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Diurnal bird raptors of Llanos de Moxos, Bolivia

Aves de rapina diurnas em Llanos de Moxos, Bolívia

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Abstract

Raptor abundance has been poorly documented in the Neotropics. Here we describe the abundance and composition of the diurnal bird raptor community of Llanos de Moxos, one of the largest and less studied Neotropical savannah. During four consecutive breeding seasons (i.e., August 2007 to February 2008, August 2008 to January 2009, August 2009 to January 2010, and August 2010 to January 2011), we monitored 11 transects and 30 points, searching for raptors' activity. We detected 29 diurnal bird raptor species in the region, which represented almost half of diurnal bird raptor species of Bolivia. As expected, scavengers and generalists were most frequent and abundant diurnal bird raptors. The Llanos de Moxos shared 83% of raptor species with Venezuelan Llanos and 67% with Chaco wetlands. The Llanos de Moxos is an important migratory and conservation region for some species as Swainson's hawk, Chaco eagle, osprey and peregrine falcon. The lack of effective protected areas in the region is concerning, and, thus, the establishment of such areas should be a conservation priority.

Keywords: Accipitridae, Cathartidae, Falconidae, hawk, monitoring, Neotropics, species' inventory, savannah.

Resumo

A abundância de aves de rapina tem sido pouco documentada na região Neotropical. No presente trabalho, descrevem-se a abundância e a composição da comunidade diurna de aves de rapina de Llanos de Moxos, uma das maiores e menos estudadas savanas neotropicais. Durante quatro períodos de reprodução consecutivos (agosto de 2007 a fevereiro de 2008, agosto de 2008 a janeiro de 2009, agosto de 2009 a janeiro de 2010 e agosto de 2010 a janeiro de 2011), foram monitorados 11 transectos e 30 pontos, buscando atividades de aves de rapina. Detectamos 29 espécies de aves de rapina diurnas na região, que representaram quase metade das espécies dessas aves diurnas da Bolívia. Como esperado, os detritívoros e generalistas foram as aves de rapina diurnas mais frequentes e abundantes. Os Llanos de Moxos compartilharam 83% de espécies de aves de rapina com Llanos venezuelanos e 67% com áreas úmidas de Chaco. Os Llanos de Moxos representam uma importante região migratória e de conservação para algumas espécies, tais como o falcão de Swainson, a águia cinzenta, a água pescadora e o falcão peregrino. A falta de áreas protegidas efetivas na região é preocupante, de forma que o estabelecimento de tais áreas deve ser considerado uma prioridade de conservação.

Palavras-chave: Accipitridae, Cathartidae, Falconidae, falcão, monitoramento, Neotrópico, inventário de espécies, savana.

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Introduction

Large savannahs usually sustain high density of bird raptors, especially scavengers and generalists (del Hoyo *et al.,* 1994). While raptor abundance was widely described in the African region, it is poorly documented in the Neotropics (Sorley and Andersen, 1994; Seavy and Apodaca, 2002; Ferguson-Lees and Christie, 2005; Thiollay, 2007). Some savannahs of South America acknowledged some attention from raptor researchers. Raptor abundance was described in the Llanos of Venezuela, the Brazilian Cerrado and the Argentinean Wet Chaco (Di Giacomo, 2000; Jensen *et al.,* 2005; Eduardo *et al.,* 2007; Seipke, 2007). By the other hand, savannas as the Llanos de Moxos, received little or any attention from raptor's researchers. Even when all these savannahs are geographically distant one from another, they are ecologically similar, exposed to seasonal flooding, and with major vegetation types including grasslands, savannah woodlands, and gallery forests (Werneck *et al.,* 2012).

Llanos de Moxos is one of largest savannas of South America with an approximately area of the size of the United Kingdom (i.e., 213.564 km^2). The lack of a network of roads first, and later the drug trafficking, constrain field research in this Bolivian region until the end of the twenty century (Brace *et al.,* 1997). During the last two decades, some new vertebrate species were discovered or rediscovered in this region (Jordan and Munn, 1993; Balchin, 2007; Martínez and Wallace, 2007). Even concentrating the 41% of diurnal bird raptors of Bolivia, the Llanos de Moxos was poorly studied and the available information is limited (Hennessey *et al.,* 2003; Herrera and Maillard, 2007; Berkunsky *et al.,* 2012). Here we describe the abundance and composition of the diurnal bird raptor community of one of greatest Neotropical savannah, the Llanos de Moxos; and we compare this community with other diurnal bird raptor communities of Neotropical savannahs.

Methods

Study site

We conducted surveys in the Llanos de Moxos (from 12° to 16° S, and from 63° to 67° W), Beni Department, northern Bolivia (Figure 1). The Llanos de Moxos is a seasonally inundated savannah, interspersed with a complex mosaic of forest islands and riverine gallery forests, occupying the extremely flat Beni-Mamoré-Iténez basin in southwest Amazonia, situated between the Precambrian Shield to the east and the Andes to the west and south (Hanagarth and Beck, 1996). Numerous white-water rivers and hundreds of shallow, flat-bottomed lakes cover the landscape. The landscape is dominated by flat, low-lying areas, which are seasonally inundated and covered by

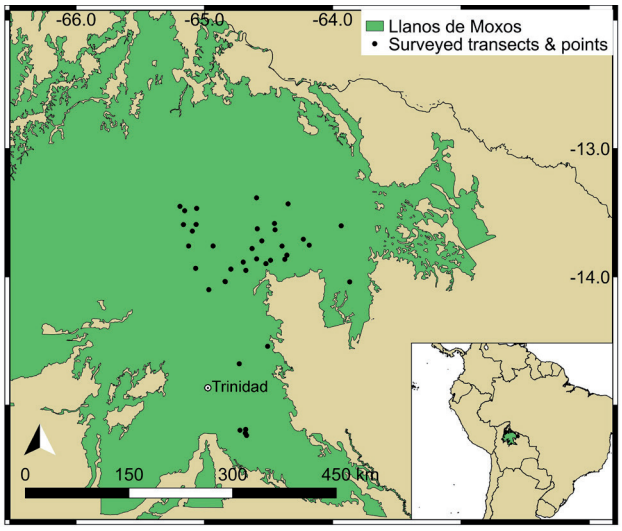

Figure 1. Geographic distribution of transects and points (black dots), where raptors surveys were conducted in the Llanos de Moxos, northern Bolivia.

completely open, treeless savannah (Mayle *et al.,* 2007). Conversely, forest islands are scarce and restricted to raised areas (mounds), which are sufficiently elevated to escape annual flooding. Most of forest islands are eroded relics of natural levees or terraces of abandoned river canals, and therefore constitute fragments of former gallery forest (Langstroth, 1996).

Human presence in the study area occurs at low densities (1.4 people per square kilometer), with 43 settlements spanning the municipalities of Trinidad, San Javier, San Ramón, Santa Ana de Yácuma, San Andrés and Loreto. The primary occupation of the residents is cattle ranching (Hangarth and Sarmiento, 1990) as has been the case for several hundred years. The study was carried out on private lands (owner names are mentioned in acknowledgments).

Data collection

In this study, we considered diurnal bird raptors as those members of the Cathartidae, Pandionidae, Accipitridae and Falconidae families. Data were collected from early August up to late January during four consecutive breeding seasons (i.e., August 2007 to February 2008, August 2008 to January 2009, August 2009 to January 2010, and August 2010 to January 2011). Each season, a total of 11 transects (10 km each, unbounded) were travelled by two observers, and a total of 30 points (30 minutes each, unbounded) were completed by two simoultaneously observers with binoculars (10 x 42, and 10 x 52). In transects and points, we searched for raptors' activity and all detected individuals were counted (perched and flying). We detailed all detected individuals (perched or flying)

from transect and/or point, and we documented the presence of juveniles and/or nests.

We easily recognized the observed species, and most of them were photographed. However, doubts were clarified with the aid of bird and raptor guides for identification (del Hoyo *et al.*, 1994; Ferguson-Lees and Christie, 2005). We follow the South American Classification Committee for common and Latin names of birds (Remsen *et al.,* 2017). Raptors were classified in residents or migrants according Bildstein (2004) and Ferguson-Lees and Christie (2005). Migrants were classified as complete migrants, partial migrants, irregular and local migrants (Bildstein, 2004). For each species, we estimated frequency as the number of sites (transect and points) where the species was detected by the total of surveyed sites; and relative abundance as the number of detected individuals per kilometer of transect.

Results

We detected 29 diurnal bird raptor species in Llanos de Moxos. The Llanos de Moxos shared 24 raptor species (83%) with Venezuelan Llanos and 18 raptor species (67%) with Chaco wetlands (Table 1). Six species were only detected from points: osprey, hook-billed kite, slender-billed kite, peregrine falcon, bat falcon and orange-breasted falcon. One of ospreys had a pair of leg bands, being probably an individual from North hemisphere (Figure 2A). In line transects we counted 782 individuals from 22 species. Most abundant species were southern caracara (2.09 individual km^{-1}), black vulture (2.01 individual km^{-1}) and snail kite (1.32 individual km^{-1}), while most frequent species include savanna hawk (91%), southern caracara (82%), turkey vulture (82%), black-collared hawk (73%) and black vulture (73%, Table 1).

We detected 10 migrant species. Three species are complete migrants (osprey, Swainson's hawk and peregrine falcon); three species are partial migrants (turkey vulture, snail kite, and plumbeous kite); and four species are irregular and local migrants (hook-billed kite, slender-billed kite, aplomado falcon and american kestrel. Flocks of hundreds of Swainson's hawk were observed in late October and November in 2007, 2008, 2009 and 2010. A flock of at least 15 hook-billed kites was observed near to a stream in October 2008. We observed breeding behavior in at least 47% of the species (Table 1).

Discussion

The richness of species was similar to other Neotropical savannahs. The 29 species of llanos de Moxos was close to the 30 species reported for the Venezuelan Llanos, and almost the double of the 15 species reported for Wet Chaco (Jensen *et al.,* 2005; Seipke, 2007; Trejo, 2007).

As expected, scavengers and generalists were the most frequent and abundant diurnal bird raptors (Ferguson-Lees and Christie, 2005). The most common diurnal bird rap-

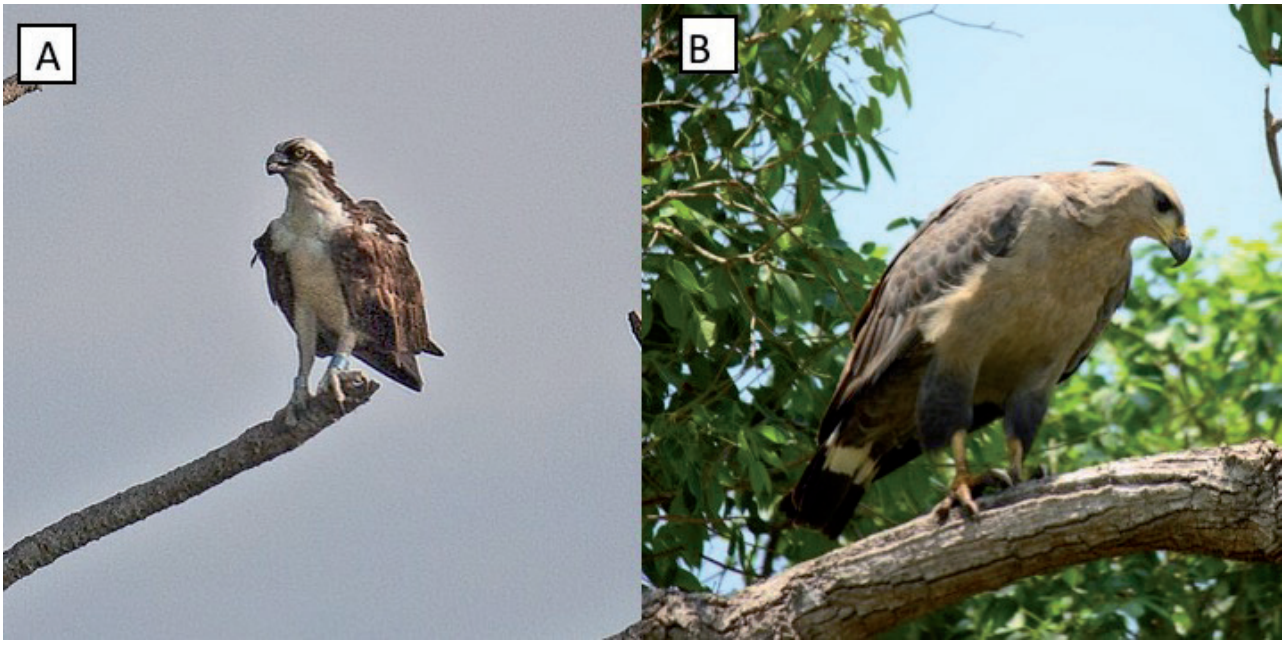

Figure 2. Two bird raptor species of concern in the Llanos the Moxos, northern Bolivia: (A) a leg-banded migratory Osprey (*Pandion haliaetus*) in Río San Martín (13.27° S, 63.70° W), on October 15th, 2010; and (B) an adult of the endangered Chaco Eagle (*Buteogallus coronatus*) in Arroyo Colorado (13.84° S, 64.54° W), on October 28th, 2009. Photographs: G. Daniele.

Table 1. Diurnal bird raptors in Neotropical savannahs: conservation status and population trend (IUCN Red List 2017), relative frequency (sites with detection over the total surveyed sites) and mean relative abundance (± SD) of species observed between 2007 and 2009 in Llanos de Moxos, Bolivia (this work). Last two columns represent the species found by Jensen *et al.* (2005) and Trejo (2007) in Venezuela llanos and Chaco wetlands, respectively. -: not detected.

Taxa	IUCN category & trend	Relative frequency and abundance (indiv./km)	Breeding and/ or migratory activity	Venezuelan llanos (Jensen *et al.,* 2005)	Chaco wetlands (Trejo, 2007)
Cathartidae					
King vulture, *Sarcoramphus papa* (Linnaeus, 1758)	LC decreasing	3% (0.01 ± 0.03)	Juveniles	Present	Present
Turkey vulture, *Cathartes aura* (Linnaeus, 1758)	LC stable	82% (0.69 ± 0.93)	-	Present	Present
Lesser yellow-headed vulture, *Cathartes burrovianus* Cassin, 1845	LC stable	27% (0.07 ± 0.12)	-	Present	Present
Black vulture, *Coragyps atratus* (Bechstein, 1793)	LC increasing	73% (2.01 ± 4.14)	Nest, egg, nestlings	Present	Present
Pandionidae					
Osprey, *Pandion haliaetus* (Linnaeus, 1758)	LC increasing	1%	-	Present	-
Accipitridae					
White-tailed kite, *Elanus leucurus* (Vieillot, 1818)	LC increasing	-	-	-	Present
Pearl kite, *Gampsonyx swainsonii* Vigors, 1825	LC increasing	-	-	-	Present
Gray-headed kite, *Leptodon cayanensis* (Latham, 1790)	LC decreasing	-	-	Present	-
Hook-billed kite, *Chondrohierax uncinatus* (Temminck, 1822)	LC decreasing	2%	Large flocks	Present	-
Black hawk-eagle, *Spizaetus tyrannus* (zu Wied-Neuwied, 1820)	LC decreasing	1%	-	-	-
Black-collared hawk, *Busarellus nigricollis* (Latham, 1790)	LC decreasing	73% (0.23 ± 0.21)	Nest, nestlings and juveniles	Present	-
Snail kite, *Rosthramus sociabilis* (Vieillot, 1817)	LC increasing	55% (1.32 ± 2.02)	Juveniles	Present	-
Slender-billed kite, *Helicolestes hamatus* (Temminck, 1821)	LC decreasing	1%	-	Present	-
Plumbeous kite, *Ictinia plumbea* (Gmelin, JF, 1788)	LC stable	3% (0.03 ± 0.06)	-	Present	Present
Cinereous harrier, *Circus cinereus* Vieillot, 1816	LC decreasing	-	-	-	Present
Long-winged harrier, *Circus buffoni* (Gmelin, JF, 1788)	LC decreasing	2% (0.02 ± 0.04)	-	Present	Present
Crane hawk, *Geranospiza caerulescens* (Vieillot, 1817)	LC decreasing	18% (0.02 ± 0.04)	-	Present	Present
Slate-colored hawk, *Buteogallus schistaceus* (Sundevall, 1850)	LC decreasing	9% (0.02 ± 0.06)	-	-	-
Common black hawk, *Buteogallus anthracinus* (Deppe, 1830)	LC decreasing	-	-	Present	-
Savanna hawk, *Buteogallus meridionalis* (Latham, 1790)	LC increasing	91% (0.51 ± 0.71)	Nest, nestlings and juveniles	Present	Present
Great black hawk, *Buteogallus urubitinga* (Gmelin, 1788)	LC stable	55% (0.11 ± 0.15)	Nest, nestlings and juveniles	Present	Present
Chaco eagle, *Buteogallus coronatus* (Vieillot, 1817)	EN decreasing	18% (0.04 ± 0.09)	Nest, egg, nestling, juveniles	-	Present

Table 1. Continuation.

Taxa	IUCN category & trend	Relative frequency and abundance (indiv./km)	Breeding and/ or migratory activity	Venezuelan llanos (Jensen *et al.,* 2005)	Chaco wetlands (Trejo, 2007)
Roadside hawk, *Rupornis magnirostris* (Gmelin, 1788)	LC increasing	27% (0.06 ± 0.10)	Juveniles	Present	Present
Harris's hawk, *Parabuteo unicinctus* (Temminck, 1824)	LC decreasing	-	-	Present	Present
White-tailed hawk, *Geranoaetus albicaudatus* Vieillot, 1816	LC increasing	55% (0.11 ± 0.16)	Juveniles	Present	Present
Black-chested buzzard-eagle, *Geranoaetus melanoleucus* (Vielliot, 1819)	LC stable	-	-	-	Present
Gray-lined hawk, *Buteo nitidus* (Latham, 1790)	LC decreasing	-	-	Present	Present
Short-tailed hawk, *Buteo brachyurus* Vielliot, 1816	LC increasing	-	-	Present	-
Swainson's Hawk, *Buteo swainsoni* Bonaparte, 1838	LC stable	9% (0.08 ± 0.26)	Large migratory flocks		
Zone-tailed Hawk, *Buteo albonotatus* Kaup, 1847	LC increasing	27% (0.03 ± 0.07)	-	Present	Present
Falconidae					
Laughing falcon, *Herpetotheres cachinans* (Linnaeus, 1758)	LC decreasing	2% (0.02 ± 0.01)	-	Present	Present
Southern caracara, *Caracara plancus* (Miller, 1777)	LC increasing	82% (2.09 ± 1.46)	Nest, nestlings and juveniles	Present	Present
Yellow-headed caracara, *Milvago chimachima* (Vielliot, 1816)	LC increasing	64% (0.14 ± 0.19)	Nest, eggs, nestlings and juveniles	Present	Present
Chimango caracara, *Milvago chimango* (Vieillot, 1816)	LC increasing	-	-	-	Present
American kestrel, *Falco sparverius* Linnaeus, 1758	LC stable	64% (0.09 ± 0.11)	Nest, nestlings and juveniles	Present	Present
Bat falcon*, Falco rufigularis* Daudin, 1800	LC decreasing	1%	Nest	Present	Present
Orange-breasted falcon, *Falco deiroleucus* Temminck, 1825	NT decreasing	1%	-	-	Present
Aplomado falcon, *Falco femoralis* Temminck, 1822	LC decreasing	36% (0.04 ± 0.06)	Juveniles	Present	-
Peregrine falcon, *Falco peregrinus* Tunstall, 1771	LC stable	1%	-	Present	-

tors were black vulture, turkey vulture, southern caracara and savanna hawk; followed by other less abundant, but still frequent species generalists, such as turkey vulture, black-collared hawk, white-tailed hawk, yellow-headed caracara and American kestrel.

The highest abundant, but less frequent (55%), species was the snail kite, which showed large congregates in flooded areas. This gregarious kite is common in flooded fields, streams and small lakes in the whole region (Brace *et al.,* 1997).

Some habitat specialists have a low frequency, and this could be a consequence of a low availability of their specific habitats in the sampled area. This is the case of the osprey and the slender-billed kite, two species detected only near to streams and/or rivers with high vegetation coverage. We failed to detect some forest associated species as forest eagles (e.g., harpy eagle, crested eagle, etc), hawks (genus *Accipiter)* and forest-falcons (genus *Micrastur*) reported for the Beni department (Hennessey *et al.,* 2003). Our sampling was concentrated in Beni savannahs, a habitat where these species usually have a low detectability (*pers. obs*.).

The presence of flocks of migratory species suggests that the Llanos de Moxos would be an important stepping-stone for these species. Large numbers of Swainson's hawk confirm the Llanos de Moxos as part of their con-

tinental migratory route (Bildstein, 2004; Sarasola *et al.,* 2007). Other large concentrations of raptors, as the case of hook-billed kite, also suggest migratory movements of these species in the region (Paulson, 1983). In the case of lonely migrants, the detection of a leg-banded osprey would be suggesting a wintering habitat in the Llanos de Moxos, and the detection of a single peregrine falcon may suggest the Llanos is also a wintering site and/or it is in it migratory route (Fuller *et al.*, 1998).

Almost half (29 of 68 species, Hennessey *et al*., 2003) of diurnal bird raptor species of Bolivia were found in the Llanos de Moxos, including two globally threatened species, the chaco eagle and the orange-breasted falcon. The chaco eagle was found in almost one fifth of the surveyed sites, but always in low abundance. One breeding pair was located recently, confirming the reproduction of this endangered eagle in the region (Berkunsky *et al.,* 2012). The orange-breasted falcon is globally considered as near threatened, being uncommon in the Llanos de Moxos, only detected once in a survey point. The Llanos de Moxos concentrated a good number and abundance of diurnal raptor birds and it is an important migratory and conservation area for these species. The lack of effective protected areas in the region is concerning, and the establishment of such areas should be a conservation priority (Herzog *et al.,* 2005).

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References

BALCHIN, C. 2007. Back from the dead! A potpourri of recent rediscoveries in the Neotropics. *Neotropical Birding*, **2**(1):4-11.

BERKUNSKY, I.; DANIELE, G.; KACOLIRIS, F.P.; FAEGRE. S.I.K.; GANDOY, F.A.; GONZÁLEZ, L.; DÍAZ LUQUE, J.A. 2012. Records of the Crowned Eagle (*Urubitinga coronata*) in Moxos plains of Bolivia and observations about breeding behavior. *Revista Brasileira de Ornitologia-Brazilian Journal of Ornithology*, **20**(4):447-450.

BILDSTEIN, K.L. 2004. Raptor migration in the Neotropics: patterns, processes, and consequences. *Ornitología Neotropical*, **15**(Suppl.):83-99.

BRACE, R.C.; HORNBICKLE, J.; PEARCE-HIGGINS, J.W. 1997. The avifauna of the Beni Biological Station. *Bird Conservation International*, **7**(2):117-159. https://doi.org/10.1017/S0959270900001465

DEL HOYO, J.; ELLIOT, A.; SARGATAL J. 1994. *Handbook of the birds of the world, Vol. 2. New World Vultures to Guineafowl*. Barcelona, Lynx Edicions, 638 p.

DI GIACOMO, A.G. 2000. Nidificación de algunas rapaces poco conocidas en el Chaco Oriental argentino. *Hornero*, **15**(2):135-139.

EDUARDO, C.; CARVALHO, A.; MARINI, M.A. 2007. Distribution patterns of diurnal raptors in open and forested habitats in south-eastern Brazil and the effects of urbanization. *Bird Conservation International*, **17**(4):367-380. https://doi.org/10.1017/S0959270907000822

FULLER, M.R.; SEEGAR, W.S.; SCHUECK, L.S. 1998. Routes and Travel Rates of Migrating Peregrine Falcons *Falco peregrinus* and Swainson's Hawks *Buteo swainsoni* in the Western Hemisphere. *Journal of Avian Biology*, **29**(1):433-440. https://doi.org/10.2307/3677162

FERGUSON-LEES, J.; CHRISTIE, D.A. 2005. *Raptors of the world.* Princenton/London, Christopher Helm, 320 p.

HANAGARTH, W.; BECK, S.G. 1996. Biogeographie der Beni-Savannen (Bolivien). *Geologische Rundschau*, **48**(3):662-668.

HANAGARTH, W.; SARMIENTO, J. 1990. Reporte prelimniar sobre la geo-ecología de la Sabana de Espíritu y sus alrededores (Llanos de Moxos, Departamento del Beni, Bolivia). *Ecología en Boliva*, **16**(1):47-75.

HENNESSEY, A.B.; HERZOG, S.K.; SAGOT, F. 2003. *Lista anotada de las aves de Bolivia.* 5th ed., Santa Cruz de la Sierra, Asociación Armonía-BirdLife International, 238 p.

HERZOG, S.K.; SORIA AUZA, R.W.; HENNESSEY, A.B. 2005. Patrones ecorregionales de riqueza, endemismo y amenaza de la avifauna boliviana: prioridades para la planificación ecorregional. *Ecología en Bolivia*, **40**(1):27-40.

HERRERA, M.; MAILLARD, O. 2007. Registros significativos de aves para el Departamento de Beni, Bolivia. *Kempffiana*, **3**(1):28-34.

JENSEN, W.J.; GREGORY, M.S.; BALDASSARRE, G.A.; VILELLA, F.J.; BILDSTEIN, K.L. 2005. Raptor abundance and distribution in the Llanos wetlands of Venezuela. *Journal of Raptor Research*, **39**(4):417-428.

JORDAN, O.C.; MUNN, C.A. 1993. First observations of the Blue-throated Macaw in Bolivia. *The Wilson Bulletin*, **105**(4):694-695.

LANGSTROTH, R.P. 1996. *Forest islands in an Amazonian savannah of northeastern Bolivia*. Madison, United States. PhD thesis. University of Wisconsin, 197 p.

MARTÍNEZ, J.; WALLACE, R.B. 2007. Further notes on the distribution of endemic Bolivian titi monkeys, *Callicebus modestus* and *Callicebus olallae*. *Neotropical Primates*, **14**(2):47-54. https://doi.org/10.1896/044.014.0201

MAYLE, F.E.; LANGSTROTH, R.P.; FISHER, R.A.; MEIR, P. 2007. Long-term forest-savannah dynamics in the Bolivian Amazon: Implications for conservation. *Philosophical Transactions of the Royal Society B Biological Sciences*, **362**(1478):291-307. https://doi.org/10.1098/rstb.2006.1987

REMSEN, J.V.; ARETA, J.I.; CADENA, C.D.; CLARAMUNT, S.; JARAMILLO, A.; PACHECO, J.F.; PÉREZ-EMÁN, J.; ROBBINS, M.B.; STILES, F.G.; STOTZ, D.F.; ZIMMER, K.J. 2017. A classification of the bird species of South America. American Ornithologists' Union. Available at: http://www.museum.lsu.edu/~Remsen/SACCBaseline.htm Accessed on: August 30th, 2017.

PAULSON, D.R. 1983. Flocking in the Hook-billed Kite. *Auk*, **100**(3):749-750.

SARASOLA, J.H.; GALMES, M.A.; SANTILLÁN, M.A. 2007. Ecología y conservación del Aguilucho Langostero (*Buteo swainsonii*) en Argentina. *Hornero*, **22**(2):173-184.

SEAVY, N.E.; APODACA, C.K. 2002. Raptor abundance and habitat-use in a highly-disturbed-forest landscape in western Uganda. *Journal of Raptor Research*, **36**(1):51-57.

SEIPKE, S. 2007. A comparison of raptor abundance in the Venezuelan Llanos and the Wet Chaco in Argentina. *In*: Neotropical Ornithological Congress, VIII, Maturín, 2007. *Proceedings*... Maturín, **1**:216.

SORLEY, C.S.; ANDERSEN, D.E. 1994. Raptor abundance in south-central Kenya in relation to land use patterns. *African Journal of Ecology*, **32**(1):30-38. https://doi.org/10.1111/j.1365-2028.1994.tb00552.x

THIOLLAY, J.M. 2007. Raptor declines in West Africa: comparisons between protected, buffer and cultivated areas. *Oryx*, **41**(3):322-329. https://doi.org/10.1017/S0030605307000809

TREJO, A. 2007. Bibliografía comentada sobre aves rapaces de Argentina. *Hornero*, **22**(2):185-217.

WERNECK, F.P.; NOGUEIRA, C.; COLLI, G.R.; SITES JR, J.W.; COSTA, G.C. 2012. Climatic stability in the Brazilian Cerrado: implications for biogeographical connections of South American savannas, species richness and conservation in a biodiversity hotspot. *Journal of Biogeography*, **39**(9):1695-1706. https://doi.org/10.1111/j.1365-2699.2012.02715.x

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