THREATENED WILDLIFE OF THE TWIN LAKES BALINSASAYAO AND DANAO NATURAL PARK, NEGROS ORIENTAL, PHILIPPINES

Cynthia N. Dolino, Apolinario B. Cariño, and Angelita M. Cadeliña

ABSTRACT

The Twin Lakes of Balinsasayao and Danao of southeastern Negros constitute an extensive tropical rainforest ecosystem and one of the centers of great biological diversity on Negros Island. They are a part of the 133,000 ha Philippine National Oil Company (PNOC) Geothermal Reserve. The lakes and forest ecosystems are refuges to the 180 species of dipterocarp and non-dipterocarp trees, 113 species of birds, 27 mammals, and 49 amphibians and reptiles. Currently, the Twin Lakes have been officially declared as a Natural Park with some of the unique mammals, birds, amphibians, and reptiles in threatened status. The vertebrate fauna having the most threatened species are the birds with 17 globally threatened species. The mammals have 11 threatened species that are under different levels of threat. The amphibians have 5 threatened species while the reptiles have two lizards and one snake that are threatened. Habitat loss and degradation coupled with discrete hunting, collection and harvesting of aquatic and forest resources for subsistence, commercial, ornamental, pet, or zoo trade are putting an increasing pressure on threatened and non-threatened plant and animal species in the Twin Lakes area. Long-term conservation program for keystone threatened plant and animal species is essential for the preservation of the remaining forest and its wildlife.

Introduction

The Philippine forests host one of the world's richest plant and animal species. They are estimated to harbor about 8,120 species of flowering plants of which about 3, 200 are endemic; 3,500 species of indigenous trees; 33 species of gymnosperms, and 640 species of mosses (The State of the Philippine Environment 1997). Philippine land vertebrate species number about a thousand (Alcala in Heaney and Regalado, 1998), approximately 105 amphibians, 278 reptiles, 556 birds (resident and migratory), and 174 mammals (Heaney and Regalado, 1998). Once overlooked as a center of biological diversity, this nation of islands has now vaulted to the top of the list of "megadiversity" countries. Unfortunately, with the discovery of the richness of Philippine biodiversity has come the realization that nearly half of the unique mammals, birds, as well as amphibians and reptiles are in threatened status. Acre – for – acre, the Philippines may have the most seriously threatened flora and fauna on earth (Heaney and Regalado, 1998).

Based on the composition of species on each island group in relation to land bridges formed during the Pleistocene period, the Philippines is divided into five major faunal regions: Greater Luzon, Greater Mindanao, Negros-Panay, Mindoro, and Palawan (Heaney, 1986). Among the five faunal regions, Negros, centrally situated in the Philippine Archipelago, is the third largest island with a total land area of 13,670 sq. km (Paalan, 1993). Two separate highlands are present on Negros: a main central range that runs nearly the length of the island, and a double cluster of uplands at the southern end. The southeastern part is dominated by Cuernos de Negros (PENRO-DENR, 1999), one of the most important but critically endangered ecosystems in the island. It is also popularly known as the 133,000 hectare Philippine National Oil Company (PNOC)

geothermal reserve. Currently, the Twin Lakes of Balinsasayao and Danao, which are part of the reserve, have been declared as a Natural Park.

More studies on the systematics and ecology of the original and remnant flora as well as the vertebrate fauna on Negros have been carried out compared to those of any other larger islands in the Philippines. Since the mid-1950s to the present, scientists associated with Silliman University and their research collaborators have been conducting research on plants, mammals, birds, amphibians, and reptiles from which a number of scientific papers, monographs, articles, and books have been published, notably by D.S. Rabor, A.C. Alcala, A.Y. Reyes, W.C. Brown, L.R. Heaney, P. Heideman, and R.C.B. Utzurrum. However, these publications deal with generalized coverage of Philippine flora and fauna. Much of the data obtained from the fieldworks conducted in the remaining tropical rain forest of Cuernos de Negros and Twin Lakes (Balinsasayao and Danao) areas are incorporated in these publications.

This paper is written for three main purposes, namely: (1) to bring to the attention of the general public and to other scientists whose interests lie outside of conservation, our diverse but rare and poorly known plants and vertebrates present in the Twin Lakes area; (2) to present the conservation status of endemic threatened plants and vertebrates; (3) and to underscore the urgent need for protective measures for those plant and vertebrate species that are already listed under different levels of threatened category.

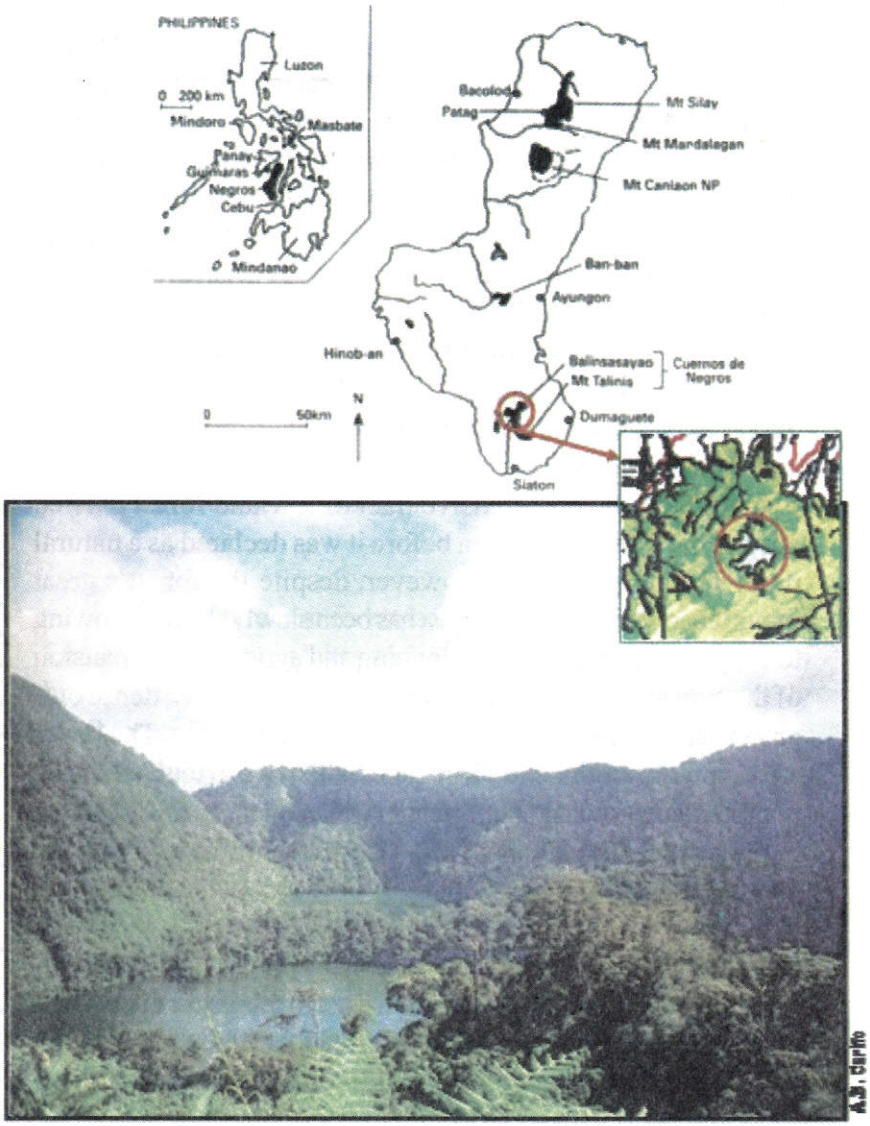

Figure 1. Inset is a map of the Philipines showing Negros Island with location (Brooks *et al*., 1992, DENR 2002) and photograph of the Twin Lakes Balinsasayao and Danao Natural Park in Southeastern Negros.

Methodology

Description of the Area

The southeastern mountain range of Negros Island is Cuernos de Negros that rises at 1,800 meters (6,600 feet) above sea level (ASL). To the north of Mt. Talinis are substantial areas of primary and secondary lowland dipterocarp forest around; the Twin Lakes at Balinsasayao and Danao Natural Park (Fig. 1), with some patches of secondary growth in recently cleared areas. These two small crater lakes are separated by a narrow mountain ridge, and situated in a hollow between four mountains, Mt. Mahungot to the south, Mt. Kalbasaan to the north, Mt. Balinsasayao to the east, and Mt. Guintabon to the west of the Twin Lakes. Lake Balinsasayao lies to the northwest of the ridge and Lake Danao to the southeast (Mallari *et al.*, 2001).

In the past, an extensive tract of lowland forest existed around the Twin Lakes area before it was declared as a natural park. Through the years, however, despite the forest's great importance, the Twin Lakes area has been slowly shrinking owing to the pressure of small-scale logging and agricultural expansion of the surrounding needy rural population. Currently, dense old-growth still surrounds the mountain peaks and lakes. The lower areas, mainly around the Twin Lakes, still have extensive stands of dipterocarp lowland rainforest as well as patches of Almaciga, the largest tree in the Philippines (which can grow up to 60 meters/ 197 feet in height) (Hicks, 2000).

Sources of Information

Literature. Much of the information used in this paper come from published surveys, researches, and Red Data documents along with unpublished manuscripts done in the mid-1950s, in the 1980s, early and late 1990s to 2003.

Biomonitoring Activities. Community validated outputs of surveys done by researchers in the academe and from planned wildlife monitoring activities learned by local people from the

Biomonitoring and Evaluation (BIOME) staff of CenTrop are also utilized in this paper.

Ethnobiological Interviews. Additional information on the presence or absence of plant and vertebrate species was gathered from residents (hunters and farmers) of nearby local communities adjacent to the Twin Lakes.

Internet and CD-ROMS. Websites and electronic database compilations of threatened plants and vertebrates have been cross-checked with previous and current Red Data Book listings.

Flora and Fauna of the Twin Lakes Natural Park

Flora

A total of 180 tree species (see ANNEX A) are recorded in the forest surrounding lakes Balinsasayao and Danao and are classified as dipterocarps and non-dipterocarps.

Dipterocarps

The dipterocarp forest is the principal tropical rainforest formation in the twin lakes and is characterized by several layers of vegetation and a multiplicity of tree species. These are mostly medium- to large size trees, unbranched to a considerable height, and usually attain a height of 40 to 65 meters in diameter at breast height (dbh) or a diameter above buttress (dab) of 60 to 150 centimeters. A few unusually large trees have been found to attain dbh or dab as large as 300 centimeters (de Guzman *et al.*, 1986). Of the 11 dipterocarp species recorded in the Twin Lakes area, the genus *Shorea* is well represented with seven species while the genera *Parashorea*, *Pentacme*, and *Hopea* have one species each (Annex A). From these seven species of *Shorea*, six species are under the Critically Endangered category while the lone species of *Agathis philippinensis* is Vulnerable (Table 1). They thrive on all types of topography but are usually well developed on wet valley bottoms and other well-watered and well-drained areas on the lower mountain slopes. Most of these species are found below an altitude of 700 meters ASL with very few species found above

an altitude of 800 meters ASL (de Guzman *et al.*, 1986). They constitute the bulk of the country's log exports and wood for domestic building construction and infrastructure development. Hence, they are greatly in demand economically and, consequently, harvested illegally.

Table 1. List of globally threatened tree species recorded in Twin Lakes Balinsasayao and Danao Natural Park, Sibulan, Negros Oriental.

SPECIES NAME	LOCAL COMMON NAME	THREAT CATEGORY (IUCN 2000)
1. *Pentacme contorta* [1]	White Lauan	Critically endangered
2. *Shorea almon* [1]	Álmon	Critically endangered
3. *Shorea astylosa* [1]	Yakál	Critically endangered
4. *Shorea guiso* [1]	Guíjo	Critically endangered
5. *Shorea negrosensis* [1]	Red Lauan	Critically endangered
6. *Shorea polysperma* [1]	Tangíle	Critically endangered
7. *Agathis philippinensis* [1]	Almaciga	Vulnerable
8. *Aglaia rimosa* [1]	Balúbar	Lower risk/Not threatened
9. *Artocarpus blancoi* [1]	Antipólo	Vulnerable
10. *Cinnamomum mercadoi* [1]	Kalíngag	Vulnerable
11. *Elaeocarpus calomala* var. *postulatus* [1]	Hamíndang	Vulnerable
12. *Ficus ulmifolia* [1]	Is-ís	Vulnerable
13. *Macaranga bicolor* [1]	Kalomála	Vulnerable
14. *Mangifera monandra* [1]	Malapáho	Endangered
15. *Myristica philippensis* [1]	Dugúan	Vulnerable
16. *Palaquium luzoniense* [1]	Natóo	Vulnerable
17. *Palaquium philippense* [1]	Malák-malák	Vulnerable
18. *Sandoricum vidalii* [1]	Malasántol	Vulnerable
19. *Tectona philippinensis* [1]	Philippine Teak	Endangered
20. *Terminalia nitens* [1]	Sakát	Vulnerable
21. *Terminalia pellucida* [1]	Dalínsi	Vulnerable
22. *Toona calantas* [1]	Kalántas	Data deficient
23. *Vitex parviflora* [1]	Moláve	Vulnerable

Reference:

[1] FPE - SUCENTROP RSA Report 1994

Non-Dipterocarps

The dipterocarps is not a pure stand of tree species but rather a mix forest consisting of non-dipterocarp species of various families. They comprise the other one hundred seventy trees or approximately 93% of the tree species recorded in the Twin Lakes area. Non-dipterocarp species are mostly broad-leafed trees which are associated with the dipterocarps as well as some exotic species introduced into the country for timber, food, fuel wood, ornamental, and other uses. In the uppermost stratum where the dipterocarps are dominant as well as portions of the lowest stratum, they exist as subsidiary species.

The 171 non-dipterocarp tree species in the Twin Lakes area are represented by 52 families and so many genera. The Euphorbiaceae is the most dominant among the families, represented by 15 species; Moraceae, 12 species; Meliaceae, 13 species; Lauraceae, 11 species; Rubiaceae, 9 species; Myristicaceae and Myrtaceae, each with 8 species. The other families are represented by 2-7 species each. However, it is mostly in these not well-represented families that many, at most a total of 23 species of plants are under threatened categories. Among them are *Mangifera monandra* of Anacardiaceae, *Tectona philippinensis* of Verbenaceae and *Agathis philippinensis* of Araucariaceae, categorized as Endangered while 13 other tree species of the rest of the families are considered Vulnerable, two are Data Deficient and one is at lower risk/not threatened (Table 1).

Vertebrate Fauna

A. Birds

The birds of Negros were extensively collected in the late nineteenth and early twentieth centuries as summarized in Dickinson *et al.* (1991). The inter-war period saw little ornithological fieldwork on the island, but studies were restarted there between 1947 and 1967 by D.S. Rabor, A.L. Rand, and S.D. Ripley. Their collections included Balinsasayao area

(Rand, 1951; Rand & Rabor, 1952). Once again in 1970, Rabor and company collected at Balinsasayao, and Alcala & Carumbana in 1975, and again in 1980 (Brooks *et al.*, 1992). Currently, a total of 278 resident and migrant birds have been recorded on Negros Island (Kennedy *et al.*, 2000; Dickinson *et al.*, 1991). However, most of the coastal and marine species have been removed from the list since they are not expected to occur in the Twin Lakes area. A few are retained in the list, particularly if they have been reported to go inland as far as the high elevation areas. Thus, the list has gone down from 278 to 209, with 113 species recorded in the Twin lakes Balinsasayao and Danao areas (see ANNEX B). Thirteen species of these are globally threatened (Table 2).

Threatened Birds

The bird of greatest concern is the Visayan Wrinkled Hornbill. It is known to be endemic in the central islands of the Philippines—Panay, Guimaras, and Negros, and believed to survive in small numbers only on the first and last islands (Collar *et al.*, 1999). Fewer than 50 pairs are estimated to remain on Negros (Y. de Soye verbally, 1997) but this may be an overestimation since fieldwork done in North Negros Forest Reserve resulted in two or three encounters of one or two individuals and none was seen during a week on Mt. Talinis (E. Curio *in litt.*, 1997). In the Twin Lakes, the average number of birds seen per month was 3.75 from January 1977 to July 1978 (Alcala & Carumbana, 1980). In 1991, only one group of four individuals—two females and two males—was recorded and seen twice at Balinsasayao over a total of 87 man-hours over four days spent in the field (Brooks *et al.*, 1992). Recently, local inhabitants residing around the Twin Lakes have reported sightings of only two individuals within this year, 2004 (pers. comm, Abancio). However, joint biomonitoring activities of the Center for Tropical Conservation Studies (CENTROP), POs (Peoples' Organization), and Department of Environment and Natural Resources (DENR) from 2002-2004

Table 2. List of globally threatened birds recorded in the Twin Lakes Balinsasayao and Danao Natural Park, Sibulan, Negros Oriental.

SPECIES NAME/ COMMON NAME	HABITAT	THREAT CATEGORY (Birdlife International 2004)
HORNBILLS		
1. *Aceros waldeni* Visayan Wrinkled-billed Hornbill** 1, 2, 3	Primary lowland forest	Critically Endangered
2. *Penelopides panini* Tarictic Hornbill* 2, 4, 5	Primary evergreen dipterocarp forest	Endangered
DOVES AND PIGEONS		
3. *Gallicolumba keayi* Negros Bleeding-heart Pigeon** 1, 6	Mid-montane forest; Secondary forest	Critically Endangered
4. *Ducula poliocephala* Pink-bellied Imperial Pigeon 7	Primary lowland forest; Secondary forest	Near Threatened
HAWK-EAGLE		
5. *Spizaetus philippensis* Philippine Hawk Eagle 2, 3	Primary lowland forest	Vulnerable
HERON		
6. *Gorsachius goisagi* Japanese Night Heron^ 1	Shaded forest near bodies of water	Endangered
BABELER		
7. *Stachyris (Dasycrotapha) speciosa* Flame-templed Babbler** 1, 9, 10	Primary lowland forest; Secondary forest; forest edge; Secondary growth	Endangered
FLYCATCHERS		
8. *Rhinomyias albigularis* White-throated Jungle Flycatcher** 8	Lowland montane forest	Endangered
SHRIKE		
9. *Coracina ostenta* White-winged Cuckoo Shrike** 1	Lowland and montane forest	Vulnerable
KINGFISHER		
10. *Todiramphus winchelli* Rufous-lored Kingfisher* 1	Lowland forest streams	Vulnerable
FLOWERPECKER		
11. *Dicaeum haematostictum* Visayan Flowerpecker* 2	Lowland forest	Vulnerable
MONARCH		
12. *Hypothymis coelestis* Celestial Blue Monarch* 1	Forest edge or secondary forest	Vulnerable
COCKATOO		
13. *Cacatua haematuropygia* Philippine Cockatoo 11	Primary and lowland forest	Critically endangered

Legend: *Philippine endemic **Negros-Panay endemic ^ Migrant

References:

[1] Alcala & Carumbana 1980; [2] Brooks *et al.*, 1992; [3] Evans *et al.* 1993; [4] C.R. Robson *in litt.*, 1994; [5] F. Verbelen *in litt.*, 1997; [6] Diesmos & Pedregosa 1995; [7] FPE-CENTROP RSA Report, 1994; [8] Collar *et al.*, 1999; [9] Rand, 1951; [10] Erickson & Heideman 1983; [11] L. Tag-at verbally, 1995;

failed to observe this bird species in the Twin Lakes (pers. comm. Cariño). Habitat loss, along with hunting and collection for pet trade, continue to pose the greatest threat to this bird species. To compound all these difficulties, a chronic understaffing of the few protected areas in which this species occurs renders habitat protection and control of hunting difficult to enforce (E. Curio *in litt.*, 1997).

The Negros Bleeding-heart *Gallicolumba keayi* occurs only on Panay (where recently discovered) and Negros. On Negros, the species was considered "fairly common" by Eagle Clark (1900) although Hachisuka (1931-1935, 1936) called it "an extremely rare species". Half a century ago, it may still have been at least modestly represented on the island but recent sightings and reports confirm that it is now extremely rare and its numbers are very small (Collar *et al.*, 1999). In the Twin Lakes, biomonitoring activities by local inhabitants as well as members of the joint CENTROP-POs-DENR biomonitoring team failed to observe this bird from 2002-2004. Habitat degradation continues to pose a serious threat to the remaining fragments (Brooks *et al.*, 1992). Local trapping and hunting is a chronic problem that exacerbates the effects of deforestation (Collar *et al.*, 1999).

The Philippine Cockatoo *Cacatua haematuropygia* was common 50 years ago throughout the Philippines (Delacour & Mayr, 1946). However, Dickenson *et al.* (1991) considered it as rare and only confined to very few islands in the Philippines. It was reported on Negros by McGregor (1911) and particularly sighted in the Twin Lakes by L. Tag-at (verbally, 1995). Nevertheless, there are no recent records or local reports from Negros either from the 36-day fieldwork in 1991 (Collar *et al.*, 1999) or from the more recent joint biomonitoring activities of CENTROP-POs-DENR in the Twin Lakes. Habitat destruction and intensive trapping for the cagebird trade are the main threats (Boussekey, 1993; Lambert, 1994).

The Visayan Tarictic *Penelopides panini* is found only in the Philippines but it has now become rare or extinct on all the

islands within its range (Collar *et al.*, 1999). On Negros, only two individuals were encountered at Mt. Talinis, Siaton, Lake Yagomyum, and Hinoba-an, with three in the Twin Lakes area (M. Ebreo & R. Paalan verbally, 1995) from 1992 to 1995. Currently, the hornbill is rarely seen in the Twin Lakes but according to Collar *et al.* (1999), it is less scarce than the Visayan Wrinkled hornbill. Forest destruction has been a major threat to this bird as well as hunting and trapping (Curio *et al.*, 1996).

The Japanese Night-heron *Gorsachius goisagi* is an uncommon winter visitor in the Philippines (Dickinson *et al.*, 1991) with the chief wintering area appearing to be the islands in the archipelago with Negros as one of them (Collar *et al.*, 1999). It was specifically recorded on the Twin Lakes during the period from January 1977 to July 1978 by Alcala and Carumbana (1980). However, its true status has not been and cannot be assessed with any confidence due to its cryptic and crepuscular habits in dense forest (Collar *et al.*, 1999). This bird species is presumably declining in numbers owing to destruction of its habitat and breeding grounds that are being converted to plantations (Collar & Andrew, 1988).

The White-throated Jungle-flycatcher *Rhinomyias albigularis* is known only on the islands of Negros, Guimaras, and Panay (Collar *et al.*, 1999). This bird was considered "extremely rare" (Bourns & Worcester, 1894; Worcester, 1898) and scarce by Whitehead (1899). On Negros, the outlook is very doubtful although in the six major forested areas surveyed in 1991, six individuals of this species were found only in Banban, Ayungon (Evans *et al.*, 1993). Also, during the floral and faunal survey in Banban, Ayungon, only one individual was recorded (Tiempo *et al.*, 1999). It was recorded in the Twin Lakes in May 1949 and December 1953 with two specimens in the Field Museum of Natural History (FMNH) (Collar *et al.*, 1999). Currently, there are no recent records of the species from the Twin Lakes inspite of the joint biomonitoring activities by CENTROP-POs-DENR from 2002-2004. The primary threat for this bird species is the

continued habitat destruction for agriculture, charcoal production, and lumber extractions (Brooks *et al.*, 1992; Evans *et al.*, 1993).

The Flame-templed Babbler *Stachyris* (*Dasycrotapha*) *speciosa* is found only on Panay and Negros (Collar *et al.*, 1999). On Negros, Erickson and Heideman (1983) trapped them in the Twin Lakes but the bird went unrecorded in 1991 (Collar *et al.*, 1999). Continuing forest destruction is the major cause that "will lead to the extinction of *D. speciosa* in the near future" (Brooks *et al.*, 1992; Evans *et al.*, 1993).

The Celestial Monarch *Hypothymis coelestis* is found on most of the big islands in the Philippines. On Negros, it is found in the southern part including the Twin Lakes area (Alcala & Carumbana, 1980). However, the bird was not observed during a recent survey on Negros (Brooks *et al.*, 1992; Evans *et al.*, 1993) and it may be that it is now extinct on the island. Extensive and continuing habitat destruction within its range is a major threat to its survival (Collar *et al.*, 1999).

The Visayan Flowerpecker *Dicaeum* (*australe*) *haematostictum* is found only in the Philippines and occurs on three islands—Panay, Guimaras, and Negros (Collar *et al.*, 1999). On Negros, it was reported to be common in both the northern and southern parts of the island including the Twin Lakes area (Brooks *et al.*, 1992). Currently, the joint biomonitoring activities by CENTROP-POs-DENR from 2002-2004 in the Twin Lakes recorded only a few birds (pers. comm., Cariño). This species has been strongly affected by the removal of forest and scrub within its altitudinal range (Collar *et al.*, 1994).

The White-winged Cuckoo Shrike *Coracina ostenta* is known from the islands of Panay, Guimaras, and Negros with an unconfirmed occurrence in Bohol. On Negros it was found to be fairly common at all non-montane sites including the Twin Lakes area (Alcala & Carumbana, 1980; Brooks *et al.*, 1992; and Evans *et al.*, 1993). The joint bio-monitoring activities of CENTROP-POs-DENR from 2002-2004 in the Twin Lakes have recorded a number of individuals of this bird species. The major

threat to the remaining population of this bird, which will lead to its extinction, is continuing forest destruction within its altitudinal range (Brooks *et al.*, 1992).

The Rufous-lored Kingfisher (*Todirhamphus winchelli)* is only found and widely distributed in the southern half of the Philippines, often on small islands. On Negros, it has been recorded mostly in the southern portion of the island that includes the Twin Lakes area (Alcala & Carumbana, 1980). At present, there are no recent records of the species from the Twin Lakes despite the joint biomonitoring activities of CENTROP-POs-DENR (pers. comm., Cariño). It is quite possible that the species is extinct on Negros (Brooks *et al.*, 1999). The continuing clearance of lowland forest poses a very significant threat and the problem is possibly greatly compounded by this species' need for freshwater habitats within this broader habitat type (T. H. Fisher verbally, 1997).

The Philippine Hawk Eagle *Spizaetus philippensis* is found in the Philippines where records exist for at least 12 islands (Collar *et al.*, 1999). On Negros, four individuals were recorded—one at the Twin Lakes area (Brooks *et al.*, 1992). The paucity of records compared to other raptors on Negros suggests that its status should be reviewed (Brooks *et al.*, 1999). This forest-dependent species is threatened by habitat destruction throughout its extensive but predominantly lowland range (Brooks *et al.*, 1992; Dutson *et al.*, 1992; Evans *et al.*, 1993; Collar *et al.*, 1994; Danielsen *et al.*, 1994; Poulsen, 1995). Habitat loss is exacerbated by considerable hunting and trapping pressure (Danielsen *et al.*, 1994).

Near-Threatened

The Pink-bellied Imperial Pigeon *Ducula poliocephala* is found on most of the major islands in the Philippines (Kennedy *et al.*, 2000). On Negros, it is recorded in the Twin Lakes area where it is still common. However, informal discussions with local inhabitants of the area showed that it has now gradually become rarer than it was 5 years ago. Habitat loss and trapping for pet

trade are the primary threats for the continued survival of this bird species (pers. obs).

B. Mammals

Currently, a total of 54 mammals are recorded for Negros Island (ANNEX C), of which 23 are found in the Twin Lakes area. From this number, 11 species are under different levels of threatened categories (Table 3).

The Visayan Spotted Deer *Cervus alfredi* is found only in the Philippines and is recorded on Cebu, Guimaras, Masbate, Negros, and Panay islands (Oliver, 1994; Oliver *et al.*, 1992). It is geographically restricted and rare. Heavily hunted and severely endangered (Cox, 1987; Evans *et al.*, 1993; Oliver, 1994; Oliver *et al.*, 1992), it is now extinct on Cebu, Guimaras, and probably Masbate.

The Visayan Warty Pig *Sus cebifrons negrinus,* found originally in primary and secondary forests, is scarcely observed and rarely sighted. Heavily hunted, increasingly rare, and currently hybridizing with domestic pigs (Oliver 1992), it is believed now to be extinct on Cebu and Guimaras.

The Golden-crowned Flying Fox *Acerodon jubatus* is found only in the Philippines and is considered widespread in its distribution. From the late 1800s and early 1900s, it had been reported to number about 100,000 individuals in a colony but this figure contrasts with recent observations of maximum colony size of 5,000 and usually far fewer (Heaney & Heideman, 1987; Heaney & Utzurrum, 1991; Lawrence, 1939; Mickleburg *et al.*, 1992; Mudar & Allen, 1986; Rickart *et al.*, 1993; Taylor, 1984; Utzurrum, 1992).

The Philippine Naked-backed Fruit bat *Dobsonia chapmani* is one of the most threatened bats in the world. It is found only in the Philippines and endemic to Negros and Cebu islands. Heaney & Heideman (1987), Rabor (1986), and Utzurrum

Table 3. List of globally threatened mammals recorded in the Twin Lakes Balinsasayao and Danao Natural Park, Sibulan, Negros Oriental.

SPECIES NAME/COMMON NAME	HABITAT	THREAT CATEGORY
DEER		
1. *Cervus alfredi* Philippine Spotted Deer**[1]	Primary forest; Secondary growth	Endangered (US ESA: Endangered)
PIG		
2. *Sus cebifrons negrinus* Visayan Warty Pig**[1]	Primary and secondary forests; original or secondary growth, grassland	Critically endangered (IUCN 2000)
BATS		
3. *Acerodon jubatus* Golden-crowned Flying Fox*[1]	Primary and secondary lowland forests; Mangrove forest; Small islands	Endangered (IUCN 2000)
4. *Dobsonia chapmani* Negros Naked-backed Fruit Bat****[1]	Lowland forest (caves)	
5. *Eonycteris robusta* Philippine Nectar Bat*[1]	Primary forest; Mixed forest & clearings	Critically endangered #
6. *Nyctimene rabori* Tube-nosed Fruit Bat*[1]	Primary lowland and secondary forests	Data Deficient (locally rare)
7. *Haplonycteris fischeri* Fischer's Pygmy Fruit Bat*[1]	Primary lowland and montane forests	Critically endangered (IUCN 2000)
8. *Harpyionycteris whiteheadi** Harpy Fruit Bat*[1]	Primary and secondary forests	Vulnerable (IUCN 2000)
9. *Pteropus pumilus* Golden-mantled Flying Fox*[1]	Primary or lightly disturbed forest; lowland forest; montane forest	Vulnerable (IUCN 2000) Vulnerable (IUCN 2000) CITES: Appendix II
SHREW		
10. *Crocidura negrina* Negros Shrew***[1]	Primary and well-developed secondary lowland forest	Critically Endangered (IUCN 2000)
LEOPARD CAT		
11. *Prionailurus bengalensis rabori* Philippine Leopard Cat**[1]	Agricultural habitats and forest	Endangered (IUCN 2000)

Legend: *Philippine endemic **Negros-Panay endemic ***Negros endemic ****Negros and Cebu endemic

US ESA - Unites States Endangered Species Act

WCSP - Wildlife Conservation Society of the Philippines

CITES - Convention on the International Trade for Endangered Species

IUCN - International Union for Conservation of Nature

Mammal Specialist Group of WCSP

Reference:

[1] FPE=SUCENTROP RSA Report 1994

(1992) considered it to be formerly common in lowland forests in southern Negros Island, and roosting exclusively in caves (Heaney & Heideman, 1987; Rabor, 1986; Utzurrum, 1992). In the past years, however, it was believed to have become extinct when field surveys in these islands revealed negative find. However, this bat was rediscovered in forest patches of Carmen in Cebu by an expedition team from Cebu Biodiversity Conservation Foundation (CBCF) in early part of 2001 and in Manlucahoc of Sipalay City in Negros Occidental by a research team from Silliman University-Angelo King Center for Research and Environmental Management (SUAKCREM) in 2003 (see Paguntalan *et al.*, and Alcala *et al.*, this volume). Nevertheless, in the Twin Lakes area where it was reported to occur, continuous joint biomonitoring activities of CENTROP-POs-DENR have failed to observe this bat species (pers. comm., Cariño). Its population is severely declining as a result of forest destruction, disturbance by guano miners, and heavy hunting (Heaney *et al.*, 1998).

The Philippine Tube-nosed Fruit Bat *Nyctimene rabori* is recorded only on Cebu, Negros, and Sibuyan and is considered to be rare or uncommon at all sites (Heaney & Peterson *et al.*, 1984; Heaney *et al.*, 1989; Heideman & Heaney, 1989; Mickleburg *et al.*, 1992; Utzurrum, 1992). Populations have declined severely since 1950 as a result of habitat destruction and this species faces extinction on Negros Island, and possibly elsewhere, within 10 years if current trends continue (Mickleburg *et al.*, 1992; Utzurrum, 1992).

The Philippine Dawn Bat *Eonycteris robusta* is found throughout the Philippines but absent from Palawan Faunal Region and Batanes/Babuyan group of islands (Heaney *et al.*, 1998). Rarely captured in the 1980s and 1990s, it may now be quite rare (Heaney *et al.*, 1991; Mickleburg *et al.*, 1992; Utzurrum, 1992). Recent surveys have not observed or captured them around Negros Island and in the Twin Lakes area where they had been previously reported.

The Philippine Pygmy Fruit Bat *Haplonycteris fischeri* and the Harpy Fruit Bat *Harpyionycteris whiteheadi* are found only in the Philippines where they are widespread. They have stable populations in the wild but as a result of habitat destruction by logging, recent studies have shown that their numbers are declining (Heaney *et al.*, 1998).

The Little Golden Mantled Flying Fox *Pteropus pumilus* is found only in the Philippines but not in the Batanes/Babuyan and Palawan faunal regions (Heaney *et al.*, 1998). The species is most common on small islands and uncommon to rare on larger islands (Heaney, 1984; Heaney *et al.*, 1989; Heideman & Heaney, 1989; Lepiten, 1995, Rickart *et al.*, 1993; Utzurrum, 1992). The population is declining as a result of habitat destruction, but still fairly widespread and stable (Heaney *et al.*, 1998).

The Negros Shrew *Crocidura negrina* is recorded in the Philippines only and endemic to Negros Island. Specimens were obtained from primary lowland and montane forest in southern Negros (Rabor, 1986; Heaney & Utzurrum, 1991; Heaney & Ruedi, 1994), including the Twin Lakes area. It is rare because of restricted range and habitat destruction (Heaney & Utzurrum, 1991).

The Philippine Leopard Cat *Prionailurus bengalensis rabori* is uncommon but widespread in the Philippines. The subspecies *rabori* is recognized as distinct subspecies from the Negros-Panay Faunal Region (Groves cited by Heaney *et al.*, 1998). The population is declining due to heavy hunting (Heaney *et al.*, 1998).

C. Amphibians and Reptiles

A total of 86 species of amphibians and reptiles are recorded on Negros Island, with 49 listed in the Twin Lakes area (ANNEX D). Eight species are in threatened category, consisting of 5 frogs, 2 lizards, and a snake (Table 4).

Table 4. List of globally threatened amphibians and reptiles recorded in the Twin Lakes Balinsasayao and Danao Natural Park, Sibulan, Negros Oriental.

SPECIES NAME/COMMON NAME	HABITAT	THREAT CATEGORY
FROGS		
1. *Platymantis negrosensis* Negros Forest Frog** [1]	Lowland & lower montane forests	Endangered++
2. *Platymantis hazelae* Hazel's Forest Frog* [1]	Mossy and montane rainforests	Endangered++
3. *Limnonectes visayanus* Visayan Fanged Frog** [1]	Lower montane and lowland forests	Vulnerable++
4. *Rana everetti* Everett's Frog* [1]	Lower montane and lowland forests	Near Threatened++
5. *Platymantis dorsalis* Common Forest Frog* [1]	Lower montane and lowland forests	Near Threatened to Threatened++
LIZARDS		
6. *Hydrosaurus pustulatus* Sailfin Water Lizard [1]	Lowland forests; secondary forests; secondary growth	Vulnerable+
7. *Varanus salvator nuchalis* Rough-necked Water Monitor [1]	Wide variety of habitats including mangrove areas and rain forests	Near Threatened+
SNAKE		
8. *Python reticulatus* Reticulated Python [1]	Humid tropical rain forests	Near threatened+

Legend:
** Negros-Panay endemic
* Philippine endemic

++ IUCN/SSC CI/CABS Global Amphibian Biodiversity Assessment 2004
+IUCN - International Union for the Conservation of Nature 2000
CI - Conservation International
CABS – Center for Applied Biodiversity Science
SSC - Species Survival Commission

Reference:
[1] FPE-SUCENTROP RSA Report 1994

The most threatened frogs in the Twin Lakes area are the Negros Forest Frog *P. Negrosensis* and Hazel's Forest Frog *Platymantis hazelae.* They dwell on arboreal ferns, in leaf axils of screw pines and Araceae in lower montane and lowland forests of Negros. The common forest frog *P. dorsalis* is allied to undisturbed and disturbed lower montane and lowland forests. The aquatic Visayan fanged frog *Limnonectes visayanus* (formerly known as *Rana magna visayanus*) and Everett's frog *Rana everetti* are inhabitants of undisturbed and disturbed cool and clear unpolluted streams and rivers in lower montane and lowland forests.

The Reticulated Python Snake *Python reticulatus* and the Rough-necked Water Monitor *Varanus salvator nuchalis* are associated with humid tropical rainforests and observed on trees and on ground near streams, while the Sailfin Water Lizard *Hydrosaurus pustulatus* is at home equally in water or on trees and usually associated with unpolluted mountain streams in lowland forests (Alcala 1986).

Habitat for amphibians and reptiles is destroyed through various methods of harvesting timber which adversely interfere with many aspects of the biology of forest-restricted (and moisture-dependent) species of frogs, such as the Negros and the Hazel's forest frogs. Pesticides, high concentration of heavy metals washed into aquatic breeding sites, thermal pollution of streams and rivers from geothermal activity, and poisoning resulting from mining and logging operations may cause the decline (Pough *et al.*, 2001) of a few frogs such as the Philippine Woodland Frog *L. visayanus* and Everett's Frog *R. everetti*. The agamid Sailfin Water Lizard *H. pustulatus*, the varanid Rough-necked Water Monitor *V. salvator nuchalis,* and the colubrid Reticulated Python *P. reticulatus* are adversely affected primarily by increasing habitat loss and, and by collection for zoo, pet, and skin trades. Threatened by over collection for the pet trade, smaller specimens of Sailfin water Lizard are sold in

large numbers at pet shops in Manila from P100 to P500 each. Rare in foreign zoos, it is sold in substantial numbers outside the country and prized by foreign collectors (Philippine Red Data Book, 1997).

Threats to the Wildlife of the Twin Lakes Balinsasayao and Danao Natural Park

The single most serious threat to wildlife is habitat modification and destruction. Tropical forests are some of the most species-rich habitats in the world and most vulnerable to human destruction (Pough *et al.*, 2001). The reason for so many species being threatened over the years has been summarized in Rabor (1958; 1961; 1966; 1979). For so many plants, birds, mammals, amphibians, and reptiles in the Twin Lakes area, habitat destruction and loss are by far the main hazard. Most of the threatened species are endemics associated with the rain forests (Dickinson *et al.*, 1991).

Rain forest destruction in the Twin Lakes area over the years is brought about by slash and burn forest farming, commercial and illegal logging, fuel wood gathering, charcoal production, and livestock raising, the first two posing the major threats to the forest. Fuel wood gathering, charcoal production, and livestock raising are gradually posing much damage on the local level. Therefore, remnants of the original forest are left in various sizes, shapes, and distances from other forest portions. Wildlife may or may not be able to disperse among isolated patches of habitat. Populations restricted to isolated habitat fragments are vulnerable to local extinction through chance environmental and demographic catastrophes and loss of genetic heterozygosity (Dickinson *et al.*, 1991). The tiny sizes of the populations are reason enough for concern because small populations are increasingly vulnerable to complete destruction by periodic storms, droughts, floods, disease, or other factors such as the

occasional failure of a wild fruit crop in a small area of rain forest (Heaney & Regalado, 1998). A species common in its preferred habitat may in fact be threatened because its habitat is disappearing, or because its habitat is restricted, leaving the species vulnerable to random changes in the environment (Pough *et al.*, 2001). This holds true to all the threatened plant and animal species listed (and those not listed) within the Twin Lakes area.

Removal of trees due to small-scale logging and commercial harvesting opens the canopy, bringing aggressive and weedy species from outside the forest to occupy the open space (Heaney & Regalado, 1998) and threaten other groups of native non-dipterocarp species. Forest fragmentation deprives other plants of their optimum environment. The forest canopy buffers the microclimate of the forest floor, keeping the forest floor relatively cool, moist, and shaded during the day while reducing air movement and trapping heat during the night. When the forest is cleared, those effects are removed. As the forest floor is exposed to direct sunlight, the ground becomes much hotter during the day, and without the canopy to reduce heat and moisture loss, the forest floor is also much colder at night and generally less humid. Since species of plants are often precisely adapted to the temperature, humidity, and light levels, changes in these factors will eliminate many species from forest fragments (Primack, 1998).

The flowering epiphyte *Medinilla magnifica* (which is unique to the Philippines) is becoming exceedingly rare in its native habitat because of forest destruction which opens the canopy. Likewise, the epiphytic lipstick plant *Aeschynanthus* and other herbaceous plants in the understorey are especially susceptible to the removal of trees that shelter them from the bright sun. They are sometimes encountered in damp primary forests at low elevations but become more numerous in high mossy forests. Also, the removal of trees results in the loss

of lianas in tropical rain forests which depend reciprocally on the trees for support. The number of species has drastically decreased because when trees are removed, aggressive and weedy species from outside the forest often move in and occupy the open space. Consequently, lianas have become one of the most threatened groups of plants in the Philippines (Heaney and Regalado, 1998).

The almaciga *Agathis philippinensis is* now listed as threatened species because of excessive tapping and destructive extracting methods (such as application of sulfuric acid to stimulate resin production) that have killed many trees (de Guzman *et al.*, 1986). The rattan *Calamus merrillii* is officially listed as threatened due to excessive harvesting. Since rattan is not cultivated, but only extracted from the wild, its collection as supplementary source of income for people living near the forest certainly puts pressure on the remaining populations. *Medinilla magnifica* is often sought out by garden enthusiasts and as a result more and more of this plant are gathered from the wild (Heaney and Regalado, 1998).

Another major threat is intensive and uncontrolled hunting which intensifies the effects of habitat loss and degradation. Hunting on Negros is for subsistence, trade, and sport (Diesmos & Pedregosa, 1995). The unsupervised and hence, uncontrolled, collections of threatened vertebrate species worsen the direct effects of habitat loss and degradation and unrestrained heavy hunting on the survival of these highly threatened species.

Summary

The tropical rainforest of the Twin Lakes Balinsasayao and Danao has been logged in the past and this practice has been continuing, though to a smaller extent today, in spite of the area being declared as a natural park. The illegal cutting of timber is believed to be reducing the inflow of

water to the lakes and causing a fall in water levels especially during the dry season. The Twin Lakes are recognized as a major watershed supplying water to the lowland rural and urban communities. Hunting and collecting of faunal resources as well as gathering and collecting of floral resources are still going on clandestinely.

Currently, no known protection schemes have been given to threatened species, except for legislations and proclamations protecting wildlife in general and declaration of certain areas as national parks to protect habitats (Philippine Red Data Book, 1997). Over the next few years, the problem concerning priorities of human needs over forest preservation will become even more acute (Pough *et al.*, 2001). The preservation and protection of the existing forest biodiversity in the Twin Lakes must include social, political, and economic agenda. Willingness to preserve and protect would no longer be enough.

Recommendations

Conservation programs must be multifaceted and must involve: 1) field research in order to understand the animals especially those that are threatened; 2) education to provide information and increase the awareness of the public; 3) control of pet and zoo trades; and 4) legislations to protect threatened species and their habitat; and 5) habitat protection.

Field Research. One constraint on effective conservation is a lack of information on the basic biology of threatened species. We simply do not know enough about the basic requirements of most of the threatened species to be sure that we are protecting the right habitat, the right resources, or the right life history stages. Ideally, basic research should include examination of population size and structure, age-specific survivorship and sources of mortality, habitat preference, spatial requirements and activity patterns

(including migrations to feeding and breeding sites), reproductive patterns and frequency of breeding activity, life history traits, social behavior, feeding ecology, and genetic variability (Pough *et al.*, 2001). We must be careful not to employ conservation solutions that are merely halfway technology—that is, interventions that are done after the problem has already occurred and which do not address the underlying causes of the problem (Frazer, 1992).

Information, Education and Communication. Education is urgently needed at all levels if we hope to maintain viable populations of threatened species. Conservation advocacy must be strengthened among local people who share the environment with threatened species, policymakers, managers, the media, and the general public. Training in basic areas of habitat protection, wildlife management, and conservation biology is needed. Educators and curriculum developers should be encouraged to produce materials for use in the schools to introduce children, who will be making policy decisions in the future, to conservation issues early in life. Naturally curious and enthusiastic, children are usually receptive to new ideas. A long-term benefit is a change in attitude in people toward nature (Pough *et al.*, 2001).

Regulation of Pet and Zoo Trades. Protected areas impose a total ban on wildlife hunting and collection for any purpose. If there is any collection for pet and zoo trade done outside of protected area, the legal framework of the region or province must prevail and must be used as a basis for the regulation and control of the same.

Habitat Protection. The most important action that can be taken for threatened plants and animals is to protect their habitat. If a reserve is to be established, decisions should include the location, size, and shape of the area to be protected. The degree of habitat fragmentation should be minimized in order to slow extinction rates (Pough *et al.*, 2001) specifically for highly-threatened forest-dependent species. Establishment of corridors to join patches of

forest has been found to be effective in expanding the food range of threatened species.

Acknowledgments

We wish to acknowledge the members of the People's Organizations around Mt. Talinis and Twin Lakes area who played crucial roles in various conservation activities through the support of the Foundation for the Philippine Environment (FPE). The same goes to Fauna and Flora International (FFI) through its Coordinator of the Philippine Programme, William Oliver, and to Bat Conservation International, Lubee Foundation, AZA Bat Taxon Advisory Group Small Grants Program, BP Conservation Programme, Bristol Zoo, Haribon Foundation, and the Department of Environment and Natural Resources. Likewise, the Ting Matiao Foundation is also gratefully acknowledged for its biodiversity conservation efforts in Mt. Talinis and its surrounding communities.

We also thank in particular, the Biology Department through its chairperson, Mrs. Mirasol N. Magbanua, and the respective members of the faculty who conducted their studies in the area. To the support staff and volunteers of CenTrop: S. Villegas, S. M. Villagante, G. Flores, Dr. G. Acuña, J. Diputado, A. Inocencio, L.J. Cerial, V. Futalan, L. Futalan, R. Vendiola, C.C. Catan, P. Lumhod, F. Catalbas and US Peace Corps Volunteers H. Fairbank, J. Hanna, M.L. Van Hoffman, M. Slavin, N. Sanchez, H.I. Roberts, and J. Speicher, many thanks, for offering assistance in various ways. Most importantly, we are thankful to Prof. Felina A. Tiempo for her technical assistance, and to Neil Aldrin D. Mallari, Dr. Nina R. Ingle, and Dr. Angel C. Alcala for the initial review of the manuscript.

Literature Cited

Alcala, A.C. 1956. *Kaloula picta* on Negros Island. Silliman Journal 31: 44-146.

Alcala, A.C. 1986. Guide to Philippine flora and fauna. Amphibians and reptiles. Vol. X. Natural Resources Management Center and University of the Philippines, JMC Press, Inc., Quezon City, Philippines. 192 pp.

Alcala, A.C. and E. Carumbana. 1980. Ecological observations of game birds in South Negros, Philippines. Silliman Journal 27:91-119.

Alcala, A.C. and W.C. Brown. 1998. Philippine Amphibians: An illustrated field guide. Bookmark Press, Makati City, Philippines. 113 pp.

Antone, M.S. 1983. Vegetational analysis surrounding Lake Balinsasayao-Lake Danao, Negros Oriental, 1. The Tree Species. Unpublished M.S. Thesis. University of the Philippines at Los Baños, Laguna.

Boussekey, M. 1993. Der Rotsteisskkakadu *Cacatua haematuropygia* – ein bedrohter Vogel. Papageien 6: 216-218.

Bourns, F.S. and D.C. Worcester. 1894. Preliminary notes on the birds and mammals collected by the Menage Scientific Expedition to the Philippine Islands. Occasional Papers of the Minnesota Academy of Natural Science 1: 1-64.

Brooks, T.M., T.D. Evans, G.C.L. Dutson, G.Q.A. Anderson, D.C. Asane, R.J. Timmins, and A.G. Toledo. 1992. The conservation status of the birds of Negros, Philippines. Bird Conservation International. 2:273-302.

Brooks, T.M., S.L. Sim, V. Kapos, and C. Ravilios. 1999. Threat from deforestation to montane and lowland birds and mammals in Insular Southeast Asia. Journal of Animal Ecology 68: 1061-1078.

Brown, W.C. and A.C. Alcala. 1978. Philippine lizards of the Family Gekkonidae, Silliman University Press, Dumaguete City, Philippines. 146 pp.

Brown, W.C. and A.C. Alcala. 1980. Philippine lizards of the Family Scincidae, Silliman University Press, Dumaguete City, Philippines. 264 pp.

Brown, W.C. and A.C. Alcala. 1982. A new cave *Platymantis* (Amphibia: Ranidae) from the Philippine Islands. Proceedings of the Biological Society of Washington 95: 386-391.

Brown, W.C. and A.C. Alcala. 1994. Philippine frogs of the Family Rhacophoridae. Proceedings of the California Academy of Sciences 48: 185-220.

Brown, W.C. and R.F. Inger. 1964. The taxonomic status of the frog *Cornufer dorsalis* A. Dumeril. Copiea: 450-451.

Collar, N.J., N.A.D. Mallari, and B.L. Tabaranza, Jr. 1999. Threatened birds of the Philippines. The Haribon Foundation, Birdlife International Red Data Book. 558 pp.

Collar, N.J., and P. Andrew. 1988. Birds to watch: The ICBP world checklist of threatened birds. Cambridge, U.K.: International Council for Bird Preservation (Techn. Publ. 8).

Cox, R. 1987. The Philippine spotted deer and the Visayan warty pig. Oryx, 21: 37- 42.

Curio, E., A. Hamann, P. Heubüschl, and L. L. Lastimosa. 1996. Hornbill research and conservation in the Philippines. EPP Hornbill Taxon Advisory Group Newsletter 2: 26-27.

Delacour, J., and E. Mayr. 1946. Birds of the Philippines. MacMillan Company, New York.

Danielsen, F., D.S. Balete, T.D. Christensen, M. Heegaard, O.F. Jakobsen, A. Jensen, T. Lund, and M.K. Poulsen. 1994. Conservation of biological diversity in the Sierra Madre mountains of Isabela and southern Cagayan Province, the Philippines. Birdlife International, Manila and Copenhagen. 146 pp.

Diesmos, A.C., and M. dG. Pedregosa. 1995. The conservation status of threatened species of bleeding-hearts (Columbidae) and hornbills (Bucerotidae) in the Philippines. Wildlife Biology Laboratory, IBS – CAS, U.P. Los Baños.

Dickinson, E.C., R.S. Kennedy, and K.C. Parkes. 1991. The Birds of the Philippines. An annonated checklist. B.O.U. check-list No. 12, British Ornithologist Union, U.K. 506 pp.

de Guzman, E.D., R.M. Umali and E.D. Sotalbo. 1986. Guide to Philippine flora and fauna. Dipterocarps and non-dipterocarps.Vol.3. Natural Resources Management Center, Ministry of Natural Resources and University of the Philippines. JMC Press, Inc., Quezon City, Philippines. 414 pp.

Dutson, G.C.L., T.D. Evans, T.M. Brooks, D.C. Asane, R.J. Timmins, and A. Toledo. 1992. Conservation status of birds in Mindoro, Philippines. Bird Conservation International 2: 303-325.

Eagle Clark, W. 1900. On some birds of the island of Negros, Philippines. Part IV. Ibis (7)6: 351-361.

Erickson, K.R. and P.D. Heideman. 1983. Notes on the avifauna of the Balinsasayao Rainforest Region, Negros Oriental, and Philippines. Silliman Journal 30: 63-72.

Evans, T.D., G.C.L. Dutson, and T.M. Brooks. 1993. Cambridge Philippines Rainforest Project 1991: Final report. Cambridge, U.K: Birdlife International (Study Report 54).

Frazer, N. B. 1992. Sea turtle conservation and halfway technology. Conservation Biology 6: 179-184.

Hackisuka, M. 1931-1935. The birds of the Philippine Islands with notes on the mammalian fauna. Witherby, London.

Hackisuka, M. 1936. Oiseaux rares ou remarquables des Iles Philippines. Oiseau et R.F.O 6: 185-197, 412-418.

Heaney, L.R. 1986. Biogeography of the mammals of Southeast Asia: Estimates of colonization, extinction, and speciation. Biological Journal of the Linnaean Society, 28:127-165.

Heaney, L.R. and D.S. Rabor. 1982. The mammals of Dinagat and Siargao Islands, Philippines. Occasional papers of the Museum of Zoology, University of Michigan, 699:1-30.

Heaney, L.R. and P.D. Heideman. 1987. Philippine fruit bats, endangered and extinct. Bats 5: 3-5.

Heaney, L.R. and R.C.B. Utzurrum. 1991. A review of the conservation status of Philippine Land Mammals. Association of Systematic Biologists of the Philippines, Communications, 3:1-13.

Heaney, L.R. and M. Ruedi. 1994. A preliminary analysis of biogeography and phylogeny of *Crocidura* from the Philippines, pp. 357-377. In Meritt, J.F., G.L. Kirkland, and R.K. Rose, eds. Advances in the Biology of Shrews. Special Publication 18, Carnegie Museum of Natural History, Pittsburgh, 458 pp.

Heaney, L.R. and J.C. Regalado, Jr. 1998. Vanishing treasures of the Philippine rain forest. The Field Museum, Chicago, Illinois. 88 pp.

Heaney, L.R., P.D. Heideman, E.A. Rickart, R.C.B. Utzurrum, and J.S.H. Klompen, 1989. Elevational zonation of mammals in the central Philippines. Journal of Tropical Ecology, 5:259-280.

Heaney, L.R., D.S. Balete, M.L. Dolar, A.C. Alcala, A.T.L. Dans, P.C. Gonzales, N.R. Ingle, M.V. Lepiten, W.L.R. Oliver, P.S. Ong, E.A. Rickart, B.R. Tabaranza, Jr., and R.C.B. Utzurrum. 1998. A synopsis of the mammalian fauna of the Philippine Islands. Fieldiana: Zoology, new series, 88:1-61.

Heaney, L.R., P.C. Gonzales, R.C.B. Utzurrum, and E.A. Rickart. 1991. The mammals of Catanduanes Island: Implications for the biogeography of small-land bridge islands in the Philippines. Proceedings of the Biological Society of Washington 104: 399-415.

Heideman, P.D., and L.R. Heaney 1989. Population biology and estimates of abundance of fruit bats (Pteropodidae) in Philippine submontane rainforest. Journal of Zoology, London, 218:565-586.

Hicks, N. The national parks and other wild places of the Philippines. 2000. New Holland Publishers Ltd. UK. 176 pp.

Hoogstraal, H. 1951. Philippine zoological expedition, 1946-1947. Narrative and itinerary. Fieldiana: Zoology, 33:1-86.

IUCN/SSC CI/CABS Global amphibian biodiversity assessment 2004.

IUCN, 2000. IUCN Red list of threatened species. International Union for the Conservation of Nature, Cambridge, U.K. (compact disc).

Kennedy, R.S., P.C. Gonzales, E.C. Dickinson, H.C. Miranda Jr., and T.H. Fisher. 2000. A guide to the birds of the Philippines. Oxford University Press. 369 p.

Lawrence, B.L. 1939. Collections from the Philippine Islands. Mammals. Bulletin of the Museum of Comparative Zoology 86: 28-73.

Lepiten, M.V. 1995. The mammals of Siquijor Island, central Philippines. Sylvatrop, The Philippine Forest Research Journal 5: 1-17.

Mallari, N.A.D., B.R. Tabaranza, Jr., and M.J. Crosby. 2001. Key conservation sites in the Philippines. Haribon Foundation and Birdlife International. Bookmark, Inc., Makati City, Philippines. 485 pp.

McGregor, R.C. 1911. Notes on a collection of birds from northern Negros. Philippine Journal of Science 6: 39-46.

McGuire, J.A. and A.C. Alcala. 2000. A taxonomic revision of the flying lizards of the Philippine Islands (Iguania: Agamidae: *Draco*) with a description of a new species. Herpetological Monographs 14: 92-145.

Mickleburgh, S.P., P.A. Racey, and A.M. Hutson, Eds. 1992. Old-World fruit bats: An action plan for the Family Pteropodidae. International Union for the Conservation of Nature Press, Gland, 252 p.

Mudar, K.M. and M.S. Allen. 1986. A list of bats from northeastern Luzon, Philippines. Mammalia 50: 219-225.

Oliver, W.L.R. 1992. The taxonomy, distribution and status of Philippine wild pigs. Silliman Journal. 36(1):55-64.

Oliver, W.L R. 1994. Threatened endemic mammals of the Philippines: An integrated approach to the management of wild and captive populations. *In*: Creative Conservation: Interactive Management of Wild and Captive Animals, eds. Olney, P.G.S., G.M. Mace and A.T.C. Fiestner, 467-477 pp. Chapman and Hall, London. 517 pp.

Oliver, W.L.R. 1999. Taxonomy and conservation of Philippine wild pigs – an update. Sylvatrop, Technical Journal of Philippine Ecosystems and Natural Resources. 8(1&2):27-41.

Oliver, W.L.R., M.L. Dolar, and E.L. Alcala. 1992. The Philippine spotted deer, *Cervus alfredi* Sclater, Conservation Program. Silliman Journal 36: 47-54.

Paalan, R.B. 1993. Habitat-correlated patterns of bird abundance and diversity in Southern Negros Oriental, Philippines. M. Sc. Thesis, Silliman University, Dumaguete City, Negros Oriental.

Panaguiton, S. and S.Z. Parco. 1993. Vegetational analysis of Lake Balinsasayao - Negros Biodiversity Conservation Project Floral Component. A final report to the Foundation of the Philippine Environment. Center for Tropical Conservation Studies, Silliman University, Dumaguete City.

PENRO-DENR. 1999. Environmental characterization of the Bayawan-Basay (Pagatban River) watershed in the Province of Negros Oriental: Final Report.

Philippine Red Data Book. 1997. Wildlife conservation society of the Philippines. Bookmark, Inc. Makati City, Philippines. 262 pp.

Pough, F.H., R.M. Andrews, J.E. Cadle, M.L. Crump, A.H. Savitzky and K.D. Wells. 2001. Herpetology. 2nd ed. Prentice Hall, New Jersey. 612 pp.

Poulsen, M.K. 1995. The threatened and near-threatened birds of Luzon, Philippines, and the role of the Sierra Madre mountains in their conservation. Bird Conservation International 5: 79-115.

Primack, R.B. 1998. Essentials of conservation biology. 2nd ed. Sinauer Associates, Inc., Sunderland, Massachusetts, USA. 660 pp.

Rabor, D.S. 1977. Philippine birds and mammals. University of the Philippines Science Education Center, University of the Philippines Press, Quezon City. 284 pp.

Rabor, D.S. 1986. Guide to Philippine flora and fauna. Birds and mammals. Vol II, Ministry of Natural Resources and the University of the Philippines, Quezon City. 213 pp.

Rand, A.L. 1951. Birds of Negros Island. Fieldiana, Zoology 31: 571-596.

Rand, A.L. and D.S. Rabor. 1952. Notes on Philippine birds. Nat. Hist. Misc. 107: 5

Rickart, E.A., L.R. Heaney, P.D. Heideman, and R.C.B. Utzurrum. 1993. The distribution and ecology of mammals in Leyte, Biliran and Maripipi islands, Philippines. Fieldiana: Zoology, new series, 72: 1-62.

RSA, 1994. Rapid site assessment of Twin Lakes of Balinsasayao and Mt. Talinis, Negros Oriental, Philippines. S.U. CenTrop. (Unpublished Report).

Peoples' Organization biomonitoring system preliminary report on the flora and fauna of the Twin Lakes Balinsasayao and Danao. Center for Tropical Conservation Studies, Silliman University, Dumaguete City.

Taylor, E.H. 1934. Philippine land mammals. Monographs of the Bureau of Science, Manila 30: 1- 548 + 25 pls.

The state of the Philippine environment. 1997. IBON Foundation, Inc, Manila, Philippines. 83 pp.

Tiempo, F.A., L.M.J. Paguntalan, C.N. Dolino, and A.B. Cariño. 1999. Survey of the forest cover and vertebrate fauna in Ayungon, Negros Oriental, Philippines. Unpublished Report to Fauna and Flora International (FFI). Center for Tropical Conservation Studies, Silliman University, Dumaguete City, Philippines.

Utzurrum, R.C.B. 1992. Conservation status of Philippine fruit bats (Pteropodidae). Silliman Journal. 36:27-45.

Whitehead, J. 1899. Field-notes on birds collected in the Philippine Islands in 1893-6. Ibis (7)5: 81-111.

Worcester, D.C. 1898. Contributions to Philippine ornithology, Part II. Notes on the distribution of Philippine Birds. Proceedings of the United States National Museum 20: 567-625.

www. birdlife. org. 2004

www. globalamphibians.org. 2004

ANNEX A. Lists of forest tree species recorded in the Twin Lakes Balinsasayao and Danao Natural Park, Sibulan, Negros Oriental, Philippines.

Family/Species	Official Common Name
DIPTEROCARPS	
Family Dipterocarpaceae	
1. *Hopea acuminata* (1, 2, 3)	Manggachápui
2. *Pentacme contorta* (1, 2, 3)	White Lauan
3. *Shorea almon* (1, 2, 3)	Álmon
4. *Shorea astylosa* (1, 2, 3)	Yakál
5. *Shorea guiso* (1, 2, 3)	Guíjo
6. *Shorea negrosensis* (1, 2, 3)	Red Lauán
7. *Shorea polysperma* (1, 2, 3)	Tangíle
8. *Parashorea plicata* (1, 2, 3)	Bágtikan
NON-DIPTEROCARPS	
Family Actinidiaceae	
9. *Saurauia elegans* (1, 2, 3)	Uyók
Family Aceraceae	
10. *Acer laurinum* (1, 2, 3)	Baliág/Philippine Maple
Family Alangiaceae	
11. *Alangium meyeri* (1, 2, 3)	Putián
Family Amygdalaceae	
12. *Parinari corymbosa* (1, 2, 3)	Liúsin
13. *Pygeum vulgare* (1, 2, 3)	Lágo
Family Anacardiaceae	
14. *Buchanania arborescens* (1, 2, 3)	Balinghásai
15. *Buchanania nitida* (1, 2, 3)	Balitántan
16. *Buchanania* sp. (1, 2, 3)	
17. *Koordersiodendron pinnatum* (1, 2, 3)	Amúgis
18. *Mangifera monandra* (1, 2, 3)	Malapáho
19. *Pistacia chinensis* (1, 2, 3)	Sangílo
20. *Semecarpus* sp. (1, 2, 3)	
Family Annonaceae	
21. *Alphonsea arborea* (1, 2, 3)	Bolón
22. *Miliusa vidalii* (1, 2, 3)	Takúlau
23. *Papualthia lanceolata* (1, 2, 3)	Anólang
24. *Polyalthia flava* (1, 2, 3)	Lanútan-diláu

Family/Species	Official Common Name
Family Apocynaceae	
25. *Alstonia macrophylla* **(1, 2, 3)**	Batíno
26. *Alstonia scholaris* **(1, 2, 3)**	Ditá
Family Araliaceae	
27. *Polyscias nodosa* **(1, 2, 3)**	Malapapáya
Family Araucariaceae	
28. *Agathis dammara* **(1, 2, 3)**	
29. *Agathis philippinensis* **(1, 2, 3)**	Almaciga
Family Bignoniaceae	
30. *Radermachera pinnata* **(1, 2, 3)**	Banái-banái
Family Burseraceae	
31.*Canarium asperum* **(1, 2, 3)**	Pagsahíngin
32.*Canarium calophyllum* **(1, 2, 3)**	Pagsahíngin-bulóg
33.*Canarium odontophyllum* **(1, 2, 3)**	Salíng-salíng
Family Caesalpinaceae	
34. *Afzelia rhomboidea* **(1, 2, 3)**	Tindálo
Family Celastraceae	
35. *Euonymus javanicus* **(1, 2, 3)**	Malasángki
Family Combretaceae	
36. *Terminalia citrina* **(1, 2, 3)**	Binggás
37. *Terminalia foetidissima* **(1, 2, 3)**	Talísai-gúbat
38. *Terminalia nitens* **(1, 2, 3)**	Sakát
39. *Terminalia pellucida* **(1, 2, 3)**	Dalínsi
Family Cornaceae	
40. *Alangium* sp. 1 **(1)**	
Family Ebenaceae	
41. *Diospyrus philosanthera* **(1, 2, 3)**	Bolóng-éta
42. *Diospyrus pyrrhocarpa* **(1, 2, 3)**	Anáng
Family Elaeocarpaceae	
43. *Elaeocarpus monacera* **(1, 2, 3)**	Tabián
44. *Elaecarpus calomala* var. *postulatus* **(1, 2, 3)**	Kalomála
Family Ericaceae	Dusóng
44. *Vaccinium barandanum* **(1, 2, 3)**	

Family/Species	Official Common Name
Family Euphorbiaceae	
45. *Baccaurea tetrandra* (1, 2, 3)	Dílak
46. *Baccaurea philippinensis* (1, 2, 3)	Balóiboi
47. *Blumeodendron philippinense* (1, 2, 3)	Salngán
48. *Breynia acuminata* (1, 2, 3)	Karmái-búgkau
49. *Breynia rhamnoides* (1, 2, 3)	Tulog-tulog
50. *Bridelia minutiflora* (1, 2, 3)	Subiáng
51. *Drypetes maquilingensis* (1, 2, 3)	Tináang-pantái
52. *Glochidion album* (1, 2, 3)	Malabág-ang
53. *Macaranga bicolor* (1, 2, 3)	Hamíndang
54. *Mallotus philippensis* (1, 2, 3)	Banáto
55. *Mallotus ricinoides* (1, 2, 3)	Hinlaúmo
56. *Neotrewia cumingii* (1, 2, 3)	Apanáng
57. *Homalanthus populneus* (1, 2, 3)	Balánti
58. *Sapium luzonicum* (1, 2, 3)	Balákat-gúbat
59. *Trignostemon philippinense* (1, 2, 3)	Kátap
Family Fagaceae	
60. *Lithocarpus boholensis* (1, 2, 3)	Bohol oyágan
61. *Lithocarpus cyrtorhyncha* (1, 2, 3)	Layán
Family Guttiferae	
62. *Calophyllum blancoi* (1, 2, 3)	Bitánghol
63. *Calophyllum inophyllum* (1, 2, 3)	Bitáog/Pálo-maria
64. *Cratoxylum formosum* (1, 2, 3)	Salinggógon
65. *Garcinia venulosa* (1, 2, 3)	Gatósan
Family Icacinaceae	
66. *Gonocaryum calleryanum* (1, 2, 3)	Taingáng-bábui
67. *Stemonurus luzoniensis* (1, 2, 3)	Howard - Mabunót
Family Lauraceae	
68. *Beilschmiedia glomerata* (1, 2, 3)	Tirúkan
69. *Cinnamomum mercadoi* (1, 2, 3)	Kalíngag
70. *Cryptocarya ampla* (1, 2, 3)	Bagariláu
71. *Cryptocarya glauca* (1, 2, 3)	Baliktáran
72. *Dehaasia triandra* (1, 2, 3)	Margapáli
73. *Litsea glutinosa* (1, 2, 3)	Sablót
74. *Litsea perrottetii* (1, 2, 3)	Maráng
75. *Litsea philippinensis* (1, 2, 3)	Bakán

Family/Species	Official Common Name
76. *Litsea* sp. **(1)**	Púso-púso
77. *Neolitsea vidalii* **(1, 2, 3)**	Kabúro
78. *Phoebe sterculioides* **(1, 2, 3)**	
Family Lecythidaceae	
79. *Planchonia spectabilis* **(1, 2, 3)**	Lamóg
Family Loganiaceae	
80. *Fagraea obovata* **(1, 2, 3)**	Dólis
Family Magnoliaceae	
81. *Talauma villariana* **(1, 2, 3)**	Patángis
Family Melastomataceae	
82. *Astronia cumingiana* **(1, 2, 3)**	Badlíng
83. *Astronia negrosensis* **(1, 2, 3)**	Negros dungáu
84. *Astronia rolfei* **(1, 2, 3)**	Dungáu-pulá
85. *Astronia williamsii* **(1, 2, 3)**	Dungáu
86. *Melastoma* sp. **(1, 2, 3)**	Tungáu
Family Meliaceae	
87. *Aglaia diffusa* **(1, 2, 3)**	Malaságing
88. *Aglaia iloilo* **(1, 2, 3)**	Ílo-ílo
89. *Aglaia langlassei* **(1, 2, 3)**	Malaságing-pulá
90. *Aglaia llanosiana* **(1, 2, 3)**	Bayánti
91. *Aglaia rimosa* **(1, 2, 3)**	Balúbar
92. *Aphanamixis perrottetiana* **(1, 2, 3)**	Kangkó
93. *Cedrela odorata* **(1, 2, 3)**	Spanish cedar
94. *Chisocheton pentandrus* **(1, 2, 3)**	Katóng-matsín
95. *Dysoxylum arborescens* **(1, 2, 3)**	Kalimútain
96. *Dysoxylum decandrum* **(1, 2, 3)**	Ígyo
97. *Epicharis cumingiana* **(1, 2, 3)**	Tará-tará
98. *Sandoricum vidalii* **(1, 2, 3)**	Malasántol
99. *Toona calantas* **(1, 2, 3)**	Kalántas
Family Memcylaceae	
100. *Memecylon caeruleum* **(1, 2, 3)**	Javanese kulís
101. *Memecylon lanceolatum* **(1, 2, 3)**	Digég
Family Mimosaceae	
102. *Parkia roxburghii* **(1, 2, 3)**	Kupáng

Family/Species	Official Common Na
Family Moraceae	
103. *Ficus balete* (1, 2, 3)	Baléte
104. *Ficus callosa* (1, 2, 3)	Kalúkoi
105. *Ficus gul* (1, 2, 3)	Butlí
106. *Ficus irisana* (1, 2, 3)	Aplás
107. *Ficus minahassae* (1, 2, 3)	Hagímit
108. *Ficus nota* (1, 2, 3)	Tibíg
109. *Ficus pubinervis* (1, 2, 3)	Dungó
110. *Ficus* sp. (1, 2, 3)	
111. *Ficus hauli* (1, 2, 3)	Lábnog
112. *Ficus ulmifolia* (1, 2, 3)	Is-ís
113. *Parartocarpus venenosus* (1, 2, 3)	Malanángka
114. *Artocarpus blancoi* (1, 2, 3)	Antipólo
Family Myristicaceae	
115. *Knema glomerata* (1, 2, 3)	Tambálau
116. *Myristica elliptica* var. *simiarum* (1, 2, 3)	Tanghás
117. *Myristica philippensis* (1, 2, 3)	Dugúan
118. *Myristica* sp. (1, 2, 3)	
Family Myrsinaceae	
119. *Ardisia loheri* (1, 2, 3)	Kandúlit
120. *Ardisia squamulosa* (1, 2, 3)	Tágpo
121. *Ardisia* sp. (1, 2, 3)	Lolúmboi
122. *Ardisia sibuyanensis* (1, 2, 3)	
Family Myrtaceae	
123. *Decaspermum* sp. (1, 2, 3)	
124. *Eugenia* sp. (1)	
125. *Rhodomyrtus* sp. (1)	
126. *Syzygium costulatum* (1, 2, 3)	Paítan
127. *Syzygium hutchinsonii* (1, 2, 3)	Malatámbis
128. *Syzygium nitidum* (1, 2, 3)	Makaásim
129. *Syzygium simile* (1, 2, 3)	Panglóngboien
130. *Syzygium zanthophyllum* (1, 2, 3)	Malatámpui
Family Naucleaceae	
131. *Nauclea coadunata* (1, 2, 3)	Bangkál

Family/Species	Official Common Name
Family Nyctaginaceae	
132. *Pisonia umbellifera* (1, 2, 3)	Anúling
Family Olacaceae	
133. *Strombosia philippinensis* (1, 2, 3)	Tamáyuan
Family Palmae	
134. *Arenga pinnata* (1, 2, 3)	Káong/sugar palm
135. *Caryota cumingii* (1, 2, 3)	Pugáhan/Fish-tailed Palm
Family Rhamnaceae	
136. *Ziziphus talanai* (1, 2, 3)	Balákat
Family Rubiaceae	
137. *Adina multifolia* (1, 2, 3)	Adina/Dunpílan
138. *Canthium ellipticum* (1, 2, 3)	Potót
139. *Ixora longistipula* (1, 2, 3)	Mayánman
140. *Neonauclea bartlingii* (1, 2, 3)	Lisák
141. *Neonauclea bernardoi* (1, 2, 3)	Ludék
142. *Neonauclea calycina* (1, 2, 3)	Kalamansánai
143. *Pavetta indica* (1, 2, 3)	Gusókan
144. *Psychotria* sp. (1, 2, 3)	
145. *Randia racemosa* (1, 2, 3)	Kapí-kapí
Family Rutaceae	
146. *Melicope triphylla* (1, 2, 3)	Matáng-árau
Family Sapindaceae	
147. *Euphoria didyma* (1, 2, 3)	Alupág
148. *Pometia pinnata* (1, 2, 3)	Malúgai
Family Sapotaceae	
149. *Chrysophyllum* sp. (1)	Mt. starapple
150. *Palaquium foxworthyi* (1, 2, 3)	Tagátoi
151. *Palaquium luzoniense* (1, 2, 3)	Nató
152. *Palaquium merrillii* (1, 2, 3)	Dulítan
153. *Palaquium philippense* (1, 2, 3)	Malák-malák
154. *Palaquium pinnatinervium* (1, 2, 3)	Tágkan
155. *Pouteria duclitan* (1, 2, 3)	Baehni-Duklítan
Family Simaroubaceae	
156. *Ailanthus integrifolia* (1, 2, 3)	Malasápsap
157. *Picrasma javanica* (1, 2, 3)	Nalís

Family/Species	Official Common Name
Family Sterculiaceae	
158. *Heritiera littoralis* (1, 2, 3)	Dungón-láte
159. *Kleinhovia hospita* (1, 2, 3)	Tan-ág
160. *Pterospermum diversifolium* (1, 2, 3)	Bayók
161. *Sterculia cuneata* (1, 2, 3)	Malabunót
162. *Sterculia montana* (1, 2, 3)	Tapínag-bundók
163. *Tarrietia sylvatica* (1, 2, 3)	Dungón
Family Stilaginaceae	
164. *Antidesma pentandrum* (1, 2, 3)	Bígnai-pógo
165. *Antidesma pleuricum* (1, 2, 3)	Bígnai-kalábau
Family Symplocaceae	
166. *Symplocos villarii* (1, 2, 3)	Agósip
Family Theaceae	
167. *Camellia lanceolata* (1, 2, 3)	Haíkan
168. *Ternstroemia megacarpa* (1, 2, 3)	Tapmís
Family Tiliaceae	
169. *Diplodiscus paniculatus* (1, 2, 3)	Balóbo
170. *Microcos stylocarpa* (1, 2, 3)	Kamúling
171. *Trichospermum discolor* (1, 2, 3)	Bonótan
Family Ulmaceae	
172. *Celtis luzonica* (1, 2, 3)	Magabúyo
173. *Trema orientalis* (1, 2, 3)	Anabióng
Family Urticaceae	
174. *Cypholopus muluccanus* (1, 2, 3)	Cypholopus
175. *Laportea meyeniana* (1, 2, 3)	Lipáng-kalábau
176. *Leucosyke capitellata* (1, 2, 3)	Alagási
Family Verbenaceae	
177. *Premna odorata* (1, 2, 3)	Alagáu
178. *Teijsmanniodendron ahernianum* (1, 2, 3)	Dangúla/Sasálit
179. *Vitex parviflora* (1, 2, 3)	Moláve
180. *Tectona philippinensis* (1, 2, 3)	Philippine Teak

Bold numbers in parentheses indicate references for species occurrence in the Twin Lakes Balinsasayao and Danao areas.

References:

[1]Foundation for Philippine Environment-Silliman University Center for Tropical Conservation Studies Rapid Site Assessment (FPE-SUCENTROP RSA) Updated Report 1995

[2] Panaguiton & Parco 1993

[3]Antone 1983

ANNEX B. List of birds (residents, migrants and endemics) recorded for Negros Island and in the Twin Lakes Balinsasayao and Danao Natural Park, Sibulan, Negros Oriental. All except a few of the coastal and marine bird species are excluded in the list.

Legend: R - resident M - migrant R/MP - resident/migrant population E - endemic

Species in **bold** are recorded in the Twin Lakes Balinsasayao and Danao areas. Numbers not in parentheses indicate reference(s) for species occurrence on Negros Island while bold numbers in parentheses indicate references for species occurrence in the Twin Lakes Balinsasayao and Danao areas.

NEGROS ISLAND
FAMILY/SPECIES/COMMON NAME
Family Podicipedidae (Grebes)
1. *Podiceps nigricollis* (Black-necked Grebe)[M 1, 2 (14)]
Family Ardeidae (Bitterns, Egrets, Herons)
2. *Bubulcus ibis* (Cattle Egret)[R/MP 1, 2, (17)]
3. *Butorides striatus* (Little Heron)[R/MP 1, 2, (9)]
4. *Gorsachius goisagi* (Japanese Night Heron)[M 1, 2, (3)]
5. *Nycticorax caledonicus* (Rufous Night Heron)[R 1, 2, (17)]
6. *Ixobrychus cinnamomeus* (Cinnamon Bittern)[R 1, 2]
7. *Dupetor flavicollis* (Black Bittern)[R 1, 2]
Family Anatidae (Ducks, Geese)
8.*Dendrocygna arcuata* (Wandering Whistling Duck)[R 1, 2]
9. *Anas luzonica* (Philippine Duck)[R 1, 2,
Family Pandionidae (Osprey)
10. *Pandion haliaetus* (Osprey)[M 1, 2, (15)]
Family Accipitridae (Buzzards, Eagles, Harriers, Hawks, Kites)
11. *Pernis ptilorhynchus* (Oriental Honeybuzzard) [R/MP 1, 2
12.*Pernis celebensis* (Barred Honeybuzzard) [R 1, 2
13. *Haliastur indus* (Brahminy Kite)[R 1, 2, (9)]
14. *Spilornis cheela* (Crested Serpent-Eagle)[R 1, 2
15. *Accipiter virgatus* (Besra)[R 1, 2, (9)]
16. *Accipiter trivirgatus* (Crested Goshawk)[R 1, 2, (9)]
17. *Butastur indicus* (Grey-faced Buzzard)[M 1, 2
18. *Hieraaetus kienerii* (Rufous-bellied Sea Eagle)[R 1, 2
19. *Spizaetus philippensis* (Philippine Hawk-Eagle)[E 1, 2, (4, 5)]

Family Falconidae (Falcons, Falconets)
20. *Microhierax erythrogenys* (Philippine Falconet)[E 1, 2]
Family Megapodidae (Megapodes, Scrubfowl)
21. *Megapodius cumingii* (Tabon Scrubfowl)[R 1, 2]
Family Phasianidae (Partridges, Pheasants, Quail)
22. *Coturnix chinensis* (Blue-breasted Quail)[R 1, 2]
23. *Gallus gallus* (Jungle Redfowl)[R 1, 2 (9)]
Family Turnicidae (Buttonquails)
24. *Turnix sylvatica* (Small Buttonquail)[R 1, 2]
25. *Turnix suscitator* (Barred Buttonquail)[R 1, 2]
26. *Turnix ocellata* (Spotted Buttonquail)[E 1, 2]
Family Rallidae (Coot, Crakes, Rails, Waterhens)
27. *Galliralus striatus* (Slaty-breasted Rail)[R 1, 2]
28. *Galliralus torquatus* (Barred Rail)[R 1, 2]
29. *Rallina eurizonoides* (Slaty-legged Crake)[R 1, 2]
30. *Porzana pusilla* (Baillon's Crake)[M 1, 2]
31. *Porzana fusca* (Ruddy-breasted Crake)[R 1, 2]
32. *Porzana cinerea* (White-browed Crake)[R 1, 2]
33. *Amaurornis olivaceus* (Plain Bush-hen)[E 1, 2 (17)]
34. *Amaurornis phoenicurus* (White-breasted Waterhen)[R 1, 2]
35. *Gallicrex cinerea* (Watercock)[R 1, 2]
36. *Gallinula chloropus* (Common Moorhen)[R/MP 1, 2]
37. *Fulica atra* (Eurasian Coot)[M 1, 2]
Family Columbidae (Doves, Pigeons)
38. *Treron pompadora* (Pompador Green Pigeon)[R 1, 2, (9)]
39. *Treron vernans* (Pink-necked Green Pigeon)[R 1, 2, (9)]
40. *Phapitreron leucotis nigrorum* (White-eared Brown Dove)[E 1, 2, (9)]
41. *Phapitreron amethystina* (Amethyst Brown Dove)[E 1, 2, (9)]
42. *Ptilinopus occipitalis* (Yellow-breasted Fruit Dove)[E 1, 2, (9)]
43. *Ptilinopus arcanus* (Negros Fruit Dove)[E 1, 2]
44. *Ptilinopus lenlancheri* (Black-chinned Fruit Dove)[R 1, 2, (9)]
45. *Ducula poliocephala* (Pink-bellied Imperial Pigeon)[E 1, 2, (9)]
46. *Ducula carola* (Spotted Imperial Pigeon)[E 1, 2]
47. *Ducula aenea* (Green Imperial Pigeon)[R 1, 2]
48. *Ducula bicolor* (Pied Imperial Pigeon)[R 1, 2]
49. *Columba vitiensis* (Metallic Wood Pigeon)[R 1, 2, (9)]

50. *Macrophygia tenuirostris* (Slender-billed Cuckoo Dove)[R 1, 2, (9)]
51. *Streptopelia bitorquata* (Island Collared Dove)[E 1, 2]
52. *Streptopelia chinensis* (Spotted Dove)[R 1, 2, (9)]
53. *Geopelia striata* (Zebra Dove)[R 1, 2, (9)]
54. *Chalcophaps indica* (Common Emerald Dove)[R 1, 2, (9)]
55. *Gallicolumba keayi* (Bleeding Heart Pigeon)[E 1, 2, (3, 8)]
56. *Caloenas nicobarica* (Nicobar Pigeon)[R 1, 2]

Family Psittacidae (Cockatoo, Lorikeets, Parrots. Racquet-tails)

57. *Cacatua haematuropygia* (Philippine Cockatoo)[E 1, 2, (13)]
58. *Prioniturus discurus* (Blue-crowned Racquet-tail)[E 1, 2, (17)]
59. *Tanygnathus lucionensis* (Blue-naped Parrot)[R 1, 2]
60. *Tanygnathus sumatranus* (Blue-backed Parrot)[R 1, 2]
61. *Loriculus philippensis* (Colasisi)[E 1, 2, (9)]

Family Cuculidae (Cuckoos, Malkohas, Coucals)

62. *Cuculus sparverioides* (Large Hawk-Cuckoo)[M 1, 2]
63. *Cuculus fugax* (Hodgson's Hawk Cuckoo)[R 1, 2]
64. *Cuculus micropterus* (Indian Cuckoo)[M 1, 2]
65. *Cuculus saturatus* (Oriental Cuckoo)[M 1, 2]
66. *Cacomantis sepulcralis* (Brush Cuckoo)[R 1, 2, (9)]
67. *Surniculus lugubris* (Drongo Cuckoo)[R 1, 2, (9)]
68. *Chrysococcyx russatus* (Gould's Bronze Cuckoo)[R 1, 2]
69. *Eudynamys scolopacea* (Common Koel)[R 1, 2, (9)]
70. *Centropus viridis* (Philippine Coucal)[E 1, 2, (17)]
71. *Centropus bengalensis* (Lesser Coucal)[R 1, 2, (17)]

Family Tytonidae (Bars and Grass Owls)

72. *Tyto capensis* (Grass Owl)[R 1, 2, (17)]

Family Strigidae (Owls)

73. *Otus megalotis* (Philippine Scops Owl)[E 1, 2, (9)]
74. *Ninox scutulata* (Brown Hawk Owl)[E 1, 2]
75. *Ninox philippensis* (Philippine Hawk Owl)[E 1, 2, (9)]

Family Podargidae (Frogmouths)

76. *Batracostomus septimus* (Philippine Frogmouth)[E 1, 2, (9)]

Family Caprimulgidae (Nightjars)

77. *Caprimulgus indicus* (Grey Nightjar)[M 1, 2]
78. *Caprimulgus manillensis* (Philippine Nightjar)[R 1, 2]
79. *Caprimulgus affinis* (Savannah Nightjar)[R 1, 2]

Family Hemiprocnidae (Treeswifts)
80. *Hemiprocne comata* (Lesser Tree Swift)[R 1, 2, (9)]
Family Apodidae (Swifts)
81. *Collocalia mearnsi* (Philippine Swiflet)[E 1, 2, (9)]
82. *Collocalia whiteheadi* (Whiteheads Swiflet)[E 1, 2]
83. *Collocalia esculenta* (Glossy Swiflet)[R 1, 2, (9)]
84. *Collocalia troglodytes* (Pygmy Swiflet)[E 1, 2, (9)]
85. *Mearnsia* (*Chaetura*) *picina* (Philippine Needletail)[E 1, 2, (9)]
86. *Hirundapus celebensis* (Purple Needletail)[R 1, 2, (9)]
87. *Apus pacificus* (Fork-tailed Swift)[R/MP 1, 2]
88. *Apus affinis* (House Swift)[R 1, 2]
89. *Cypsiurus balasiensis* (Asian Palm Swift)[R 1, 2]
Family Alcedinidae (Kingfishers)
90. *Alcedo atthis* (Common Kingfisher)[R 1, 2]
91. *Alcedo cyanopecta* (Indigo-banded Kingfisher)[E 1, 2]
92. *Ceyx lepidus* (Variable forest Kingfisher)[R 1, 2]
93. *Halcyon capensis* (Stork-billed Kingfisher)[R 1, 2]
94. *Halcyon coromanda* (Ruddy Kingfisher)[R/MP 1, 2]
95. *Halcyon smyrnensis* (White-throated Kingfisher)[R 1, 2, (17)]
96. *Halcyon* (*Todiramphus*) winchelli (Rufous-lored Kingfisher)[E 1, 2, (3)]
97. *Halcyon chloris* (White-collared Kingfisher)[R 1, 2, (17)]
98. *Actenoides lindsayi* (Spotted Wood Kingfisher)[E 1, 2, (9)]
Family Meropidae (Bee-Eaters)
99. *Merops viridis* (Blue-throated Bee-eater)[R 1, 2 (9)]
100. *Merops philippinus* (Blue-tailed Bee-eater)[R 1, 2]
Family Coraciidae (Rollers)
101. *Eurystomus orientalis* (Dollarbird/Broad-billed Roller)[R 1, 2, (9)]
Family Bucerotidae (Hornbills)
102. *Penelopides panini* (Tarictic Hornbill)[E 1, 2, (4, 6, 7)]
103. *Aceros waldeni* (Visayan Writhed-billed Hornbill)[E 1, 2, (3, 4, 5)]
Family Capitonidae (Barbets)
104. *Megalaima haemacephala* (Crimson-breasted Barbet)[R 1, 2, (9)]
Family Picidae (Woodpeckers)
105. *Drycopus javensis* (White-bellied Woodpecker)[R 1, 2, (9)]
106. *Dendrocopos maculatus* (Philippine Pygmy Woodpecker)[E 1, 2]
107. *Chrysocolaptes lucidus* (Greater Flameback)[R 1, 2, (9)]

Family Pittidae (Pittas)
108. *Pitta erythrogaster* (Red-bellied Pitta)[R 1, 2, (17)]
109. *Pitta sordida* (Hooded Pitta)[R 1, 2 (17)]
Family Alaudidae (Larks)
110. *Mirafra javanica* (Singing Bushlark)[R 1, 2]
111. *Alauda gulgula* (Oriental Skylark)[R 1, 2]
Family Hirundinidae (Swallows and Martins)
112. *Riparia paludicola* (Plain Martin)[R 2]
113. *Hirundo rustica* (Barn Swallow)[M 1, 2]
114. *Hirundo tahitica* (Pacific Swallow)[R 1, 2, (9)]
115. *Hirundo daurica* (Red-rumped Swallow)[R/MP 1, 2]
Family Campephagidae (Cuckoo-shrikes, Minivets, Trillers)
116. *Coracina striata* (Bar-bellied Cuckoo Shrike)[R 1, 2, (9)]
117. *Coracina ostenta* (White-winged Cuckoo Shrike)[E 1, 2, (9)]
118. *Lalage nigra* (Pied Triller)[R 1, 2 , (16)]
119. *Pericrocotus divaricatus* (Ashy Minivet)[M 1, 2]
120. *Pericrocotus flammeus* (Scarlet Minivet)[R 1, 2, (9)]
Family Pycnonotidae (Bulbuls)
121. *Pycnonotus urostictus* (Yellow-wattled Bulbul)[E 1, 2]
122. *Pycnonotus goaivier* (Yellow-vented Bulbul)[R 1, 2, (9)]
123. *Hypsipetes philippinus* (Philippine Bulbul)[E 1, 2, (9)]
Family Dicrudidae (Drongos)
124. *Dicrurus balicassius* (Balicassiao)[E 1, 2. (9)]
Family Oriolidae (Orioles, Fairy-bluebirds)
125. *Oriolus xanthonosus* (Dark-throated Oriole)[E 1, 2, (9)]
126. *Oriolus steerei* (Philippine Oriole)[E 1, 2, (9)]
127. *Oriolus chinensis* (Black-naped Oriole)[R 1, 2, (9)]
Family Corvidae (Crows)
128. *Corvus macrorynchus* (Large-billed Crow)[R 1, 2, (9)]
Family Paridae (Tits)
129. *Parus elegans* (Elegant Tit)[E 1, 2, (9)]
Family Sittidae (Nuthatches)
130. *Sitta frontalis* (Velvet-fronted Nuthatch)[R 1, 2, (9)]
Family Rhabdornithidae (Rhabdornis)
131. *Rhabdornis mysticalis* (Stripe-headed Creeper)[E 1, 2 (9)]
132. *Rhabdornis inornatus* (Stripe-breasted Rhabdornis)[E 1 (9)]

Family Timaliidae (Babblers)

133. *Stachyris* (*Dasycrotapha*) *speciosa* (Flame-templed Babbler)[E 1, 2, (9, 11, 12)]

134. *Stachyris nigrorum* (Negros Striped Babbler)[E 1, 2]

Family Turdidae (Robins, Shamas,Thrushes)

135. *Brachypteryx montana* (Blue Shortwing)[R 1, 2, (9)]

136. *Luscinia calliope* (Siberian Rubythroat)[M 1, 2]

137. *Copsychus saularis* (Oriental Magpie-Robin)[R 1, 2, (9)]

138. *Copsychus luzoniensis* (White-browed Shama)[E 1, 2]

139. *Saxicola caprata* (Pied Bushchat)[R 1, 2, (9)]

140. *Monticola solitarius* (Blue Rock-Thrush)[M 1, 2]

141. *Zoothera andromedae* (Sunda Ground Thrush)[R 1, 2, (9, 12)]

142. *Turdus poliocephalus* (Island Thrush)[R 1, 2]

143. *Turdus obscurus* (Eye-browed Thrush)[M 1, 2]

Family Sylviidae (Old World Warblers)

144. *Gerygone sulphurea* (Golden-bellied Flyeater)[R 1, 2]

145. *Phylloscopus borealis* (Arctic Warbler)[M 1, 2]

146. *Phylloscopus olivaceous* (Philippine Leaf-Warbler)[E 1, 2]

147. *Phylloscopus cebuensis* (Lemon-throated Leaf-Warbler)[E 1, 2, (9)]

148. *Phylloscopus trivirgatus* (Mountain Leaf-Warbler)[R 1, 2, (9)]

149. *Acrocephalus orientalis* (Oriental Reed-Warbler)[M 1, 2]

150. *Acrocephalus sorghophilus* (Streaked Reed-Warbler)[M 1, 2]

151. *Locustella ochotensis* (Middendorff's Grasshopper Warbler)[M 1, 2]

152. *Locustella fasciolata* (Gray's Grasshopper Warbler)[M 1, 2, (9)]

153. *Megalurus timoriensis* (Tawny Grassbird)[R 1, 2 (9)]

154. *Megalurus palustris* (Striated Grassbird)[R 1, 2]

155. *Orthotomus atrogularis* (Philippine Tailorbird)[E 1, 2, (9)]

156. *Cisticola exilis* (Bright-capped Cisticola)[R 1, 2, (9)]

157. *Cisticola juncidis* (Zitting Cisticola)[R 1, 2]

Family Muscicapidae (Flycatchers)

158. *Rhinomyias albigularis* (White-throated Jungle Flycatcher)[E 1, 2, (9)]

159. *Muscicapa griseisticta* (Gray-spotted Flycatcher)[M 1, 2]

160. *Muscicapa randi* (Ashy-breasted Flycatcher)[E 1, 2]

161. *Eumyias panayensis* (Mountain Verditer Flycatcher)[R 1, 2, (9)]

162. *Ficedula narcissina* (Narcissus Flycatcher)[M 1, 2]

163. *Ficedula mugimaki* (Mugimaki Flycatcher)[M 1, 2]

164. *Ficedula westermanni* (Little Pied Flycatcher)[R 1, 2, (9)]

165. *Cyanoptila cyanomelana* (Blue-and-White Flycatcher)[M 1, 2]
166. *Cyornis rufigastra* (Mangrove Blue Flycatcher)[R 1, 2, (9)]
167. *Culicicapa helianthea* (Citrine Canary-Flycatcher)[R 1, 2, (9)]
168. *Rhipidura cyaniceps* (Blue-headed Fantail)[E 1, 2 (9)]
169. *Rhipidura javanica* (Pied Fantail)[R 1, 2 (9)]
170. *Rhipidura nigrocinnamomea* (Black-and-Cinnamon Fantail)[E 1, 2]
171. *Hypothymis coelestis* (Celestial Monarch)[E 1, 2 (3)]
172. *Hypothymis azurea* (Black-naped Monarch)[R 1, 2 (9)]
173. *Terpsiphone cinnamomea* (Rufous Paradise-Flycatcher)[E 1, 2]

Family Pachycephalidae (Whistlers)

174. *Pachycephala homeyeri* (White-vented Whistler)[E 1, 2 (9)]

Family Motacillidae (Wagtails, Pipits)

175. *Motacilla alba* (White Wagtail)[M 1, 2]
176. *Motacilla cinerea* (Grey Wagtail)[M 1, 2]
177. *Motacilla flava* (Yellow Wagtail)[M 1, 2 (9)]
178. *Dendronanthus indicus* (Forest Wagtail)[M 1, 2]
179. *Anthus hodgsoni* (Olive Tree Pipit)[M 1, 2]
180. *Anthus novaeseelandiae* (Richard's Pipit)[R 1, 2]
181. *Anthus gustavi* (Pechora Pipit)[M 1, 2]

Family Artamidae (Wood-Swallows)

182. *Artamus leucorynchus* (White-breasted Wood Swallow)[R 1, 2 (9)]

Family Laniidae (Shrikes)

183. *Lanius schach* (Long-tailed Shrike)[R 1, 2 (9)]
184. *Lanius cristatus* (Brown Shrike)[M 1, 2 (9)]

Family Sturnidae (Mynas, Starlings)

185. *Aplonis panayensis* (Asian Glossy Starling)[R 1, 2 (9)]
186. *Sturnus philippensis* (Chestnut-Cheeked Starling)[M 1, 2]
187. *Acridotheres cristatellus* (Crested Myna)[R 1, 2]
188. *Sarcops calvus* (Coleto)[E 1, 2 (9)]

Family Nectariniidae (Sunbirds)

189. *Anthreptes malacensis* (Plain-throated Sunbird)[R 1, 2]
190. *Nectarinia sperata* (Van Hasselt's Sunbird)[R 1, 2 (9)]
191. *Nectarinia jugularis* (Olive-backed Sunbird)[R 1, 2 (9)]
192. *Aethopyga flagrans* (Flaming Sunbird)[E 1, 2 (9)]
193. *Aethopyga shelleyi* (Lovely Sunbird)[E 1, 2]
194. *Aethopyga siparaja* (Yellow-backed Sunbird)[R 1, 2 (9)]

Family Dicaeidae (Flowerpeckers)
195. *Dicaeum aeruginosum* (Striped Flowerpecker)[E 1, 2]
196. *Dicaeum bicolor* (Bicolored Flowerpecker)[E 1, 2 (9)]
197. *Dicaeum haematosticum* (Visayan Flowerpecker)[E 1, 2 (9)]
198. *Dicaeum trigonostigma* (Orange-breasted Flowerpecker)[R 1, 2 (9)]
199. *Dicaeum pygmaeum* (Pygmy Flowerpecker)[E 1, 2 (9)]
200. *Dicaeum ignipectus* (Firebreasted Flowerpecker)[R 1, 2]
201. *Prionochilus olivaceous* (Olive-backed Flowerpecker)[E 9, 12]
Family Zosteropidae (White-eyes)
202. *Zosterops nigrorum* (Yellow White-eye)[E 1, 2 (9)]
203. *Zosterops montanus* (Mountain White-eye)[R 1, 2 (9)]
Family Ploceidae (Old World Sparrows, Weavers)
204. *Passer montanus* (Eurasian Tree Sparrow)[R 1, 2]
Family Estrildidae (Avadavat, Parrotfinches, Munias)
205. *Erythrura viridifacies* (Green-faced Parrotfinch)[E 1, 2]
206. *Padda oryzivora* (Java Sparrow)[R 1, 2]
207. *Lonchura leucogastra* (White-bellied Munia)[R 1, 2 (9)]
208. *Lonchura punctulata* (Scaly-breasted Munia)[R 1, 2]
209. *Lonchura mallaca* (Chestnut Manikin)[R 1, 2 (9)]

References:

[1] Kennedy *et al.* 2000; [2] Dickenson *et al.* 1991; [3] Alcala & Carumbana 1980; [4] Brooks *et al.* 1992; [5] Evans *et al.* 1993; [6] C.R. Robson *in litt.* 1994; [7] F. Verbelen *in litt.* 1997; [8] Diesmos & Pedregosa 1995; [9] FPE-CENTROP RSA Report 1994; [10] Collar *et al.* 1999; [11] Rand 1951; [12] Erickson & Heideman 1983; [13] L. Tag-at verbally 1995; [14] Rabor 1977; [15] PNOC Faunal Survey 2004; [16] pers. comm. Cariño; [17] pers. obs.

The Dark-throated Oriole *Oriolus xanthonotus* has only one previous record in Negros, specifically in the Twin Lakes Balinsasayao and Danao areas as recorded in the FPE-CENTROP RSA Report (1994). *O. xanthonotus* is restricted to the Palawan group of islands, namely, Culion, Calamianes and Palawan and not known in Negros (Kennedy *et al.* 2000; Dickenson *et. al.* 1991).

The Olive-backed Flowerpecker *Prionichilus olivaceous* was netted in a forest edge of Balinsasayao as claimed by Erickson and Heideman (1983) and is also recorded in the FPE-CENTROP RSA Report (1994). *P. olivaceous* is alsonot known in Negros, and, this may presumably be a misprint for the Philippine Leaf-warbler *Phylloscopus olivaceous* (Brooks *et. al.* 1992).

ANNEX C. List of mammals recorded on Negros Island and in the Twin Lakes Balinsasayao and Danao Natural Park, Sibulan, Negros Oriental.

Legend: * Philippine endemic ** Negros-Panay endemic
***Negros-Cebu endemic ****Negros endemic
Species in **bold** are recorded in the Twin Lakes Balinsasayao and Danao areas. Numbers not in parentheses indicate reference(s) for species occurrence on Negros Island while bold numbers in parentheses indicate references for species occurrence in the Twin Lakes Balinsasayao and Danao areas.

NEGROS
FAMILY/SPECIES/COMMON NAME
Family Cercopethicidae (Monkeys)
1. *Macaca fascicularis* (Long-tailed Macaque) [1, (2)]
Family Cervidae (Deers)
2. *Cervus alfredi* (Philippine Spotted Deer)** [1, (2)]
Family Suidae (Pigs)
3. *Sus cebifrons negrinus* (Visayan Warty Pig)** [1, (2, 3)]
Family Felidae (Cats)
4. *Prionailurus bengalensis rabori* (Philippine Leopard Cat)** [1, (2)]
Family Viveridae (Civets)
5. *Paradoxurus hermaphroditus* (Palm Civet Cat) [1, (2)]
6. *Viverra tangalunga* (Malay Civet Cat) [1, (2)]
MEGACHIROPTERA
Family Pteropodidae (Fruit bats)
7. *Acerodon jubatus* (Golden-crowned Flying Fox)* [1, (2, 3)]
8. *Cynopterus brachyotis* (Short-nosed Fruit Bat) [1, (2, 3)]
9. *Dobsonia chapmani* (Philippine Naked-backed Fruit Bat)*** [1]
10. *Eonycteris spelaea* (Philippine Nectar Bat) [1, (2, 3)]
11. *Eonycteris robusta* (Philippine Dawn Bat)** [1]
12. *Haplonycteris fischeri* (Fischer's Pygmy Fruit Bat)* [1, (2, 3)]
13. *Harpyionycteris whiteheadi* (Harpy Fruit Bat)* [1, (2, 3)]
14. *Macroglossus minimus* (Long-tailed Fruit Bat) [1, (2, 3)]
15. *Nyctimene rabori* (Tube-nosed Fruit Bat)** [1, (2, 3)]
16. *Ptenochirus jagori* (Dog-faced Bat)* [1, (2, 3)]
17. *Pteropus hypomelanus* (Island Flying Fox) [1, (2, 3)]
18. *Pteropus pumilus* (Golden-mantled Flying Fox)* [1, (2, 3)]
19. *Rousettus amplexicaudatus* (Common Rousette) [1, (2, 3)]
MICROCHIROPTERA (Insect bats)
Family Emballonuridae (Sheat-tailed bats)
20. *Emballonura alecto* (Philippine Sheat-tailed Bat) [1]
21. *Saccolaimus saccolaimus* (Pouched Bat) [1]
22. *Taphozous melanopogon* (Black-bearded Tomb Bat) [1]

Family Megadermatidae (False Vampire and Ghost Bats)
23. *Megaderma spasma* (Common Asian Ghost Bat) [1, (3)]
Family Rhinolophidae (Horsehoe and Roundleaf Bats)
24. *Hipposideros ater* (Dusky Roundleaf Bat) [1]
25. *Hipposideros diadema* (Diadem Roundleaf Bat) [1, (3)]
26. *Hipposideros obscurus* (Philippine Forest Roundleaf Bat)* [1]
27. *Hipposideros pygmaeus* (Philippine Pygmy Roundleaf Bat)* [1, (3)]
28. *Rhinolophus arcuatus* (Arcuate Horseshoe Bat) [1]
29. *Rhinolophus inops* (Philippine Forest Horseshoe Bat)* [1]
30. *Rhinolophus macrotis* (Big-eared Horseshoe Bat) [1]
31. *Rhinolophus philippinensis* (Enormous-eared Horsehoe Bat) [1]
32. *Rhinolophus virgo* (Yellow-faced Horseshoe Bat)* [1]
Family Vespertilionidae (Vesper and Evening Bats)
33.*Harpiocephalus harpia* (Hairy-winged Bat) [1]
34. *Miniopterus australis* (Little Bent-winged Bat) [1]
35. *Miniopterus schreibersi* (Common Bent-winged Bat) [1]
36. *Miniopterus tristis* (Greater Bent-winged Bat) [1]
37. *Myotis horsefieldii* (Common Asiatic Myotis) [1]
38. *Myotis macrotarsus* (Philippine Large-footed Myotis) [1]
39. *Myotis muricula* (Whiskered Myotis) [1]
40. *Myotis rufopictus* (Orange-fingered Myotis) [1]
41. *Philetor brachypterus* (Short-winged Pipistrelle) [1]
42. *Pipistrellus javanicus* (Javan Pipistrelle) [1]
43. *Pipistrellus tenuis* (Least Pipistrelle) [1]
44. *Scotophilus kuhlii* (Lesser Asian House Bat) [1]
45. *Tylonycteris robustula* (Greater Flat-headed Bat) [1]
Family Mollosidae (Free-tailed Bats)
46. *Chaerephon plicata* (Wrinkled-lip Bat) [1]
47. *Cheiromeles parvidens* (Lesser Naked Bat) [1]
Family Muridae (Rats and Mice)
48. *Apomys* sp. A (Western Visayas Forest Mouse) [1]
49. *Mus musculus* (House Mouse) [1]
50. *Rattus argentiventer* (Rice-field Mouse) [1]
51. *Rattus exulans* (Polynesian Rat) [1, (2, 3)]
52. *Rattus tanezumi* (Oriental House Rat) [1, (3)]
Family Soricidae (Shrews)
53. *Crocidura negrina* (Negros Shrew)**** [1, (2)]
54. *Suncus murinus* (Oriental House Shrew) [1, (2)]

References:

[1] Heaney *et al.* 1998

[2] FPE - SUCENTROP RSA Report 1994

[3] SUCENTROP - Peoples' Organization (PO) Biomonitoring System (BMS) Report 2004

ANNEX D. List of herpetofauna for Negros Island and in the Twin Lakes Balinsasayao and Danao Natural Park, Sibulan, Negros Oriental.

FAMILY/SCIENTIFIC NAME/COMMONNAME

AMPHIBIANS

Family Bufonidae (True Toads)

1. ***Bufo marinus*** **(Giant Marine Toad)** [2,3,(9)]

Family Ranidae (True Frogs)

2. *Fejervarya (Rana) cancrivora* (Asian Brackish Water Frog) [2,3]
3. ***Limnonectes (Rana) leytensis*** **(Swamp Frog)*** [2,3(9)]
4. ***Limnonectes (Rana magna) visayanus*** **(Visayan Fanged Frog)**** [2,3(9)]
5. ***Occidozyga (Ooeidozyga) laevis visayanus*** **(Small-headed Frog)*** [2,3,(9,11)]
6. ***Platymantis corrugatus*** **(Rough-backed Forest Frog)*** [2,3,(9)]
7. ***Platymantis dorsalis*** **(Common Forest Ground Frog)*** [2,3,4,(12)]
8. ***Platymantis hazelae*** **(Hazel's Forest Frog)*** [2,3,(9)]
9. ***Platymantis negrosensis*** **(Negros Forest Frog)**** [2,3,(11,12)]
10. *Platymantis spelaeus* (Negros Cave Frog)*** [3,7]
11. ***Rana erythraea*** **(Common Green Frog)** [2,3,(9)]
12. ***Rana everetti*** **(Everett's Frog)** [2,3,(9)]

Old World Tree Frogs

Family Rhacophoridae

13. ***Polypedates leucomystax quadrilineatus*** **(Common Tree Frog)** [2,3,(9)]
14. *Rhacophorus appendiculatus* (Rough-armed Tree Frog) [2,3]
15. ***Rhacophorus pardalis pardalis*** **(Gliding Tree Frog)** [2,3,8,(9)]

Narrow-mouthed Frogs

Family Microhylidae

16. ***Kaloula conjuncta negrosensis*** **(Truncate-toed Chorus Frog)**** [2,3,(9,12)]
17. *Kaloula kalingensis* (Smooth-fingered Narrow-mouthed Frog) [10]
18. ***Kaloula picta*** **(Slender-digit Chorus Frog)*** [1,2,3,(9)]

REPTILES

Lizards

Family Agamidae (Agamids)

19. ***Bronchocela cristatella (Calotes cristatellus)*** **(Indonesian Calotes)** [2]
20. *Bronchocela (Calotes) marmoratus* (Philippine Calotes) [2]
21. ***Draco spilopterus*** **(Common Flying Lizard)** [13]
22. ***Gonocephalus sophiae*** **(Dark-spotted Anglehead)** [2]
23. ***Hydrosaurus pustulatus*** **(Sailfin Water Lizard)** [2,(9,12)]

Family Dibamidae (Blind-earless Lizards)

24. *Dibamus argenteus* (Philippine Blind-earless Lizard) [2]
25. *Dibamus novaeguineae* (Blind-earless Lizard) [2]

Family Gekkonidae (Geckos)

26. *Cosymbotus platyurus* (Flat-bodied House Gecko) [2,5,(9)]

27. *Cyrtodactylus annulatus* (Small Bent-toed Gecko)* [2,5,(9)]

28. *Cyrtodactylus philippinicus* (Philippine Bent-toed Gecko)* [2,5,(9)]

29. *Gehyra mutilata* (Tender-skinned House Gecko) [2,5,(9)]

30. *Gekko gecko gecko* (Toko Narrow-disked Gecko) [2,5,(9,12)]

31. *Gekko mindorensis* (Mindoro Narrow-disked Gecko) [2,5]

32. *Hemidactylus frenatus* (Common House Gecko) [2,5]

33. *Hemidactylus garnoti* (Large Hemidactylid Gecko) [2,5,(9)]

34. *Hemiphyllodactylus typus* (Small Smooth-scaled Gecko) [2,5,(9)]

35. *Lepidodactylus christiani* (Negros Broad-tailed Smooth-scaled Gecko)*** [2,5,(9)]

36. *Lepidodactylus herrei herrei* (White-lined Smooth-scaled Gecko) * [2,5,(9)]

37. *Lepidodactylus lugubris* (Mangrove Smooth-scaled Gecko) [2,5]

38. *Luperosaurus cumingi* (Cuming's Flap-legged Gecko)* [2,5,(14)]

39. *Pseudogekko brevipes* (Orange-spotted Smooth-scaled Gecko)* [2,5,(9)]

Family Scincidae (Skinks)

40. *Brachymeles boulengeri taylori* (Common Burrowing Skink) * [2,6,(9)]

41. *Brachymeles talinis* (Large striped Burrowing Skink) *** [2,6,9]

42. *Brachymeles tridactylus* (Negros Three-digit Worm Skink) *** [2,6]

43. *Lamprolepis smaragdina philippinica* (Spotted Green Tree Skink) [2,6,(9,12)]

44. *Emoia atrocostata* (Gray Swamp Skink) [2,6]

45. *Lipinia auriculata* (Bronze slender Tree Skink) *** [2,6,9]

46. *Lipinia pulchellum taylori* (Yellow-striped Slender Tree Skink)*** [2,6,9]

47. *Lipinia rabori* (Black Slender Tree Skink) *** [2,6,9]

48. *Lipinia quadrivittata* (Black-striped Slender Tree Skink)*** [2,6,9]

49. *Mabuya indeprensa* (Mabouya)*[2,6]

50. *Mabuya multicarinata borealis* (Two-striped Mabouya) [2,6,(9)]

51. *Mabuya mullifasciata* (Common Mabouya) [2,6,(9,12)]

52. *Sphenomorphus arborens* (Negros Sphenomorphus)* [2,6,(9,12)]

53. *Sphenomorphus jagori grandis* (Jagor's Sphenomorphus)* [2,6,(9,12)]

54. *Sphenomorphus steerei* (Steere's Sphenomorphus)* [2,6,(9,12)]

Family Varanidae (Monitor Lizards)

55. *Varanus salvator nuchalis* (Rough-necked Water Monitor) [2,6,(9,12)]

Snakes

Family Acrochordidae (Wart Snakes)

56. *Acrochordus granulatus* (Small Wart Snake) [2]

Family Colubridae (Colubrid Snakes)

57. *Ahaetulla prasina preocularis* (Elongate-headed Tree Snake)

58. *Boiga cynodon* (Philippine Blunt-headed Tree Snake)*[2]

59. *Calamaria gervaisi* (Gervais' Worm Snake)* [2,(9)]

60. *Cerberus (Hurria) rynchops* (Dog-faced Water Snake) [2]

61. *Chrysopelea paradisi* (Paradise Snake) [2,(9)]

62. *Dendrelaphis caudolineatus terrificus* (Lined Slender Arboreal Snake)* [2,9]
63. *Dendrelaphis pictus pictus* (Common Bronze-backed Snake) [2]
64. *Dryophiops philippina* (Philippine Dryophiops) * [2,9]
65. *Elaphe erythrura psephenoura* (Common Rat Snake)* [2,9]
66. *Gonyosoma oxycephala* (Arboreal Rat Snake) * [2,9]
67. *Lycodon aulicus capacinus* (Common Wolf Snake) [2,(9)]
68. *Oligodon modestum* (Spotted-bellied Short-headed Snake)* [2,(9)]
69. *Oxyrhabdium leporinum visayanum* (Banded Philippine Burrowing Snake)* [2,(9)]
70. *Oxyrhabdium modestum* (Non-banded Philippine Burrowing Snake) * [2,9]
71. *Psammodynastes pulverulentus* (Dark-spotted Mock Viper) [2,(9,15)]
72. *Pseudorabdion mcnamarae* (Mcnamara's Burrowing Snake) * [2]
73. *Pseudorabdion montanum* (Mountain Burrowing Snake)*** [2,9]
74. *Pseudorabdion oxycephalum* (Negros Light-scaled Burrowing Snake)* [2,9]
75. *Tropidonophis (Natrix dendrophiops) negrosensis* (Spotted Water Snake) [2,(9)]
76. *Zaocys luzonensis* (Smooth-scaled Mountain Rat Snake) * [2,(9)]

Family Elapidae (Coral Snakes and Cobras)

77. *Calliophis calligaster gemianulis* (Barred Coral Snake)** [2,9]
78. *Ophiophagus hannah* (King Cobra) [2,9]

Family Pythonidae (Pythons)

79. *Python reticulatus* (Reticulated Python) [2,(9)]

Family Typhlopidae (Blind Snakes)

80. *Rhamphotyphlops braminus* (Brahminy Blind Snake) [2,9]
81. *Typhlops canlaonensis* (Canlaon Blind Snake)*** [2]
82. *Typhlops cumingi* (Cuming's Blind Snake) [2,9]
83. *Typhlops luzonensis* (Luzon blind Snake)* [2,9]

Family Viperidae (Vipers)

84. *Tropidolaemus (Trimeresurus) wagleri* (Wagler's Pit Viper) [2,(9)]

Turtles

Family Bataguridae (Asian Hardshell Turtles)

85. *Cuora amboinensis amboinensis* (Malayan Freshwater Turtle) [2,(9)]

Crocodiles

Family Crocodylidae

86. *Crocodylus mindorensis* (Philippine Crocodile)* [2]

Legend:
*Philippine endemic
**Negros-Panay endemic
***Negros Island endemic

Species in **bold** are recorded in the Twin Lakes Balinsasayao and Danao areas. Numbers not in parentheses indicate reference(s) for species occurrence on Negros Island while bold numbers in parentheses indicate references for species occurrence in the Twin Lakes Balinsasayao and Danao areas.

References:

[1] Alcala 1956 ; [2]Alcala 1986; [3]Alcala & Brown 1998; [4] Brown & Inger 1964; [5]Brown & Alcala 1978; [6] Brown & Alcala 1980; [7] Brown & Alcala 1982; [8] Brown & Alcala 1994; [9] FPE-SUCENTROP RSA Report 1994; [10] pers. obs. Brown, Diesmos and Dolino; [11] pers. comm. Brown; [12] pers. obs; [13] McGuire & Alcala 2000; [14]pers. comm. Heaney & Hedeimann 1998; [15]pers. comm. Cariño