-owl**

A single specimen from the 1960s (SMF 47029; Bo Kaatuan) and an aural record of this species from late Sep. 1994 (Table 1n) are the only documentation of its presence on Kitanglad. The paucity of records from the mountain is quite surprising.

#### ***Collocalia mearnsilamelis*vanikorensis† Philippine Island Swiftlet**

The taxonomy (Dickinson, 1989) and identification (Chantler & Driessens, 1994) of large,

dark swiftlets in the Philippines is extremely problematic, as indeed is the name to which this form should be assigned (referred to as *C. amelis* in the text and tables that follow but may be better considered within *C. vanikorensis*). Such swiftlets are common on Kitanglad and are likely to be predominantly *C. mearnsi*, an uncommon Philippine montane endemic (Dickinson et al., 1991). The only conclusive documentation of this, however, are specimens collected at Kibangay at 1260 m on 21 Dec. 1951 by Salamonsen (ZMUC 1684), 1 collected at Malaybalay on 11 Oct. 1951 (ZMUC 1686), and 1 collected from a cave at 1620 m in May 1999 by SEB and DHC. Numerous reports of Grey Swiftlet *C. amelis*, a taxon given full specific status by Sibley and Monroe (1990), could certainly represent birds wandering up onto Kitanglad from the adjacent lowlands—a specimen exists from Malaybalay from 12 Oct. 1951 (ZMUC 225)—but no clear criteria are known for separating the 2 in the field (Chantler & Driessens, 1994). AG and colleagues saw swiftlets identified as *C. amelis* at 900–1500 m on the northeast slope, with excellent details and comparisons; members of this species were often in mixed flocks with *C. esculenta*. Sight records of large, dark swiftlets on Kitanglad are numerous (Table 1d, f–h, j–l, o) but lack sufficient detail to permit definitive determination. Lack of broader specimen documentation makes conclusive statements regarding the occurrence of these 2 taxa on Kitanglad difficult.

#### ***Collocalia esculenta* Glossy Swiftlet**

DHC visited a small nesting colony in a cave along a stream about 15 min from Lupiagan (1300–1400 m). The cave was apparently man-made and apparently once held a larger colony that is now reduced in numbers. On 3 May 1999, DHC found 6 nests, of which 2 were empty, 2 held 2 eggs each, and 2 held nestlings. Swiftlets of this species were observed [DHC, ATP] foraging by picking insects off of lichens on canopy tree branches. Both DHC and ATP observed swiftlets of this species participating in multispecific foraging flocks.

#### ***Mearnsia picina* Philippine Needletail**

##### **NEAR THREATENED**

The status of this southern Philippine endemic (Dickinson et al., 1991) was recently up-listed to near threatened (Collar et al., 1999). It appears to be rather scarce on Kitanglad, with the only sightings being from below 800 m in Apr. 1992 [ATP], 4 in Mar. 1993 and 9 in Apr. 1994 between 660 and

700 m on the northwest flank and 6 in Jan. 1994 at 1080–1100 m on the northeast flank [AG], from Sep. 1994 (Table 1n), 2 in Dec. 1996 (Table 1b), 2 at 1520 m in Apr. 1998 (Table 1h), and 1 at 1250 m on 2 Dec. 1998 (Table 1g).

#### ***Harpactes ardens* Philippine Trogon**

This species is represented from Kitanglad by numerous specimens (FSM, PNM, YPM, ZMUC) (Ripley & Rabor, 1961), and we found it at 700–1800 m in Apr.–May 1993 [ATP, RF], at 1900 m on Mt. Nangkabulos in Mar. 1993 [JCTG, NADM], and at 600–840 m on the northwest slope in well-structured secondary forest with canopy cover >50% [AG]. The fact that no records exist from the northeast slope above Dalwangan suggest that the species may have declined dramatically in more accessible areas.

#### ***Eurystomus orientalis* Dollarbird**

No recent reports place this species on Kitanglad, the only records being specimens from the 1960s (YPM 61699–701, 62336–7, SMF 46924–5, 46927) (Ripley & Rabor, 1961). A 1951 specimen is from Cabanglasan, at the mountain's foot (ZMUC 657).

#### ***Alcedo argentata* Silvery Kingfisher**

##### **VULNERABLE**

Although no records of this lowland Greater Mindanao endemic exist from the mountain itself (Dickinson et al., 1991), several 1951 specimens from Cabanglasan and the River Bubunaon place this species at its foot (ZMUC 741–747). Recent evidence for the survival of this population was provided by P. Thompson (*in litt.*, 1999), who found the species at Impalatao in 1999. Collar et al. (1999) considered a report of this lowland species from Dalwangan as hypothetical.

#### ***Actenoides hombroni* Blue-capped Wood-kingfisher**

##### **VULNERABLE**

This species has only recently been sighted on Kitanglad, with 2 sightings by J. de Roeber in Feb. 1991 (Table 1m), sightings by P. Davidson in Apr. 1994 and P. Morris in Feb. 1996 and Feb. 1997 (Collar et al., 1999), and birds seen daily on 3–5 Apr. 1996 (Table 1a). In addition, Mark (Table 1n) reported 1 in Sep. 1994, and Gee (Table 1b) reported an aural record: "... calls pre-dawn and usually only once. Song is a series of quite loud *plew ... plew ... plew* etc." An interesting low-elevation historical specimen exists from ~400 m at Cabanglasan, Bukidnon, from 26 Oct. 1951 (ZMUC 1285).

***Penelopides affinis* Mindanao Hornbill†**

Species limits of *Penelopides* in the Philippines are under debate, with some (Dickinson et al., 1991) treating all forms as *panini*, others (Kemp, 1988) treating the complex as 4 species (including *affinis* of Mindanao and the Eastern Visayas), and still others (Sibley & Monroe, 1990; Collar et al., 1994) further separating *samarensis* of the Eastern Visayas from *affinis*. Collar et al. (1999) reverted to the treatment proposed by Kemp (1988) and hence dropped the taxon from consideration as near threatened. This decision is supported by the frequency of sight records from Kitanglad, including birds seen in late Apr. 1983 (Table 1l), daily on 14–16 Mar. 1987 (Table 1i), in Oct. 1991 [TB, GD], on 26 Feb. 1991 (Table 1m), heard on 28 Feb. 1992 (Table 1k), at 1100 m in Apr. 1992 [ATP, RF], at 1900 m on Mt. Nangkabulos in Mar. 1993 [JCTG, NADM], regularly in 1993 and 1994 at 1180–1500 m on the northeast slope, and at 640–780 m on the northwest slope [AG], in late Sep. 1994 (Table 1n), on 16 Dec. 1994 (Table 1o), on 3 Apr. 1996 (Table 1a), in Dec. 1996 at 1250 m (Table 1b), on 6–7 Apr. 1998 at 1250–1520 m (Table 1h), and 2 on 2 Dec. and 3 on 8 Dec. 1998 at 1250 m (Table 1g). The taxon is also known from numerous Kitanglad specimens (DMNH, FMNH, PNM, YPM) (Ripley & Rabor, 1961).

***Aceros leucocephalus* Writhed Hornbill†**

**NEAR THREATENED**

This lowland Greater Mindanao endemic (Dickinson et al., 1991) is now considered specifically distinct from the Visayan Hornbill *A. waldeni* (Kemp 1988; Sibley & Monroe, 1990; Kennedy et al., 2000). Many specimens were collected on Kitanglad in the 1960s (FMNH, PNM, YPM, SMF) (Ripley & Rabor, 1961), and we sighted it at 1100–1200 m in Apr. 1992 [ATP, RF] and at 600–1100 m in the Kalawaig area in 1993–1994 [AG]. Like *Buceros hydrocorax*, no recent records exist from Kitanglad's accessible northeastern flank, raising serious concerns regarding the species' conservation status here. This point suggests that the decision by Collar et al. (1999) to down-list the taxon to near threatened from vulnerable may have been premature.

***Buceros hydrocorax* Rufous Hornbill**

**NEAR THREATENED**

Although *B. hydrocorax* is not documented from Kitanglad by any specimens, we found it at

1100–1800 m in Apr.–May 1992 [ATP, RF] and at 1900–2250 m on Mt. Nangkabulos in Mar.–Apr. 1993 [JCTG, NADM]. AG sighted this species only rarely, at lower elevations: once at 1460 m on the northeast slope on 6 Jan. 1994 and at 720–780 m on the northwest slope on 29 Mar. 1993 and 25 Apr. 1994 [AG]. The paucity of records from the accessible flanks of Kitanglad may indicate that the species has been extirpated from more accessible areas.

***Dryocopus javensis* White-bellied Woodpecker**

An active nest with large young was found on 27 Apr. 1992 at 1100 m; details are provided elsewhere (Peterson et al., 1995).

***Eurylaimus steerii* Mindanao Broadbill**

**VULNERABLE**

The only Kitanglad record is of 1 collected at Cabanglasan at the mountain's base on 31 Oct. 1951 by Salomonsen (ZMUC 157) (Collar et al., 1999). Lambert (1996) recently separated the East Visayas form *samarensis* from this taxon.

***Pitta erythrogaster* Red-bellied Pitta**

Although this species is present across the lowlands and foothills of Mindanao (Dickinson et al., 1991), the only sightings from Kitanglad are from the northwest slope: 1 on 26 Mar. 1993 in primary forest at 700 m and 2 in second growth with sparse ground cover at 650–750 m on 24 Apr. 1994 [AG].

***Coracina striata* Bar-bellied Cuckoo-shrike**

This species is known from Kitanglad from only a few records: 2 specimens from the mountain's base from 1951 (ZMUC 481–482), 5 specimens from the 1960s (FMNH 262485–262486, YPM 62361–62362, SMF 46468) (Ripley & Rabor, 1961), a single sighting at 700 m in Apr. 1992 [ATP, RF], and observations in the Lalawan valley at 950–1350 m and at 870 m between Kalawaig and Tulohan River [AG].

***Coracina mindanensis* Black-bibbed Cuckoo-shrike**

**VULNERABLE**

The only Kitanglad record of this lowland species is of 1 collected at the mountain's base at Cabanglasan on 27 Oct. 1951 by Salomonsen (ZMUC 407).

***Coracina mcgregori* McGregor's Cuckoo-shrike**

**NEAR THREATENED**

Although Kitanglad is 1 of only 2 mountain ranges from which this species is known, it is common, and Collar et al. (1999) down-listed it

from vulnerable to near threatened. Numerous specimens document its presence on the mountain (DMNH, FMNH, PNM, YPM, ZMUC, SMF) (Salomonsen, 1953; Ripley & Rabor, 1961). We sighted 1–4 birds daily on 4–6 Oct. 1991 [TB, GD], daily at 1100–1800 m in Apr.–May 1992 [ATP, RF], at 1900 m on Mt. Nangkabulos in Mar. 1993 [JCTG, NADM], at 1555 m in Apr. 1999 [SEB, DHC], and regularly even in heavily disturbed secondary forests at 1300–1620 m in 1993 and 1994 on the wide slopes north and south of the Lalawan River [AG]. Other sightings include birds seen daily 29 Apr.–1 May 1983 (Table 1l), 14 on 14–17 Mar. 1987 (Table 1j), in Dec. 1989–Jan. 1990 (Lambert, 1993), 27–28 Feb. 1992 (Table 1k), in Feb. 1993 (I. Gardner, *in litt.*, 1993), Feb. 1994 (Table 1f), on 27 Feb. 1991 (Table 1m), in late Sep. 1994 (Table 1n), 17–18 Dec. 1994 (Table 1o), 4 Apr. 1996 (Table 1a), up to 1680 m in Dec. 1996 (Table 1b), at 1520 m on 7–8 Apr. 1998 (Table 1h), and singles at 1250 m on 2 days in Dec. 1998 (Table 1g).

#### ***Lalage melanoleuca* Black-and-white Triller**

The only confirmed record of the species from Kitanglad is of a pair collected at the mountain's base at Cabanglasan on 29 Oct. 1951 (ZMUC 759–60). A report of the species (Table 1n) from Kitanglad suggests that this lowland Philippine endemic, normally restricted to elevations below 1000 m (Dickinson et al., 1991), may occasionally straggle up onto the mountain's higher slopes.

#### ***Chloropsis flavipennis* Philippine Leafbird**

##### **VULNERABLE**

This scarce endemic of the southern Philippines (Dickinson et al., 1991), down-listed to vulnerable (Collar et al., 1999) from endangered (Collar et al., 1994), is known from Kitanglad by 2 reports only: 2 specimens apparently collected at Malaybalay in Oct. 1951 (ZMUC; specimens not seen) and “6 Kitanglad Mts” noted without details from Feb. 1991 (Table 1m). It is a lowland species and may now have been extirpated by clearance of low-elevation forest in the Kitanglad region.

#### ***Pycnonotus urostictus* Yellow-wattled Bulbul**

The only record of this lowland species (Dickinson et al., 1991) from the Kitanglad area is of a bird collected by Salamonsen at Cabanglasan on 25 Oct. 1951 (ZMUC 799).

#### ***Hypsipetes philippinus* Philippine Bulbul**

This species was abundant at all elevations on Kitanglad. An *Accipiter virgatus* (FMNH 357393) was mist-netted on 17 Apr. 1993 on the 1100-m ridge carrying a fledgling of this species (FMNH 357477), and a recently fledged juvenile was sighted on the northwest slope on 28 Apr. 1994 [AG]. Two females collected Apr.–May 1999 at 1440–1620 m had yolking follicles [SEB, DHC]. Birds at high elevations (1700–1850 m) in May 1992 were quiet, in contrast to the populations at lower elevations [ATP, RF].

#### ***Hypsipetes everetti* Yellowish Bulbul**

Specimens were collected at Malaig and Cabanglasan at the base of Kitanglad in the early and middle twentieth century (Collar et al., 1999; ZMUC 23–35). Following the clearance of nearly all of the area's lowland forest, this lowland species (Dickinson et al., 1991) is presumably now absent from the Kitanglad area.

#### ***Oriolus steerii* Philippine Oriole**

Although numerous historical specimens of this species have been taken from Kitanglad (FMNH, PNM, YPM, ZMUC) (Ripley & Rabor, 1961), no recent records exist. Considering its lowland affinities (Dickinson et al., 1991), it is possible that the species is now extirpated on the mountain.

#### ***Irena cyanogaster* Philippine Fairy-bluebird**

This species is known on Kitanglad only from sight records at 1100–1200 m on the west flank on 21 Apr.–1 May 1992 [ATP, RF].

#### ***Parus elegans* Elegant Tit**

Adults of this abundant species were attending an apparently active nest on 22 Apr. 1992 on a ridgetop at 1200 m, 2 m up in a rotting dead trunk (~30-cm diameter) [ATP]. The nest cavity was too deep to permit determination of the contents. Three fledged young were sighted on 27 Apr. 1997 near the Kalawaig River at 620 m [AG].

#### ***Rhabdornis mystacalis* Stripe-headed Rhabdornis**

This Philippine endemic is usually replaced above about 800 m by its congener, *R. inornatus* (Dickinson et al., 1991). Nevertheless, a handful of sight records places this species on the mountain: 27 Feb. 1992 (Table 1k), 2 on 14 Mar. 1990 (Table 1d), at 1100 m on 21 Apr. 1992 [ATP], at 1300–1550 m on the northeast slope on 31 Mar. and 5 Apr. 1994 [AG], at 670 m on the northwest slope on 26 Mar. 1993 and 21 Apr. 1994 [AG], and (at an oddly high elevation) at

1900 m on Mt. Nangkabulos in Mar. 1993 [JCTG, NADM]. Three historical specimens are from Cabanglasan at the mountain's base, collected by Salomonsen in Oct. 1951 (ZMUC 915–7). The seeming co-occurrence of this species with *R. inornatus* on Kitanglad suggests that their customary segregation (Kennedy et al., 2000) does not seem to operate at this site.

#### ***Leonardina woodi* Bagobo Babbler**

This secretive bird is evidently largely terrestrial: we mist-netted 1 individual and trapped 2 more (FMNH 357457–9) in snap-traps (coconut bait) at 1100–1500 m in Apr.–May 1992 and snap-trapped (earthworm bait) single birds at 1900 m and 2250 m on Mt. Nangkabulos in Mar.–Apr. 1993 (FMNH 364198–9). It was found at 1290–1340 m on the northeast slope in Mar.–Apr. 1994 and as low as 620 m on the northwest slope in the Kalawaig valley 29 Mar. 1993 [AG], well below its “usual” minimum elevation of 1000 m (Dickinson et al., 1991). Other records include several specimens from the 1960s (SMF), 1 mist-netted on 12 Mar. 1990 (Table 1d), and a possible sighting on 10 Feb. 1994 (Table 1f). Collar et al. (1999) dropped this species from consideration as vulnerable, presumably on the grounds that its elusiveness and preference for high montane forest have led to its being underrecorded (Kennedy et al., 2000).

#### ***Ptilocichla mindanensis* Streaked Ground-babbler**

This species' maximum elevation is usually taken as 1000 m (Dickinson et al., 1991), so it is unsurprising that it is known from Kitanglad from 3 records only: a bird collected at Kaatoan at 1250 m on 11 Nov. 1951 by Salomonsen (ZMUC 105), others collected at the remarkably high elevations of 1500–1730 m in the 1960s (YPM 62398, SMF 46277–46278) (Ripley & Rabor, 1961), and a sight record at 650 m on the northwest slope on 17 Apr. 1994 [AG]. Collar et al. (1999) dropped the species from consideration as near threatened, presumably because of its relative abundance wherever lowland limestone forest remains across Greater Mindanao (e.g., Brooks et al., 1996).

#### ***Stachyris plateni* Pygmy Babbler**

##### **NEAR THREATENED**

An uncommon endemic to Greater Mindanao, this species has been recorded up to about 1000 m on most of Mindanao's other mountain ranges (Dickinson et al., 1991). It is rare on Kitanglad, the only sightings being from 15 Mar.

1987, associated with *Macronous striaticeps* (Table 1j; Hornskov, 1995), and of birds at 590–750 m at the Kalawaig site in 1993–1994 [AG]. A single specimen was also collected at Cabanglasan at the foot of Kitanglad by Salomonsen on 27 Oct. 1951 (ZMUC 550) (Table 1c; Collar et al., 1999).

#### ***Stachyris capitalis* Rusty-capped Babbler**

The only Kitanglad records of this lowland species are of 3 collected at Cabanglasan at the mountain's base by Salomonsen on 25 Oct. 1951 (ZMUC 557–9).

#### ***Micromacronus leytensis* Miniature Tit-babbler**

##### **DATA DEFICIENT**

This rare and poorly-known species is reportedly restricted to elevations below 1300 m on Greater Mindanao (Dickinson et al., 1991). Collar et al. (1999), however, provided reports at up to 1670 m and noted that most come from above 1000 m. This species has only been reported once on Kitanglad, where A. Long saw 3 in canopy of montane forest with *Phylloscopus trivirgatus* in Jan. 1995 (Collar et al., 1999).

#### ***Luscinia calliope* Siberian Rubythroat**

A winter visitor to the northern Philippines (Dickinson et al., 1991); a Kitanglad sighting from late Sep. 1994 (Table 1n) was the first for Mindanao.

#### ***Zoothera andromedae* Sunda Ground-Thrush**

This species is known from Kitanglad from specimens collected in the 1960s (YPM 61808, 62397, SMF 46379–46380) in May and December (Ripley & Rabor, 1961) and from 1 recent sighting at 1700 m on 14 Mar. 1987 (Table 1j).

#### ***Turdus chrysolais* Brown-headed Thrush**

An uncommon winter visitor to the northern Philippines (Dickinson et al., 1991), a sighting of 2 on 13 Mar. 1987 was the first for Mindanao (Table 1j).

#### ***Locustella fasciolata* Gray's Grasshopper-warbler**

A rare winter visitor to the Philippines, known from elsewhere on Mindanao from only 2 specimens from Lanao del Norte and Misamis Oriental (FMNH 284066–7) (Dickinson et al., 1991). Hence, a 1960s specimen (SMF uncataloged) and a sighting at 950 m on the northeast slope of Kitanglad on 2 Jan. 1994 [AG] are notable.

#### ***Orthotomus nigriceps* Black-headed Tailorbird**

A single specimen was collected at Cabanglasan at the base of Kitanglad on 21 Oct. 1951

(ZMUC 370) (Collar et al., 1999), by Salomonsen, but no recent records exist, and this lowland Greater Mindanao endemic (Dickinson et al., 1991) is presumably now extirpated in the area.

#### ***Bradypterus caudatus* Long-tailed Ground-warbler**

Evidently chiefly terrestrial, this species was mist-netted and snap-trapped (coconut bait) twice in May 1992 at 1500–1800 m (FMNH 357480–357481), in Apr.–May 1999 at 1455 m [SEB, DHC], and snap-trapped (earthworm bait; FMNH 364200) at 1900 m on Mt. Nangkabulos in Mar. 1993. Other Kitanglad records include specimens from the 1960s (YPM 61815–61816, SMF 48166) (Ripley & Rabor, 1961) and numerous birds seen and heard as follows: “1–16 noted almost daily” in Mar. 1987 (Table 1j), on 5 Oct. 1991 [TB, GD], daily 26–29 Feb. 1992 (Table 1k), in Feb. 1993 (I. Gardner, *in litt.*, 1993), 1 at 630 m—an extremely low elevation for this species, which is normally only found above 1000 m (Dickinson et al., 1991)—and 1 at 1120 m on the northwest slope on 14 Apr. 1993 [AG], on 9–10 Feb. 1994 (Table 1f), in Dec. 1994 and Jan. 1995 (Table 1o), a probable sighting in Apr. 1996 (Table 1a), and birds heard only in Dec. 1996 (Table 1b). This frequency of records, especially considering the species’ elusive habits, support the decision of Collar et al. (1999) to drop it from consideration as near threatened.

#### ***Rhinomyias goodfellowi* Goodfellow’s Jungle-flycatcher** NEAR THREATENED

This Mindanao endemic is shy and retiring and hence is known from Kitanglad principally from specimens (FMNH 262539, YPM 61920–61921, 62463, SMF 46284) (Ripley & Rabor, 1961) and only a handful of recent records: 11 collected in Apr.–May 1992 (FMNH 357497–357507) by ATP, including 2 juvenile-plumaged individuals on 13 May at 1700 m, and sightings in Jan. 1992 (R. J. Timmins, pers. comm., 1992), at 1290–1620 m on the northeast slope in 1993 and at 750 m on 26 Mar. 1993 m in primary forest in the upper Kalawaig valley [AG]. The 750-m sighting is an unusually low elevation for the species (usually above 1000 m; Dickinson et al., 1991). Collar et al. (1999) down-listed the species to near threatened from vulnerable, presumably because of its relative abundance in undisturbed montane forest.

#### ***Ficedula mugimaki* Mugimaki Flycatcher**

A rare winter visitor to the Philippines (Dickinson et al., 1991), with the 5 Mindanao

records all from Kitanglad: a female collected (apparently no longer in YPM) on 22 Dec. 1960 (Ripley & Rabor, 1961), a female seen on 15 Mar. 1987 (Table 1j), 1 in late Sep. 1994 (Table 1n), a male in Dec. 1996 (Table 1b), and a male at 1350 m on 3 Dec. 1998 (Table 1g).

#### ***Rhipidura superciliaris* Blue Fantail**

This species is known from Kitanglad only from our records: a specimen (FMNH 357536) from 1100 m and sight records from 1100 to 1800 in Apr.–May 1992 [ATP, RF], 1 bird at 1180 m on the northeast slope on the Lalawan valley on 16 Jan. 1994, and regular sightings at 600–840 m on the northwest slope in 1993 and 1994 in mature secondary growth, occasionally in mixed flocks [AG]. The records from 1800 m are quite exceptional for a species that has not previously been recorded above 1200 m (Dickinson et al., 1991); however, the species was not observed regularly and may have been represented by strays from the adjacent lowlands only.

#### ***Motacilla alba* White Wagtail**

This species is a rare winter visitor to the Philippines, not previously known from Mindanao (Dickinson et al., 1991). Sightings on 20 and 25 Apr. 1994 at 660–700 m on the northwest slope are the first for the island [AG].

#### ***Anthus hodgsoni* Olive Tree-pipit**

Another uncommon winter resident (Dickinson et al., 1991) for which few Kitanglad records exist. Rabor collected males on 24 Mar. and 22 Dec. 1960 and females on 6 Apr. and 20 Dec. 1960 (YPM 61741–61742, 62358–62359), and more recently Jensen and Hornskov (Table 1j) sighted 1–5 “almost daily” 13–17 Mar. 1987, Simpson (Table 1o) sighted 1 on 15 Dec. and 2 on 17 Dec. 1994, and singles were observed on 14 and 17 Jan. 1994 at 1310–1320 m on the northeast slope [AG].

#### ***Anthus gustavi* Pechora Pipit**

An uncommon winter visitor to the Philippines (Dickinson et al., 1991) but possibly overlooked in the field, as most records from Kitanglad have come from mist-nets: Rabor collected a male on 26 Mar. and a female on 22 Apr. 1960 (YPM 61743–6174); another was mist-netted (FMNH 357446) on the west slope in Apr. 1992 [ATP, RF]. A long series of specimens in SMF (e.g., SMF 47195) further indicates that its frequency may have been underappreciated. Observations include on the northeast slope at 1280 m on 1 Apr. 1994 [AG], 29 Feb. 1992

(Table 1k), and 4 seen at 1500–1600 m on 9 Apr. 1998 (Table 1h).

***Lanius validirostris* Mountain Shrike**

**NEAR THREATENED**

A pair of adults was observed feeding 2 recently fledged young (tail about 60% of adult length) at 1750 m on 7 May 1992 [ATP, RF]. The juveniles had plumage similar to that of the adults, though washed with gray on the entire underparts instead of only on the flanks, and with a short, orange bill. A bird was mist-netted (FMNH 357448) at 1800 m in May 1992, and other individuals were found at 1900–2250 m on Mt. Nangkabulos in Mar.–Apr. 1993 (FMNH 364185–364186), a pair at 1420–1460 m on the northeast slope in Apr. 1993, and a single individual on 1 Apr. 1994 at 1510 m in dry degraded habitat [AG]. In the northwest, it was seen at extremely low elevations (records cited in Dickinson et al., 1991) for this species (720–1030 m) in Apr. 1994 [AG]. Other records include 1960s specimens (PNM 10187, YPM 61786–61787, SMF various) (Ripley & Rabor, 1961) and sight records on 15 and 17 Mar. 1987 (Table 1j), 12–14 Mar. 1990 (Table 1d), 2 seen by R. Hopf in Feb. 1994 (Table 1f), on 4 Apr. 1996 (Table 1a), in Dec. 1996 (Table 1b), at 1400–1600 in Apr. 1998 (Table 1h), and at 1450 m on 9 Dec. 1998 (Table 1g).

***Basilornis miranda* Apo Myna**

**NEAR THREATENED**

Our records of *B. mirandus* include a single group at 1300 m in Apr. 1992, with more birds and 3 mist-netted (FMNH 357664–357665, 395835) at 1500–1800 m in May 1992, 2 mist-netted at 1900 m and more sighted up to 2250 m on Mt. Nangkabulos in Mar.–Apr. 1993 [JCTG, NADM], and regular sightings, often in connection with natural clearings (wind- and fire-damaged areas), at 1380–1860 m on the northeast slope in 1993 and 1994, on the northwest slope on 28 Mar. 1993 at 1090 m, and on 21 Apr. 1994 at 1150 m [AG]. It was invariably found in flocks of 2–8 individuals in which as many as 4 were in what appeared to be adult plumage, suggesting that the species may be a cooperative breeder. Other sightings include birds seen in late Apr. 1983 (Table 1l), 2 on 14 Mar., 41 in a single flock on 15 Mar., 1 on 16 Mar. and 14 on 17 Mar. 1987 (Table 1j), 2 on 15 Mar. 1990 (Table 1d), on 27 Feb. 1991 (Table 1m), 2 in Aug. 1991 (G. Anderson pers. comm., 1991), on 11 Feb. 1994 (Table 1f), in late Sep. 1994 (Table 1n), 1 on 15 Dec. 1994 (Table 1o),

on 3 Apr. 1996 (Table 1a), 12 at ~1500 m and 6 at 1800 m in Dec. 1996 (Table 1b), 6 groups of up to 13 birds at 1520–1700 m on 5–8 Apr. 1998 (Table 1h), and groups of up to 6 at 1520 m most days 2–10 Dec. 1998 (Table 1g). Numerous specimens place the species on the mountain (FMNH, PNM, YPM, KUNHM, SMF) (Ripley & Rabor, 1961).

***Nectarinia sperata* Purple-throated Sunbird**

The only records of this lowland species are 3 specimens: 2 collected at the base of Kitanglad at Cabanglasan on 19 Oct. 1951 by Salomonsen (ZMUC 490–1), and 1 at Bo Kaatuan in 1964–1965 (SMF 46663).

***Aethopyga primigenius* Grey-hooded Sunbird**

**NEAR THREATENED**

This Mindanao montane endemic species is common on Kitanglad, demonstrated by numerous specimens and sight records. It is considered near threatened as a precaution given its small extent of occurrence.

***Aethopyga pulcherrima* Metallic-winged Sunbird**

The only records of this species from the Kitanglad area are of 5 specimens collected at Cabanglasan at the mountain's base in Oct. 1951 by Salomonsen (ZMUC 1121–1125).

***Aethopyga boltoni* Apo Sunbird**

**NEAR THREATENED**

Numerous specimens of this species exist from the 1950s and 1960s (ZMUC, FMNH, SMF, YPM) (Ripley & Rabor, 1961). We observed birds at 1500–1800 m in May 1992, including 3 mist-netted (FMNH 357630–357633) and a further individual sighted [ATP, RF], and at 1900–2250 m on Mt. Nangkabulos in Mar.–Apr. 1993, including 2 birds mist-netted at 1900 m and 15 at 2250 m [JCTG, NADM]. On the northeast slope, it was observed during both 1993 and 1994 [AG]. A male and a pair at 590–600 m near the Kalawaig River on 29 Mar. 1993 and 26 Apr. 1994 [AG] represent an extremely low elevation for this species, which is normally found only above 1500 m (Dickinson et al., 1991). Three other sightings include 1 on 4 Apr. 1996 (Table 1a), a male at 1735 m in Dec. 1996 (Table 1b), and 2 males on 7 Apr. 1998 at 1650–1700 m (Table 1h).

***Aethopyga shelleyi* Lovely Sunbird**

This species is apparently very scarce on Kitanglad, as no specimens exist, and the only sight records are of 1–3 on 14, 15, and 17 Mar.



1987 (Table 1i), and 1 seen at 1800 m in May 1992 [ATP].

***Arachnothera clarae* Naked-faced Spiderhunter**

Although known from a number of Kitanglad specimens collected in the 1960s at 1400–1500 m (FMNH, PNM, YPM, SMF) (Ripley & Rabor, 1961), rather few recent records place this species on the mountain. We found it at 1100–1200 m in Apr. 1992 [ATP, RF], at 1900 m—well above the maximum elevation of 1300 m given by Dickinson et al. (1991)—on Mt. Nangkabulos in Mar. 1993 [JCTG, NADM], and at 1180 m on the northeast slope on 14 Mar. 1993 and 630–1050 m on the northwest slope in 1993 and 1994 [AG], but the only other recent sighting is from Dec. 1996 (Table 1b). Collar et al. (1999) down-listed the species from near threatened considering its broad habitat tolerances and distribution across the eastern Philippines.

***Arachnothera longirostris* Little Spiderhunter**

The only confirmed records of this species from the mountain are of 6 collected at Cabanglasan at Kitanglad's foot by Salomonsen in Oct. 1951 (ZMUC 48–53) and several from Bo Kaatuan (1500 m, SMF 46636–46671). These relatively high-elevation occurrences lend some credence to reports of this species, normally restricted to below 1000 m (Dickinson et al., 1991), from 1900 m on Mt. Nangkabulos in Mar. 1993 (Table 1c) and from 17 Mar. 1987 (Table 1i).

***Pronichilus olivaceus* Olive-backed Flowerpecker**

Our records at 900–1100 m on the west slope in Apr. 1992 (FMNH 357587–357590) [ATP, RF] and from 650 m (an adult with fledgling) on 22 Apr. 1994 and 810 m on 26 Apr. 1994 on the northwest slope [AG] are the only records of this species from Kitanglad except for a single bird collected at Cabanglasan at the mountain's base on 22 Oct. 1951 (ZMUC 500) and several from 1500 m at Bo Kaatuan (e.g., SMF 46579).

***Dicaeum aeruginosum* Striped Flowerpecker**

The only report of this species from Kitanglad is of 1 seen on 9 Feb. 1994 (Table 1f). This widespread species is not unexpected in northern Mindanao, and as such we accept it provisionally as reasonable.

***Dicaeum anthonyi* Flame-crowned Flowerpecker  
NEAR THREATENED**

This species occurs at quite low densities on Kitanglad, found in particular at higher eleva-

tions and seeming quite unpredictable in its occurrence. Records include 1 on 5 Oct. 1991 [TB, GD]; 2 mist-netted at 1100 m and 1 seen in the field at 1200 m in Apr. 1992 and 6 at 1500 m in May 1992 (FMNH 357599–357605) [ATP, RF]; and at 1900 m on Mt. Nangkabulos in Mar. 1993 [JCTG, NADM]. Other recent sightings include birds seen in late Apr. 1983 (Table 1l), in Feb. 1991 (Table 1m), on 28 Feb. 1992 (Table 1k), a male seen by R. Hopf on 10 Feb. 1994 (Table 1f), an adult male and presumed immature male seen on 10 Jan. 1995 (Table 1o), 1 seen by D. Cooper in Apr. 1996 (Table 1a), and 1 at 1300 m on 4 Dec. and a pair at 1250 m on 6 Dec. 1998 (Table 1g). Numerous old specimens (FMNH, YPM, ZMUC, SMF) (Salomonsen, 1953; Ripley & Rabor, 1961) also document its presence.

***Dicaeum proprium* Whiskered Flowerpecker  
NEAR THREATENED**

This uncommon species was the last montane Mindanao endemic to be recorded from Kitanglad, reported for the first time in the broader scientific literature in this paper. It has recently been down-listed from vulnerable (Collar et al., 1994) to near threatened (Collar et al., 1999). Sightings with good details are of 6–10 birds at 1500 m in Apr. 1993 (Table 1c) and on 11 Jan. 1994 at 1300 m on the northeast slope [AG].

***Dicaeum pygmaeum* Pygmy Flowerpecker**

This species is scarce on Kitanglad, known from only 3 specimens from 9 Dec. 1951 at Kibangay at 1200 m (ZMUC 334) and from 2 and 12 May 1960 (YPM 60238–60239) (Ripley & Rabor, 1961) and sight records in Feb. 1993 (I. Gardner, *in litt.*, 1993) and at 1250 m and 1300 m (pairs) in Dec. 1998 (Table 1g).

***Zosterops everetti* Everett's White-eye**

Restricted to lowlands below 1000 m (Dickinson et al., 1991), *Z. everetti* replaces the abundant Mountain White-eye *Z. montanus* on Kitanglad's lower flanks. It was sighted almost daily between 420 and 800 m on the northwest slope, with up to 10 individuals per flock, and 5 were seen at 1170 m on 7 Apr. 1993 [AG], but otherwise the only records are sightings of 3–40 seen 14–17 Mar. 1987 (Table 1j) and up to 8 on 3 days in Mar. 1990 (Table 1d) and 1 on 26 Feb. 1991 (Table 1m).

***Erythrura coloria* Red-eared Parrotfinch  
NEAR THREATENED**

This species is common on Kitanglad, and we sighted at least 2 on 5–6 Oct. 1991 [TB, GD].

several at 2250 m on Mt. Nangkabulos in Mar.–Apr. 1993 including 1 mist-netted (FMNH 364255), 4 at 1440–1525 m in Apr.–May 1999 [SEB, DHC], and 1 at 1300–1420 m on the northeast slope in 1993–1994 [AG]. Other recent sightings include 3 on 15 Mar. 1987 (Table 1j), 2 at 1450–1500 m in early Jan. 1990 (Lambert, 1993), several in Feb. 1991 (Table 1m), birds seen daily 27–29 Feb. 1992 (Table 1k), daily on 8–10 Feb. 1994 (Table 1f), 1 in late Sep. 1994 (Table 1n), 6 seen (by A. Long) on 10 Jan. and 2 on 11 Jan. 1995 (Table 1o), 1 on 5 Apr. 1996 (Table 1a), and 5 at 1250–1400 m in Dec. 1996 (Table 1b). Numerous old specimens of the species are from 1400 to 1500 m (FMNH, YPM, SMF, and others) (Ripley & Rabor, 1961). The species' relative abundance on the mountain supports the decision of Collar et al. (1999) to down-list it to near threatened from vulnerable; depending on its status elsewhere in Mindanao, it may in fact be better treated as least concern.

#### ***Lonchura punctulata* Scaly-breasted Munia**

A sighting of 3 birds at 1050 m in fallow land on the northeast slope on 18 Jan. 1994 [AG] becomes the earliest known record of this species in Mindanao, it having been first recorded on the island only recently (Brooks & Dutton, 1997).

#### ***Serinus estherae* Mountain Serin**

This species presents an interesting distributional quandary, known only from Indonesia (Sumatra, Java, Sulawesi) and the mountains of Mindanao. It was long thought to be known on Kitanglad only by a single specimen from 19 Apr. 1960 (YPM 58898) (Ripley & Rabor, 1961) and from a sighting at 1900 m on Mt. Nangkabulos in Mar. 1993 [JCTG, NADM]; however, an important series collected in 1965 (SMF 46399–46404, 1 uncataloged) documents its presence with greater clarity. Detailed comparisons of this specimen material are required to clarify the taxonomic status of these populations.

#### ***Pyrhula leucogenys* White-cheeked Bullfinch**

Relatively common at high elevations on Kitanglad, we recorded and collected this species at 1500–1800 m in May 1992 (FMNH 357659–357660) [ATP, JCTG, NADM], mist-netted singles at both 1900 m and 2250 m on Mt. Nangkabulos in Mar.–Apr. 1993 (FMNH 364253–364254) [JCTG, NADM], and found single birds or flocks of up to 5 individuals at 1680–1810 m on the northeast slope from primary to degraded

secondary forest in 1993–1994 [AG]. Other recent sightings include 7–16 on 14–17 Mar. 1987 (Table 1j), 13 on 13–15 Mar. 1990 (Table 1d), 1 on 27 Feb. 1991 (Table 1m), a pair on 8 Feb. 1994 (Table 1f), 1 heard in late Sep. 1994 (Table 1n), 4 on 11 Jan. 1995 (Table 1o), sightings on 3–4 Apr. 1996 (Table 1a), and several at ~1500 m in Dec. 1996 (Table 1b). Numerous specimens place this species on the mountain from the 1950s and 1960s (FMNH, PNM, YPM, ZMUC, SMF) (Ripley & Rabor, 1961).

#### **Hypothetical Records**

##### ***Aviceda jerdoni* Jerdon's Baza**

An uncommon resident on the larger islands throughout the Philippines (Dickinson et al., 1991), this species was reported from Kitanglad on 26 Feb. 1991 (Table 1m). Given its rarity, we prefer to treat this sighting as hypothetical, although it is supported by the fact that a female was collected (ZMUC) on 20 Nov. 1952 from the Pulangi River, Bukidnon, which rises on Kitanglad (Parkes, 1961). Collar et al. (1999) dropped the species from consideration as near threatened, presumably because of its huge range.

##### ***Butastur liventer* Rufous-winged Buzzard**

A bird seen on 28 Feb. 1992 and tentatively identified as *B. liventer* (Table 1k), which is not known from the Philippines (Dickinson et al., 1991), was likely to have in fact been *B. indicus* (B. King, *in litt.*, 1996), which is a relatively common winter visitor to Kitanglad.

##### ***Cacomantis merulinus* Plantive Cuckoo**

With the reidentification of the voucher specimen mist-netted on 25 Apr. 1992 at 1100 m (FMNH 357424) as *C. sepulchralis* [ATP], it seems sensible to consider the only other sightings of the species from Kitanglad, from 1900 to 2250 m on Mt. Nangkabulos in Mar.–Apr. 1993 [JCTG, NADM] and on 1 May 1983 (Table 1l), as hypothetical.

##### ***Bubo philippensis* Philippine Eagle-owl**

###### **VULNERABLE**

This species of deep forest on the larger Philippine islands, reportedly at low elevations (Dickinson et al., 1991) was recently down-listed to vulnerable (Collar et al., 1999) from endangered. The only 2 Kitanglad reports involve 1 heard on 19 Mar. 1987 by Jensen and Hornskov (Table 1j), who had some prior experience with

the species' vocalizations, and a molted secondary feather found in mature secondary forest at 730 m on the northwest slope on 27 Apr. 1994 [AG]. It is very surprising that convincing records of this species have not been obtained, given the amount of nocturnal effort that other observers have carried out on Kitanglad, so we feel that we have to consider these records hypothetical until more conclusive documentation is obtained.

***Collocalia whiteheadi* Whitehead's Swiftlet**

**DATA DEFICIENT**

This species is a Philippine montane endemic known with certainty from very few specimens (Dickinson et al., 1991; Kennedy et al., 2000). It has been reported at 2250 m on Mt. Nangkabulos in Mar.–Apr. 1993 [JCTG, NADM], in Feb. 1994 when Hornbuckle (Table 1f) noted that “two apparently larger birds high on Kitanglad when the cloud was low could have been the rare Whitehead's Mountain Swiftlet *C. whiteheadi*,” at 1450–1700 m on the northeast slope in 1993 and 1994 [AG], and in Sep. 1994 (Table 1n). Given its rarity and the lack of specimen documentation, however, acceptance of this species as occurring on Kitanglad should await full documentation. The lack of information regarding this species led Collar et al. (1999) to consider it data deficient rather than vulnerable (Collar et al., 1994).

***Apus pacificus* Fork-tailed Swift**

An uncommon passage migrant in the Philippines, not known south of Negros (Dickinson et al., 1991). A possible sighting of the species on 2 Jan. 1994 at 500 m on the northeast slope of Kitanglad [AG] would represent the first record for Mindanao; however, given the potential for confusion between this species and *A. affinis*, which is also not known from Mindanao but which is expanding in the Philippines (Evans et al., 1993), we feel that it is best to treat this record as unconfirmed.

***Mirafra javanensis* Singing Bushlark**

This species is likely to occur around the Kitanglad massif but has been reported only once, in late Sep. 1994 (Table 1n), so we consider it hypothetical.

***Alauda gulgula* Oriental Skylark**

A sighting from 960 m on the eastern slopes of Kitanglad [AG], which would represent only the second Mindanao record (Meyer de Schauensee,

1957), is considered hypothetical without better documentation of the identification.

***Ficedula basilanica* Little Slaty Flycatcher**

**VULNERABLE**

This rare forest endemic, restricted to below 1000 m on Greater Mindanao (Dickinson et al., 1991), has not been recorded with certainty on Kitanglad: for lack of better detail or voucher specimens, we retracted our [TB, GD] sightings from 1200 m on 5 Oct. 1991 (“two birds were found in *kaingin* at the edge of forest in a mixed-species foraging flock”; Evans et al., 1993) and consider as hypothetical those by R. Hopf from 1200 m on 9 Feb. 1994 (Table 1f), from late Sep. 1994 when apparently “quite common” (Table 1n), and from 1300 m on 3 Dec. 1998 (Table 1g).

***Erythrura viridifacies* Green-faced Parrotfinch**

**VULNERABLE**

Recent reports of parrotfinches resembling *E. viridifacies* from Kitanglad and elsewhere on Mindanao are of great interest, in particular 4 specimens collected on Mt. Hilong-Hilong in May 1971 (SUNSM) and 6 on Kitanglad in 1996 (PNM) (Nordeco & Denr, 1998). Dickinson et al. (1991) considered the species endemic to Luzon and Negros, but birds were recently found on Panay (Curio, 1997). Considering its irruptive habits, it is not inconceivable that birds could have escaped detection on (or recently colonized) Mindanao. However, criteria for separation of *E. viridifacies* from immature *E. coloria* are unclear, and D. Allen and F. Danielsen (*in litt.*, 1999), who have examined the Kitanglad specimens, believe them more likely to be *E. coloria*.

**Analysis**

We have presented a summary of the known avifauna of the Kitanglad massif on Mindanao Island, Philippines, including 198 species known from the massif (Tables 2 and 3) and another 10 that are considered hypothetical or not accepted from the region. The records cover about 6 decades, including specimen series assembled by professional collectors, detailed altitudinal surveys by professional ornithologists, and observations by bird-watchers. Although the data that serve as the foundation of this monograph are thus quite heterogeneous (Heaney, 2002; Heaney et al., 2002), in this section we attempt to

synthesize aspects of the avifauna of the Kitanglad region.

**MIST-NET CAPTURE RATES**—Knowledge of patterns of abundance and rarity in a local fauna can be critical to understanding a wide variety of biological phenomena, including community structure and interactions, autecological requirements of species, and regional patterns of diversity and endemism. Nevertheless, estimation of abundance is an extremely challenging task. Species differ not only in abundance but also in detectability, and the 2 phenomena are easily confounded. In particular, caution must be used when comparing relative abundances between mist-net samples, because mist-nets sample canopy (e.g., *Coracina mcgregori*) and terrestrial (e.g., *Leonardina woodi*) species poorly; moreover, mist-nets sample species differentially depending on distances moved by individuals (Remsen & Good, 1996).

Patterns of abundance as represented in mist-net captures were contrasted between the 2 elevations for which detailed data were available: 1100–1300 m and 1500–1800 m (Table 4). Thirty species were detected at 1100–1300 m, whereas 35 species were detected at 1500–1800 m; these differences probably reflected the overall canopy height differences between the 2 habitats, although differences in sampling effort should also be considered. The canopy at higher elevations was sufficiently low for more species to become nettable, accounting for the greater species diversity at higher elevations.

At 1100–1300 m, 4 species reached relative abundances of more than 40 individuals per 1000 net-hours (Table 4): *Ficedula hyperythra* (144.36), *Hypsipetes philippinus* (102.26), *Rhipidura nigrocinnamomea* (96.24), and *Parus elegans* (48.12). At 1500–1800 m, 6 species were detected at more than 40 individuals per 1000 net-hours: *Pachycephala philippensis* (75.58), *Ficedula hyperythra* (72.67), *Hypocryptadius cinnamomeus* and *Rhipidura nigrocinnamomea* (58.14 each), *Turdus poliocephalus* (46.51), and *Hypsipetes philippensis* (40.70). Interestingly, none of these high-elevation species reached much more than half the densities of *F. hyperythra* at the lower elevations. Although preliminary in nature, this pattern suggests that abundances may be more evenly distributed at higher elevations, with fewer dominant species and more relatively common species, at least within the understory community.

Overall capture rates at these elevational stations were 697–770 individuals per 1000 net-days. These capture rates contrast strongly with those for other islands in the Philippines: on Mindoro and Negros in 1991, overall capture rate were ~1430 individuals per 1000 net-days (Evans et al., 1993). These differences may result from distinct styles of setting nets (e.g., many of the Field Museum nets were set for bats, which means that they were higher, more open, and along ridgetops; our experience is that such “bat” nets yield significantly fewer birds than do “bird” nets). Differences in capture rates could also result from different forest structure, avian community structure, or seasons of visit.

**FLOCK MEMBERSHIP**—Mixed-species flocks accounted for a considerable portion of the birds observed during our studies on Mt. Kitanglad (summary in Table 5). Although these flocks were often the only birds apparent in the forest, their composition varied considerably between the lower forest ridges (1100–1300 m) and the montane forest (1500–1700 m). On the lower ridges, flocks were dominated by *Rhipidura nigrocinnamomea*, *Aethopyga primigenius*, *Parus elegans*, *Coracina mcgregori*, *Dicaeum bicolor*, and *D. hypoleucum*, all of which were present in >69% of the 15 flocks observed. Twenty-three species were observed in flocks (3–11 observed in individual flocks, average 8.0 species per flock), amounting for almost half the avifauna recorded at 1100–1300 m.

At higher elevations, flock structure changed noticeably. More bird activity was observed outside the flocks. Only *Zosterops montanus* approached ubiquity (70% of 10 flocks), although many species were present in 40–60% of flocks. Again, flocks were diverse, with 20 species observed participating and 2–11 (average 7.1) species per flock observed. An unexpected member of 2 flocks at this elevation was *Collocalia esculenta*, several individuals of which were observed to focus their foraging activities inside the forest where the flock was located and even to glean insects directly from leaves of trees. Many flocks on the higher-elevation ridges would better be characterized as family groups of single species, with a few individuals of other species associated.

**FEATURES OF THE ELEVATIONAL TRANSECT**—Elevational transect studies of faunas have much to offer toward understanding ecological and

TABLE 4. Summary of number of individuals captured and individuals per 1000 net-hours captured at 2 elevational levels on Mt. Kitanglad by the 1992–1993 FMNH groups. Total net-days = 174 (1100–1300 m) and 365 (1500–1800 m).

Species	Total individuals		Individuals per 1000 hours	
	1100–1300 m	1500–1800 m	1100–1300 m	1500–1800 m
Family Accipitridae				
<i>Accipiter trivirgatus</i>	1	0	6.0	0.0
<i>A. virgatus</i>	0	2	0.0	5.8
Family Falconidae				
<i>Microhierax erythrogenys</i>	0	1	0.0	2.9
Family Columbidae				
<i>Chalcophaps indica</i>	2	1	12.0	2.9
<i>Phapitreron</i> spp.	3	8	18.0	23.3
<i>Ptilinopus occipitalis</i>	1	1	6.0	2.9
Family Psittacidae				
<i>Prioniturus discurus</i>	0	6	0.0	17.4
Family Cuculidae				
<i>Cacomantis sepulcralis</i>	2	2	12.0	5.8
<i>Cuculus fugax</i>	0	3	0.0	8.7
<i>C. saturatus</i>	1	1	6.0	2.9
Family Strigidae				
<i>Otus megalotis</i>	1	0	6.0	0.0
<i>O. mirus</i>	0	4	0.0	11.6
Family Caprimulgidae				
<i>Caprimulgus manillensis</i>	0	1	0.0	2.9
Family Picidae				
<i>Chrysocolaptes lucidus</i>	1	1	6.0	2.9
Family Pycnonotidae				
<i>Hypsipetes philippinus</i>	17	14	102.3	40.7
Family Paridae				
<i>Parus elegans</i>	8	4	48.1	11.6
Family Sittidae				
<i>Sitta oenochlamys</i>	1	9	6.0	26.2
Family Rhabdornithidae				
<i>Rhabdornis inornatus</i>	1	0	6.0	0.0
Family Timaliidae				
<i>Leonardina woodi</i>	1	0	6.0	0.0
<i>Macronous striaticeps</i>	5	3	30.1	8.7
Family Turdidae				
<i>Turdus poliocephalus</i>	0	16	0.0	46.5
Family Sylviidae				
<i>Orthotomus heterolaemus</i>	0	5	0.0	14.5
<i>Phylloscopus olivaceus</i>	6	2	36.1	5.8
Family Muscicapidae				
<i>Eumyias panayensis</i>	3	1	18.0	2.9
<i>Ficedula hyperythra</i>	24	25	144.4	72.7
<i>F. westermanni</i>	4	2	24.1	5.8
<i>Rhinomyias goodfellowi</i>	6	7	36.1	20.4
<i>Rhipidura nigrocinnamomea</i>	16	20	96.2	58.1
<i>R. superciliaris</i>	2	0	12.0	0.0
Family Pachycephalidae				
<i>Pachycephala philippinensis</i>	4	26	24.1	75.6
Family Motacillidae				
<i>Anthus gustavi</i>	1	0	6.0	0.0
Family Laniidae				
<i>Lanius validirostris</i>	0	1	0.0	2.9
Family Sturnidae				
<i>Basilornis miranda</i>	0	3	0.0	8.7
Family Nectarinidae				
<i>Aethopyga boltoni</i>	0	3	0.0	8.7
<i>A. primigenius</i>	1	8	6.0	23.3
Family Dicaeidae				

TABLE 4. *Continued.*

Species	Total individuals		Individuals per 1000 hours	
	1100–1300 m	1500–1800 m	1100–1300 m	1500–1800 m
<i>Dicaeum</i> spp.	6	5	36.1	14.5
<i>D. anthonyi</i>	2	6	12.0	17.4
<i>D. nigrilore</i>	1	13	6.0	37.8
<i>Prionochilus olivaceus</i>	3	0	18.1	0.0
Family Zosteropidae				
<i>Hypocryptadius cinnamomeus</i>	3	20	18.1	58.1
<i>Lophozosterops goodfellowi</i>	0	11	0.0	32.0
<i>Zosterops montanus</i>	1		6.0	14.5
Net-days	166.25	344	—	—
Total species	30	35	—	—
Total individuals	129	240	775.9	697.7

evolutionary processes affecting communities (Brown, 1995; Heaney, 2001). Patterns of species replacements provide insights into competition from limitation by habitat preference or physical factors (Terborgh, 1971). More generally, information spread across altitudinal gradients provides a series of natural “experiments” in which species combinations are placed in different environmental contexts, allowing testing of ideas about causal factors. For these reasons, we next discuss generalities of patterns observed in the Kitanglad avifauna.

**Adequacy of Sampling along the Elevational Transect**—The degree to which our inventories summarize accurately the *entire* avifauna varies. The disturbed lowland habitats were least well sampled because of limited time and logistic problems. The 2 highest points (1900- and 2250-m ridges) were probably sampled very thoroughly because their avifaunas are relatively simple and sampling was intensive, although detailed daily lists necessary for quantitative assessment were not made. For the 1100-, 1700-, and 1800-m ridges, however, we were able to evaluate the completeness of each single-elevation inventory (Fig. 3) using probabilistic estimators of total fauna size (Peterson & Slade, 1998). In each of the inventories, the cumulative species total was approaching an asymptote (Fig. 3), suggesting that inventories were almost complete. Estimated percent completeness for the 3 ridges was 95.2% for the 1100-m ridge, 94.7% for the 1700-m ridge, and 91.5% for the 1800-m ridge. Therefore, at least for the middle and upper portions of the transect, the Field Museum inventories appear to represent a fairly complete picture of the avifauna present on that slope of Kitanglad in the season in which our inventories were carried out.

**Avifaunal Turnover along the Transect**—Relatively little altitudinal turnover was observed along the 1550-m altitudinal transect that we studied, coincident with patterns observed in mammal faunas along the same transect (Heaney, 2001). Migrant species were concentrated generally in the lowlands. A few species were restricted to the higher portions of the transect, such as *Basilornis miranda*, *Centropus melanops*, and *Gallus gallus* (above 1300 m). On the mountain’s northeastern flank, the steepness of the river valleys below 1000 m places highland and lowland habitats in close proximity, apparently explaining why some montane bird species (e.g., *Leonardina woodi*, *Ptilocichla mindanensis*, *Rhinomyias goodfellowi*, *Aethopyga boltoni*) can occasionally be observed at lower elevations along these valleys. Relatively few species (e.g., *Batrachostomus septimus*) appeared to be restricted to exclusively lowland forest habitats, probably a consequence of the already-great reduction of lowland forests in the region, given that numerous open-country species were restricted to this lower portion of the transect.

**Elevational Overlap of Congeners**—The FMNH surveys at 1100-, 1200-, 1300-, 1500-, 1800-, 1850-, 1900-, and 2250-m elevations provide a comparable set of inventories across an elevational range from near the lower limit of forest in the area up to near tree line (Table 6). Six pairs (*Accipiter*, *Aplonis*, *Ficedula*, *Otus*, *Rhabdornis*, *Rhipidura*), 2 trios (*Aethopyga*, *Phapitreron*), and 1 quintet (*Dicaeum*) of congeneric species were present along the transect. Overlapping congener distributions were the rule—the most extreme example was the genus *Dicaeum*, in which 5 species overlapped broadly at the 1100–1500-m

TABLE 5. Summary of species observed participating in multispecies flocks at 2 different elevational levels on Mt. Kitanglad by the 1992 FMNH team [ATP, RF]. Number of flocks = 15 (1100–1300 m) and 10 (1500–1800 m).

Species	Number of individuals		Percent of flocks	
	1100–1300 m	1500–1800 m	1100–1300 m	1500–1800 m
Family Columbidae				
<i>Phapitreron</i> spp.	5	0	33.3	0
<i>Ptilinopus occipitalis</i>	3	0	20.0	0
Family Psittacidae				
<i>Prioniturus montanus</i>	0	2	0	20
Family Apodidae				
<i>Collocalia esculenta</i> <sup>a</sup>	0	1	0	10
Family Picidae				
<i>Dendrocopos maculatus</i>	5	1	33.3	10
<i>Dryocopus javensis</i>	2	0	13.3	0
Family Campephagidae				
<i>Coracina mcgregori</i>	9	5	60.0	50
<i>Pericrocotus flammeus</i>	1	0	6.7	0
Family Pycnonotidae				
<i>Hypsipetes philippinus</i>	4	0	26.7	0
Family Dicuridae				
<i>Dicurus hottentottus</i>	2	0	13.3	0
Family Paridae				
<i>Parus elegans</i>	10	6	66.7	60
Family Sittidae				
<i>Sitta oenochlamys</i>	5	5	33.3	50
Family Rhabdornithidae				
<i>Rhabdornis inornatus</i>	3	0	20.0	0
<i>R. mystacalis</i>	1	0	6.7	0
Family Sylviidae				
<i>Orthotomus heterolaemus</i>	0	1	0	10
<i>Phylloscopus olivaceus</i>	3	3	20.0	30
Family Muscicapidae				
<i>Eumyias panayensis</i>	1	1	6.7	10
<i>Ficedula hyperythra</i>	1	0	6.7	0
<i>F. westermanni</i>	0	1	0	10
<i>Rhinomyias goodfellowi</i>	1	0	6.7	0
<i>Rhipidura nigrocinnamomea</i>	14	5	93.3	50
Family Pachycephalidae				
<i>Pachycephala philippinus</i>	1	2	6.7	20
Family Sturnidae				
<i>Aplonis panayensis</i>	2	0	13.3	0
<i>Basilornis miranda</i>	1	1	6.7	10
Family Nectarinidae				
<i>Aethopyga boltoni</i>	0	1	0	10
<i>A. primigenius</i>	11	3	73.3	30
<i>Arachnothera clarae</i>	2	0	13.3	0
Family Dicaeidae				
<i>Dicaeum</i> spp.	8	0	53.3	0
<i>D. anthonyi</i>	1	0	6.7	0
<i>D. nigrilore</i>	0	2	0	20
Family Zosteropidae				
<i>Hypocryptadius cinnamomeus</i>	7	3	46.7	30
<i>Lophozosterops goodfellowi</i>	0	2	0	20
<i>Zosterops montanus</i>	7	5	46.7	50
Family Fringillidae				
<i>Pyrrhula leucogastra</i>	0	1	0	10

<sup>a</sup> This rather odd record is backed up by independent observations by DHC, again of an individual swiftlet foraging in concert with a multispecies flock.

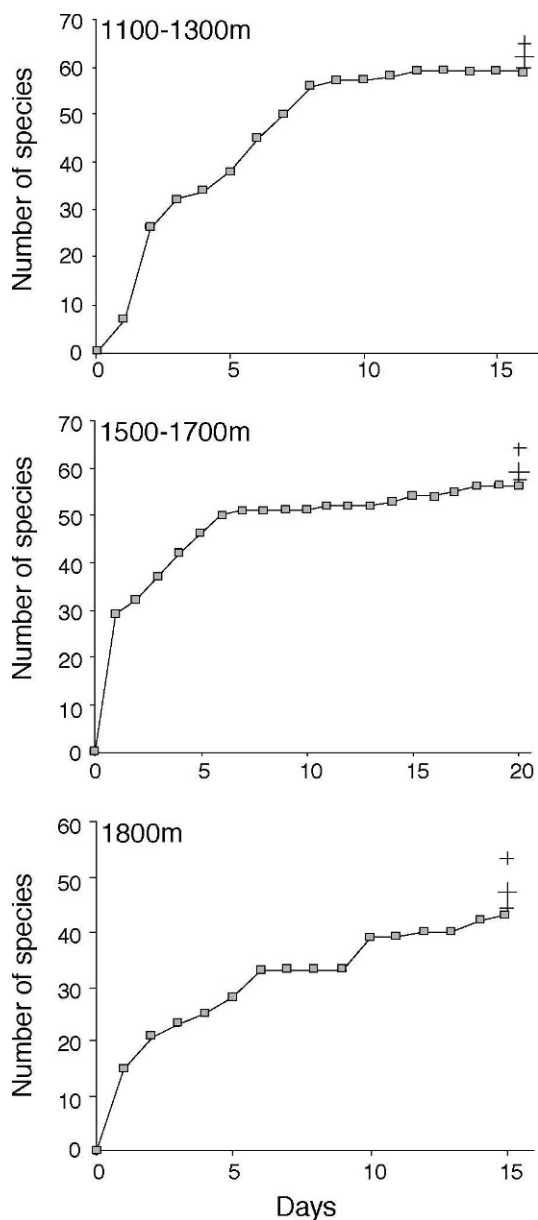


FIG. 3. Species-accumulation curves for 3 sites of detailed study: the 1100–1300-, 1500–1700-, and 1800-m ridges studied by the Field Museum team in 1992. Cumulative numbers of species recorded are shown as squares; 25% and 75% intervals (small +) and the median (large +) of the bootstrapped predicted overall species diversity are shown for the last day of the inventories.

stations on the transect. More generally, congeneric species pairs overlapped by 1–6 stations in all cases.

Over a broader spectrum of habitats, including the highly disturbed lowlands, numerous

examples of nonoverlapping distributions were present. Each, however, consisted of related species with markedly different habitat requirements. For example, *Lanius cristatus* and *L. schach* were restricted to open, disturbed areas in the lowlands, whereas *L. validirostris* was found only in closed montane forest above 1800 m, separated by about 1000 m of elevation from the other 2 species. Similarly, *Centropus viridis* was found in disturbed lowland forest below 1000 m, whereas *C. melanops* was restricted to closed montane forest above 1500 m (which is itself a most surprising result). Other examples include members of the genera *Orthotomus*, *Coracina*, and *Zosterops*. Hence, elevational structuring of avifaunas in the absence of discrete habitat differences, which may be a strong indicator of competitive interactions (Terborgh, 1971), was not found in any group in the Kitanglad avifauna.

**Altitudinal Patterns of Diversity and Endemism**—Previous studies have documented a general pattern of high species richness in the lowlands, contrasting with elevated endemism in the highlands (e.g., Mayr, 1963; Peterson et al., 1993). Based on general references available (Dickinson et al., 1991), we estimate that approximately 172 of the species detected are resident and breeding on Kitanglad. Altitudinal patterns of diversity and endemism along the FMNH transect up Mt. Kitanglad (500–2250 m), however, do not show clearly the predicted inverse correlation of diversity and endemism (Fig. 4). Species richness was low at the lowest elevations studied ( $\leq 700$  m), high in lowland and foothill forests (1100–1300 m) and at middle elevations (1700–1800 m), and declined somewhat at high elevations (1850–2250 m). We attribute the low species richness in the lowlands to the severe disturbance of natural habitats below 700–1000 m in the region, reducing the richness of those communities considerably, an explanation supported by the nondetection of numerous lowland species in recent surveys (e.g., *Eurystomus orientalis*), although many possible explanations exist (Heaney, 2001).

Philippine endemism was more than 35% in the lowlands (although our “lowland” surveys surely were affected by the near-complete deforestation at low elevations), rising to 100% at 1900 m. Endemism at the level of Greater Mindanao and at the level of Mindanao alone was quite low in the lowlands but rose steadily to 40–50% at the highest elevations. Hence, ende-



TABLE 6. Summary of species recorded at 8 elevational stations along the transect covered by the 1992–1993 FMNH groups.

Species	1100-m camp	1200-m ridge	1300-m ridge	1500-m ridge	1800-m ridge	1850-m ridge	1900-m camp	2250-m camp
Family Accipitridae								
<i>Accipiter trivirgatus</i>	X	—	—	X	—	—	—	—
<i>A. virgatus</i>	X	X	—	X	X	—	—	—
<i>Haliastur indus</i>	—	—	X	—	—	—	—	—
<i>Hieraetus kienerii</i>	X	X	—	—	—	—	—	—
<i>Spilornis holospilus</i>	X	X	X	X	X	—	X	X
Family Falconidae								
<i>Microhierax erythrogenys</i>	—	—	—	X	—	—	—	—
Family Phasianidae								
<i>Gallus gallus</i>	—	—	X	X	—	—	X	X
Family Columbidae								
<i>Chalcophaps indica</i>	X	—	—	X	—	—	—	—
<i>Ducula poliocephala</i>	X	—	—	X	X	—	—	—
<i>Macropygia tenuirostris</i>	X	—	X	X	X	—	X	X
<i>Phapitreron</i> spp.	X	—	—	X	—	—	—	—
<i>P. amethystina</i>	X	—	—	X	X	—	—	—
<i>Ptilinopus occipitalis</i>	X	X	X	X	X	X	X	—
Family Psittacidae								
<i>Loriculus philippensis</i>	X	X	X	—	—	—	—	—
<i>Prioniturus waterstradti</i>	X	X	X	X	X	—	—	X
Family Cuculidae								
<i>Cacomantis sepulcralis</i>	X	X	—	X	X	X	X	X
<i>Centropus melanops</i>	—	—	—	X	X	X	—	—
<i>Cuculus fugax</i>	—	—	—	X	X	—	—	—
Family Strigidae								
<i>Otus megalotis</i>	X	X	X	X	—	—	—	—
<i>O. mirus</i>	X	X	—	X	—	—	X	X
Family Podargidae								
<i>Batrachostomus septimus</i>	X	—	—	—	—	—	—	—
Family Caprimulgidae								
<i>Caprimulgus manillensis</i>	—	—	—	X	X	—	—	—
Family Apodidae								
<i>Collocalia esculenta</i>	X	X	X	X	X	X	X	X
<i>Hirundapus giganteus</i>	—	—	—	X	—	—	—	—
Family Trogonidae								
<i>Harpactes ardens</i>	X	—	X	X	X	X	X	—
Family Bucerotidae								
<i>Aceros leucocephalus</i>	X	X	—	—	—	—	—	—
<i>Buceros hydrocorax</i>	X	X	X	X	X	X	X	X
<i>Penelopides panini</i>	X	—	—	—	—	—	X	—
Family Picidae								
<i>Chrysocolaptes lucidus</i>	X	X	—	X	X	—	—	—
<i>Dendrocopos maculatus</i>	X	X	X	X	X	—	—	—
<i>Dryocopus javensis</i>	X	—	—	X	—	—	X	—
Family Campephagidae								
<i>Coracina mcgregori</i>	X	X	X	X	X	X	X	—
<i>Lalage nigra</i>	X	—	—	X	—	—	—	—
<i>Pericrocotus flammeus</i>	X	—	—	—	—	—	—	—
Family Pycnonotidae								
<i>Hypsipetes philippinus</i>	X	X	X	X	X	X	X	—
Family Dicuridae								
<i>Dicrurus hottentottus</i>	X	—	—	—	—	—	X	—
Family Oriolidae								
<i>Irena cyanogaster</i>	X	X	—	—	—	—	—	—
Family Paridae								
<i>Parus elegans</i>	X	X	X	X	X	X	X	X
Family Sittidae								
<i>Sitta oenochlamys</i>	X	X	X	X	X	—	X	X
Family Rhabdornithidae								

TABLE 6. *Continued.*

Species	1100-m camp	1200-m ridge	1300-m ridge	1500-m ridge	1800-m ridge	1850-m ridge	1900-m camp	2250-m camp
<i>Rhabdornis inornatus</i>	X	X	—	—	—	—	—	—
<i>R. mystacalis</i>	X	—	—	—	—	—	X	—
Family Timaliidae								
<i>Leonardina woodi</i>	X	X	—	X	—	—	X	X
<i>Macronous striaticeps</i>	X	X	—	X	X	—	—	—
Family Turdidae								
<i>Brachypteryx montana</i>	—	—	—	X	X	X	X	X
<i>Turdus poliocephalus</i>	—	—	—	X	X	X	X	X
Family Sylviidae								
<i>Bradypterus caudatus</i>	—	—	—	X	X	—	X	—
<i>Orthotomus heterolaemus</i>	—	—	—	X	X	X	X	X
<i>Phylloscopus olivaceus</i>	X	X	X	X	X	X	X	X
Family Muscicapidae								
<i>Culicicapa helianthea</i>	—	—	—	X	—	—	—	—
<i>Eumyias panayensis</i>	X	X	X	X	X	—	X	X
<i>Ficedula hyperythra</i>	X	X	X	X	X	X	X	X
<i>F. westermanni</i>	X	X	—	X	X	X	—	X
<i>Muscicapa griseisticta</i>	—	—	—	X	—	—	—	—
<i>Rhinomyias goodfellowi</i>	X	X	—	X	X	—	—	—
<i>Rhipidura nigrocinnamomea</i>	X	X	X	X	X	X	X	X
<i>R. superciliaris</i>	X	X	X	X	X	X	—	—
Family Pachycephalidae								
<i>Pachycephala philippinensis</i>	X	X	X	X	X	X	X	X
Family Laniidae								
<i>Lanius validirostris</i>	—	—	—	—	X	X	X	X
Family Sturnidae								
<i>Aplonis minor</i>	X	X	X	X	X	—	X	—
<i>A. panayensis</i>	X	X	—	—	—	—	—	—
<i>Basilornis miranda</i>	—	—	X	X	X	X	X	X
Family Nectarinidae								
<i>Aethopyga boltoni</i>	—	—	—	—	X	X	X	X
<i>A. primigenia</i>	X	X	X	X	X	X	X	—
<i>A. shelleyi</i>	—	—	—	—	X	—	—	—
<i>Arachnothera clarae</i>	X	X	—	—	—	—	X	—
Family Dicaeidae								
<i>Dicaeum anthonyi</i>	X	X	—	X	—	—	X	—
<i>D. bicolor</i>	X	X	—	X	—	—	—	—
<i>D. hypoleucum</i>	X	X	—	X	—	—	—	—
<i>D. nigrilore</i>	X	X	—	X	X	X	X	X
<i>D. trigonostigma</i>	X	—	—	X	—	—	—	—
<i>Prionochilus olivaceus</i>	X	—	—	—	—	—	—	—
Family Zosteropidae								
<i>Hypocryptadius cinnamomeus</i>	X	X	X	X	X	X	X	X
<i>Lophozosterops goodfellowi</i>	—	—	—	X	X	X	X	X
<i>Zosterops montanus</i>	X	X	X	X	X	X	X	X
Family Fringillidae								
<i>Pyrrhula leucogenys</i>	—	—	—	X	X	X	X	X
Total	56	40	27	58	44	27	39	28

mism, as expected on the basis of other transects, increased steadily with elevation.

SINGLE-SITE INVENTORY—Intensive single-site inventories provide extremely valuable data for conservation planning (Balmford & Gaston, 1999). Thus, the total of 198 species now known to occur (or to have occurred) on the Kitanglad massif ranks it among the richest sites for birds in the Philippines, surpassing such well-surveyed sites on

Luzon as Mt. Isarog, with 135 species (Goodman & Gonzales, 1989). While such statements demand detailed comparisons of survey effort, altitudinal range surveyed, habitat range surveyed, and so on, the crude comparison remains—the Kitanglad massif holds a large number of species in comparison with other well-surveyed sites.

In fact, given that the Kitanglad massif is much smaller in area than the Sierra Madre of

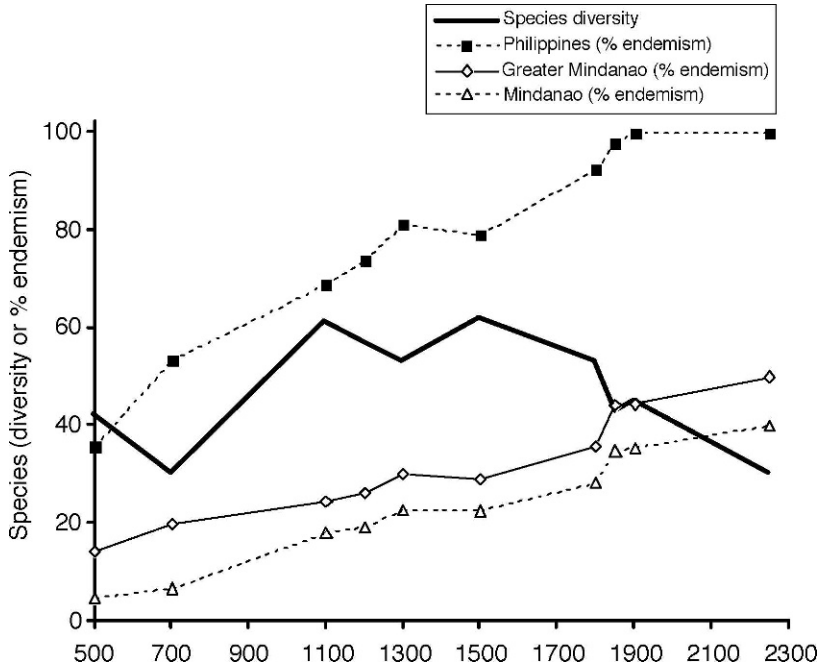


FIG. 4. Elevational biodiversity trends: species diversity, Philippine endemism, Greater Mindanao endemism, and strict Mindanao endemism, all plotted against elevation (in m) along the 500–2250-m transect covered by the FMNH expeditions.

Luzon, Kitanglad’s species richness may be comparable with the total of ~250 species believed to occur there (Poulsen, 1995). Compared with these sites, Kitanglad’s avifauna is similar in richness at lower elevations but richer toward higher elevations. Given the relatively broad elevational distributions of Philippine birds, we suspect that approximately 200 species may represent a limit for single lowland-to-highland transect avian diversity in the Philippines.

**Avifaunistic Changes**—Of the ~172 bird species known to be resident in the Kitanglad region, the early collectors (most prominently Salomonsen, Rabor, and Gonzales) collected 129 (75.0%) (and probably sighted many more; overall field time not known). Recent field crews, during almost 4 months of intensive fieldwork at all elevations holding significant forest, as well as many months of effort by bird-watchers, detected 153 (88.9%) species. Hence, the early surveys did not detect as high a proportion of overall known species richness as the modern ones. However, to understand how best to interpret the results of the early surveys, it is worth examining which groups of species were better detected by the early surveys and which were better detected by the modern work.

The 18 species documented historically but with no recent records in spite of intensive studies are *Falco severus*, *Streptopelia bitorquata*, *Ninox philippensis*, *Hirundapus giganteus*, *Alcedo atthis*, *Halcyon capensis*, *Eurystomus orientalis*, *Eurylaimus steerii*, *Coracina morio*, *Lalage melanoleuca*, *Pycnonotus urostictus*, *Hypsipetes everetti*, *Oriolus steerii*, *Stachyris capitalis*, *Orthotomus nigriceps*, *Nectarinia sperata*, *Aethopyga pulcherrima*, and *Arachnothera longirostra* (Table 2). Several additional species well documented by historical specimens are known from only 1 or 2 recent records (e.g., *Ducula carola*, *Surniculus lugubris*, *Alcedo argentata*, *Zoothera andromedae*). A substantial portion of these species (see Species Accounts) are lowland species (Dickinson et al., 1991) and may be in danger of extirpation from the Kitanglad region because of habitat destruction. Hence, the bulk of the species not detected in recent surveys appear to be species that would not be likely to be found in the reduced set of habitats—chiefly montane—remaining on the mountain today (an exception would be *Z. andromedae*, which is an elusive montane forest resident).

Similar are a group of species that, while collected commonly in the 1960s (Ripley &

Rabor, 1961), have not been recorded in recent years on Kitanglad's accessible northeastern flank, above Dalwangan, despite the visits of many bird-watchers. These species appear restricted on Kitanglad to the relatively inaccessible northwestern and western flanks: all 3 *Phapitreron*, *Columba vitiensis*, *Harpactes ardens*, and *Aceros leucocephalus*. These species are all large-bodied frugivores, and it seems likely that their decline on Kitanglad is due to hunting pressure as well as to deforestation. It is noteworthy that no raptors feature in this group, suggesting that they are not heavily hunted, perhaps because of inconspicuousness or unpalatability.

Recent surveys, however, documented a total of 43 species not known historically. These species break down fairly clearly into 3 groups: water-associated species; species of open and disturbed habitats; and low-density, primary habitat species. Water-associated species were detected principally by AG and colleagues on the mountain's lower slopes, such as *Butorides striatus*, *Dupetor flavicollis*, *Gallirallus philippensis*, *G. torquatus*, *Amaurornis olivacea*, and *A. phoenicurus*. Most likely, the early surveys were carried out in areas lacking aquatic habitats, and for that reason these species were not collected.

Another component lacking from the early collections are resident and migrant species restricted to open and disturbed habitats, principally in the lowlands surrounding the Kitanglad massif. These species include, for example, *Geopelia striata*, *Halcyon chloris*, *Merops philippinus*, *Anthreptes malacensis*, and *Zosterops everetti*. These species were probably much less apparent around Kitanglad in the 1950s and 1960s, as habitat destruction was less far advanced than at present. In addition, they were probably of least interest to the collectors, being principally species that are common and widespread throughout the Philippines. Hence, the absence of these disturbed- and open-habitat species in the early collections may indicate the effects of colonization and advance by such species in the wake of widespread habitat destruction (Brooks et al., 1996).

Finally, we detected several low-density, primary forest bird species not noted in the early surveys, including *Spizaetus cirrhatius*, *S. philippensis*, *Centropus melanops*, *Ducula poliocephala*, *Bolbopsittacus lunulatus*, *Pitta erythrogaster*, *Irena cyanogaster*, and *Rhipidura superciliaris*. Especially surprising is the absence of early

records of *Buceros hydrocorax*, which we found to be common in the forested portions of the massif and which would have been of particular interest to early collectors.

Hence, it appears that for the Mt. Kitanglad region, the early information available (all of it specimen based, Rabor's material being the principal part) does not present as exhaustive a sampling of the avifauna present as do modern surveys. This result apparently holds also for other groups that Rabor sampled, such as mammals, where the use of new methodologies has amply demonstrated that an enormous amount remains to be learned about sites earlier surveyed by Rabor (L. R. Heaney, pers. comm.). Nevertheless, the material accumulated by Rabor, Gonzales, Salomonsen, Bregulla, and other early collectors is remarkable in that most species were recorded as present; these records provide considerable confidence in the diversity of possible uses of their data for documenting bird distributions elsewhere in the Philippines. The data and specimens accumulated by Rabor and colleagues (with identifications appropriately checked and modernized) merit further exploration as to their utility—indeed, we observed no situations in which Rabor tag data were clearly suspect. We suggest that the data from all of these explorations would lay an unparalleled foundation for a national biological inventory of the Philippines.

#### **Conservation of Mindanao's Endemic Species**—

Eighteen bird species are strictly endemic to Mindanao. Seventeen of these endemics have been found on Kitanglad: *Trichoglossus johnstoniae*, *Prioniturus waterstradti*, *Otus mirus*, *Actenoides hombroni*, *Coracina mcgregori*, *Leonardina woodi*, *Rhinomyias goodfellowi*, *Rhipidura nigrocinnamomea*, *Orthotomus heterolaemus*, *Basilornis miranda*, *Aethopyga primigenius*, *A. boltoni*, *Dicaeum nigrilore*, *D. propium*, *Lophozosterops goodfellowi*, *Hypocryptadius cinnamomeus*, and *Erythrura coloria*. The only Mindanao endemic not found on Kitanglad, *Aethopyga linarabori*, was recently described as a species distinct from the more widespread Mindanao endemic *A. boltoni* (Kennedy et al., 1997)—it is restricted to the eastern provinces of Davao del Norte and Davao Oriental and thus is an allospecies of a Kitanglad resident species. As such, the Kitanglad massif is certainly comparable with Mt. Apo in terms of richness of Mindanao endemic species.

The flagship reserve in the southern Philippines has traditionally been Mt. Apo National

Park, centered on a tall volcanic mountain (2954 m) at the southern extreme of the island. Mt. Apo was the first montane area of Mindanao to see extensive zoological exploration, and for that reason many species were long known only from there. Apo, however, is a slender volcanic cone and therefore has very limited area at higher elevations (approximately 388 km<sup>2</sup> above 1000 m). Those highest elevations of the mountain, moreover, have been compromised recently by the construction of a geothermal energy production plant, and the overall integrity of the region has been endangered by proximity to Davao City.

Kitanglad, in contrast with Apo, is a block-shaped massif (maximum elevation 2938 m). It has extensive areas at high elevations (approximately 1757 km<sup>2</sup> above 1000 m), about 4.5 times as much as Apo, although, as on Apo, construction of installations around the peak (e.g., Bukidnon Telephone, Philippine Telephone and Telegraph, Philippine Army, Radio Mindanao Network, and the DLG Building) has jeopardized natural habitats at the highest elevations. With the documentation that the Kitanglad avifauna includes essentially the full complement of species unique to the island, we suggest that Kitanglad may prove to be a more appropriate primary focus for the conservation of Mindanao's montane species. Mt. Kitanglad National Park was declared by Proclamation No. 667 on 14 Dec. 1990 and is therefore under the management of the Philippine Department of the Environment and Natural Resources. It is also one of the Integrated Protected Areas Priority sites. The area proposed under the Global Environment Fund Conservation of Priority Protected Areas Project includes a buffer zone of 74,100 ha.

**Specimens versus Observations**—Avifaunal inventories typically fall clearly into 1 of 2 categories: those assembled by observation, at times aided by mist-net captures, versus those assembled via a combination of specimen collection (when possible) and observations. A third source of information is from historical specimens, although often neglected. Oddly enough, true bridges between these worlds in primary research studies, including both the force of numbers and time that observations by bird-watchers can offer and the force of information and depth that specimen-based ornithology provides, are few. One feature of the present monograph, then, is the presentation of such a bridge.

We have presented and discussed gaps in species lists assembled based on the historical specimen record and emphasized the need for new, modern survey initiatives. Use of mist-nets is key (see, e.g., the important nets-only records, such as *Phapitreron brunneiceps*), as is increased reliance on vocal cues for efficient species detection and identification (Parker, 1991). More generally, a focus on inventory (assembling a complete catalog of species present), rather than sampling or simply collecting specimens, is enormously helpful (Colwell & Coddington, 1994; Peterson & Slade, 1998). We have avoided a point-to-point comparison of which teams detected more species in this study, particularly given marked differences in time spent on the mountain, techniques employed, experience of observers, and elevations and slopes surveyed.

Bird-watchers clearly held a great advantage in terms of numbers of observers and time spent observing. Kitanglad is a relatively accessible mountain massif with abundant endemic species in a region that is itself rich in endemism and as such has attracted immense attention from the bird-watching community. The numerous teams of birders that have visited Kitanglad have reached several sectors of the range that would otherwise have gone unsurveyed and have provided broader seasonal coverage than the collecting teams were able to cover (although wet-season data for the mountain are still scanty; Fig. 2). In this sense, bird-watchers provided to this monograph an enormous force of observation effort that would otherwise not have been represented in this inventory. One shortcoming, though, is that exact locations, dates, and/or elevations were not always recorded.

Specimen collection and preparation is a time-intensive endeavor and clearly cannot in and of itself provide great numbers of records of species; for this reason, all the recent collecting teams that have visited Kitanglad have supplemented specimen records with observations. Observational information may have been collected by the earlier collecting teams, but this information was not available to us, if it exists. The specimen information summarized herein offers a powerful advantage in that records can be revisited in light of new information or new interpretations—as species limits are reinterpreted, for example, specimens can be determined precisely, whereas observational information cannot. Specimens provide a rich resource of additional information, including providing the basis for description and

documentation of new taxa (e.g., Gamauf et al., 1998a; Kennedy et al., 1997, 2001), understanding species limits and phylogenetic relationships of complex groups (Miranda et al., 1997; Kemp, 1988), and understanding seasonal and reproductive status (Rensen, 1995).

## Conclusions

The present study examined the avifauna of Mt. Kitanglad, a large mountain mass in northern Mindanao. The composition of Mt. Kitanglad's avifauna has not previously been documented in detail. In this monograph, we present a summary of all information existing regarding the avifauna of the region; principal results and points for further consideration include the following:

1. Mt. Kitanglad holds one of the richest single-site avifaunas in the Philippines, with a total of 198 bird species, of which about 172 are resident. A further 10 species are considered hypothetical or doubtful as occurring on the mountain.
2. Of Kitanglad's avifauna, 85 species are endemic to the Philippines, 28 are endemic to Greater Mindanao, and 17 are endemic to Mindanao alone, all but one of the island's endemic species.
3. Of Kitanglad's avifauna, 1 species is considered critically endangered, 10 as vulnerable, 17 as near threatened, and 1 as data deficient (BirdLife International, 2004).
4. Changes in threat categorization (Collar et al., 1999) relative to those used in earlier publications (Collar et al., 1994) appear largely justified based on the evidence from Kitanglad.
5. Kitanglad's lower slopes have lost nearly all their forest species through deforestation and hunting, but the mountain's high-elevation forests retain rich and intact communities of birds.
6. Great potential for further avian discoveries await on Mindanao's mountains, as illustrated by the newly described *Scelopax bukidnonensis*; odd and suggestive elevational records (e.g., *Centropus melanops*); first reports for the island of *Luscinia calliope*, *Turdus chrysolus*, and *Motacilla alba*; and large range extensions for *Phapitreron brunneiceps* and *Otus mirus*.
7. Kitanglad appears to constitute a key site for conservation of montane birds on Mindanao, with excellent representation of the island's endemic species of birds, and as such its status as a protected area should be given full international support.

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APPENDIX. Summary of soft-part colors (for sexually monotypic species, data given once only) and weights (N) from adult individuals collected in 1992–1993 on Mt. Kitanglad, based on tag data from specimens deposited at the FMNH.

Species	Colors					Weight (g)
	Iris	Maxilla	Mandible	Legs	Sex	
Family Accipitridae <i>Accipiter virgatus quaggae</i>	red; orange	dark gray; black, gray base	light gray; black, gray base	corn-yellow; yellow	m	82.5–90 g (2)
Family Falconidae <i>Microhierax erythrogonys meridionalis</i>	dark brown	black	black	dark gray	m	65 (1)
Family Columbidae <i>Chalcophaps i. indica</i>	dark brown	orange, blackish or bluish purple base; brown	orange, blackish, or bluish purple base; brown	maroon; purplish gray	f	94.5–107 (3)
<i>Phapitreron amethystina mindanaensis</i>	orange-red; light brown; dark brown	black	black	dull pink; reddish brown; dull purplish; dull red	m f	110–119 (2) 90–102 (3)
<i>Phapitreron brunneiceps</i>	orange; brown; red	black	black	maroon-pink; dull rose; dull red	m f	140–153 (2) 124 (1)
<i>Phapitreron leucotis brevirostris</i>	pink-blue; whitish pink; purple yellow	black	black	brown; maroon; maroon-pink	m	110–112 (2)
<i>Ptilinopus occipitalis incognitus</i>		red base, yellow tip	red base, yellow tip	red	m	175 (1)
Family Psittacidae <i>Prioniturus waterstradti mindangensis</i>	red-brown; dark gray; dark brown	pink-cream; light gray; ivory	pink-cream; light gray; ivory	flesh; gray; dull green	m	108–139 (2)
Family Cuculidae <i>Cacomantis sepulcralis</i>	cream; dark brown	black	greenish, black tip; dull green; dull yellow, black tip	corn-yellow; yellow	m f	33.0 (1) 33.5 (1)
<i>Cuculus fugax pectoralis</i>	dark brown	black, olive-green or green base	lime-green; dull flesh	corn-yellow; yellow	m	86 (1)
<i>Cuculus saturatus horsfieldi</i>	tan; dull orange	black	dull light green, black tip; gray, green-gray base	corn-yellow	m	73.2 (1)
Family Strigidae <i>Otus mirus</i>	yellow	brown; medium to very dark gray	olive green-yellow; medium to very dark gray	olive-green; gray-pink; cream	m f	64.5 (1) 68.5 (1)
<i>O. megalotis</i>	dark brown; chestnut brown; orange	dull brown, light base; gray-pink; medium gray, black tip	greenish yellow; gray-pink; medium gray, black tip	flesh; pink	m	123 (1)
Family Caprimulgidae <i>Caprimulgus manillensis</i>	dark brown	black	black	black		70 (1)

Species	Colors					Sex	Weight (g)
	Iris	Maxilla	Mandible	Legs			
Family Apodidae <i>Collocalia esculenta bagobo</i>	dark brown	black	black	dark gray; blackish brown; black		m f	6.6–7 (4) 6.2–6.5 (3)
Family Picidae <i>Picoides maculatus fulvifasciatus</i> <i>Chrysocolaptes lucidus montanus</i>	dark brown brown; dark brown	black, gray base black	black, gray base yellow-green; yellow, black tip	yellow-brown dull green or yellow		f m	26.8 (1) 125–128 (2)
Family Campephagidae <i>Coracina nigregori</i>	dark brown	black	black	black		m	42.5 (1; skull not ossified)
Family Pycnonotidae <i>Hypsipetes philippinus saturator</i>	dark brown to red-brown	black	black	dark brown, dark gray, purplish gray		m f	39–43 (2) 37–42 (5)
Family Paridae <i>Parus elegans mindanensis</i>	dark brown	black, trace of gray at base	black, trace of gray at base	medium gray		m f	11–13 (4) 11.5–11.7 (2)
Family Sittidae <i>Sitta oenochlamys apo</i>	yellow yellow	green-yellow yellow-green	green-yellow yellow-green	green-gray dull yellow-brown		m f	14.5–16 (4) 14.5 (1)
Family Rhabdornithidae <i>Rhabdornis inornatus ataris</i>	dark brown	black	black	brownish gray		f	39 (1)
Family Timaliidae <i>Leonardina woodi</i>	dark brown	black	black	gray; medium gray; purplish gray		m	37.5–39 (2)
<i>Macronous striaticeps mindanensis</i>	cream or gray	dark gray or black	dark gray or gray- black or black, tip gray	gray; dark gray; purplish gray		f	14.5–19.5
Family Turdidae <i>Turdus poliocephalus kattanglad</i>	dark brown; brown	corn-yellow; orange-yellow	corn-yellow; orange yellow	corn-yellow; orange- yellow		m f	59–69.3 (5) 57–62.8 (2)
Family Sylviidae <i>Bradypterus caudatus malindangensis</i>	brown	very dark gray to black	very dark gray to black	dark gray-brown		f	22 (1)
<i>Orthotomus heterolaemus</i>	dark brown	very dark gray to black	pinkish or yellowish gray	dull yellow or yellow brown		m	8–8.8 (3)
<i>Phylloscopus olivaceus</i>	dark brown	black or brown	cream to pink	brownish gray		m f	10 (2) 8.5–10.5 (3)
Family Muscicapidae <i>Culicicapa helianthea panayensis</i> <i>Eumyias panayensis nigriloris</i>	dark brown dark brown	black black	black, pink-gray base black	yellow-brown dark gray		m m f	7.2 (1) 18 (1) 15.2–16 (2)
<i>Ficedula hyperythra montigena</i>	dark brown	black	black	gray-pink		m f	9.7–10.1 (5) 8.8–11.2 (5)

Species	Colors					Sex	Weight (g)
	Iris	Maxilla	Mandible	Legs			
<i>F. w. westermanni</i>	dark brown	black	black	dark gray to black		m	7.6-7.7 (2)
<i>Rhinomyias goodfellowi</i>	dark brown	very dark gray to black	very dark gray to black	medium gray		f	7.2 (1)
<i>Rhipidura nigrocinnamomea</i>	dark brown	black	black	dark brown, dark gray, to black		m	31.7-33.3 (4)
<i>R. hutchinsoni</i>	dark brown	black	black	dark brown, dark gray, to black		f	27.2-33 (3)
<i>R. superciliosus apo</i>	dark brown	black	black	gray		f	11.3-14.5 (9)
Family Pachycephalidae							10.5-13 (4)
<i>Pachycephala philippinensis apoensis</i>	dark brown	black	black	gray		m	20.7-22 (4)
Family Motacillidae							18-23.5 (5)
<i>Anthus g. gustavi</i>	dark brown	dark brown	flesh	light brown		u	18 (1)
Family Laniidae							
<i>Lanius validirostris hachisuka</i>	dark brown	black	black	black		m	41 (1)
Family Sturnidae							
<i>Aplonis minor todayensis</i>	red	black	black	black		f	39 (2)
<i>Basilornis mirandus</i>	dark brown	yellow	yellow	blackish yellow to dark brown		m	107-110 (2)
Family Nectarinidae							
<i>Aethopyga p. primigenius</i>	dark brown	black	black	black		m	7-7.8 (3)
<i>Aethopyga boltoni malindangensis</i>	dark brown	black	black	very dark gray to black		f	6 (1)
Family Dicaeidae							
<i>Dicaeum anthonyi kampakili</i>	dark brown	black	black	gray to black		m	9.5-10.9 (3)
<i>Dicaeum b. bicolor</i>	dark brown	very dark brown	very dark brown	dark gray		f	10.8-11.1 (2)
<i>Dicaeum hypoleucum pontifex</i>	dark brown	black or orange with black tip	black or orange with black tip	dark gray		f	9 (1)
<i>Dicaeum n. nigrilore</i>	red	black	black	gray		m	7.9-8.8 (7)
<i>Dicaeum trigonostigma cinereigulare</i>	dark brown	black	black	dark gray to black		f	7.5-9 (3)
<i>Prionochilus o. olivaceus</i>	dark brown	red-brown	black	black		m	10 (4)
Family Zosteropidae							
<i>Hypocryptadius cinnamomeus</i>	brown	gray, pink base	gray, pink base	gray		m	25-28.2 (2)
<i>Lophozosterops g. goodfellowi</i>	red to dark brown	black	black	greenish		f	25-27.2 (3)
<i>Zosterops montanus vulcani</i>	dull cream to light brown	black	black, gray base	gray		f	18.3-20.5 (3)
Family Fringillidae							
<i>Pyrrhula leucogenys steerei</i>	dark brown	black, gray base	black, gray base	brown		m	20-20.2 (2)
						f	9-10.7 (3)
						f	9.8-10.3 (2)
						m	20.5 (1)
						f	20.5 (1)