Abra Maruncunca, dpto. Puno, Peru, revisited: vegetation cover and avifauna changes over a 30-year period

by Mark B. Robbins, Thomas S. Schulenberg, Daniel F. Lane, Andrés M. Cuervo, Laurence C. Binford†, Árpád S. Nyári, Mariela Combe, Enrique Arbeláez-Cortés, Walter Wehtje & Andrés Lira-Noriega

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Summary.—Avifaunal inventories in 1980, 2007 and 2009 along the eastern slope of the Peruvian Andes at Abra Maruncunca, dpto. Puno, document the occurrence and change in relative abundance of 245 species. Degradation of forest cover with an increase in secondary vegetation probably explains many of the differences between the 1980 and 2009 surveys. We provide details for the first occurrence and clarification of the status in Peru for Ochre-cheeked Spinetail *Synallaxis scutata*, Olivaceous Woodcreeper *Sittasomus griseicapillus viridis*, Scimitar-winged Piha *Lipaugus uropygialis*, White-necked Thrush *Turdus albicollis contemptus*, Blue-browed Tanager *Tangara cyanotis cyanotis*, White-browed Brush Finch *Arremon torquatus* and Yellow-bellied Siskin *Sporagra xanthogastra*, with comments on the taxonomy of Roadside Hawk *Rupornis magnirostris*, Plumbeous Pigeon *Patagioenas plumbea*, a *Pyrrhura* parakeet, White-bellied Hummingbird *Amazilia chionogaster*, an antwren *Herpsilochmus* sp., and Fuscous Flycatcher *Cnemotriccus fuscatus*. The key for ensuring that this rich avifauna is preserved at this site lies in the protection of the relatively intact forest at the base of the massif at the north end of our study area.

The east Andean slope has long been recognised to harbour one of the most speciose avifaunas in the world (Chapman 1917, 1926, Meyer de Schauensee 1970, Stotz *et al*. 1996). Many Andean species possess narrow geographic ranges and are densely packed along an elevational gradient, often corresponding to sharp replacements and specialisation to localised elevational zones (Terborgh 1977, Herzog *et al*. 2005, Forero-Medina *et al*. 2011). High phenotypic variation and endemism is associated with these narrow elevational distributions (Graves 1985, 1988). Deforestation and landscape change along the eastern Andes has had negative consequences for this ecologically complex avian assemblage, resulting in many species with restricted ranges being regarded as globally threatened (Stattersfield *et al*. 1998, BirdLife International 2012, Swenson *et al*. 2012).

Although the unrivaled diversity of the eastern Andes has been appreciated for nearly a century, this avifauna remains poorly known in general (Weske 1972, Lane & Pequeño *in* Vriesendorp *et al*. 2004, Robbins *et al*. 2011) with very few sites surveyed intensively over an extended time (Mee *et al*. 2002, Walker *et al*. 2006, Forero-Medina *et al*. 2011). One of the least-known regions on this slope is in south-eastern Peru between the frequently visited Manu road, dpto. Cusco (Walker *et al*. 2006) and western Bolivia (Hennessey *et al*. 2003a, Schulenberg *et al*. 2010). In part, as a result of the dearth of information from this region, we surveyed the foothill avifauna at Abra Maruncunca, dpto. Puno, in extreme south-eastern Peru, in 1980, 2007 and 2009 (Fig. 1). Located within an important biogeographic region in the Andes, many species' distributions terminate here. Sometimes referred to as the southern Peruvian or Bolivian Yungas (*yungas* is a Quechua word for cloud forest), the region is generally bounded to the north by the Urubamba Valley and Vilcanota cordilleras,

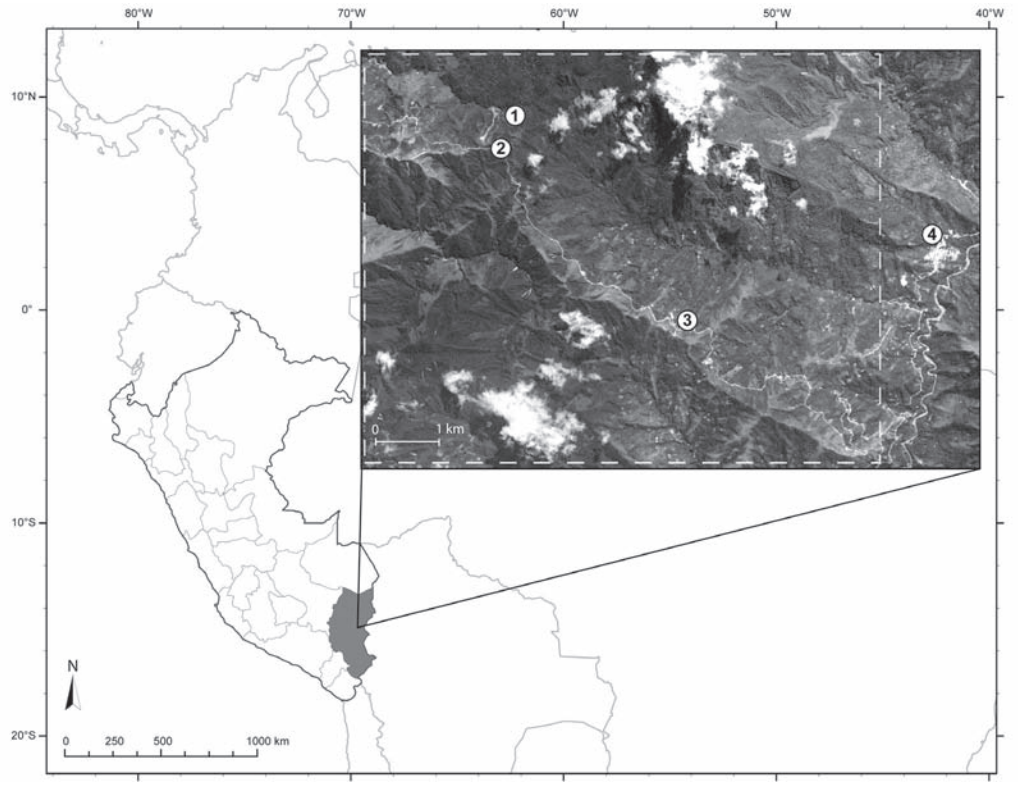

Figure 1. Google Earth image of study area. Dpto. Puno is highlighted in grey. Numbers refer to camp sites: (1) 1980; (2) 2007; (3) 2009. Number 4 refers to San Juan de Oro. Region inside white dotted line refers to area of vegetation analyses. Cloud cover at top of image enshrouds much of the massif seen in Fig. 2.

and is included within Endemic Bird Areas 054 and 055 (Stattersfield *et al*. 1998). Given that an unpaved road crosses the pass and has provided access to this area for decades, it is unsurprising that the vegetation has been subject to extensive anthropogenic modification. We document changes in both forest cover and the avifauna that occurred at this site between the 1980 and 2007 and 2009 surveys.

Study sites and Methods

Avifaunal inventories.—1980 survey: Louisiana State University (LSU) / Museo de Historia de la Universidad Nacional Mayor de San Marcos (MUSM), Lima team's camp was at *c*.1,650 m, 7 November–6 December 1980, on a trail north of the road just west of Abra Maruncunca. Elevations covered *c*.1,800 to 2,200 m; camp location approximate in Fig. 1 as no GPS unit was available; personnel were TSS, LCB, A. Urbay T., G. Campos-L. & M. Sánchez. Selectively logged cloud forest was north of the road, whereas the area along the road and to the south had been clearcut, except for steep ravines. Twenty mist nets were in use by 20 November, with another ten added along a ridge above camp on 23 November.

2007 survey: LSU / Centro de Ornitología y Biodiversidad (CORBIDI) team's camp was along the road (14°12.360'S, 69°13.200'W; 2,050 m; Fig. 1) on 3–4 and 14–15 June. Collecting was with shotguns at this site due to the brevity of the visit, and covered *c*.5 km of road, and *c*.5 km of trails into better forest, mostly north of the road, over elevations of *c*.2,000–2,200 m. Additional specimens were taken at sites peripheral to the Maruncunca massif on 2, 5 and

Figure 2. Massif located at the north side of the area that we worked; taken 29 October 2009 from campsite (Mark B. Robbins). See text for the importance of this ridge to forest-dwelling birds in this region. Low-lying ridge on extreme left of photograph was surveyed in 1980 and less extensively in 2007.

16 June. Another camp was established above San Juan de Oro (14°13.800'S, 69°09.960'W; 1,500 m) with shotgun-collecting only on 13–14 June. The team comprised DFL, AMC, K. Faust & J. Nuñez. Relative abundance designations are not included from the 2007 visit as a result of the survey's short duration. Roadside habitats surveyed were the same as those visited in 2009 (see below). We used trails into the forest that had clearly been established for selective logging, and transected several different habitats, including rock landslide, stunted second growth (canopy *c*.5–10 m, choked with fern and *Chusquea*-like bamboo), ridgetop stunted forest (canopy *c*.5–15 m), taller forest on steeper slopes (canopy *c*.15–20 m) and tall forest on a shallow slope (canopy *c*.30 m). This visit coincided with the early dry season, but we experienced overnight rain on 2 June, fog and drizzle on 4 June, and a late morning shower on 14 June.

2009 survey: University of Kansas Biodiversity Institute (KUBI) / CORBIDI team's camp on 23 October–6 November 2009 was sited along the road below and east of Abra Maruncunca (14°13.860'S, 69°11.640'W,1,925 m; elevations covered *c*.1,800–2,200 m; Fig. 1); this camp was *c*.3.8 km in a direct line from the 2007 camp. Personnel were MBR, AN, MC, EA-C, WW & A. Urbay T. All forest below camp and along the road was secondary with patches of taller secondary forest interspersed with thorn-dominated scrub; the latter was more prevalent along the road below camp. Remnant strips of selectively logged forest reached the road between our camp and Abra Maruncunca. Slopes above, to the south and west, were devoid of forest and were covered with a dense fern and thorn-dominated herbaceous growth *c*.1 m in height. In highly disturbed areas, along the road and at the edge of clearings within the forest, there were bamboo patches (*Guadua* spp.). Surveys

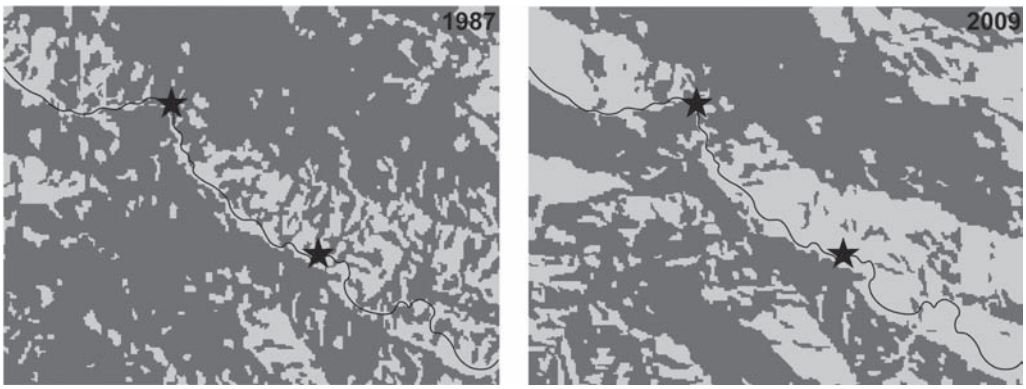

Figure 3. Land cover classification for the years 1987 and 2009. Pale grey = scrub and pasture, dark grey = closed forest. Stars indicate campsites (upper left = 2007, lower right = 2009).

were concentrated in the forest / scrub around camp and downslope to a stream just below 1,800 m and along the road to Abra Maruncunca pass (14°12.360'S, 69°13.140'W) and for several road km (down to *c*.1,800 m) towards San Juan del Oro. On 24–30 October, 23 mist-nets (12 m in length, positioned at ground level; opened from first light until late evening) were restricted to secondary forest downslope of the camp. Late in the morning on 30th, these were moved to forest at Abra Maruncunca and remained there through 5 November (ten nets were left open throughout the night of 4 November). With the exception of brief periods of rain on 2–3 November, days were mostly clear and relatively warm. The moon was full on 2 November.

Although we were unable to ascertain when the road was constructed through this area, it may have been as early as the 1950s when the military opened several roads in the region (B. Walker pers. comm.). By the time of the first survey in 1980 the natural vegetation had already been significantly modified. LCB (unpubl. field notes) wrote in 1980: 'North of the road the pass remains covered with tall cloud forest, which, at time of our visit, was being subjected to selective logging by the local people. Extensive areas south of the road at the pass, and along the road east and west of the pass, however, are almost completely clear-cut; the remaining forest [there] is restricted to gullies and very steep slopes.' During the 2007 and 2009 surveys, selective logging continued along steep slopes and the valley below. However, the forest at the base and on the near-vertical massif just north of our area was still intact (Fig. 2).

Specimens from 1980 are deposited at LSUMZ and MUSM; 2007 and 2009 material is deposited at LSUMZ, KUBI and CORBIDI. MBR's sound recordings (*n* = 172; ML148142–313) and DFL's audio cassettes are deposited at the Macaulay Library (ML), Cornell Lab of Ornithology, Ithaca, NY. Selected audio recordings by DFL and AMC are available on xeno-canto (http://www.xeno-canto.org; XC). Taxonomy and nomenclature follow the South American Check-list Committee as of 8 January 2013 (Remsen *et al*. 2012), except for the Parulidae where we follow Chesser *et al*. (2011).

Measuring changes in vegetation cover.—To quantify vegetation cover changes between 1980 and 2009, ALN categorised three land cover classes (bare soil, closed forest, and scrub and pasture) that were identified, with ground truth occurring during expeditions, using object-oriented classification (Baatz *et al*. 2003) from Landsat images for the following years: March 1987, October 1991, September 1999 and July 2009. The defined area circumscribed the following coordinates (63.5 km^2): 69°14.820'S, 14°11.340'W (top-left corner; Figs. 1, 3) and 69°09.780'S, 14°15.120'W (bottom-right corner; Figs. 1, 3). These images were chosen as

they were relatively cloud free and gave the best spatial resolution (30 m) available for the period. To complete the classification, we first segmented images in two levels with two scale parameters (4 and 10) using a composition of homogeneity criterion of 0.8 for colour and 0.2 for shape, and 0.5 for smoothness and compactness within shape. This enabled us to select objects in the lowest level that was adequate to identify our three land cover classes. With this process we obtained four maps that were compared using Map Comparison Kit (version 3.2.0) with the Kappa method.

Results and Discussion

Vegetation cover changes.—Satellite imagery enabled us to quantify vegetation changes between 1987 and 2009. Images prior to 1987 were of low resolution that precluded confident classification of vegetation types. Nevertheless, there was *c*.20% increase in bare soil, *c*.15% increase in scrub and pasture, and *c*.15% decrease in closed forest between 1987 and 2009 (Table 1). We presume these are conservative figures given the lack of quantitative information on vegetation coverage during the 1980 survey. Moreover, the closed forest classification does not capture the impact of selective logging upon this vegetation type. Areas significantly degraded by selective logging would still be scored as closed forest.

General results and discussion.—Some 245 avian species were recorded at Abra Maruncunca during these inventories, with 164 in 1980, 161 in 2007 and 174 in 2009. The following numbers are of species unique to each of the surveys: 49 in 1980, 25 in 2007 and 57 in 2009. Because the 2007 inventory was of shorter duration we limit the following comparisons to the 1980 and 2009 surveys. Breeding was documented (specimen gonad data, behaviour and active nests) in 51% of the avifauna during the 1980 and 2009 inventories (105 of 207 species). Forty-one percent (54 of 132 species) of the avifauna was documented breeding in 1980 and 46% (77 of 168 species) in 2009; the above totals exclude diurnal raptor species recorded only once and migrants (Appendix). Naturally, these figures should be considered very conservative given that no specimens were taken for many species (Appendix) and sample sizes for most collected species were very small.

Excluding species for which there were only 1–2 records / species / survey (note that this was especially prevalent in groups that are notoriously difficult to detect, e.g., diurnal raptors and hummingbirds; Appendix) and migrants, changes in avian species composition and relative abundance can probably be explained by vegetation modification and differences in effort. We presume in the intervening period between the 1980 and the later surveys that further deforestation and the accompanying increase in aridity enabled at least 26 species (Appendix; 46% of the unique records recorded in 2009 and not in 1980) to move upslope and become more abundant. It is probable that at least some of these were already present along the road and lower slopes east of Abra Maruncunca in 1980, but effort in that year was concentrated in primary forest near to and north of the pass (Fig. 1). Moreover, those species inhabiting secondary habitats (e.g., Rufous-capped Antshrike *Thamnophilus ruficapillus*, White-winged Black Tyrant *Knipolegus aterrimus*) that were detected in low frequency in 1980 may have been under-estimated as well.

TABLE 1
Area in square kilometres and percentage (between parentheses) of the land cover classes in each of the four years analysed.

	1987	1991	1999	2009
Bare soil	0.01 (0.02)	0.12 (0.19)	0.04 (0.06)	0.14 (0.22)
Scrub and pasture	15.84 (24.96)	23.81 (37.52)	20.71 (32.62)	25.29 (39.84)
Closed forest	47.62 (75.02)	39.53 (62.29)	42.73 (67.73)	38.04 (59.94)

As a result of forest degradation and camp location the 2009 effort was almost entirely in secondary (varying from young to tall, selectively logged) forest and roadside scrub (Fig. 1). It is probable that several species would have been detected in 2009 had the intact primary forest at the base of the steep escarpment been surveyed, as all were detected in 2007, e.g., Ochre-breasted Antpitta *Grallaricula flavirostris*, Hazel-fronted Pygmy Tyrant *Pseudotriccus simplex*, Tufted Flycatcher *Mitrephanes olivaceus*, Scimitar-winged Piha *Lipaugus uropygialis*, Barred Becard *Pachyramphus versicolor*, Chestnut-capped Brush Finch *Arremon brunneinucha* and Spectacled Redstart *Myioborus melanocephalus*. Furthermore, during the 2009 effort, mist-nets were not placed along forest streams, which may, in part, explain why species such as Sharp-tailed Streamcreeper *Lochmias nematura*, Slaty-backed Chat-Tyrant *Ochthoeca cinnamomeiventris* and White-capped Dipper *Cinclus leucocephalus* went unrecorded, despite being found in 2007. Although the 1980 and 2009 surveys occurred at the same season, the primary breeding season for many species (see above), we underscore that there was a major difference in effort among all three inventories (30 days in 1980, nine in 2007, 15 in 2009) that probably accounts for some presence / absence and relative abundance designation differences.

Despite differences in effort there clearly have been changes in the relative abundance for some species. As mentioned above, several species that inhabit young second growth undoubtedly increased in abundance. Less obvious changes concern those species that inhabit forest, ranging from selectively logged to primary. For example, in 1980, Blue-banded Toucanet *Aulacorhynchus coeruleicinctis* was considered to be fairly common and Chestnut-tipped Toucanet *A. derbianus* went unrecorded. Almost the exact opposite in relative abundance was recorded in 2009. Although both occur in montane forest, it is unclear if *derbianus* adapts better to secondary forest than *coeruleicinctis*. Again, not having surveyed primary forest in 2009 probably resulted in *coeruleicinctus* being under-recorded as it was the only toucanet found above 1,200 m in 2007; *derbianus* was only recorded below that elevation in 2007. Andean Solitaire *Myadestes ralloides* was uncommon at the pass in 1980, but just one was recorded in 2009; this may reflect forest degradation and / or tracking fruiting plants. If fruiting plants explained the presence / absence of *Myadestes*, we would have expected this to be reflected also by White-eared Solitaire *Entomodestes leucotis*, but the latter was fairly common and persistently vocalising daily during the 2009 survey. Intriguingly, both Pale-eyed Thrush *Turdus leucops* and Glossy-black Thrush *T. serranus* were not detected in 2007 or 2009, but were considered fairly common and rare, respectively, in 1980.

Hunting pressure may have declined between 1980 and 2009. In 2009, several Andean Guans *Penelope montagnii* were heard displaying at dawn from our campsite and flocks, comprising up to eight individuals, were observed foraging daily in scrubby vegetation along the road. Just north of the pass in less disturbed forest a minimum of 8–9 Hooded Tinamous *Nothocercus nigrocapillus* and, from our campsite up to the pass, at least six Brown Tinamous *Crypturellus obsoletus* were heard singing daily in 2009. Speckled Chachalaca *Ortalis guttata* was probably more common in 2009 as a result of the humid, tall forest being replaced by drier, secondary woodland. The apparent scarcity of Rufous-breasted Wood Quail *Odontophorus speciosus* in 2009 may simply be related to birds not vocalising during that survey, as appropriate habitat was present just below our campsite and at the pass; both areas were surveyed daily at dawn and dusk when wood quail pairs often duet and can be heard from up to 1 km distant.

In sum, although there appear to have been dramatic changes in the relative abundance for a number of species, the overall composition in 1980 still appeared to be present in 2009. We suspect that the relatively intact forest at the base and along the steep slopes of the massif that is still connected to the area that we worked continues to be a source for those

species that have been negatively affected by forest degradation (Fig. 2). That area is likely key for the continued existence of forest-dependent species.

Several distributional replacements and contact zones occur along the eastern Andes in dpto. Puno and extreme eastern Cusco, where no prominent geographic barriers appear to be involved. For example, the ranges of the following taxa meet somewhere in this region: Grey-browed Brush Finch *Arremon assimilis poliophrys* and White-browed Brush Finch *A. t. torquatus*, Speckled Hummingbird *Adelomyia melanogenys inornata* and *A. m. chlorospila*, Three-banded Warbler *Basileuterus t. tristriatus* and *B. t. punctipectus*, Streak-headed Antbird *Drymophila striaticeps peruviana* and *D. s. boliviana*, and Yellow-rumped Antwren *Euchrepomis sharpei* and Rufous-rumped Antwren *E. callinota*. These examples underscore the large gap in sampling between Cusco (Manu Road) and southern Puno, where range limits between these taxa pairs are poorly known (Cadena & Cuervo 2010, Chaves & Smith 2011, Gutiérrez-Pinto *et al*. 2012, Isler *et al*. 2012). Thus, even with the extensive surveys in the Maruncunca area much more sampling is needed in this region.

Several species recorded at Abra Maruncunca are still unknown from Bolivia (Hennessey *et al*. 2003b), and given the close proximity of our study site to the border, these should be looked for in dpto. La Paz: Rusty-winged Barbtail *Premornis guttuligera*, Ashy-headed Tyrannulet *Phyllomyias cinereiceps*, Variegated Bristle Tyrant *Phylloscartes poecilotis*, Jet Manakin *Xenopipo unicolor*, Blackburnian Warbler *Setophaga fusca* (sight records only for Bolivia), Yellow-throated Tanager *Iridisornis analis* and *Arremon brunneinucha*.

Species accounts

ROADSIDE HAWK *Rupornis magnirostris*

An adult male taken at Maruncunca (KUBI 11560) on 3 November 2009 appears to be intermediate between *R. m. saturatus* and *R. m. occiduus*, as are two immatures at the Academy of Natural Sciences, Philadephia (ANSP 104011 from La Oroya, Inambari, Puno, 8 June 1931; ANSP 104009 from Santo Domingo, Inca Mine, Puno, 30 June 1931). This widespread hawk is represented in south-west Amazonia and the nearby foothills of the Andes by perhaps three taxa (*R. m. occiduus*, *R. m. saturatus* and nominate *magnirostris*). Recent authors (e.g., Mayr & Cottrell 1979, Thiollay 1994) generally assign all Amazonian birds in Peru and northern Bolivia to *R. m. occiduus* (type locality 'Río Tambopata'), characterised as like nominate *magnirostris*, but having the 'chest bright cinnamon-rufous'; Bangs 1911). Birds in the Bolivian Yungas and adjacent humid lowlands east into the drier lowlands of dptos. Beni and Santa Cruz are considered *R. m. saturatus* (type locality 'Apolo and Tilotilo [dpto. La Paz], Bolivia'), a very distinctive form with dark chocolate-brown upperparts and throat (creating a 'hooded' effect), orange-rufous chest and distinctly rufous bars in the tail. Additional observations of this species from the foothills and lowlands of the Manu region, dpto. Cusco, suggest that *R. m. saturatus* is a seasonal visitor to the area, present May–August, whereas *R. m. occiduus* is the resident form (DFL pers. obs.). Paler grey birds lacking rufous on the breast, presumably best treated as *R. m. magnirostris*, occur at least as far south as northern Junín. Each of these forms appears to grade into one another where they meet, and birds with a mix of *occiduus* and *saturatus* characters (e.g., rufous and grey tail-bands, dark hoods with some grey on the breast) occur as far north as dpto. Cusco (DFL pers. obs.).

PLUMBEOUS PIGEON *Patagioenas plumbea*

Although there is only one named subspecies in south-west Amazonia and adjacent Andean slopes, *P. p. pallescens*, field workers have recognised a distinctive song type

among birds in the Bolivian Yungas (Mayer 1996). We encountered birds with this song type at Maruncunca, the only area in Peru where it has been documented (XC45804, 103879, ML148235). Specimens from Maruncunca and Bolivia do not appear to possess any morphological characters that distinguish them from lowland birds of the 'Amazonian' song type, but tend to be heavier by *c*.50 g. Furthermore, there seem to be birds that sing intermediate songs both at Maruncunca and further north on the Manu Road in dpto. Cusco (DFL pers. obs.; XC92491). A more detailed investigation involving voice, morphology and genetics is necessary to understand the significance of the different song types.

PARAKEET SP. *Pyrrhura sp*.

Pyrrhura parakeets were heard more than seen as small-sized groups (<10 individuals) passed through the forest interior. Although local population size was difficult to assess because of flock mobility, we probably encountered at least three or four groups between 1,800 m and the ridge crest in 2009. The expected species of *Pyrrhura* in this region is Black-capped Parakeet *P. rupicola*, which is widespread in lowland south-east Peru (Schulenberg *et al*. 2010). The type locality of one subspecies, *P. r. sandiae*, is only *c*.30 km west of Maruncunca. Nonetheless, we are unable to identify with certainty the taxon that occurs there. Singles were collected on the 1980 and 2009 expeditions. A female in relatively fresh plumage that was mist-netted and photographed on 5 November 2009 (Fig. 4; CORBIDI uncatalogued) has extensive whitish fringes to the throat and breast feathers, extensive red on the dorsal surface of the rectrices, reddish-brown abdominal feathers and bluish primaries. Three characters that have been used to distinguish *P. rupicola* from other *Pyrrhura* are the solid green uppertail, the lack of a red abdomen and mostly green primaries (Forshaw 1989). As a point of comparison, the plumage characters of the 2009 Maruncunca specimen approach those of Maroon-tailed Parakeet *P. melanura berlepschi*, which is unknown south of dpto. San Martín, Peru (Schulenberg *et al*. 2010). The 2009 Maruncunca specimen has green lores that extend into the forecrown and above the bare orbital skin, which is more *P. rupicola*-like, as this region is typically brown in *P. m. berlepschi*. The other Maruncunca specimen (LSUMZ 98088), although heavily worn and perhaps in transition from immature to adult plumage, also has limited red in the rectrices (the outermost pair are new and dusky, not red; S. Cardiff pers. comm.), the crown is pale brown rather than blackish brown, has extensive red on the belly, and the breast is hardly scaled; rather, it is pale cream with only a hint of darker feather bases. Primaries 1–6 (pp 1–5 are very worn, p6 is new, p3 on right side is completely orange) are green, whereas pp7–10 are bluish. It has been proposed that this specimen is a hybrid between *rupicola* and Green-cheeked Parakeet *P. molinae* (Juniper & Parr 1997). *P. molinae*, which is known from adjacent Bolivia, has extensive pale fringes to the breast feathers, a reddish tail, red abdominal patch and blue outer primaries, thus some of the plumage characters of the 2009 Maruncunca specimen appear to be shared with *molinae* (Fig. 4). However, both Maruncunca specimens have solid red in the wing bend (although this is mixed with some green on the primary-coverts in the left wing of the LSU specimen), which *molinae* lacks. The primary-coverts and primaries are green in *rupicola*. Thus, it appears that these specimens share plumage attributes of both *rupicola* and *molinae*. Nominate *P. rupicola* is restricted to central Peru, at *c*.1,000–2,000 m, in Pasco and Junín (Forshaw 1989, Schulenberg *et al*. 2010). Bond & Meyer de Schauensee (1944) described *P. r. sandiae* based on two adult females from *c*.30 km west of Maruncunca. They distinguished *sandiae* from nominate *rupicola* by the former having a much narrower whitish fringe to the throat and neck. Black-capped Parakeets in the lowlands of south-east Peru, western Brazil and northern Bolivia also have been assigned to *sandiae* (Forshaw 1989, Collar 1997). Lowland populations typically exhibit much stronger scaling on the breast, usually with

Figure 4. *Pyrrhura* sp., showing mixture of characters of Black-capped *rupicola* (red in bend of wing, green ear-coverts) and Green-cheeked Parakeets *molinae* (red upper rectrices, outer blue primaries and reddish-brown abdomen) (Mark B. Robbins). See text for discussion of this adult female (CORBIDI uncatalogued) and other specimens from south-eastern Peru.

the dark feather bases appearing triangular (not as rounded as in the nominate or the type series of *sandiae*). Thus, the use of *sandiae* for lowland birds may be a misallocation, in which case the lowland birds may represent an undescribed taxon. Moreover, *sandiae* may not be diagnosable from nominate *rupicola* as Bond & Meyer de Schauensee admitted later that *sandiae* was probably not distinct (see comments under *sandiae* in Forshaw 1989) or represents a population intermediate between *rupicola* and *molinae*. More field work and genetic data are required to clarify this puzzlingly diverse *Pyrrhura* complex.

CLOUD-FOREST SCREECH OWL *Megascops marshalli*

Although not recorded in 1980, a single individual thought to be of this species was recorded, but not seen, by DFL on 14 June 2007 (XC92487). At least four were heard in stunted forest along the crest at the Maruncunca pass during the 2009 expedition (ML148255, 148287). A male, which was with a presumed female, was sound-recorded and collected on 2 November (CORBIDI uncatalogued; ML148287). The other vocalising birds did not respond to playback and called infrequently; this coupled with the relatively small testes, 5 × 3 mm, of the male, leads us to believe that November was not the breeding season. This may also explain why the species was unrecorded in November–December 1980. In the Cordillera Vilcabamba, Weske & Terborgh (1981) believed breeding occurred from late June to mid August, and a male collected on 31 August 2001 in the Cordillera Cocapata, dpto. Cochabamba, Bolivia (Herzog *et al*. 2009) had testes very similar in size to the Maruncunca male. The species is not unexpected given that it is now known from Bolivia (Herzog *et al*. 2009), but our records extend the range south in Peru from the type locality in the Cordillera Vilcabamba, dpto. Cusco (Weske & Terborgh 1981, Herzog *et al*. 2009, Schulenberg *et al*. 2010). The Maruncunca specimen is very similar to the colour rendition and description of the holotype and paratypes (Weske & Terborgh 1981). Additional data for the CORBIDI specimen: mass: 105 g; light fat.

SUBTROPICAL PYGMY OWL *Glaucidium parkeri*

Only discovered upon reviewing field sound-recordings, DFL documented this species in the distant background of a recording made on 14 June 2007 at *c*.2,050 m on the flanks of the large mountain (Fig. 2) just north of the road at Maruncunca (XC92486). This is the southernmost record in Peru, the highest elevation known for the species, and bridges the gap, of *c*.500 km, between records from the Pantiacolla Ridge in dpto. Madre de Dios, Peru

(Walker *et al*. 2006) and Serranía Eslabón and Serranía Bellavista, dpto. La Paz, Bolivia (Hennessey *et al*. 2003a).

BUFF-FRONTED OWL *Aegolius harrisii*
A female in non-breeding condition that was mist-netted in stunted forest along the ridge at Maruncuna Pass on 3 November 2009 (CORBIDI uncatalogued) represents the first record for dpto. Puno (Schulenberg *et al*. 2010). Like *Megascops marshalli*, this species is probably more numerous and widespread than the few Peruvian records indicate.

OCELLATED POORWILL *Nyctiphrynus ocellatus*
Several were regularly heard in the valley just below our 1,925 m camp and on slopes immediately west of Abra Maruncunca during the 2009 survey. This further extends the upper known elevation for the species, which was recently found at 1,700 m in dpto. Cusco (Robbins *et al*. 2011). It appears that this nightjar occurs at much higher elevations in southern Peru than in the north of its range, where the species is primarily known from below 900 m (Hilty & Brown 1986, Robbins & Ridgely 1992, Ridgely & Greenfield 2001).

WHITE-BELLIED HUMMINGBIRD *Amazilia chionogaster*
At Maruncunca, only the southern subspecies of *chionogaster*, *A. c. hypoleuca*, was documented. This taxon was first documented in Peru by three male specimens taken at Oconeque, Puno, in late May 1931 (Zimmer 1950; ANSP 103666–68). Two males (with slightly enlarged testes) were collected on 1–2 November 1980, along the río Huari Huari, north-east of Sandia (LSUMZ 98124–25). In 2007, the species was common in drier open habitats along the río Huari Huari, west of Maruncunca, with some along the north side of Abra Maruncunca in bracken scrub and drier second growth. No specimens were taken, but recordings were made (XC92478–80, 92482). A non-breeding male mist-netted in taller secondary forest on 2 November 2009 was identified as *hypoleuca* (CORBIDI uncatalogued). Below our 2009 camp, in younger, drier roadside scrub, several males were observed and sound-recorded singing from exposed, leafless branches *c*.5–8 m above ground. None of these was collected, thus definitive characterisation of tail pattern was not made. However, sound-recordings of a displaying male's song (ML148234), a series of loud, single notes, are very similar to those of *A. c. hypoleuca* recorded in Bolivia (online recordings at ML and XC).

The status, distribution and potential interactions between *A. chionogaster* and Green-and-white Hummingbird *A. viridicauda* in south-east Peru are complicated and require

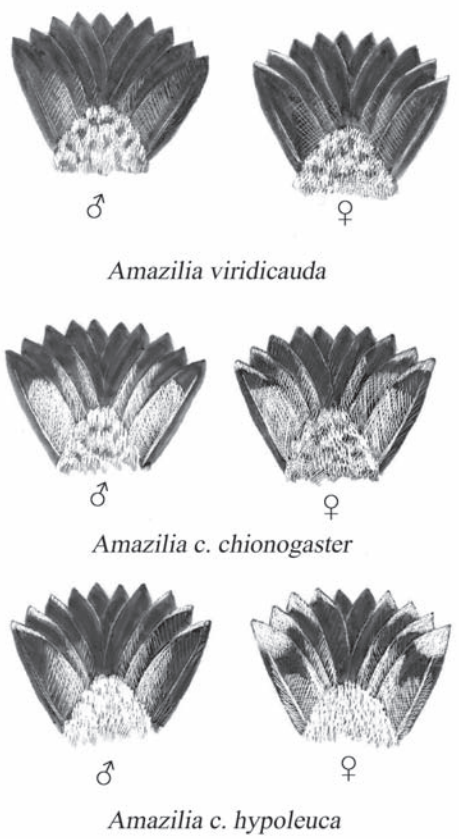

Figure 5. Undertail patterns of Green-and-white Hummingbird *Amazilia viridicauda* and White-bellied Hummingbird *A. chionogaster chionogaster* and *A. c. hypoleuca* (Daniel F. Lane)

clarification. The range of *A. viridicauda* overlaps completely with that of *chionogaster*, although usually *viridicauda* occurs at sites with more extensive humid forest cover, and *chionogaster* is prevalent in more arid or deforested sites. Although very poorly understood, seasonal movements appear to occur in the relatively well-known Urubamba Valley, dpto. Cusco, where nominate *chionogaster* usually occurs at higher, drier localities (such as Ollantaytambo), whereas *viridicauda* is more characteristic of more humid sites (e.g., Aguas Calientes). Each species can be found at the other site, however, probably as a result of tracking food resources (DFL pers. obs.).

Distinguishing the two species is an infamous problem, both in the field and in the museum. Body plumage is effectively the same among the three taxa that comprise the complex (*A. c. chionogaster*, *A. c. hypoleuca* and *A. viridicauda*), with the main morphological characters separating the three being undertail pattern and bill length (*viridicauda* averaging *c*.1–2 mm shorter than nominate *chionogaster*, and *c*.1 mm shorter than *hypoleuca*, sex for sex). Fig. 5 compares the undertail patterns of males and females of the three taxa (based on 'average-looking' specimens at LSUMZ). Notice that females have more white on the undertail, particularly at the tips of the outer three rectrices. Some male *A. c. hypoleuca* can appear nearly as dark-tailed as *A. viridicauda*, which may be a cause for confusion between the two forms.

The vocal repertoires of these three taxa are poorly understood. Nominate *chionogaster* is found from the Utcubamba Valley (dpto. Amazonas) south to the Urubamba Valley (and possibly further, as there are records from the Manu Road; Walker *et al*. 2006). This taxon exhibits local dialects in its songs and calls over this range, but they are still recognisably similar in structure among all populations. Furthermore, these vocalisations are remarkably similar to those of *A. viridicauda*, with which *A. c. chionogaster* is locally syntopic (and nearly identical morphologically!). We wonder how *A. c. chionogaster* and *A. viridicauda* maintain species status given their near-identical plumage and voice in syntopy. By contrast, *A. c. hypoleuca*, distributed from central Puno east to Bolivia and northern Argentina (Fjeldså & Krabbe 1990), has an entirely different song and call repertoire compared to both *A. c. chionogaster* and *A. viridicauda*, which, despite some dialect-forming, is still remarkably constrained within the taxon. Based on voice and the minor plumage differences described above, *A. c. hypoleuca* appears sufficiently distinct to suggest that it might be best considered a separate species from nominate *chionogaster*. Clearly, these taxa require detailed studies to make sense of these issues.

OCHRE-CHEEKED SPINETAIL *Synallaxis scutata*

First discovered in Peru by G. Engblom (post to Birding Peru listserv 2 June 2005) near San Juan de Oro, the 2007 survey found the species to be uncommon in brushy second growth from around San Juan de Oro, at *c*.1,500 m, and below, collecting six specimens (LSUMZ 179654–55, 179656, CORBIDI AV-003269-71), with sound-recordings (e.g., XC103877). These are the first specimens for the country and based on plumage appear to represent a new taxon, which will be described elsewhere.

OLIVACEOUS WOODCREEPER *Sittasomus griseicapillus*

One male collected on 10 November 1980 (LSUMZ 98216) is identified as *S. g. viridis* and represents the first record of this taxon from Peru. Sound-recordings from Maruncunca (*c*.2,100 m) and foothill areas at lower elevations nearby (ML, XC) agree with this taxonomic identification, as *viridis* is easily distinguished by voice from *amazonus*, which is widespread throughout the rest of eastern Peru (Marantz *et al*. 2003). Based on available sound-recordings the two forms seem to replace each other between the foothills of dpto. Puno and the lowlands of dpto. Madre de Díos (compare ML24111 and XC92484).

YELLOW-RUMPED ANTWREN *Euchrepomis sharpei*
A single of this low-density and poorly known antwren was sound-recorded (XC92527) on 14 June 2007 by DFL. The bird was part of a mixed-species foraging flock moving through the canopy and midstorey of tall montane forest on the flank of the large mountain north of Maruncunca. This is only the third site for the species in Peru (Inca Mine, Puno, Zimmer 1932; Manu Road, Cusco, Walker *et al*. 2006).

ANTWREN SP. *Herpsilochmus* sp.
F. Schmitt first discovered this taxon in September 2004 in the Huari Huari Valley on the north side of the Maruncunca massif, near the town of Masiapo (14°06.000'S, 69°12.960'W; 1,267 m). At least three territories were found by the LSU team on 9 June 2007 below Putina Punco, *c*.25 km north-east of San Juan de Oro (14°06.000'S, 69°00.960'W; 1,175–1,200 m), where two were collected and sound-recorded (XC105018); the male showed no sign of breeding condition, the female with only slightly enlarged ova (LSUMZ 179661, CORBIDI uncatalogued). These birds were primarily found in drier, but not deciduous, ridgetop woodland (canopy 15–25 m). In 2009, at least three pairs were heard singing sporadically (ML148252, 148254) in secondary forest from 1,850 m and the slopes below. Neither the male nor female that were taken from different pairs in 2009 was in breeding condition (male, CORBIDI AV-2010-995; female, KUBI 115587). These specimens apparently represent an undescribed taxon in the Black-capped Antwren *H. atricapillus* group; in plumage and natural history it most closely resembles Ash-throated Antwren *H. parkeri* of northern Peru. It will be formally described elsewhere.

BUFF-BANDED TYRANNULET *Mecocerculus hellmayri*
Since one collected by M. A. Carriker at La Pampa, dpto. Puno, on 2 July 1931 (ANSP 103002), there were no additional Peruvian records until DFL collected one (with sound-recordings; XC85953–54) on the slopes of the mountain north of Abra Maruncunca on 15 June 2007. This bird was encountered *c*.7–15 m up in humid forest interior with moderate *Chusquea* bamboo understorey at an elevation of *c*.2,150 m. Subsequently, DFL found singing birds considerably further north on the Manu Road in dpto. Cusco (13°07.980'S, 71°34.998'W; *c*.2,165 m), on 28 July 2011, where he documented one with sound-recordings (XC85952) and photographs. In Bolivia, the species is fairly common in the humid Yungas, where it occurs at 500–3,100 m (Hennessey *et al*. 2003b). Schulenberg *et al*. (2010) suggested that the species may be an austral migrant to Peru, and there is anecdotal evidence that it is present only seasonally in Argentina (M. Pearman post to Birding Peru listserv 11 February 2002). Whether the species is only present in Peru during the austral winter or resident year-around will require more field work at other seasons.

YUNGAS TODY-TYRANT *Hemitriccus spodiops*
Fairly common in second growth, especially in stands of bamboo, from our 2009 camp at 1,925 m (extending the upper elevational range) down to as far as we worked, 1,800 m. Birds sporadically called from 2–6 m above ground (ML148144, 148236, 148310) and did not appear to be breeding. This tody-tyrant may have become more common and widespread between 1980 and 2009 as a result of the continued conversion of tall and wet forest to short-stature, secondary forest. The species is known in Peru only from the upper Inambari Valley, and was included in Schulenberg *et al*. (2010) on the basis of unpublished sightings (first by B. Walker in 1999) and specimens from this region taken in 2002 by T. Valqui.

FUSCOUS FLYCATCHER *Cnemotriccus fuscatus*
This species was documented above San Juan de Oro on 14 June 2007 by AMC (CORBIDI uncatalogued), and another was seen on 9 June 2007 below Putina Punco, *c*.25 km north-east of San Juan de Oro (14°06.000'S, 69°00.960'W; 1,175–1,200 m). The form found here is vocally distinctive and is believed to represent an undescribed taxon, perhaps best considered a species (S. Cardiff & D. Dittmann pers. comm.; Mayer 1996). This foothill taxon was initially recognised in dpto. La Paz, Bolivia, by an LSUMZ field team in 1993. S. K. Herzog *et al*. will present elsewhere their investigation into the classification of this taxon and species limits in *Cnemotriccus*.

SCIMITAR-WINGED PIHA *Lipaugus uropygialis*
The first Peruvian records of this range-restricted cloud-forest cotinga were obtained when adult females were collected at Abra Maruncunca on 15 and 25 November 1980 (LSUMZ 98424–25), a male was collected on 7 January 2001 by T. Valqui (MUSM 24135) and an adult male taken on 15 June 2007 (CORBIDI uncatalogued). Despite playback of primary vocalisations, the species was not recorded in 2009. The only other Peruvian locality known is >500 km to the north in the Zona Reservada Megantoni, dpto. Cusco, where it was discovered in May 2004 (D. Lane & T. Pequeño *in* Vriesendorp *et al*. 2004). Although this piha is now known as far north as dpto. Cusco, it certainly still deserves Vulnerable designation due to ongoing deforestation within its range (Bryce *et al*. 2005, BirdLife International 2012).

MOUSTACHED WREN *Pheugopedius genibarbis*
Of note was the presence of this usually lowland species in the subtropical Yungas of Maruncunca (up to 2,050 m). It is found at similar elevations in dpto. La Paz, Bolivia (DFL pers. obs.), particularly where there is *Chusquea* bamboo. Probably, in the absence of a member of the *P. euophrys* superspecies (including Whiskered *P. mystacalis* and Inca Wrens *P. eisenmanni*), *P. genibarbis* extends its elevational range in Puno and Bolivia. Specimens are deposited at all three institutions, and sound-recordings at ML, XC.

WHITE-NECKED THRUSH *Turdus albicollis*
Three specimens collected *c*.25 km north-east of San Juan de Oro (14°06.000'S, 69°00.960'W; 900 m) on 7 June 2007 (CORBIDI, uncataloged) and above San Juan de Oro (14°13.860'S, 69°11.640'W; 1,925 m) on 25 and 29 October 2009 (KUBI 115457, CORBIDI, uncatalogued) are the first documentation for Peru of *T. a. contemptus*, a taxon found in the foothills of Bolivia and south into Argentina, which differs from the more widespread *T. a. spodiolaemus* of south-west Amazonia by having some olive or yellow on the mandible and cutting edge of the maxilla, and warm brown flanks. The voices of the two forms are strikingly different as well (Mayer 1996). *T. a. contemptus* appears to be at least partially migratory, with birds moving through the foothills at the 'bend of the Andes' near Bermejo, dpto. Santa Cruz, Bolivia, in mid or late September (DFL pers. obs.). This might suggest that some birds in Puno and / or the Bolivian Yungas are wintering, but the October specimens were males with enlarged testes and seminal vesicles indicating local breeding. Further year-round research is necessary to confirm the resident status of *T. a. contemptus* in Peru.

GREEN-CAPPED TANAGER *Tangara meyerdeschauenseei*
Schulenberg & Binford (1985) described this species based on four adult specimens taken in November 1980 from the outskirts of Sandia, in the dry valley of the río Inambari. During the 1980 inventory, the same authors noted that it was fairly common at the edge

of cleared areas west of Abra Maruncunca. In 2009, 2–3 pairs / day were recorded in young second growth from our camp down to the lower limit of our surveys at 1,800 m. Like other *Tangara* species, *meyerdeschauenseei* was breeding during the October–November 2009 survey (males, enlarged testes and seminal vesicles; females, collapsed follicles and enlarged and convoluted oviducts that indicated recent laying). In contrast, five adults collected near Sandia in June 2007 had reduced (inactive) gonads. A juvenile female (skull unossified, bursa 6 × 4 mm; LSUMZ 179687), was collected on 2 June 2007 below Huancaluque (14°14.400'S, 69°24.840'W; *c*.1,685 m). We provide a brief description of this specimen for the first time (Hilty 2011). It resembles the adult female in size and coloration but is decidedly duller overall, especially over the upperparts. Outer webs of primaries and rectrices buff to drab green, instead of the dark blue-green of the adult. Crown and forehead duller and less contrasting with back. Lores and eye-ring much paler, tinged dull green, producing a less conspicuous mask in the juvenile. Wing-coverts had dark buff and dull green feathers. Listed as Vulnerable (Birdlife International 2012) because of its very small range, but the species probably has increased considerably in this region as a result of the conversion of tall, wet forest to lower stature, drier scrub. We presume that, prior to large-scale deforestation in the region, the species formerly had a much more limited distribution, perhaps being restricted to the narrow dry upper río Inambari Valley.

BLUE-BROWED TANAGER *Tangara cyanotis*
An adult male (KUBI 115639) taken on 4 November 2009 at 2,100 m is the first documentation of the southern, nominate subspecies for Peru.

WHITE-BROWED BRUSH FINCH *Arremon torquatus*
With the recent revision of the *A. torquatus* complex, in which eight species are now recognised (Cadena & Cuervo 2010), *A. torquatus* (*sensu stricto*) is restricted to extreme southern Peru south to Argentina. At Abra Maruncunca it was found during the 1980 and 2009 inventories. These records represent the first and the northernmost records for this species in Peru. Just prior to the 2009 Abra Maruncunca survey, the KUBI / CORBIDI team also encountered this species at *c*.2,900 m just below Siná (14°29.400'S, 69°16.800'W), *c*.30 km south-west of Abra Maruncunca. The boundary between the ranges of *A. t. torquatus* and the adjacent Grey-browed Brush Finch *A. assimilis poliophrys* is not known due to a lack of sampling from intervening areas and the absence of a clear geographic barrier that may separate the two. Records north and west of Abra Maruncunca in Limbani, Carabaya, dpto. Puno, and from dpto. Cusco correspond to *A. a. poliophrys* (Cadena & Cuervo 2010).

YELLOW-BELLIED SISKIN *Sporagra xanthogastra*
Four specimens (LSUMZ 98913–16) collected during the 1980 expedition represent the first records for Peru. All were fat and in non-breeding condition, which coupled with the species not being recorded during the 2007 and 2009 surveys and being known to make altitudinal and erratic movements in Bolivia (S. K. Herzog pers. comm.) may indicate that this siskin is only seasonally present in the Maruncunca region.

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Addresses: Mark B. Robbins, University of Kansas Biodiversity Institute, 1325 Jayhawk Boulevard, Lawrence, KS 66045, USA, e-mail: mrobbins@ku.edu. Thomas S. Schulenberg, Cornell Lab of Ornithology, 159 Sapsucker Woods Road, Ithaca, NY 14850, USA, e-mail: tss62@cornell.edu. Daniel F. Lane, Louisiana State University Museum of Natural Science, 119 Foster Hall, Baton Rouge, LA 70803-3216, USA, e-mail: barbetboy@yahoo.com. Andrés M. Cuervo, Louisiana State University Museum of Natural Science & Dept. of Biological Sciences, Louisiana State University, Baton Rouge, LA 70803-3216, USA, e-mail: acuerv1@tigers.lsu.edu. Laurence C. Binford†. Árpád S. Nyári, Oklahoma State University, Dept. of Zoology, 501 Life Sciences West, Stillwater, OK 74078, USA, e-mail: arpinyari@gmail.com. Mariela Combe, Centro de Ornitología y Biodiversidad (CORBIDI), Calle Sta Rita 105 de 202, Urb. Huertos de San Antonio, Lima 33, Peru, e-mail: marielacombe@corbidi.org. Enrique Arbeláez-Cortés, Museo de Zoología, Dpto. de Biología Evolutiva, Facultad de Ciencias and Posgrado en Ciencias Biológicas, Universidad Nacional Autónoma de México, Ciudad Universitaria 04510, México D.F., Mexico, e-mail: enriquearbelaez@gmail.com. Walter Wehtje, 106 N. Glenwood, Columbia, MO 65203, USA, e-mail: wehtje@gmail.com. Andrés Lira-Noriega, University of Kansas Biodiversity Institute & Dept. of Ecology and Evolutionary Biology, 1325 Jayhawk Boulevard, Lawrence, KS 66045, USA, e-mail: alira@ku.edu

Appendix: List of species recorded at Abra Maruncunca, dpto. Puno, Peru.

Relative abundance criteria for 1980 and 2009 surveys (no relative abundance designations were assigned for the 2007 survey; however, an 'x' in this column denotes that the species was recorded during the period). C = common; >20 individuals / day; F = fairly common; 5–20 individuals / day; U = uncommon; present in small numbers (<5 individuals / day); R = rare; only occasionally encountered in small numbers; X= single record. Documentation: s = specimen; v = sound-recording; 0 = sight observation only.

English name	Scientific name	1980	Breeding evidence for 1980	2007	2009	Breeding evidence for 2009	Documentation
TINAMIDAE							
Hooded Tinamou	*Nothocercus nigrocapillus*	R	b	x	F	b	s
Brown Tinamou	*Crypturellus obsoletus*	U		x	F	b	v
CRACIDAE							
Andean Guan	*Penelope montagnii*	R		x	F	b	s
Speckled Chachalaca	*Ortalis guttata*	R	b	x	C		s
ODONTOPHORIDAE							
Rufous-breasted Wood Quail	*Odontophorus speciosus*	U	b	x	X		s
CATHARTIDAE							
Turkey Vulture	*Cathartes aura*	R		x	U		o
Black Vulture	*Coragyps atratus*			x			o
ACCIPITRIDAE							
Swallow-tailed Kite	*Elanoides forficatus*	R					o
Black-and-white Hawk-Eagle	*Spizaetus melanoleucus*				X		o
Black-and-chestnut Eagle	*Spizaetus isidori*	X					o
Plumbeous Kite	*Ictinia plumbea*	X					o
Sharp-shinned Hawk	*Accipiter striatus*	R					o
Solitary Eagle	*Buteogallus solitarius*	X					o
Roadside Hawk	*Rupornis magnirostris*	R		x	U		s
White-rumped Hawk	*Parabuteo leucorrhous*	X					o
White-tailed / Variable Hawk	*Geranoaetus albicaudatus / polyosoma*				X		o
COLUMBIDAE							
Band-tailed Pigeon	*Patagioenas fasciata*	R		x	R		s
Pale-vented Pigeon	*Patagioenas cayennensis*				C		v
Plumbeous Pigeon	*Patagioenas plumbea*	U		x	F	b	s
White-tipped Dove	*Leptotila verreauxi*			x	C		s
White-throated Quail-Dove	*Geotrygon frenata*	U	b		U	b	s
CUCULIDAE							
Squirrel Cuckoo	*Piaya cayana*	U		x	U	b	v
Black-billed Cuckoo	*Coccyzus erythropthalmus*	X					s
TYTONIDAE							
Barn Owl	*Tyto alba*				X		o
STRIGIDAE							
Rufescent Screech Owl	*Megascops ingens*	U		x	R		s
Cloud-forest Screech Owl	*Megascops marshalli*			x	U		s
Band-bellied Owl	*Pulsatrix melanota*				R		o
Rufous-banded Owl	*Ciccaba albitarsis*	R		x	R		s
Subtropical Pygmy Owl	*Glaucidium parkeri*			x			v
pygmy owl sp.	*Glaucidium* sp.				X		o
Buff-fronted Owl	*Aegolius harrisii*				X		s
STEATORNITHIDAE							
Oilbird	*Steatornis caripennis*	X					o
NYCTIBIIDAE							
Common Potoo	*Nyctibius griseus*				F		s
CAPRIMULGIDAE							
Rufous-bellied Nighthawk	*Lurocalis rufiventris*	U					o
Band-winged Nightjar	*Systellura longirostris*			x			s
Swallow-tailed Nightjar	*Uropsalis segmentata*			x			v
Scissor-tailed Nightjar	*Hydropsalis torquata*				U	b	s
Ocellated Poorwill	*Nyctiphrynus ocellatus*				F		v
APODIDAE							
White-chinned Swift	*Cypseloides cryptus*	X					s
Chestnut-collared Swift	*Streptoprocne rutila*	U		x	C		s
White-collared Swift	*Streptoprocne zonaris*	U			C		s
White-tipped Swift	*Aeronautes montivagus*	R			X		s

English name	Scientific name	1980	Breeding evidence for 1980	2007	2009	Breeding evidence for 2009	Documentation
TROCHILIDAE							
Buff-tailed Sicklebill	*Eutoxeres condamini*	R					s
Great-billed Hermit	*Phaethornis malaris*			x	R	b	s
Green-fronted Lancebill	*Doryfera ludovicae*	X		x			o
Wedge-billed Hummingbird	*Schistes geoffroyi*	R					s
Green Violetear	*Colibri thalassinus*			x			v
Sparkling Violetear	*Colibri coruscans*			x	U	b	s
Speckled Hummingbird	*Adelomyia melanogenys*	F		x	U		s
Long-tailed Sylph	*Aglaiocercus kingi*	U		x	R		s
Rufous-capped Thornbill	*Chalcostigma ruficeps*				R		s
Tyrian Metaltail	*Metallura tyrianthina*				F		s
Greenish Puffleg	*Haplophaedia aureliae*	F		x	F		s
Bronzy Inca	*Coeligena coeligena*	U		x	U		s
Collared Inca	*Coeligena torquata*	U		x			s
Booted Racket-tail	*Ocreatus underwoodii*			x	R		s
Violet-fronted Brilliant	*Heliodoxa leadbeateri*	R		x	R		s
White-bellied Hummingbird	*Amazilia chionogaster*			x	U	b	v
TROGONIDE							
Golden-headed Quetzal	*Pharomachrus auriceps*	R			X	b	s
Crested Quetzal	*Pharomachrus antisianus*	F	b				s
Masked Trogon	*Trogon personatus*	U	b	x	F		s
CAPITONIDAE							
Versicoloured Barbet	*Eubucco versicolor*	U		x	F		s
RAMPHASTIDAE							
Chestnut-tipped Toucanet	*Aulacorhynchus derbianus*				F	b	s
Blue-banded Toucanet	*Aulacorhynchus coeruleicinctis*	F		x	X		s
PICIDAE							
Bar-breasted Piculet	*Picumnus aurifrons*			x	R		s
Smoky-brown Woodpecker	*Picoides fumigatus*	R		x	R		s
Golden-olive Woodpecker	*Colaptes rubiginosus*	U		x	R		s
FALCONIDAE							
Barred Forest Falcon	*Micrastur ruficollis*	R		x	U		s
Bat Falcon	*Falco rufigularis*				X		o
falcon sp.	large *Falco* sp.	X					o
PSITTACIDAE							
parakeet sp.	*Pyrrhura* sp.	U		x	F		s
Barred Parakeet	*Bolborhynchus lineola*			x			v
Blue-headed Parrot	*Pionus menstruus*	R			U		o
Scaly-naped Parrot	*Amazona mercenaria*	R		x	U		v
THAMNOPHILIDAE							
Rufous-capped Antshrike	*Thamnophilus ruficapillus*	R		x	F		s
Chestnut-backed Antshrike	*Thamnophilus palliatus*				F	b	s
Variable Antshrike	*Thamnophilus caerulescens*	F	b	x	F	b	s
Slaty Antwren	*Myrmotherula schisticolor*			x			o
antwren sp.	*Herpsilochmus* sp.				U		s
Streak-headed Antwren	*Drymophila striaticeps*	R		x	R		s
Yellow-rumped Antwren	*Euchrepomis sharpei*			x			v
White-backed Fire-eye	*Pyriglena leuconota*	R	b	x	F	b	s
CONOPOPHAGIDAE							
Slaty Gnateater	*Conopophaga ardesiaca*	F	b	x	F	b	s
GRALLARIDAE							
White-throated Antpitta	*Grallaria albigula*	F	b	x	F	b	s
Ochre-breasted Antpitta	*Grallaricula flavirostris*	F	b	x			s
Rusty-breasted Antpitta	*Grallaricula ferrugineipectus*			x			o
RHINOCRYPTIDAE							
Trilling Tapaculo	*Scytalopus parvirostris*	R	b	x	R	b	s
Bolivian Tapaculo	*Scytalopus bolivianus*	R		x	F	b	s

English name	Scientific name	1980	Breeding evidence for 1980	2007	2009	Breeding evidence for 2009	Documentation
FORMICARIIDAE							
Short-tailed Antthrush	*Chamaeza campanisona*	R		x	U		v
Barred Antthrush	*Chamaeza mollissima*	U		x	R		s
FURNARIIDAE							
Olivaceous Woodcreeper	*Sittasomus griseicapillus*	R	b	x	F	b	s
Strong-billed Woodcreeper	*Xiphocolaptes promeropirhynchus*	R			X		v
Ocellated Woodcreeper	*Xiphorhynchus ocellatus*				R		s
Olive-backed Woodcreeper	*Xiphorhynchus triangularis*	F		x	X		s
Red-billed Scythebill	*Campylorhamphus trochilirostris*			x	X		v
Montane Woodcreeper	*Lepidocolaptes lacrymiger*	R	b	x	U	b	s
Streaked Xenops	*Xenops rutilans*	R		x	R		s
Rusty-winged Barbtail	*Premnornis guttuliger*	F	b	x	R		s
Sharp-tailed Streamcreeper	*Lochmias nematura*	U		x			s
Spotted Barbtail	*Premnoplex brunnescens*	F	b	x	U	b	s
Pearled Treerunner	*Margarornis squamiger*			x			o
Ash-browed Spinetail	*Cranioleuca curtata*	R		x	U		s
Ochre-cheeked Spinetail	*Synallaxis scutata*			x			s
Plain-crowned Spinetail	*Synallaxis gujanensis*			x			s
Azara's Spinetail	*Synallaxis azarae*	F		x	C		s
Montane Foliage-gleaner	*Anabacerthia striaticollis*	F		x	U		s
Buff-browed Foliage-gleaner	*Syndactyla rufosuperciliata*	R		x	R	b	s
Streaked Treehunter	*Thripadectes holostictus*	R	b	x			s
TYRANNIDAE							
Sclater's Tyrannulet	*Phyllomyias sclateri*	R		x			s
Ashy-headed Tyrannulet	*Phyllomyias cinereiceps*	X					s
White-crested Elaenia	*Elaenia albiceps*	X		x	U		s
Mottle-backed Elaenia	*Elaenia gigas*				R	b	s
Highland Elaenia	*Elaenia obscura*	U		x	C	b	s
Southern Beardless Tyrannulet	*Camptostoma obsoletum*			x	F		s
Buff-banded Tyrannulet	*Mecocerculus hellmayri*			x			s
White-throated Tyrannulet	*Mecocerculus leucophrys*			x	X		s
Torrent Tyrannulet	*Serpophaga cinerea*			x			o
Hazel-fronted Pygmy Tyrant	*Pseudotriccus simplex*	F		x			s
Bolivian Tyrannulet	*Zimmerius bolivianus*	U		x	F	b	s
Variegated Bristle Tyrant	*Phylloscartes poecilotis*	U					s
Marble-faced Bristle Tyrant	*Phylloscartes ophthalmicus*	R		x			s
Mottle-cheeked Tyrannulet	*Phylloscartes ventralis*	R		x	F		s
Streak-necked Flycatcher	*Mionectes striaticollis*	F	b	x	F	b	s
Slaty-capped Flycatcher	*Leptopogon superciliaris*	U		x	F	b	s
Yungas Tody-Tyrant	*Hemitriccus spodiops*			x	F	b	s
Ochre-faced Tody-Flycatcher	*Poecilotriccus plumbeiceps*	U		x	F	b	s
Yellow-olive Flycatcher	*Tolmomyias sulphurescens*	U		x	R		s
White-throated Spadebill	*Platyrinchus mystaceus*	R			X		s
Unadorned Flycatcher	*Myiophobus inornatus*	U	b	x	R		s
Bran-coloured Flycatcher	*Myiophobus fasciatus*				F	b	s
Tawny-breasted Flycatcher	*Myiobius villosus*	F	b		X		s
Cinnamon Flycatcher	*Pyrrhomyias cinnamomeus*	F	b	x	F	b	s
Fuscous Flycatcher	*Cnemotriccus fuscatus*			x			s
Alder Flycatcher	*Empidonax alnorum*				X		s
Olive-sided Flycatcher	*Contopus cooperi*	R			R		o
Smoke-coloured Pewee	*Contopus fumigatus*	F	b	x	U		s
Western Wood Pewee	*Contopus sordidulus*				U		o
Tufted Flycatcher	*Mitrephanes phaeocercus*	F	b	x			s
Black Phoebe	*Sayornis nigricans*			x			o
White-winged Black Tyrant	*Knipolegus aterrimus*	R		x	F	b	s
Little Ground Tyrant	*Muscisaxicola fluvitialis*			x			photo
Streak-throated Bush Tyrant	*Myiotheretes striaticollis*			x			v
Golden-browed Chat-Tyrant	*Ochthoeca pulchella*	R	b				s
Slaty-backed Chat-Tyrant	*Ochthoeca cinnamomeiventris*	R		x			s
Long-tailed Tyrant	*Colonia colonus*			x	U	b	s

English name	Scientific name	1980	Breeding evidence for 1980	2007	2009	Breeding evidence for 2009	Documentation
Piratic Flycatcher	*Legatus leucophaius*				F	b	v
Social Flycatcher	*Myiozetetes similis*			x	U		o
Golden-crowned Flycatcher	*Myiodynastes chrysocephalus*	R	b		R		s
Streaked Flycatcher	*Myiodynastes maculatus*	R			U	b	s
Variegated Flycatcher	*Empidonomus varius*				U	b	o
Tropical Kingbird	*Tyrannus melancholicus*	R		x	C		v
Pale-edged Flycatcher	*Myiarchus cephalotes*				U		s
COTINGIDAE							
Band-tailed Fruiteater	*Pipreola intermedia*	F	b	x	X	b	s
Scarlet-breasted Fruiteater	*Pipreola frontalis*	R	b	x	U	b	s
Chestnut-crested Cotinga	*Ampelion rufaxilla*	R					s
Andean Cock-of-the Rock	*Rupicola peruvianus*	R		x	U		s
Scimitar-winged Piha	*Lipaugus uropygialis*	R	b	x			s
PIPRIDAE							
Yungas Manakin	*Chiroxiphia boliviana*	F		x	C	b	s
Jet Manakin	*Xenopipo unicolor*	F	b				s
TITYRIDAE							
Masked Tityra	*Tityra semifasciata*	R			X	b	s
Barred Becard	*Pachyramphus versicolor*	U	b				s
VIREONIDAE							
Rufous-browed Peppershrike	*Cyclarhis gujanensis*			x	X		v
Brown-capped Vireo	*Vireo leucophrys*	U		x	U		s
CORVIDAE							
Violaceous Jay	*Cyanocorax violaceus*			x	U		s
Green Jay	*Cyanocorax yncas*	F		x	U		s
HIRUNDINIDAE							
Blue-and-white Swallow	*Pygochelidon cyanoleuca*	R		x	C	b	s
Southern Rough-winged Swallow	*Stelgidopteryx ruficollis*			x			o
TROGLODYTIDAE							
Grey-mantled Wren	*Odontorchilus branickii*	U	b	x			s
House Wren	*Troglodytes aedon*	F	b	x	F	b	s
Mountain Wren	*Troglodytes solstitialis*	F	b	x	X		s
Moustached Wren	*Pheugopedius genibarbis*	X		x	F	b	s
Fulvous Wren	*Cinnycerthia fulva*	X					s
Grey-breasted Wood Wren	*Henicorhina leucophrys*	F		x	U		s
Chestnut-breasted Wren	*Cyphorhinus thoracicus*	R		x			s
CINCLIDAE							
White-capped Dipper	*Cinclus leucocephalus*	X					s
TURDIDAE							
Andean Solitaire	*Myadestes ralloides*	U	b	x	X		s
Spotted Nightingale-Thrush	*Catharus dryas*	R	b	x			s
Swainson's Thrush	*Catharus ustulatus*	F			F		s
White-eared Solitaire	*Entomodestes leucotis*	F	b	x	F	b	s
Pale-eyed Thrush	*Turdus leucops*	F	b				s
Glossy-black Thrush	*Turdus serranus*	R	b				s
White-necked Thrush	*Turdus albicollis*				F	b	s
THRAUPIDAE							
Magpie Tanager	*Cissopis leverianus*				X		o
Slaty Tanager	*Creurgops dentatus*	U	b	x			s
Black-eared Hemispingus	*Hemispingus melanotis*	F	b	x	F	b	s
Rust-and-yellow Tanager	*Thlypopsis ruficeps*	X		x			o
Black-goggled Tanager	*Trichothraupis melanops*				X	b	s
Silver-beaked Tanager	*Ramphocelus carbo*				C		s
Blue-winged Mountain Tanager	*Anisognathus somptuosus*	F	b	x	C	b	s
Yellow-throated Tanager	*Iridosornis analis*	U		x	F	b	s
Orange-eared Tanager	*Chlorochrysa calliparaea*	R			X	b	s
Blue-grey Tanager	*Thraupis episcopus*	R	b	x	C	b	s

English name	Scientific name	1980	Breeding evidence for 1980	2007	2009	Breeding evidence for 2009	Documentation
Palm Tanager	*Thraupis palmarum*	U			F	b	s
Blue-capped Tanager	*Thraupis cyanocephala*	F		x	F	b	s
Golden-naped Tanager	*Tangara ruficervix*	U	b		U		s
Silvery Tanager	*Tangara viridicollis*	U			X	b	s
Green-capped Tanager	*Tangara meyerdeschauenseei*	U		x	U	b	s
Blue-necked Tanager	*Tangara cyanicollis*	R			F	b	s
Spotted Tanager	*Tangara punctata*			x	F	b	s
Blue-and-black Tanager	*Tangara vassorii*	F	b	x	F	b	s
Beryl-spangled Tanager	*Tangara nigroviridis*	F	b	x	F		s
Blue-browed Tanager	*Tangara cyanotis*				X		s
Saffron-crowned Tanager	*Tangara xanthocephala*	F		x	U	b	s
Swallow Tanager	*Tersina viridis*				F	b	s
Blue Dacnis	*Dacnis cayana*			x	F		o
Capped Conebill	*Conirostrum albifrons*	R		x			s
Rusty Flowerpiercer	*Diglossa sittoides*			x			o
Deep-blue Flowerpiercer	*Diglossa glauca*	U	b	x			s
Bluish Flowerpiercer	*Diglossa caerulescens*	F	b	x	F	b	s
Masked Flowerpiercer	*Diglossa cyanea*	F		x	F		s
Black-and-white Seedeater	*Sporophila luctuosa*	R		x	F		s
Double-collared Seedeater	*Sporophila caerulescens*				X		o
Chestnut-bellied Seedeater	*Sporophila castaneiventris*			x			o
Chestnut-bellied Seed Finch	*Oryzoborus angolensis*			x	F	b	s
Bananaquit	*Coereba flaveola*			x	F	b	s
Dull-coloured Grassquit	*Tiaris obscurus*			x	F		v
Buff-throated Saltator	*Saltator maximus*			x	F		v
EMBERIZIDAE							
Rufous-collared Sparrow	*Zonotrichia capensis*	R		x	C	b	s
Yellow-browed Sparrow	*Ammodramus aurifrons*			x			o
Chestnut-capped Brush Finch	*Arremon brunneinucha*	U		x			s
White-browed Brush Finch	*Arremon torquatus*	F	b		F	b	s
Black-faced Brush Finch	*Atlapetes melanolaemus*	F	b	x	F	b	s
Common Bush Tanager	*Chlorospingus flavopectus*	F	b	x	C	b	s
Short-billed Bush Tanager	*Chlorospingus parvirostris*	X					s
CARDINALIDAE							
Summer Tanager	*Piranga rubra*	R					o
Scarlet Tanager	*Piranga olivacea*				R		o
Black-backed Grosbeak	*Pheucticus aureoventris*			x			v
PARULIDAE							
Tropical Parula	*Setophaga pitiayumi*	R		x	F	b	s
Blackburnian Warbler	*Setophaga fusca*	U			X		s
Masked Yellowthroat	*Geothlypis aequinoctialis*				U	b	s
Slate-throated Redstart	*Myioborus miniatus*	F	b	x	F		s
Spectacled Redstart	*Myioborus melanocephalus*	R	b	x			s
Three-banded Warbler	*Basileuterus tristriatus*	F			C	b	s
Two-banded Warbler	*Myiothlypis bivittata*				F	b	s
Pale-legged Warbler	*Myiothlypis signata*	F	b	x	F	b	s
Russet-crowned Warbler	*Myiothlypis coronata*	F	b	x	F	b	s
Buff-rumped Warbler	*Myiothlypis fulvicauda*			x			o
ICTERIDAE							
Russet-backed Oropendula	*Psarocolius angustifrons*	U		x	U		v
Dusky-green Oropendula	*Psarocolius atrovirens*			x			v
Crested Oropendula	*Psarocolius decumanus*			x	U		v
FRINGILLIDAE							
Hooded Siskin	*Sporagra magellanica*	R		x	C	b	s
Yellow-bellied Siskin	*Sporagra xanthogastra*	U					s
Golden-rumped Euphonia	*Euphonia cyanocephala*	X			U	b	s
Bronze-green Euphonia	*Euphonia mesochrysa*				X		v
Orange-bellied Euphonia	*Euphonia xanthogaster*	U		x	U		s
Blue-naped Chlorophonia	*Chlorophonia cyanea*	U			F	b	s