

The avifauna of Cajas National Park and Mazán Reserve, southern Ecuador, with notes on new records

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El Parque Nacional Cajas es un área de interés para científicos y aficionados de las aves debido principalmente a su muestra representativa de los ecosistemas andinos. Los Andes presentan altos niveles de diversidad y, a la vez, fuertes presiones ocasionadas por actividades humanas. Así, los parques nacionales son herramientas importantes para la conservación de la biodiversidad. Dentro de este marco, es importante contar con listados completos de las especies que ocupan estos territorios. El presente trabajo recoge las principales observaciones ornitológicas en el Parque Nacional Cajas, prov. Azuay, Ecuador, desde 1980. Adicionalmente, se incluyen breves descripciones de especies no reportadas previamente en el área, importantes para la conservación y para la región. Las aves son buenos indicadores de calidad de hábitat y un importante componente en actividades turísticas.

The tropical Andes harbour the largest number of endemic and threatened bird species in South America^{45,46}. In Ecuador habitat loss is widespread^{46,51} and those natural habitats that remain are under pressure from human activities^{23,44}. Consequently, protected areas such as national parks are powerful tools in the conservation of biological diversity and ecological processes within this bioregion. Cajas National Park (CNP) was originally designated a National Recreation Area in 1977 and upgraded to national park in 1996. CNP and the contiguous Mazán Reserve (MR; designated in 1982) are the only formal conservation units protecting high-altitude ecosystems⁴ in the south-west Ecuadorian Andes⁶. In 1995, they were identified as key areas for bird conservation in Ecuador⁵¹, while in 1998, CNP was ranked as an irreplaceable area for bird conservation in Ecuador²⁷; in 2002, it was identified as a priority area for *Polylepis* forest birds¹² and declared a Ramsar site³⁶; in 2005, CNP and MR were included in the Important Bird Area (IBA) inventory¹⁰.

This paper updates the avifauna of CNP and MR based on data from the 1980s to the present. The previous checklist published in 2007⁴⁷ lacks those species recorded since 2003. We also discuss the conservation importance of CNP and list new bird records and important species for conservation.

Historical review

Ecuadorian ornithology was historically dominated by European and North American ornithologists¹⁵. Ornithological work in CNP commenced in earnest in the late 1970s³⁹. In 1984, the first detailed information for the endemic Violet-throated Metaltail *Metallura baroni* was published³² and an expedition from the University of North Wales led by A. Barnett published a report of the fauna in

CNP⁴. In 1986–87, a British expedition, headed by J. R. King & F. Robinson, focused on MR, undertaking biological inventories and publishing the first checklist of birds^{25,40}. Two field guides to the birds of MR were published in the 1990s^{41,49} along with an introductory guide to the birds of cloud forests in Azuay¹. Studies of bird community composition⁵⁰ and comparisons of diversity at a regional scale³⁵ were conducted. Several international and Ecuadorian researchers, ornithologists and birdwatching tours generated additional records during this decade, for instance, the first description of the nest of Rainbow Starfrontlet *Coeligena iris* was made in the Llaviucu Valley³³.

Recent field surveys have mainly been conducted by the Universidad del Azuay, and a complete database of avifaunal records in CNP and MR pre-2003 was compiled by Rodas & Tinoco⁴² as part of a management plan. This information was decisive in these areas being listed as Important Bird Areas¹⁴ and was the basis for the first field guide of birds of CNP published in 2007⁴⁷. Further, a long-term research programme began in 2007 in a collaborative project between Stony Brook University, the National Aviary (USA) and Universidad del Azuay, focusing on temporal changes in bird communities²⁹, the effects of fragmentation of *Polylepis* woodlands on high-altitude avian communities, and responses of communities to different stresses. This group has also led specific research on endangered species such as *Metallura baroni*⁴⁸ and Andean Condor *Vultur gryphus*³. In 2012, Universidad del Azuay began compiling information from international databases (e.g. eBird, GBIF), field expeditions, inventories, published records, biological monitoring and personal field observations into one database; these data include records from the last eight years in CNP and MR.

Study area

CNP and MR are contiguous protected areas 35 km west of Cuenca, Azuay prov. (02°50'S 79°13'W). CNP covers 28,544 ha, at 3,160–4,445 m⁹, while MR covers 2,395 ha⁹ at elevations of 3,100–3,500 m²⁹ (Fig. 1). Mean annual precipitation is 1,200 mm and temperatures range from 0–20°C²⁴. Since 1995, MR has been strictly managed for conservation with access restricted to researchers and other controlled visits.

The region presents evidence of Pleistocene glaciation with steep slopes, small U-shaped valleys and glacial lakes^{9,20}. The park contains c.235 lakes and two main vegetation types: high-elevation Andean forest and *páramo*. Each of these vegetation types has associated shrubby areas with distinctive plant communities³⁰. More than 1,000 patches of *Polylepis* sp. (Rosaceae) woodland of varying sizes occur throughout the *páramo*, often associated with plants of the genera *Gynoxys*, *Chuquiraga* (Asteraceae), *Brachyotum* and *Miconia* (Melastomataceae)³⁰.

Methods

Data were garnered from two main sources: the CNP and MR management plan⁴², which contains ornithological records from publications between 1980 and 2003, as well as two months of field inventories in both protected areas (March–

April 2003), and the fauna database of Ecuador's southern Andes maintained by Universidad del Azuay, which includes records since 2003. As the database is constantly updated, a cut-off date of 20 April 2013 was employed here. We also consulted other sources, such as eBird, up to the same endpoint; these data were carefully reviewed and any data exhibiting notable inconsistencies were omitted. All records were classified according to the most recent taxonomy and distribution information^{13,38,47}. For taxonomy and nomenclature we follow SACC³⁷. Threat status follows BirdLife International⁵, endemism is based on Stattersfield *et al.*⁴⁵ and habitat preferences on Ridgely & Greenfield³⁸, Tinoco & Astudillo⁴⁷ and pers. obs. We determined four abundance categories: (i) very common = large numbers present in suitable habitat; (ii) common = easy to find in smaller numbers in suitable habitat; (iii) fairly common = infrequently recorded in suitable habitat; and (iv) rare = difficult to find in suitable habitat, with few records in the study area.

Results and Discussion

A total of 154 species (from 17 orders and 39 families) has been reliably recorded in the study area. Highest species richness occurs in Trochilidae (24 species), followed by Tyrannidae (20), Thraupidae (17) and Furnariidae (11). Species

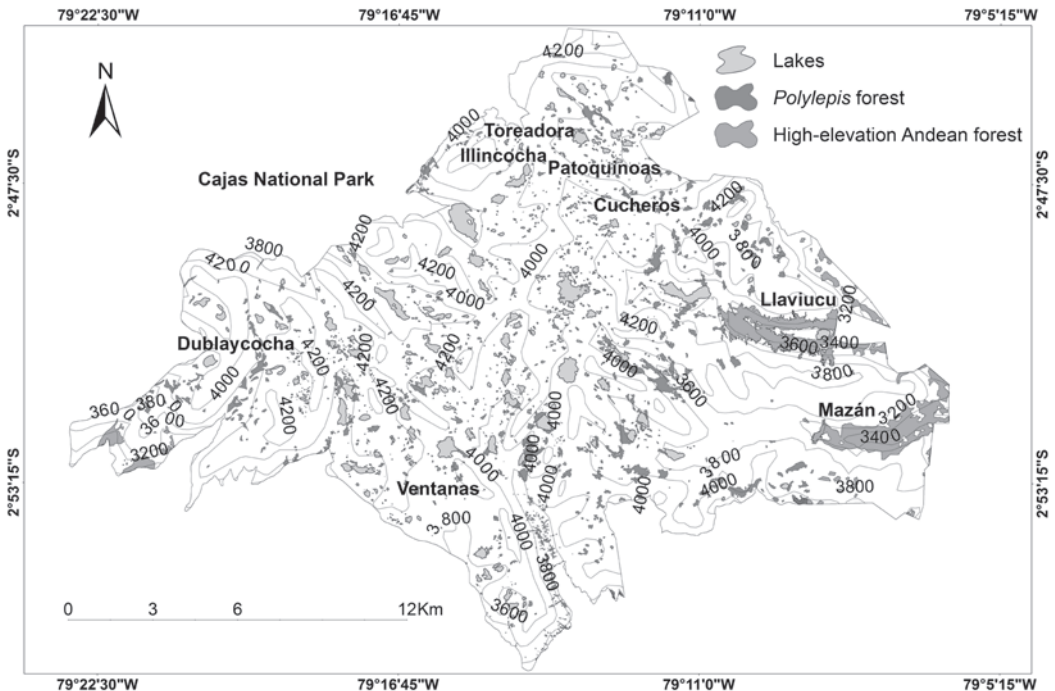


Figure 1. Map of study area, Cajas National Park and Mazán Reserve, Ecuador.

Table 1. Bird checklist for Cajas National Park and Mazán Reserve.

Habitat: F = Forest, Fs = Forest scrub, P = *Páramo*, Ps = *Páramo* scrub, Pf = *Polylepis* forest, L = Lake, St = Streams. Threat: CR = Critically Endangered, EN = Endangered, VU = Vulnerable, NT = Near Threatened. Abundance Key: R = Rare, FC = Fairly Common, C = Common, VC = Very common. Evidence Key: V = Sight only, P Photograph. Source: MP = Management plan database⁴², UA = Universidad del Azuay database, eB = eBird¹¹. Species list follows South American Classification Committee (SACC).

English name	Scientific name	Habitat	Region of Endemism	Threat	Abundance	Evidence	Source
Curve-billed Tinamou	<i>Nothoprocta curvirostris</i>	P			R	V, P	UA
Neotropical Cormorant	<i>Phalacrocorax brasilianus</i>	L, St			R	V	UA
Silvery Grebe	<i>Podiceps occipitalis</i>	L, St		VU	R	V, P	MP, UA
Andean Teal	<i>Anas andium</i>	L, St			C	V, P	MP, UA, eB
White-cheeked Pintail	<i>Anas bahamensis</i>	L, St			R	V, P	UA, eB
Yellow-billed Pintail	<i>Anas georgica</i>	L, St			R	V, P	MP, eB
Ruddy Duck	<i>Oxyura jamaicensis</i>	L, St			C	V, P	MP, UA, eB
Black-crowned Night Heron	<i>Nycticorax nycticorax</i>	F, L			R	V, P	MP, UA, eB
Andean Condor	<i>Vultur gryphus</i>	P		CR	R	V, P	MP, UA, eB
Black Vulture	<i>Coragyps atratus</i>	F, Fs, P, Ps, Pf			R	V	UA
Turkey Vulture	<i>Cathartes aura</i>	F			R	V	MP
Swallow-tailed Kite	<i>Elanoides forficatus</i>	F			R	V	MP, UA, eB
Sharp-shinned Hawk	<i>Accipiter striatus</i>	F			R	V	MP, UA
Black-chested Buzzard-Eagle	<i>Geranoaetus melanoleucus</i>	P			FC	V, P	MP, UA, eB
Variable Hawk	<i>Geranoaetus polyosoma</i>	P			C	V, P	MP, UA, eB
Carunculated Caracara	<i>Phalcoeboenus carunculatus</i>	P	Central Andean Páramo		C	V, P	MP, UA, eB
Merlin	<i>Falco columbarius</i>	F, Fs			R	V, P	UA
American Kestrel	<i>Falco sparverius</i>	Fs			C	V, P	MP, UA
Aplomado Falcon	<i>Falco femoralis</i>	P			R	V, P	MP, UA, eB
Peregrine Falcon	<i>Falco peregrinus</i>	P		VU	R	V, P	MP, UA
Andean Guan	<i>Penelope montagnii</i>	F			C	V, P	PM, UA, eB
Slate-coloured Coot	<i>Fulica ardesiaca</i>	L, St			C	V, P	MP, UA, eB
Virginia Rail	<i>Rallus limicola</i>	L, St			R	V, P	MP, UA, eB
Greater Yellowlegs	<i>Tringa melanoleuca</i>	L, St			R	V, P	UA, eB
Spotted Sandpiper	<i>Actitis macularius</i>	L, St			R	V, P	MP, UA
Baird's Sandpiper	<i>Calidris bairdii</i>	L, St			FC	V, P	MP, UA, eB
Andean Snipe	<i>Gallinago jamesoni</i>	P			C	V, P	MP, UA, eB
Andean Lapwing	<i>Vanellus resplendens</i>	P			FC	V, P	MP, UA, eB
Andean Gull	<i>Chroicocephalus serranus</i>	P, L			C	V, P	MP, UA, eB
Band-tailed Pigeon	<i>Patagioenas fasciata</i>	F			R	V, P	MP, UA
White-tipped Dove	<i>Leptotila verreauxi</i>	F, Fs			R	V, P	MP, UA
Golden-plumed Parakeet	<i>Leptosittaca branickii</i>	F		EN	R	V, P	MP, UA, eB
Barred Parakeet	<i>Bolborhynchus lineola</i>	F			R	V	MP

English name	Scientific name	Habitat	Region of Endemism	Threat	Abundance	Evidence	Source
Red-faced Parrot	<i>Hapalopsittaca pyrrhops</i>	F	Southern Central Andes	EN	R	V, P	MP, UA
Speckle-faced Parrot	<i>Pionus tumultuosus</i>	F			R	V	MP, UA
Scaly-naped Parrot	<i>Amazona mercenarius</i>	F			R	V	MP
White-throated Screech Owl	<i>Megascops albugularis</i>	F			R	V, P	MP, UA
Great Horned Owl	<i>Bubo virginianus</i>	F, Pf			FC	V, P	MP, UA, eB
Andean Pygmy Owl	<i>Glaucidium jardiinii</i>	F			FC	V, P	MP, UA, eB
Rufous-banded Owl	<i>Ciccaba albitarsis</i>	F			R	V, P	MP, UA
Short-eared Owl	<i>Asio flammeus</i>	P			R	V	MP, UA
Rufous-bellied Nighthawk	<i>Lurocalis rufiventris</i>	F, Fs			R	V	MP, UA
Band-winged Nightjar	<i>Systellura longirostris</i>	F, Fs			FC	V, P	MP, UA
White-collared Swift	<i>Streptoprocne zonaris</i>	F, P			FC	V, P	MP, UA, eB
Green Violetear	<i>Colibri thalassinus</i>	F, Fs			R	V	MP
Sparkling Violetear	<i>Colibri coruscans</i>	F, Fs			C	V, P	MP, UA, eB
Speckled Hummingbird	<i>Adelomyia melanogenys</i>	F, Fs			C	V, P	MP, UA
Ecuadorian Hillstar	<i>Oreotrochilus chimborazo</i>	P			C	V, P	MP, UA, eB
Giant Hummingbird	<i>Patagona gigas</i>	F, Fs			FC	V	MP, UA, eB
Shining Sunbeam	<i>Aglaeactis cupripennis</i>	P, Ps			C	V, P	MP, UA, eB
Mountain Velvetbreast	<i>Lafresnaya lafresnayi</i>	F, Fs			C	V, P	MP, UA, eB
Great Sapphirewing	<i>Pterophanes cyanopterus</i>	F, P			R	V, P	MP, UA, eB
Collared Inca	<i>Coeligena torquata</i>	F			R	V	MP
Rainbow Starfrontlet	<i>Coeligena iris</i>	F, Fs	Southern Central Andes		C	V, P	MP, UA, eB
Sword-billed Hummingbird	<i>Ensifera ensifera</i>	F, Fs			R	V, P	MP, UA, eB
Chestnut-breasted Coronet	<i>Boissonneaua matthewsii</i>	F, Pf			FC	V	MP, UA
Purple-throated Sunangel	<i>Heliangelus viola</i>	F, Fs	Southern Central Andes		FC	V, P	MP, UA, eB
Glowing Puffleg	<i>Eriocnemis vestita</i>	F, Fs			FC	V, P	MP, UA
Sapphire-vented Puffleg	<i>Eriocnemis luciani</i>	F, Fs			C	V, P	MP, UA, eB
Black-tailed Trainbearer	<i>Lesbia victoriae</i>	F, Fs			FC	V, P	MP, UA, eB
Green-tailed Trainbearer	<i>Lesbia nuna</i>	F, Fs			R	V, P	MP, UA, eB
Purple-backed Thornbill	<i>Ramphomicron microhynchum</i>	P, Ps			R	V	MP, UA, eB
Viridian Metaltail	<i>Metallura williami</i>	F, P			R	V	MP
Violet-throated Metaltail	<i>Metallura baroni</i>	F, P, Pf	Central Andean Páramo	EN	C	V, P	MP, UA, eB
Tyrian Metaltail	<i>Metallura tyrianthina</i>	F, Fs			VC	V, P	MP, UA, eB
Rainbow-bearded Thornbill	<i>Chalcostigma herrani</i>	P, Ps			R	V	MP, UA
Blue-mantled Thornbill	<i>Chalcostigma stanleyi</i>	P, Pf			C	V, P	MP, UA, eB
White-bellied Woodstar	<i>Chaetocercus mulsant</i>	F, Fs			R	V, P	MP, UA, eB
Masked Trogon	<i>Trogon personatus</i>	F			FC	V, P	MP, UA, eB

English name	Scientific name	Habitat	Region of Endemism	Threat	Abundance	Evidence	Source
Grey-breasted Mountain Toucan	<i>Andigena hypoglauca</i>	F		NT	FC	V, P	MP, UA, eB
Crimson-mantled Woodpecker	<i>Colaptes rivolii</i>	F			FC	V, P	MP, UA, eB
Bar-bellied Woodpecker	<i>Veniliornis nigriceps</i>	F			R	V, P	MP, UA, eB
Powerful Woodpecker	<i>Campephilus pollens</i>	F			R	V	MP
Buff-winged Cinclodes	<i>Cinclodes albidiventris</i>	P			VC	V, P	MP, UA, eB
Stout-billed Cinclodes	<i>Cinclodes excelsior</i>	P	Central Andean Páramo		FC	V, P	MP, UA, eB
Andean Tit-Spinetail	<i>Leptasthenura andicola</i>	P, Pf			FC	V, P	MP, UA, eB
Azara's Spinetail	<i>Synallaxis azarae</i>	F, Fs			VC	V, P	MP, UA, eB
White-browed Spinetail	<i>Hellmayrea gularis</i>	F			FC	V, P	MP, UA, eB
Line-cheeked Spinetail	<i>Cranioleuca antisensis</i>	F, Fs			FC	V, P	MP, UA, eB
Mouse-coloured Thistletail	<i>Asthenes griseomurina</i>	P, Pf	Central Andean Páramo		FC	V, P	MP, UA, eB
Many-striped Canastero	<i>Asthenes flammulata</i>	P, Ps			FC	V, P	MP, UA, eB
Streaked Tuftedcheek	<i>Pseudocolaptes boissonneautii</i>	F			FC	V, P	MP, UA, eB
Pearled Treerunner	<i>Margarornis squamiger</i>	F, Fs, Pf			C	V, P	MP, UA, eB
Flammulated Treehunter	<i>Thripadectes flammulatus</i>	F			R	V, P	MP, UA
Undulated Antpitta	<i>Grallaria squamigera</i>	F			FC	V, P	MP, UA, eB
Chestnut-crowned Antpitta	<i>Grallaria ruficapilla</i>	F, Fs			FC	V, P	MP, UA, eB
Rufous Antpitta	<i>Grallaria rufula</i>	F, P			C	V, P	MP, UA, eB
Tawny Antpitta	<i>Grallaria quitensis</i>	F, P			VC	V, P	MP, UA, eB
Blackish Tapaculo	<i>Scytalopus latrans</i>	F, Pf			VC	V, P	MP, UA, eB
Black-capped Tyrannulet	<i>Phyllomyias nigrocapillus</i>	F			R	V, P	MP, UA
Tawny-rumped Tyrannulet	<i>Phyllomyias uropygialis</i>	F			FC	V, P	MP, UA, eB
White-crested Elaenia	<i>Elaenia albiceps</i>	F, Fs, Pf			R	V, P	MP, UA, eB
White-throated Tyrannulet	<i>Mecocerculus leucophrys</i>	F, Ps, Pf			VC	V, P	MP, UA, eB
White-banded Tyrannulet	<i>Mecocerculus stictopterus</i>	F			FC	V	MP, UA, eB
Tufted Tit-Tyrant	<i>Anairetes parulus</i>	F, Fs, Ps			FC	V, P	MP, UA, eB
Agile Tit-Tyrant	<i>Uromyias agilis</i>	F, Fs			FC	V	MP, UA
Streak-necked Flycatcher	<i>Mionectes striaticollis</i>	F			R	V, P	MP, UA
Cinnamon Flycatcher	<i>Pyrrhomyias cinnamomeus</i>	F			FC	V, P	MP, UA
Black Phoebe	<i>Sayornis nigricans</i>	Fs, St			FC	V, P	MP, UA, eB
Brown-backed Chat-Tyrant	<i>Ochthoeca fucicolor</i>	F, P, Pf			VC	V, P	MP, UA, eB
Rufous-breasted Chat-Tyrant	<i>Ochthoeca rufipectoralis</i>	F			R	V, P	MP, UA, eB
Slaty-backed Chat-Tyrant	<i>Ochthoeca cinnamomeiventris</i>	F			FC	V, P	MP, UA
Crowned Chat-Tyrant	<i>Ochthoeca frontalis</i>	F			FC	V, P	MP, UA, eB
Yellow-bellied Chat-Tyrant	<i>Ochthoeca diadema</i>	F			FC	V	MP, UA

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Red-rumped Bush Tyrant	<i>Cnemarchus erythropygius</i>	P, Pf			C	V, P	MP, UA, eB
Streak-throated Bush Tyrant	<i>Myiotheretes striaticollis</i>	F			R	V, P	MP, UA
Smoky Bush Tyrant	<i>Myiotheretes fumigatus</i>	F			R	V, P	MP, UA
Black-billed Shrike-Tyrant	<i>Agriornis montanus</i>	P			R	V, P	MP, UA, eB
Plain-capped Ground Tyrant	<i>Muscisaxicola alpinus</i>	P			R	V, P	MP, UA, eB
Red-crested Cotinga	<i>Ampelion rubrocristatus</i>	F, P			FC	V, P	MP, UA, eB
Turquoise Jay	<i>Cyanolyca turcosa</i>	F			C	V, P	MP, UA, eB
Slaty-backed Nightingale-Thrush	<i>Catharus fuscater</i>	F			R	V	MP, UA
Swainson's Thrush	<i>Catharus ustulatus</i>	F			R	V	UA, eB
Great Thrush	<i>Turdus fuscater</i>	F, P, Pf			VC	V, P	MP, UA, eB
Glossy-black Thrush	<i>Turdus serranus</i>	F			R	V	MP
White-capped Dipper	<i>Cinclus leucocephalus</i>	St			FC	V, P	MP, UA, eB
Brown-bellied Swallow	<i>Orochelidon murina</i>	P, Ps			VC	V, P	MP, UA, eB
Bank Swallow	<i>Riparia riparia</i>	P			R	V	UA
Sedge Wren	<i>Cistothorus platensis</i>	P			FC	V, P	MP, UA, eB
Mountain Wren	<i>Troglodytes solstitialis</i>	F			FC	V, P	MP, UA, eB
Grey-breasted Wood Wren	<i>Henicorhina leucophrys</i>	F			FC	V	MP, UA
Paramo Pipit	<i>Anthus bogotensis</i>	P			R	V	MP, UA, eB
Slate-throated Redstart	<i>Myioborus miniatus</i>	F			R	V	MP
Spectacled Redstart	<i>Myioborus melanocephalus</i>	F			VC	V, P	MP, UA, eB
Black-crested Warbler	<i>Basileuterus nigrocristatus</i>	F, Fs			C	V, P	MP, UA, eB
Russet-crowned Warbler	<i>Basileuterus coronatus</i>	F			VC	V, P	MP, UA, eB
Cinereous Conebill	<i>Conirostrum cinereum</i>	F, Fs, Ps, Pf			FC	V, P	MP, UA, eB
Blue-backed Conebill	<i>Conirostrum sitticolor</i>	F			FC	V, P	MP, UA
Giant Conebill	<i>Oreomanes fraseri</i>	Pf		VU	FC	V, P	MP, UA, eB
Tit-like Dacnis	<i>Xenodacnis parina</i>	P, Pf		EN	FC	V, P	MP, UA, eB
Masked Flowerpiercer	<i>Diglossa cyanea</i>	F			C	V, P	MP, UA, eB
Black Flowerpiercer	<i>Diglossa humeralis</i>	F, Fs, Ps, Pf			C	V, P	MP, UA, eB
White-sided Flowerpiercer	<i>Diglossa albilatera</i>	F			FC	V	MP, UA
Rufous-chested Tanager	<i>Thlypopsis ornata</i>	F, Fs			FC	V, P	MP, UA, eB
Blue-and-black Tanager	<i>Tangara vassorii</i>	F			C	V, P	MP, UA, eB
Scarlet-bellied Mountain Tanager	<i>Anisognathus igniventris</i>	F, Fs, Ps, Pf			C	V, P	MP, UA, eB
Lacrimose Mountain Tanager	<i>Anisognathus lacrymosus</i>	F			R	V, P	MP, UA
Blue-winged Mountain Tanager	<i>Anisognathus somptuosus</i>	F			R	V	MP
Black-chested Mountain Tanager	<i>Cnemathraupis eximia</i>	F			R	V	MP

English name	Scientific name	Habitat	Region of Endemism	Threat	Abundance	Evidence	Source
Buff-breasted Mountain Tanager	<i>Dubusia taeniata</i>	F, Fs, Ps, Pf			R	V, P	MP, UA, eB
Superciliaried Hemispingus	<i>Hemispingus superciliaris</i>	F, Fs			C	V, P	MP, UA, eB
Black-headed Hemispingus	<i>Hemispingus verticalis</i>	F, Fs			R	V, P	MP, UA
Plushcap	<i>Catamblyrhynchus diadema</i>	F, Fs			R	V, P	MP, UA
Golden-bellied Grosbeak	<i>Pheucticus chrysogaster</i>	Fs			C	V, P	MP, UA, eB
Plain-coloured Seedeater	<i>Catamenia inornata</i>	P			VC	V, P	MP, UA, eB
Paramo Seedeater	<i>Catamenia homochroa</i>	F, P			R	V, P	MP, UA
Band-tailed Seedeater	<i>Catamenia analis</i>	Fs			R	V	MP, UA
Plumbeous Sierra Finch	<i>Phrygilus unicolor</i>	P			VC	V, P	MP, UA, eB
Yellow-breasted Brush Finch	<i>Atlapetes latinuchus</i>	F, Fs			C	V, P	MP, UA, eB
White-winged Brush Finch	<i>Atlapetes leucopterus</i>	F, Fs			FC	V	MP, UA
Grey-browed Brush Finch	<i>Arremon assimilis</i>	F, Fs			FC	V, P	MP, UA, eB
Rufous-collared Sparrow	<i>Zonotrichia capensis</i>	Fs			VC	V, P	MP, UA, eB
Yellow-billed Cacique	<i>Amblycercus holosericeus</i>	F			R	V, P	MP, UA
Hooded Siskin	<i>Sporagra magellanica</i>	Fs, Ps, Pf			C	V, P	MP, UA, eB

distribution among habitats is heterogeneous (Table 1): 86 species are exclusive to high-elevation Andean forest, 51 of them more or less confined to forest, while 30 others also occur in scrub and four are exclusive to the latter. Another 18 species occur in forests and in páramo, *Polylepis* woodland, and / or páramo-scrub. Furthermore, 20 species are confined to páramo grasslands, while five others are also found in scrubby páramo. Giant Conebill *Oreomanes fraseri* is exclusive to *Polylepis* woodland, while 20 of the aforementioned species also use this habitat. As a wetland of international importance, the number of aquatic species in the CNP is important, with 14 species reported. Six species that occur in the park are globally threatened⁵, and seven are endemic to two centres of endemism⁴⁵ (Central Andean Páramo and Southern Central Andes); Red-faced Parrot *Hapalopsittaca pyrrhops* and *Metallura baroni* are both globally threatened and endemic.

A study of high-Andean forest in Ecuador by Poulsen & Krabbe³⁵ demonstrated that species richness varies little with latitude, but composition shows strong variation. MR formed part of this study and is highly differentiated in species composition from similar localities in northern Ecuador, thus checklists from elsewhere would not necessarily be helpful in determining species composition of any particular forest. Furthermore, Llavicu, an area of Andean forest within CNP, is c.2 km from MR and also exhibits some differences from the latter. In this case, the main difference between the two areas is that Llavicu was formerly grazed and is

dominated in the lower part of the valley by scrub and pastures¹⁶.

The páramo of Ecuador shows similarity in species richness across latitude. In the early 20th century, Chapman⁸ reported 33 species in Ecuadorian páramos, while Carrión⁷ proposed 24 páramo specialists. Species numbers vary between regions as many are widespread. We report 27 páramo species, but we must reiterate the importance of records related to *Polylepis* woodland, which increases the overall richness of páramo ecosystems^{39,47}. Species strongly associated with *Polylepis* include Tit-like Dacnis *Xenodacnis parina* and *Oreomanes fraseri*, whose populations in CNP are probably the largest in Ecuador^{38,47}. More specifically, the páramo of CNP harbours the largest population of *M. baroni* and is the only protected area within the species' range^{45,47,48}.

No complete up-to-date checklists exist for the southern Ecuadorian Andes. Detailed distributional data are not readily available and what data there are is concentrated in unpublished technical reports of limited circulation, which potentially limits their use in conservation; it is important to avoid such deficiencies, especially with respect to protected areas, which is one of the major incentives behind this publication.

Species accounts

Curve-billed Tinamou *Nothoprocta curvirostris*

One observed for several minutes at Lake Llavicu, on 6 November 2006 at 3,160 m. The first record in

the western Andes of southern Ecuador. Previously recorded south only to Chimborazo prov.³⁸. Two additional observations in the region, both 20 km south of CNP; on 30 June 2009 (J. C. Sánchez pers. comm.) in the río Casco at 3,646 m (03°04'35.15"S 79°13'52.33"W) and on 16 September 2009 in Bermejos at 3,641 m (03°04'49.84"S 79°12'59.23"W, PXA).

Neotropic Cormorant *Phalacrocorax brasilianus*
A juvenile on 9 November 2005 at Lake Llaviucu (BAT & PXA) departed north-west after 15 minutes. Mostly associated with lowlands and usually considered uncommon in the highlands of Ecuador³⁸. More recently, there has been an increase in the number of observations in the country's highlands, albeit mostly in the northern Andes^{18,21}.

White-cheeked Pintail *Anas bahamensis*

On 16–17 September 2009, a pair was observed on Lake Llaviucu and on 29 September one was reported there¹¹; there were various observations elsewhere in the Andes of Ecuador during 2009. These records do not necessarily reflect regular migration; the species is more frequently reported on coastal freshwater lakes³⁸.

Black-crowned Night Heron *Nycticorax nycticorax*

Rare in CNP, with a few records in Llaviucu sector; the first on 27 February 1999 by L. Navarrete³⁸ at 3,160 m, with sporadic sightings there since 2000. On 11 July 2007, a juvenile was observed at Lake Patoquinas, at 3,800 m (PXA). The most recent record was on 23 November 2012¹¹. Status in the Andes uncertain, although numbers tend to be much reduced in the highlands due to habitat loss and agricultural expansion³⁸. Records in CNP possibly transients.

Andean Condor *Vultur gryphus*

In 2003, ten were recorded in CNP feeding on carrion⁴² but after extensive field work and the use of feeding stations only six in 2011³. The most recent sighting involved an individual over the eastern entrance to the park on 20 November 2012¹¹. Populations of this emblematic bird of the high Andes are much reduced in the north compared to the south¹³. Globally it is considered Near Threatened⁵, but in Ecuador it is Critically Endangered¹⁷. Extensive conversion of páramo to grazing areas for cattle has obliged it to forage close to cattle raising areas, provoking an increase in hunting and poisoning²⁶.

Swallow-tailed Kite *Elanoides forficatus*

On 23 August 2007 one was at Cucheros at 3,900 m soaring over *Polylepis* forest, heading

north-east (PXA). Most recently, four in the park on 23 November 2012¹¹. Records in the páramo may involve transients³⁸ and the species' status in our study area is unclear. Records in páramos of the southern Andes of Ecuador are scarce.

Merlin *Falco columbarius*

The first record in MR, at 3,200 m, was reported by King²⁵. No further reports until 16 November 2012 when one was photographed by J. C. Sánchez at Llaviucu. The two areas possess similar habitat and are just 2 km apart, separated by high páramo.

Virginia Rail *Rallus limicola*

The first record for CNP involved two at Lake Llaviucu on 24 November 2007 (BAT & J. M. Falcón). Various additional sightings at different seasons have been made in the same area, most recently on 8 March 2012 (PXA). Perhaps overlooked by previous surveys. Note that the local population, the South American race *aequatorialis*¹³, has sometimes been considered a separate species³⁸.

Greater Yellowlegs *Tringa melanoleuca*

First record in CNP involved six photographed at Lake Toreadora on 20 August 2012 by X. Clavijo, with another record 2 km south-west of Lake Illincocha the following day¹¹. These are possibly the southernmost records in the country's highlands, although the literature suggests the species occurs throughout the Ecuadorian Andes in small numbers^{13,38}.

Violet-throated Metaltail *Metallura baroni*

Endemic to western Ecuador and considered Endangered⁵. Distributed between the ríos Cañar and Jubones above 3,000 m⁴⁸, with few records in the east of this range^{22,38}, all of them probably wandering individuals⁴³. The species' distribution does not exceed 2,000 km² and the only protected areas within its range are CNP and MR⁴⁵. However, within this range it is common in shrubby páramo, *Polylepis* forest fragments and at borders between páramo and montane forest, although seasonally it also occurs in open-canopy forest, feeding on flowers of *Brachyotum*⁴⁸. Very common in the study area, particularly above 3,300 m.

Bank Swallow *Riparia riparia*

One observed at Lake Illincocha (4,100 m) on 16 November 2006 with a group of Brown-bellied Swallows *Orochelidon murina* (BAT). Few records in the Andes and this is the first report above 4,000 m.

Giant Conebill *Oreomanes fraseri*

Only localised populations in southern Ecuador, with a stronghold in CNP^{38,48}. Occurs in most patches of *Polylepis* woodland in the park, usually in

pairs or with mixed-species flocks including White-throated Tyrannulet *Mecocerculus leucophrys* and Pearled Treerunner *Margarornis squamiger* (PXA pers. obs.).

Tit-like *Dacnis Xenodacnis parina*

Very small and fragmented populations at 3,700–4,000 m, with most records in CNP³⁸. Strongly associated with *Polylepis*, especially those fragments with abundant *Gynoxys*, where even small fragments may harbour large numbers¹. CNP probably supports the largest population of *X. parina* in Ecuador.

Concluding remarks

This checklist draws on 30 years of highly reliable information. Scientific studies in the 1980s and 1990s were conducted by international expeditions and ornithologists, and the baton has since been taken up by Ecuadorian ornithologists in the 21st century; the team from Universidad del Azuay being notably active in CNP and MR.

CNP and MR are of considerable importance for regional conservation as they are the only high-altitude officially protected areas in the south-west Andes of Ecuador. Several key species are resident; 4% are globally threatened⁵ and 4.5% are endemic⁴⁵. Some species probably depend entirely on these areas; *Metallura baroni*, for example, has a very small range, and these areas constitute the only protected land within its distribution⁴⁸, making CNP and MR globally important for conservation. The status of other flagship species, such as *Vultur gryphus*, are less certain. It is unknown whether this species currently breeds in the park or how important the area is for the remaining individuals³.

The high rate of habitat loss in the Andean region caused by anthropogenic activities such as deforestation³¹ and the expansion of the agricultural frontier into páramo²³ makes the study area especially important. However, temporal comparisons of bird communities in MR (between 1994–95 and 2006–07) showed reduction in species richness and changes in composition. Although Latta *et al.*²⁹ could not directly identify the factors driving these changes, they suggested that local and regional disturbances outside MR have probably been an influence. These results demonstrate the need for regional conservation planning, although global climate change is considered one of the greatest future threats, and protected areas and high-altitude Andean ecosystems are predicted to be highly sensitive to its effects^{19,43}. Continued monitoring is needed to maintain the value of CNP and MR as protected areas under the widespread effects of human disturbance and the unavoidable effects of global climate change.

This checklist serves as a guide to managers, biologists, conservationists and birdwatchers alike. It will be of greater value as it is part of the database held by the University of Azuay that will be regularly updated; likewise, these new records along with historic ones will help determine species dynamics within the park over time.

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CORRIGENDA

In the paper, Redies, H. (2013) Observations on White-browed Guan *Penelope jacucaca* in north-east Brazil. *Cotinga* 35: 63–70, it should be noted that the wing-whirring depicted in Fig. 9 was possibly by *Penelope superciliaris* and not by *P. jacucaca*. In addition, following publication the author made observations of the roosting behaviour of *P. jacucaca* that suggests that the section 'Roosting' (p. 68) was not entirely correct. For further details, see www.mae-da-lua.org/cotinga/supplement_wbg.html.

In *Cotinga* 36, p. 108, Fig. 2B was taken by Andy Williams (not 2A); the other photographs were by James Saulino.