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NOTES ON THE AVIFAUNA OF THE FLOODPLAIN FOREST OF THE RIO MAMORÉ, BENI, BOLIVIA, WITH A DESCRIPTION OF THE JUVENILE PLUMAGE OF UNICOLORED THRUSH (*TURDUS HAPLOCHROUS*) (AVES: TURDIDAE)

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ABSTRACT

Abstract – Notes on the avifauna of the floodplain forest of the Rio Mamoré, Beni, Bolivia, with a description of the Juvenile plumage of Unicolored Thrush (*Turdus haplochrous)* – The floodplain forest along the Rio Mamoré is an isolated stretch of riverine forest in the matrix of flooded grassland and gallery forest of the Llanos de Moxos in the department of Beni, Bolivia and contains an understudied avifauna. This habitat potentially represents a stronghold for certain bird taxa. During Dec 2010-Jan 2011, we conducted daily audiovisual censuses, targeted collecting with shotguns, and general collecting with mist-nets for birds at a site in the floodplain forest north of Trinidad, dpto Beni, prov. Cercado, Bolivia. We found a mix of birds typical of Amazonian Varzea habitats and Gallery forest, and found three range-restricted taxa (*Turdus haplochrous, Lampropsar tanagrinus bolivienses,* and *Thripophaga fusciceps fusciceps*) to be fairly common. We also detected large numbers of widespread but low-density species such as *Neochen jubata* , *Ara ararauna* and *Ara chloropterus*. Here describe the juvenile plumage of *Turdus haplochrous,* which appears to be an endemic to floodplaind and gallery forests within the Beni; as well as observations and abundance estimates of 193 species of birds. We estimate this habitat to be particularly important for the world populations of at least ten taxa of birds.

RESUMEN

Resumen - Notas sobre la avifauna del bosque inundado del Río Mamoré, Beni, Bolivia, con el descripción del plumaje juvenil de Turdus haplochrous - El bosque inundable a lo largo del Río Mamoré dentro de los pastizales del Beni de Bolivia es un tramo aislado de bosque ribereño en la matriz de pastizales inundados y bosques de galería de los Llanos de Moxos y contiene una avifauna poco estudiada . Este hábitat representa potencialmente una fortaleza para ciertos taxones de aves. Durante Diciembre 2010 - Enero 2011 , realizemos censos diarios audiovisuales, colecciones especificos con escopetas y colecciones en general con redes de niebla para los Aves en un lugar en el bosque inundable al norte de Trinidad, dpto. Beni, prov. Cercado, Bolivia . Encontremos una mezcla de aves típicas de los hábitats amazónicos Varzea y bosque galería , y encontramos tres especies de distribución restringida (*Turdus haplochrous* , *Lampropsar tanagrinus* y *Thripophaga fusciceps*) a ser bastante común. También se detectemos grandes números de especies de amplia distribución pero de baja densidad, como *Neochen jubata* , *Ara ararauna* y *Ara chloropterus* . Aquí describamos el plumaje juvenil del unicolor *Turdus haplochrous*, lo que parece ser una endémica del bosque inundable y bosques de galería en el Beni , y las observaciones y estimaciones de abundancia de 193 especies de aves. Calculamos este hábitat es particularmente importante para las poblaciones mundiales de por lo menos diez taxa de aves.

INTRODUCTION

Bolivia has the highest bird diversity of any land-locked country (Hennessey et al. 2003), and many gaps remain in our understanding of avian biogeography in the region. One such gap is the forest tract along the Rio Mamoré in the Llanos de Moxos, the predominant biogeographic feature of the Department El Beni and one of largest flooded grassland systems in the world (Plotkin and Riding 2011). The avifauna of grasslands proper are relatively well studied (Brace et al. 1997), but the isolated fingers of floodplain forest that penetrate the region along major watercourses have not been thoroughly surveyed (Brace et al. 1997). To our knowledge, the only intensive work on floodplain forest in the Llanos de Moxos comes from forest in the western Beni. This site is surrounded entirely by forested habitats contiguous with the much larger forests of the Amazon Basin, and thus likely is biogeographically unique from the Rio Mamoré floodplain forest. The floodplain forests of the Llanos de Moxos are unique both for their close association with rivers and wet grasslands and for their isolation from any other large region of forest. Also, because these forests occur primarily along watercourses, they are just a few kilometers or less in width, but may extend for hundreds of kilometers in linear networks of contiguous habitat. One of the largest of these patches is along the Río Mamoré, which roughly bisects the Llanos de Moxos from south to north.

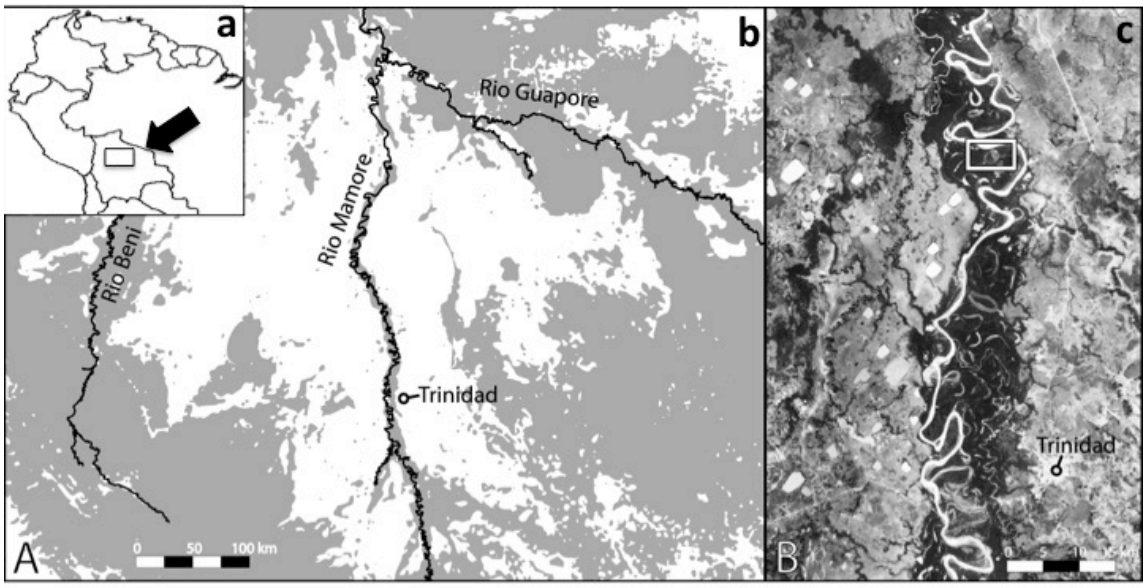
In order to assess the biogeographic makeup of the avifauna of the floodplain forest of the Rio Mamoré and the importance of this habitat for conservation of certain species, we surveyed and collected birds at a locality along the Río Mamoré resulting in the first published report of the birds of the floodplain forests of the Llanos de Moxos. The grasslands of the Llanos de Moxos are a highly altered system (Plotkin and Riding 2011), and understanding how the bird communities use different habitats is essential to conservation (Saab 1999) . Because of potentially differential effects on species from human development based on ecological traits, we characterized conservation concern, local abundance, and foraging strata for each species.

STUDY AREA AND METHODS

We conducted fieldwork from 27 Dec 2010 – 11 Jan 2011 at a small fishing camp known locally as Santa Lucia (14.462° S, 64.975° W; ~150 m) on the west bank of the Río Mamoré, 48.2 km north of the city of Trinidad, Departamento El Beni. (fig 1a,b). We camped near a small clearing about 150 m from the left bank of the Mamoré, adjacent to a wide, vegetated channel that connects the river to a large oxbow lake south of the camp (fig 1c). We classified the habitats where we observed each species into four categories: floodplain forest, successional forest, river, and lake. The camp was in successional forest, with a small trail system leading south from the river into more mature floodplain forest. This taller floodplain forest was most prominent along the south edge lake and away from the river but was interrupted in places by dried oxbow lakes vegetated with 2-3 m tall grass and small trees and other successional habitats. The majority of fieldwork was conducted

within ~2 km of camp. Our visit corresponded to the beginning of the wet season, which extends locally from December to April (Espinoza Villar et al. 2009), and we experienced heavy rains. Indeed, the Mamore River's level increased by 3-4 m during our short stay. The floodplain and successional forest was not flooded during our visit, but locals informed us that the entire area accessed by the trail system floods during each wet season.

Figure 1: A map of the riverine forest of El Beni, and a map of the study area with an inset of Northwest South America (a). In 3b, white denotes savannah habitat, and gray is forested. In 3c, dark gray denotes floodplain forest. The Santa Lucia site was within the white box in 3c.



We conducted fieldwork daily from 29 December 2010 to 7 January 2011 between 05:30 and 10:00, with intermittent work in the afternoons and evenings. We conducted observational surveys along the trail system (ca. 288 person-hours), made digital audio recordings, operated mist nets, and collected voucher specimens of select individuals from all habitats. Eight to ten mist-nets were run daily for 10-12 hours at ground level in the understory of floodplain and successional forest (960 mist-net hours total), and moved every two to three days when captures decreased. Audio recordings were archived in the Macaulay Library (ML Audio), Cornell Laboratory of Ornithology, Ithaca, New York, USA, and specimens and tissue samples were deposited in the Museo de Historia Natural Noel Kempff Mercado, Santa Cruz, Bolivia, and the Louisiana State University Museum of Natural Science, Baton Rouge, Louisiana, USA. Wherever possible, we obtained recordings and specimens of the same individual. Observational data have been deposited in the database of the Avian Knowledge Network through the eBird portal (ebird.org). We classified each species by habitat, foraging strata, and estimated abundance. Because of the brevity of our visit, we coded abundances subjectively using a combination of days detected, and number detected.

RESULTS

We recorded 195 species of birds in Santa Lucia and in transit to Santa Lucia (Table 1) and 149 at Santa Lucia itself. Of these, 19 (9.7% of total species at this site) species are of high and 77 (39.5%) of medium ecological sensitivity. We documented 92 species of canopy birds (47.2% of total), although most were present only in successional habitats. Only 39 canopy species were noted within floodplain forest. 48 species (25.1%) were observed in the understory, 15 (7.7%) overhead, and 21 (10.8%) in and around water. Almost all species observed (92.3%) are from the Lower Tropical center of abundance (Stotz et al. 1996).

We found three taxa, *Thripophaga f. fusciceps*, *Turdus haplochrous*, and *Lampropsar tanagrinus boliviensis,* that are endemic or near endemic to the Beni and are poorly known (Brace et al. 1997, Remsen 2003, O'Neill et al. 2011) to be common at the site. There are very few other known localities for these taxa (White et al. 1995, Jaramillo and Burke 1999, Remsen 2003) so continued existence of this habitat may be important for the conservation of these species. We noted large numbers of *Neochen jubata, Ara ararauna,* and *A. chloropterus* and smaller numbers of *Penelope jacquacu* and *Mitu tuberosum,* all considered highly vulnerable to human activity and are of particular conservation concern. Two (*Neochen jubata* and *Turdus haplochrous)* are listed as near threatened by the IUCN (Stattersfield et al. 2000).

Table 1: A list of all birds registered along the Rio Mamore's floodplain forest during field work and transit. Birds observed at the Santa Lucia field site are indicated with an "x" under the column "Santa Lucia" Birds observed in floodplain forest or over the river in transit but not at Santa Lucia are left black in this column. Taxonomy follows the South American Classification Committee (Remsen et al. n.d.) [S] denotes specimens collected. [R] denotes voice recordings

Total species: 193, total at Santa Lucia: 149
Abundance: C = Common, FC = Fairly Common, UC = Uncommon, R = Rare
Habitat: v = floodplain forest, s = successional, c = cocha, r = river, o = overhead

Common name	Scientific name	Santa Lucia	Abundance	Habitat
TINAMIDAE Undulated Tinamou	*Crypturellus undulatus*	x	UC	v
ANHIMIDAE Southern Screamer	*Chauna torquata*	x	C	c,r
ANATIDAE White-faced Whistling-Duck	*Dendrocygna viduata*		FC	c,r
Black-bellied Whistling-Duck	*Dendrocygna autumnalis*		UC	r
Orinoco Goose	*Neochen jubata*	x	C	r
Comb Duck	*Cairina moschata*	x	UC	r
CRACIDAE Spix's Guan	*Penelope jacquacu*	x	FC	v
Blue-throated Pipiung-Guan	*Pipile cumanensis*	x	FC	v
Speckled Chachalaca	*Ortalis guttata*	x	FC	v,s
Razor-billed Currasow	*Mitu tuberosum*	x	R	v
CICONIIDAE Jabiru	*Jabiru mycteria*	x	UC	o

Wood Stork	*Mycteria americana*	x	R	o
Neotropic Cormorant	*Phalacrocorax brasilianus*	x	C	r
ANHINGIDAE Anhinga	*Anhinga anhinga*	x	C	c,r
ARDEIDAE Rufescent Tiger-Heron	*Tigrisoma lineatum*	x	C	c,r
Boat-billed Heron[s]	*Cochlearius cochlearius* [S]	x	C	r
Zigzag Heron	*Zebrilus undulatus*		R	v
Black-crowned Night-heron	*Nycticorax nycticorax*		UC	r
Striated Heron	*Butorides striata*		UC	r
Cattle Egret	*Bubulcus ibis*	x	FC	r
Cocoi Heron	*Ardea cocoi*	x	C	c,r
Great Egret	*Ardea alba*	x	C	c,r
Whistling Heron	*Syrigma sibilatrix*		R	s
Capped Heron	*Pilherodius pileatus*		UC	r
Snowy Egret	*Egretta thula*		UC	r
THRESKIORNITHIDAE Green Ibis	*Mesembrinibis cayennensis*	x	FC	v,r
Bare-faced Ibis	*Phimosus infuscatus*		R	s
CATHARTIDAE Turkey Vulture	*Cathartes aura*	x	FC	o
Lesser Yellow-headed Vulture	*Cathartes burrovianus*	x	FC	o,s
Black Vulture	*Coragyps atratus*	x	C	o,s,r
King Vulture	*Sarcoramphus papa*		UC	o
PANDIONIDAE Osprey	*Pandion haliaetus*	x	UC	r
ACCIPITRIDAE Hook-billed Kite	*Chondrohierax uncinatus*	x	UC	o
Gray-headed Kite	*Leptodon cayanensis*	x	R	o
Black-collared Hawk	*Busarellus nigricollis*	x	C	c,r
Snail Kite	*Rostrhamus sociabilis*	x	FC	r
Double-toothed/Rufous-Thighed Kite	*Harpagus sp.*	x	R	o
Plumbeous Kite	*Ictinia plumbea*		R	o
Great Black-Hawk	*Buteogallus urubitinga*	x	C	r
Roadside Hawk	*Rupornis magnirostris*	x	C	s,r
ARAMIDAE Limpkin	*Aramus guarauna*	x	UC	s
RALLIDAE Gray-necked Wood-rail	*Aramides cajanea*	x	UC	v,s
HELIORNITHIDAE Sungrebe	*Heliornis fulica*	x	UC	c,r
SCOLOPACIDAE Spotted Sandpiper	*Actitis macularius*	x	UC	r
JACANIDAE Wattled Jacana	*Jacana jacana*	x	R	s
LARIDAE Yellow-billed Tern	*Sternula superciliaris*	x	FC	r

Large-billed Tern[S]	*Phaetusa simplex*[S]	x	C	r,c
RYNCHOPIDAE Black Skimmer	*Rynchops niger*	x	FC	r
COLUMBIDAE Pale-vented Pigoen	*Patagioenas cayennensis*	x	C	v,s
Gray-fronted Dove	*Leptotila rufaxilla*	x	C	v,s
Blue Ground-Dove	*Claravis pretiosa*		R	s
CUCULIDAE Little Cuckoo	*Coccycua minuta*	x	UC	v,s
Squirrel Cuckoo[S]	*Piaya cayana*[S]	x	C	v
Greater Ani	*Crotophaga major*	x	C	c,r
Smooth-billed Ani	*Crotophaga ani*	x	UC	s
STRIGIDAE Spectacled Owl	*Pulsatrix perspicillata*	x	FC	v
Ferruginous Pygmy-Owl	*Glaucidium brasilianum*	x	FC	v,s
CAPRIMULGIDAE Common Pauraque	*Nyctidromus albicollis*	x	R	s
Ladder-tailed Nightjar	*Hydropsalis climacocerca*		R	r
APODIDAE Lesser Swallow-tailed Swift	*Panyptila cayennensis*		R	o
TROCHILIDAE Rufous-breasted Hermit	*Glaucis hirsutus*	x	C	v
Buff-bellied Hermit	*Phaethornis subochraceus*	x	UC	s
Black-throated Mango	*Anthracothorax nigricollis*	x	UC	s
Fork-tailed Woodnymph	*Thalurania furcata*	x	UC	v
Gray-breasted Sabrewing	*Campylopterus largipennis*	x	R	s
White-chinned Sapphire[s]	*Hylocharis cyanus*[s]	x	C	v
TROGONIDAE Black-tailed Trogon[S,R]	*Trogon melanurus*[S,R]	x	C	v
Blue-crowned Trogon	*Trogon curucui*	x	CC	v
ALCEDINIDAE Ringed Kingfisher	*Megaceryle torquata*	x	C	r
Amazon Kingfisher	*Chloroceryle amazona*	x	C	r
Green Kingfisher	*Chloroceryle americana*		UC	r
Green-and-rufous Kingfisher	*Chloroceryle inda*	x	FC	c
American Pygmy-Kingfisher[S]	*Chloroceryle aenea*[S]	x	UC	r,v
Blue-crowned Motmot[S]	*Momotus momota*[S]	x	UC	v
GALBULIDAE Rufous-tailed Jacamar[S,R]	*Galbula ruficauda*[S,R]	x	C	v
BUCCONIDAE Black-fronted Nunbird	*Monasa nigrifrons*	x	C	v
RAMPHASTIDAE Toco Toucan	*Ramphastos toco*		R	s
Chestnut-eared Aracari	*Pteroglossus castanotis*	x	FC	v
PICIDAE				
White-wedged Piculet[S]	*Picumnus albosquamatus*[S]	x	UC	v
White Woodpecker	*Melanerpes candidus*		R	o
Yellow-tufted Woodpecker	*Melanerpes cruentatus*		UC	v

Red-stained Woodpecker	*Veniliornis affinis*		FC	v,s
White-throated Woodpecker	*Piculus leucolaemus*		FC	v
Cream-colored Woodpecker	*Celeus flavus*	x	UC	v
Lineated Woodpecker	*Dryocopus lineatus*	x	FC	v
Crimson-crested Woodpecker[R]	*Campephilus melanoleucos*[R]	x	UC	v
Cream-backed Woodpecker	*Campephilus leucopogon*	x	UC	v
FALCONIDAE Laughing Falcon	*Herpetotheres cachinnans*	x	UC	v,s
Collared Forest-Falcon	*Micrastur semitorquatus*	x	R	v
Southern Caracara	*Caracara plancus*	x	FC	s,r
Yellow-headed Caracara	*Milvago chimachima*	x	C	r
Peregrine Falcon	*Falco peregrinus*		R	r
Bat Falcon	*Falco rufigularis*	x	UC	v
PSITTACIDAE Blue-and-Yellow Macaw	*Ara ararauna*	x	C	v,o
Red-and-green Macaw	*Ara chloropterus*	x	FC	o
Chestnut-fronted Macaw	*Ara severus*	x	C	o
Red-bellied Macaw	*Orthopsittaca manilata*		R	o
Yellow-collared Macaw	*Primolius auricollis*	x	UC	o
White-eyed Parakeet	*Aratinga leucophthalma*	x	C	v,o
Dusky-headed Parakeet	*Aratinga weddellii*	x	UC	s,o
Peach-fronted Parakeet	*Aratinga aurea*		R	s
Blue-winged Parrotlet	*Forpus xanthopterygius*		FC	s
Yellow-chevroned Parakeet	*Brotogeris chiriri*		FC	v,s,o
Cobalt-winged Parakeet	*Brotogeris cyanoptera*	x	UC	
Blue-headed Parrot	*Pionus menstruus*	x	FC	v,o
Yellow-crowned Parrot	*Amazona ochrocephala*	x	C	v,o
THAMNOPHILIDAE Great Antshrike[S,R]	*Taraba major*[S,R]	x	C	v,s
Barred Antshrike	*Thamnophilus doliatus*		R	s
Chesntut-backed Antshrike[S,R]	*Thamnophilus palliatus*[S,R]	x	C	v
Bolivian Slaty-Antshrike[S,R]	*Thamnophilus sticturus*[S,R]	x	C	v
Plain Antvireo[S]	*Dysithamnus mentalis*[S]	x	FC	v
Amazonian Streaked-Antwren	*Myrmotherula multostriata*	x	R	v
Large-billed Antwren	*Herpsilochmus longirostris*		R	v
Mato Grosso Antbird[S,R]	*Cercomacra melanaria*[S,R]	x	UC	v,s
Band-tailed Antbird[S]	*Hypocnemoides maculicauda*[S]	x	C	v
Black-throated Antbird[S,R]	*Myrmeciza atrothorax*[S,R]	x	FC	v,s
FURNARIIDAE Olivaceous Woodcreeper[S]	*Sittasomus griseicapillus*[S]	x	C	v
Plain-brown Woodcreeper	*Dendrocincla fuliginosa*	x	UC	v
Buff-throated Woodcreeper[S]	*Xiphorhynchus guttatus*[S]	x	C	v
Straight-billed Woodcreeper[S]	*Dendroplex picus*[S]	x	C	s
Plain Xenops	*Xenops minutus*		R	v

Streaked Xenops[S]	*Xenops rutilansS*	x	FC	v
Rufous Hornero	*Furnarius rufus*		UC	s
Greater Thornbird	*Phacellodomus ruber*		UC	s
Plain Softtail[S,R]	*Thripophaga fusciceps[S,R]*	x	FC	s
Rufous Cacholote	*Pseudoseisura unirufa*		UC	s
Yellow-chinned Spinetail[S]	*Certhiaxis cinnamomeus[S]*	x	FC	c
Plain-crowned Spinetail[S]	*Synallaxis gujanensis[S]*	x	C	v,s
TYRANNIDAE Forest Elaenia	*Myiopagis gaimardii*	x	FC	v
Yellow-bellied Elaenia	*Elaenia flavogaster*		R	s
White-lored Tyrannulet	*Ornithion inerme*	x	R	v
Short-tailed Pygmy-Tyrant	*Myiornis ecaudatus*	x	UC	v
Rusty-fronted Tody-Flycatcher	*Poecilotriccus latirostris*		R	s
Yellow-olive Flycatcher[S]	*Tolmomyias sulphurescens[S]*	x	C	v
Fuscous Flycatcher[R]	*Cnemotriccus fuscatus[R]*	x	UC	v
Piratic Flycatcher	*Legatus leucophaius*	x	FC	v,s
Euler's Flycatcher[S]	*Lathotriccus euleri[S]*	x	UC	v,s
Drab Water Tyrant	*Ochthornis littoralis*	x	UC	r
Rusty-margined Flycatcher	*Myiozetetes cayanensis*		UC	r,s
Great Kiskadee	*Pitangus sulphuratus*	x	C	v,s,r,c
Lesser Kiskadee	*Pitangus lictor*		R	r
Boat-billed Flycatcher[S,R]	*Megarynchus pitangua[S,R]*	x	FC	v
Tropical Kingbird	*Tyrannus melancholicus*	x	C	s,r,c
Eastern Kingbird	*Tyrannus tyrannus*	x	C	s,r
Dusky-capped Flycatcher	*Myiarchus tuberculifer*	x	FC	v
Dull-capped Attila[S]	*Attila bolivianus[S]*	x	FC	v
COTINGIDAE Bare-necked Fruitcrow	*Gymnoderus foetidus*	x	R	o
PIPRIDAE Sulphur-bellied Tyrant-Manakin[S]	*Neopelma sulphureiventer[S]*	x	UC	v
Band-tailed Manakin[S]	*Pipra fasciicauda[S]*	x	C	v
TITYRIDAE Black-crowned Tityra	*Tityra inquisitor*		R	s
Black-tailed Tytira	*Tityra cayana*	x	UC	s
White-winged Becard[S]	*Pachyramphus polychopterus[S]*	x	UC	s
VIREONIDAE				
Red-eyed Vireo[R]	*Vireo olivaceus[R]*	x	FC	v
CORVIDAE				
Purplish Jay	*Cyanocorax cyanomelas*	x	UC	v,s
Plush-crested Jay	*Cyanocorax chrysops*	x	UC	v,s
HIRUNDINIDAE Brown-chested Martin	*Progne tapera*	x	FC	r
Martin sp.	*Progne sp. (not tapera)*		R	r
Southern Rough-winged Swallow	*Stelgidopteryx ruficollis*	x	UC	r

White-winged Swallow	*Tachycineta albiventer*	x	C	r
Bank Swallow	*Riparia riparia*	x	UC	r
Barn Swallow	*Hirundo rustica*	x	C	r,s
TROGLODYTIDAE Thrush-like Wren[S,R]	*Campylorhynchus turdinus*[S,R]	x	C	v
Fawn-breasted Wren[S]	*Cantorchilus guarayanus*[S]	x	C	v,s
Masked Gnatcatcher	*Polioptila dumicola*		R	s
DONACOBIIDAE Black-capped Donacobius	*Donacobius atricapilla*	x	UC	c,s
TURDIDAE Hauxwell's Thrush[S,R]	*Turdus hauxwelli*[S,R]	x	C	v
Unicolored Thrush[S,R]	*Turdus haplochrous*[S,R]	x	FC	v,s
Black-billed Thrush	*Turdus ignobilis*	x	FC	s
THRAUPIDAE Red-capped Cardinal[S]	*Paroaria gularis*[S]	x	C	c,r,s
Gray-headed Tanager[S]	*Eucometis penicillata*[S]	x	FC	v
White-shouldered Tanager[S]	*Tachyphonus luctuosus*[S]	x	FC	v
Silver-beaked Tanager[S]	*Ramphocelus carbo*[S]	x	FC	v,s
Sayaca Tanager	*Thraupis sayaca*		UC	v,s
Palm Tanager	*Thraupis palmarum*	x	UC	s
Blue Dacnis	*Dacnis cayana*	x	R	v
Purple Honeycreeper	*Cyanerpes caeruleus*	x	R	v
Guira Tanager	*Hemithraupis guira*	x	UC	v
White-bellied Seedeater	*Sporophila leucoptera*		UC	s
INCERTAE SEDIS Grayish Saltator	*Saltator coerulescens*	x	C	v,s
EMBERIZIDAE Yellow-browed Sparrow[S]	*Ammodramus aurifrons*[S]	x	C	r
CARDINALIDAE Hepatic Tanager	*Piranga flava*	x	UC	s
PARULIDAE Golden-crowned Warbler[S]	*Basileuterus culicivorus*[S]	x	FC	v
ICTERIDAE Crested Oropendola	*Psarocolius decumanus*	x	C	v,s
Solitary Black Cacique	*Cacicus solitarius*	x	UC	s
Yellow-rumped Cacique	*Cacicus cela*	x	C	v,s
Orange-backed Troupial	*Icterus croconotus*		UC	r
Velvet-fronted Grackle[S,R]	*Lampropsar tanagrinus*[S,R]		C	v,s
Scarlet-headed Blackbird	*Amblyramphus holosericeus*		R	r
Bay-winged Cowbird	*Agelaioides badius*		R	s
Giant Cowbird	*Molothrus oryzivorus*	x	UC	s
FRINGILLIDAE Purple-throated Euphonia	*Euphonia chlorotica*	x	C	s
Thick-billed Euphonia	*Euphonia laniirostris*	x	FC	v

SPECIES ACCOUNTS

Orinoco Goose *Neochen jubata*

This species occurs in much of tropical South America, (Carboneras 1992) and but is near threatened and populations are in decline (Davenport et al. 2012). The known high count of a single group of this species was up to 250 individuals in the Beni (Scott and Carbonell 1986). The Beni appears to be important to this species as a breeding area and a non-breeding site for nearby populations (Davenport et al. 2012), but studies on the population sizes and dynamics of this bird are sparse. We observed 322 individuals on a sandbar on 31 December. This observation of the largest reported group of this species provides further evidence for the idea that the Beni is a stronghold for its populations(Carboneras 1992) This species breeds during the dry season, and has been recorded in groups during molt after breeding (Carboneras 1992)We were unable to assess the molt stage of these birds, but this may have indeed been a post-breeding group.

Macaws *Ara spp.*

Because of habitat loss (Soares-Filho et al. 2006), rampant illegal trade (Wright et al. 2001, Herrera and Hennessey 2008) and hunting for ornamentation (Guedes 2004), many macaw species are declining (Stattersfield et al. 2000) and low in density in the western amazon basin (Brooks and Begazo 2001) We observed five species of macaws at this site at notably high abundance. We observed *Ara ararauna* and *A. severus* multiple times each day generally in monospecific flocks of 2–10 individuals. We observed *A. chloropterus, Orthopsittaca manilata,* and *Primolius auricollis* multiple times during our visit. Most of the large macaws were flying overhead, although a pair of *A. ararauna* using a cavity in a large dead tree near camp might have been nesting. Some macaws have been hypothesized to track resources over their range throughout the year, (Ragusa-Netto 2006, Tobias and Brightsmith 2007) and field work during the dry season would clarify the whether densities remain high throughout the year or if this habitat serves primarily as a non-breeding site for these birds.

Mato Grosso Antbird *Cercomacra melanaria*

This species' range is in the Pantanal of Brazil, Paraguay, and Bolivia; as well as gallery forest in the departments of Santa Cruz and El Beni (Zimmer and Isler 2003)thought the distribution of this species is poorly known and based on few localities. (Batista De Pinho et al. 2006). We observed, recorded, and collected a pair (ML Audio 166350, 166351) on 7 January 2011. These individuals were in the overgrown seasonally inundated channel connecting the oxbow lake to the river, which was dominated by 8-10 m palms with exposed roots and a shrubby understory. These specimens apparently represent the first tissues collected away

from the Panatanal. These specimens will hopefully provide data for researchers about population structure and delimitation in this species, and our observation contributes the first description of habitat preference of this species away from the Pantanal.

Plain Softtail *Thripophaga fusciceps fusciceps*

This taxon has been hypothesized to represent a species endemic to the Beni (O'Neill et al. 2011), but its behavior, habitat, and population structure have received little attention. We found it to be fairly common in the subcanopy of the riverine forest, where they traveled in single-species groups of 2-6 individuals. We collected four birds, including a pair duetting from the margins of an overgrown oxbow lake (ML Audio 166342). These were identified as *T. f. fusciceps* by their large size in comparison to *T. f. dimorpha* specimens at the LSUMNS from Madre de Dios, Peru, and Napo, Ecuador. Nominate *fusciceps* is endemic to Bolivia with only a few known localities (Remsen 2003). This polytypic species consists of the subspecies represented three to four isolated populations with morphological differentiation, but has not received modern study into species limits.

Unicolored Thrush *Turdus haplochrous*

This species is rare and apparently restricted to the contiguous tracts of floodplain forest bordering the large rivers within the Llanos de Moxos (White et al. 1995, Collar 2005). Its sister species, *Turdus sanchezorum,* was recently described and is closely related, with only 1.45% divergence in the mithochondrial gene ND2 between these two species. It inhabits similar riverine forest in western Amazonia and is morphologically similar to *T. haplochrous*. (O'Neill et al. 2011). Assessing the conservation needs of this species is difficult because little is known about its distribution and population size (Birdlife International 2011). At Santa Lucia, this species was fairly common in the riverine forest, especially between the main river and the oxbow lake, and was seen and heard almost every day around the campsite and clearings, but was never recorded further into the interior forest. *Turdus haplochrous* generally inhabited short-stature forest mixed with *Cecropia* near the forest border, but was never observed in the interior of tall forest. We obtained four recordings, which include its distinctive three-note call and its song (ML Audio 166349, 166345, 166344, 166340), as well as six specimens. On two occasions, individuals responded strongly to these recordings, particularly the call. One of a male responded to recordings of its natural calls and songs. This individual was collected and constitutes the first audio-vouchered specimen of this species (ML Audio 166349). The combination of juvenile birds and responses to conspecific playback indicating territoriality suggests that our sampling period coincided with the end of the breeding season. One specimen is in juvenile plumage (figs 2a-c). This bird weighed 45.1 g, had a wingspan of 34.5 cm, no wing or tail molt, and moderate

body molt. The ovary was 3 x 2 mm, the oviduct was straight and narrow, and the ova were minute. The bursa was 5 x 3 mm, and the skull was approximately 5% ossified. The juvenile plumage, previously unknown (White et al. 1995, Collar 2005), is described below.

Figure 2: Juvenile *Turdus haplochrous* in center compared to adult *Turdus haplochrous* collected in Santa Lucia (bottom in a and b, left in c) and a juvenile *Turdus grayi* from Mexico (top in a and b, right in c).

Juvenal Plumage description: As with many species in the family Turdidae (Collar 2005), the juvenile plumage was characterized by overall dull brownish coloration with bright buff tips to the rachi of the body feathers and coverts. Juvenile specimens of *Turdus sanchezorum* were not available for comparison, but a specimen of *Turdus grayi* in juvenile plumage was similar but more olive in the upperparts, and much paler throughout the underparts, with similar patterning overall. Capitalized color names follow Ridgway (1912). Soft part colors were taken in the field and are not capitalized. Crown Sepia, with very thin Ochraceous-buff rachi and tips at rear crown, extending onto nape and back. Back deep olive. Throat Olive-buff. Breast and belly Tawny-olive with interspersed Cinnamon-buff and Sepia smudges. Scapulars Deep olive with Cinnamon-buff rachi. Greater, median, and

lesser secondary coverts Deep olive with cinnamon-buff tips. Greater and lesser alulas Sepia with Deep olive anterior edges. Primary coverts Sepia with Deep Olive outer vein.; inner three primary coverts with Cinnamon-buff tips. Tertials Deep Olive with very thin Cinnamon-buff terminal edge. Primaries and secondaries Blackish-brown with Deep Olive edges to outer veins. Rectrices pointed at tips, and Chaetura Drab. Iris dull ochre-brown. Mandible dull yellow-green with brownish wash to the basal 1/3. Maxilla dull yellow-green with brownish wash to the basal half. Gape and orbital skin yellow. Tarsi and toes gray with a dull greenish tint.

Velvet-fronted Grackle *Lampropsar tanagrinus boliviensis*

This taxon is a subspecies endemic to the Llanos de Moxos (Jaramillo and Burke 1999) that has been hypothesized to be a separate species from *Lampropsar tanagrinus tanagrinus* in Amazonia. (O'Neill et al. 2011), but a lack of data has precluded analyses of species delimitation. It was fairly common in riverine forest, and seen and heard every day, moving through the canopy in small flocks. Six were collected, and three recordings were obtained (ML Audio 16111, 16347, 16343). Specimens were identified as *L. tanagrinus boliviensis* by direct comparison to LSUMNS specimens of the larger *Lampropsar tanagrinus tanagrinus* from Amazonas, Brazil and Loreto, Peru. Three other subspecies are described but specimens were not available for comparison. The Venezuelan subspecies *guianensis* occurs very far from our site. The Western Brazil subspecies *macropterus* is even larger than *tanagrinus*, and was thus excluded, and *violaceous* shows a colorful sheen to the plumage (Jaramillo and Burke 1999), whereas our specimens were dull black. No recent studies have attempted to clarify species limits or relationships between subspecies of *Lampropsar tanagrinus*. One individual with 75% ossified skull and a 10x5 mm bursa was in formative plumage. It had replaced all body feathers, the inner two tertials on each side, and the inner four greater coverts on each side; it retained all other feathers. No active molt was noted. This represents the first description of the preformative molt pattern of this species. (Jaramillo and Burke 1999).

Table 2: Voucher numbers of specimens collected at Santa Lucia. Specimen number corresponds to the accession number associated with a study skin at the LSU Museum of Natural Sciences section of ornithology collections. Tissue number corresponds to the voucher numbers associated with a tissue sample of muscle, heart, and liver frozen in liquid nitrogen and stored in the LSU museum of Natural Sciences section of genetic resources collections. A sample of muscle tissue from each specimen is also stored in ethanol at the Museo de Historia Natural Noel Kempff Mercado in Santa Cruz, Bolivia.

Common name	Scientific name	Specimen Number (LSUMZ-)	Tissue Number (B-)
Boat-billed Heron	*Cochlearius cochlearius*	183790	68295
Large-billed Tern	*Phaetusa simplex*	183791	68294
Squirrel Cuckoo	*Piaya cayana*	183792	68281

Black-tailed Trogon	*Trogon melanurus*	183793	68252
Blue-crowned Trogon	*Trogon curucui*	183794	68199
American Pygmy-Kingfisher	*Chloroceryle aenea*	183795	68302
Black-fronted Nunbird	*Monasa nigrifrons*	183796	68186
Black-fronted Nunbird	*Monasa nigrifrons*	183797	68177
Rufous-tailed Jacamar	*Galbula ruficauda*	183798	68194
Rufous-tailed Jacamar	*Galbula ruficauda*	183799	68296
White-wedged Piculet	*Picumnus albosquamatus*	183800	68180
Great Antrshike	*Taraba major*	183801	68210
Chestnut-backed Antshrike	*Thamnophilus palliatus*	183802	68260
Bolivian Slaty-Antshrike	*Thamnophilus sticturus*	183803	68214
Bolivian Slaty-Antshrike	*Thamnophilus sticturus*	183804	68220
Plain Antvireo	*Dysithamnus mentalis*	183805	68224
Mato Grosso Antbird	*Cercomacra melanaria*	183806	68306
Band-tailed Antbird	*Hypocnemoides maculicauda*	183807	68166
Band-tailed Antbird	*Hypocnemoides maculicauda*	183808	68184
Band-tailed Antbird	*Hypocnemoides maculicauda*	183809	68242
Black-throated Antbird	*Myrmeciza atrothorax*	183810	68290
Black-throated Antbird	*Myrmeciza atrothorax*	183811	68279
Olivaceous Woodcreeper	*Sittasomus griseicapillus*	183812	68172
Olivaceous Woodcreeper	*Sittasomus griseicapillus*	183813	68173
Buff-throated Woodcreeper	*Xiphorhynchus guttatus*	183814	68198
Buff-throated Woodcreeper	*Xiphorhynchus guttatus*	183815	68157
Straight-billed Woodcreeper	*Xiphorhynchus picus*	183816	68209
Streaked Xenops	*Xenops rutilans*	183817	68202
Plain Softtail	*Thripophaga fusciceps*	183818	68233
Plain Softtail	*Thripophaga fusciceps*	183819	68256
Yellow-chinned Spinetail	*Certhiaxis cinnamomeus*	183820	68218
Plain-crowned Spinetail	*Synallaxis gujanensis*	183821	68167
Plain-crowned Spinetail	*Synallaxis gujanensis*	183822	68241
Plain-crowned Spinetail	*Synallaxis gujanensis*	183823	68277
Yellow-olive Flycatcher	*Tolmomyias sulphurescens*	183824	68201
Yellow-olive Flycatcher	*Tolmomyias sulphurescens*	183825	68213
Euler's Flycatcher	*Lathrotriccus euleri*	183826	68234
Boat-billed Flycathcer	*Megarynchus pitangua*	183827	68305
Dull-capped Attila	*Attila bolivianus*	183828	68207
Dull-capped Attila	*Attila bolivianus*	183829	68230
Dull-capped Attila	*Attila bolivianus*	183830	68231
Sulphur-bellied Tyrant-Manakin	*Neopelma sulphureiventer*	183831	68204
Band-tailed Manakin	*Pipra fasciicauda*	183832	68156

Band-tailed Manakin	*Pipra fasciicauda*	183833	68155
Band-tailed Manakin	*Pipra fasciicauda*	183834	68208
White-winged Becard	*Pachyramphus polychopterus*	183835	68261
Thrush-like Wren	*Campylorhynchus turdinus*	183836	68211
Fawn-breasted Wren	*Cantorchilus guarayanus*	183837	68267
Fawn-breasted Wren	*Cantorchilus guarayanus*	183838	68307
Hauxwell's Thrush	*Turdus hauxwelli*	183839	68169
Hauxwell's Thrush	*Turdus hauxwelli*	183840	68215
Unicolored Thrush	*Turdus haplochrous*	183841	68161
Unicolored Thrush	*Turdus haplochrous*	183842	68292
Unicolored Thrush	*Turdus haplochrous*	183843	68301
Red-capped Cardinal	*Paroaria gularis*	183844	68216
Gray-headed Tanager	*Eucometis penicillata*	183845	68154
Gray-headed Tanager	*Eucometis penicillata*	183846	68175
Gray-headed Tanager	*Eucometis penicillata*	183847	68266
White-shouldered Tanager	*Tachyphonus luctuosus*	183848	68276
Silver-beaked Tanager	*Ramphocelus carbo*	183849	68263
Yellow-browed Sparrow	*Ammodramus aurifrons*	183850	68302
Golden-crowned Warbler	*Basileuterus culicivorus*	183851	68206
Velvet-fronted Grackle	*Lampropsar tanagrinus*	183852	68158
Velvet-fronted Grackle	*Lampropsar tanagrinus*	183853	68164
Velvet-fronted Grackle	*Lampropsar tanagrinus*	183854	68232

DISCUSSION

Biogeography

The composition of the community of birds along the Rio Mamore was similar to the floodplain forest in the Western Amazon, but comparatively depauperate and included birds from the Cerrado and Pantanal. Three of the four taxa endemic to the Llanos de Moxos were present in the riverine forest at this site. The sister lineage or conspecific subspecies of all three of these taxa occupy floodplain forest in western Amazonia (O'Neill et al. 2011). Today, floodplain forest is continuous from the Rio Mamore into Amazonia, and most species that were present at our site likely occur continuously into Amazonia. The role of geography in isolating *Turdus haplochrous, Lampropsar tanagrinus boliviensis* and *Thripophaga fusciceps fusciceps* is thus unclear. The only estimate of divergence from a sister lineage in any of these taxa is a result of 1.45% divergence at the mitochondrial marker ND2 between *Turdus haplochrous* and its sister species, *Turdus sanchezorum* (O'Neill et al. 2011), which corresponds to divergence in the early Pleistocene, when glacial cycles(Colinvaux and Oliveira 2000) and secondary effects effects from Miocene marine incursions

(Santos et al. 2008) and the uplift of the Andes(Hoorn et al. 2010) may have affected habitat dynamics in the Amazon basin (Haffer 1997, Willis and Whittaker 2000), and barriers not present today may have played a role in isolating these populations.

Conservation

The Llanos de Moxos are mix of forest and flooded savannah with four endemic taxa of birds: *Ara glaucogularis, Turdus haplochrous, Lampropsar tanagrinus boliviensis,* and *Thripophaga fusciceps fusciceps*. Much of the management and research relating to bird conservation in the Beni has focused on *Ara glaucogularis*, (Hesse and Duffield 2000)which we did not detect at our site and does not seem to use riverine forest(Yamashita and Barros 1997). The other three taxa occur exclusively in floodplain or gallery forest, and were common at our site. Conservation of floodplain forest is therefore essential to maintenance of avian endemics and diversity within the Llanos de Moxos. The forest-savannah dynamics in the Llanos de Moxos have been modified by humans for millennia (Mayle et al. 2007), but increasing energy demands in South America have led to a very rapid increase of existing (Fearnside 2004) and proposed (Finer and Jenkins 2012)hydroelectric dams, with little research into their potential effects on floodplain forest.

Though outside the extensive rainforests of Amazonia, we found many of the same birds in the riverine forest in the Llanos de Moxos as are present in Amazonian floodplain forests. The savannahs of the Llanos de Moxos are famous for their large numbers of water birds, but our data indicate that its forests support similarly impressive populations of birds that have been persecuted by hunting and illegal trade. The presence of high numbers of Macaws (*Aras sp.)* and *Neochen jubata* may indicate that the Beni is important for the global populations of these declining species. Conservation of riverine forest is particularly important in the Amazon basin because no other river drainage in the world contains such a high proportion of its avian diversity in river-created habitats (Remsen and Parker 1983). Species limits affect conservation decisions, and *Thripophaga fusciceps* and *Lampropsar tanagrinus* are polymorphic species with several isolated populations that have not received modern systematic study. Investigation into the species limits in these groups may inform and motivate conservation in the floodplain forests of the Llanos de Moxos. We hope that the specimens and tissues we collected will aid in this pursuit. With the importance of floodplain forest for endemic and declining taxa as well as overall diversity, this habitat should be considered essential to any conservation policy for the Llanos de Moxos.

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