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Cathartes aura in Peru

Buteogallus urubitinga in Mexico

Chondrohierax uncinatus in Costa Rica

Buteogallus coronatus in Brazil

Strigiformes in Venezuela

Raptor rehabilitation

A Tribute to Oscar Beingolea

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Turkey Vulture (*Cathartes aura)* photographed in the United States © Jim Shane

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The NRN is a membership-based organization. Its goal is to aid the research and conservation of Neotropical raptors by promoting communication and collaboration among biologists, raptor enthusiasts, and other conservationists working in the Neotropics. To join please e-mail the NRN coordinator, Marta Curti, at mcurti@peregrinefund.org, stating your interest in Neotropical raptor research and conservation.

Record of Turkey Vulture (*Cathartes aura*) in an Altoandino ecosystem in Puno, Peru

By **Dennis X. Huisa B.**[1 2] and **Anthony G. Pino Ch.**[1 2]

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Vultures are widely distributed around the world. They are found on almost every continent except Antarctica, Australia, and the islands that surround them (ENVIS, 2015). The Turkey Vulture (*Cathartes aura*) is widely distributed ecologically and geographically (Kiff, 2010) from southern Canada, Central America, South America to Tierra del Fuego, the Falkland Islands, and some Caribbean islands (Stager 1964, Campbell et al. 2005, BirdLife International 2012, ENVIS 2015, Pavez 2019).

This species is a specialist at finding thermal currents on which to soar and search for carrion (Campbell et al. 2005). Its size coupled with its long wings directed upwards in an extended "v"shape, with the tips of the primaries well separated in the form of fingers, and the comparatively long and rounded tail characterize this species in flight (Allen 1914, Pavez 2019). Preferred habitats are farmlands, grasslands, seashores, lakes, agricultural areas, seabird islands, wastewater ponds, or places where carcasses of domestic and wild animals can be found (Campbell et al. 2005, Garber and Young 2005, Pavez 2019). They nest in a community of several hundred and seek food socially (Garber and Young 2005). Nests were recorded in Formosa, Argentina, in large forest stands with a wide availability of suitable holes for nesting. Alejandro Di Giacomo (pers. comm.) found four Turkey Vulture nests located on the ground among high and dense grasslands (Moroni and Salvador 2014).

As a scavenger, the Turkey Vulture is located at the top of the food chain (Pavez, 2019). It is an opportunistic feeder, consuming a wide range of wild and domestic carrion. Mammals, ranging in size from mice and shrews to large ungulates, are its most common food source. It also feeds on birds, reptiles, insects, and even plant material (Campbell et al., 2005, Garber and Young 2005, ENVIS 2015, Pavez 2019). Domestic dogs (*Canis lupus familiaris*) form part of its diet (Torres-

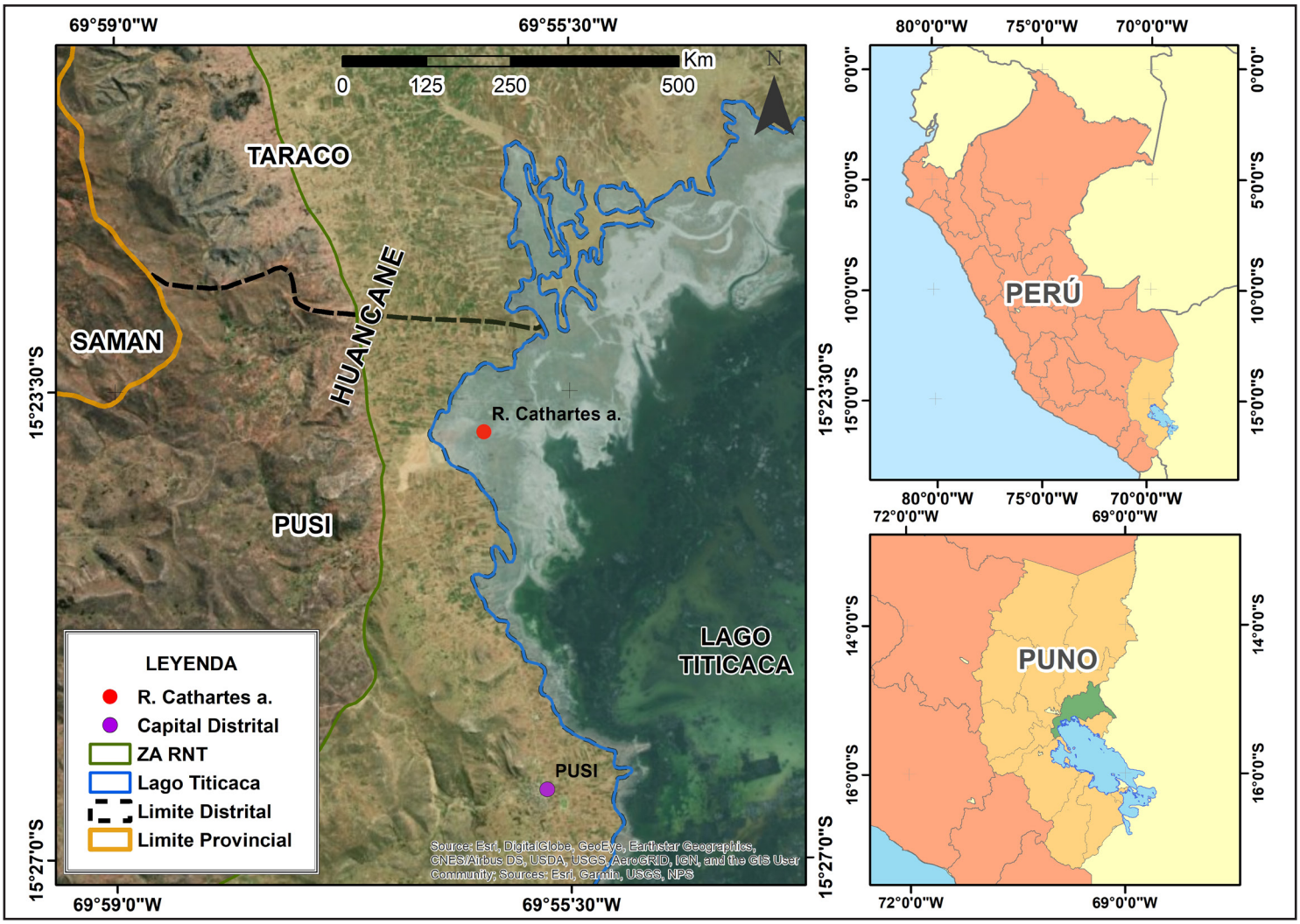

Figure 1. **Map showing location where observations of Turkey Vultures (*Cathartes aura*) occured, Ahuallane, 2016.**

Mura, Lemus and Hertel, 2015). Plastic has been found in its pellets (Torres-Mura, Lemus and Hertel, 2015). Observations of them feeding on other food resources provide important insight into the behavior of the Cathartidae family (Batista-da-Silva and Souza, 2014). For example, in Chile, Housse (1933) observed them feeding on newborn puppies.

Turkey Vulture is categorized as Least Concern (LC) according to the IUCN Red List of Threatened Species (BirdLife International, 2012). In the 20th century, athropogenic activities are one of the causes for the recent change in bird distribution (Campbell et al., 2005). In the case of the Turkey Vulture, there is evidence of changes in its selection of nesting sites and the dynamics of its populations (Lowney, 2010).

In Peru, *C. aura* occurs from sea level to 2200 masl (Schulenberg et al. 2007), and is considered "Vagrant" in high Andean ecosystems (Clements and Shanny 2001, Schulenberg et al. 2007). In Chile it was registered at 4400 masl (Cerpa,

2018) though this species does not usually exceed 1000 masl (Pavez 2019). Therefore, it is pertinent to report on the registration of individuals in a high Andean ecosystem close to 4000 masl.

Observation

The observation occurred in Zona de Ahuallane, in the community of Hatun Ayllu, within the Buffer Zone of the Titicaca National Reserve. The reserve is located in the Province of Huancané, Department of Puno, Aone 19 L (15 ° 23 ' 48.56 "S and 69 ° 56'9.54" W) (Datum WGS 84), at an altitude of 3821 masl. This area is considered a floodplain (CIRNMA-CEDAFOR, 2001). On 17 June 2016, at 11:13 hrs we observed eight Turkey Vultures gathered at a carcass at a distance of 849.75 linear meters from Lake Titicaca and 284.35 linear meters from the Ahuallane Environmental Liability Zone. This is one of the longest-lived liability zones in Peru, which began with oil activity in the area in 1944 (Figure 1). We used a Garmin e-trex 20 GPS, Nikon D-3100 camera and Nikkor 55-200mm lens, Bushnell Green Roof Trophy 10x42 binoculars, field notebook and pencil to carry out the observations.

Of the eight Turkey Vultures we observed, four were gathered at the carcass of a domestic dog (*Canis lupus familiaris*). Three individuals hovered around the carrion at a height of approximately 100 meters and one individual was flying in a southwesterly direction. During the observation, two vultures fed on the carcass, while two others waited their turn at a distance of approxi-

Figure 2. **Turkey Vulture (*Cathartes aura)* feeding on a dog carcass in the floodplain of the Titicaca National Reserve, Ahuallane, 2016 Photo © Anthony G. Pino Ch.**

mately 4 meters. At one point, one of the vultures that had been feeding left the carcass and joined the others that had been waiting a short distance away. Of these three birds, one approached the carcass, reaching its head close to try to tear off a piece of meat. It was immediately harassed by a feeding vulture. The individual that had been feeding attacked the interloper by leaping at it with open wings. Its head was forward and its neck was gathered in an "s" shape. This caused the three waiting vultures to move further away from the carcass, where they remained while they waited to feed.

It is is evident that only one "hostile" individual dominated the carrion, keeping three at bay while another three remained airborne. It is likely that the one we observed flying to the southwest had been the first to feed. In the Falkland Islands, observations showed *C. aura* often ignores any aggression shown by smaller scavenging species, and continues with its feeding uninterrputed (Dwyer and Cockwell 2003).

Discussion

The Turkey Vulture is at the top of the food chain (scavenger) in this high Andean ecosystem of the Huancane Floodplain. Its ecological function is to consume dead animals, preventing the spread of pathogenic bacteria (Batista-da-Silva and Souza, 2014), while the mechanism of its digestive system reduces the bacterial diversity of its food (Graves 2017). Hector Luque-Machaca (pers. comm.) observed Mountain Caracara (*Phalcoboenus megalopterus*) feeding on carcasses of Titicaca Grebe (*Rollandia microptera*) on the beaches of Isla Soto (Lake Titicaca). Carcasses of *R. microptera* were also recorded on the shores of Lake Huiñaymarca (denomination of the southern area of Lake Titicaca) (Richard 2013, 2017) in the months prior to the rainy season (August-November). These species serve as food sources for *C. aura* in this region.

Another important food source for this species may be provided by the death of wild fauna, mainly birds, caused by the burning of cattails (macrophyte plant). This is a custom practiced by the lake-dwelling population to accelerate plant regrowth, which is then extracted to feed livestock. Given this scenario, Gonzales (2017) recommends verifying the effect of burning on the planktonic community, birdlife, fish, and the surrounding population. Turkey Vultures, however, are adaptable and able to exploit the feeding opportunities created by human activities (Avery and Lonway 2016).

During conversations with local villagers, they mentioned that thieves leave poisoned bait with the aim of killing other villagers' dogs. It is probable that the poisoned bait is ingested by a wide variety of animals. On our way to the observation site, we observed two dead animals: an Andean Gull (*Choicocephalus serranus*) and a domestic cat (*Felis catus*). Both carcasses were in a

canal, approximately 1 km away from the carcass of the domestic dog. In British Columbia, Canada, Campbell et al. (2005) reported the death of 10 Turkey Vultures that had been indirectly poisoned after they fed on poisoned bait which had been set out to control carnivores in agricultural areas. Kiff (2000 apud Snyder and Snyder 1991), asserts that *C. aura* is sensitive to poisons dervied from cyanide and strychnine, often used to poison coyotes and other wildlife perceived as a threat to livestock. Additionally, experiments with constant exposure to lead doses weakened them causing them to defecate and regurgitate (Carpenter et al. 2003). While their rapid metabolism makes them tolerant to diclofenac (Naidoo et al., 2011), these poisoning events represent a threat to them as well as other carnivorous and scavenging species.

It is worrying that human-fauna conflicts continue throughout the natural distribution range of the Turkey Vulture, in places where agricultural activities are carried. Fortunately, through education, the persecution of all vultures (and raptors) occurs at a much lower rate than it did before (Campbell et al, 2005). At the beginning of the last century in Chile, some ranchers paid for each C. aura killed in response to the economic losses generated when they attacked cattle in calving season (Housse, 1933). Predation on livestock and pets is one of the problems associated with *C. aura* (Avery and Lowney 2016). The Turkey Vulture is not protected by Peruvian law even though its role within this high Andean ecosystem is important. The advancement of the agricultural and urban frontier makes it imperative to carry out further studies to determine the degree of influence that these activities exert on the biota of Lake Titicaca and its surrounds, since this information has been scarcely documented. Furthermore, studies on this species are necessary and may result in the Turkey Vulture being classified as "resident" in the floodplains, if sightings in this region continue.

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* * *

Additional records of the Great Black Hawk (*Buteogallus urubitinga*) in the Chontalpa Ecological Park, Tabasco, Mexico

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The Great Black Hawk (*Buteogallus urubitinga*) ranges from northwest and northeast Mexico to northern Argentina, from sea level to 1800 masl, in habitats that include forested areas, often near water, swamps, and mangroves (Howell and Webb 1995). In Mexico it is a species at risk, and subject to Special Protection (SEMARNAT 2010). In the state of Tabasco it is a rare resident, and was first observed in March 1959 between Villahermosa and Frontera (Berrett 1962).

Since then it has been registered in other sites in the state (Berrett 1962, CONABIO 2020), including four Natural Protected Areas (NPA): Pantanos de Centla Biosphere Reserve (302,706 ha), Cañón del Usumacinta State Park (45,954 ha), Parque Sierra de Tabasco State (15,113 ha) and Chontalpa Ecological Park (277 ha) (Córdova-Ávalos et al. 2009, González-Valdivia et al. 2012, Sánchez-Soto 2012, CONABIO 2014). These NPAs are possibly the most important areas for the conservation of *B. urubitinga* and other species of birds of prey in Tabasco. This state has largely lost its rainforests, to the extent that its territory of 24,661 km^2 currently resembles a large paddock. (SEDESPA 2006).

The Chontalpa Ecological Park (PECh for its acronym in Spanish) is one of the few remnants of native vegetation in the La Chontalpa region, located in western Tabasco, which was largely deforested in the 1960s during the establishment of an agricultural development program called the Chontalpa Plan (SEDESPA 2006). The PECh is located 21 km west of the city of Heroica Cárdenas (17 ° 59'34.69 "N, 93 ° 35'1.55" W). It is divided into three fragments with different types of vegetation, mainly median floodplain evergreen forest. It is dominated by an agricultural landscape with grasslands, sugar cane crops, cocoa plantations and human settlements (Sánchez-Soto 2012). One of these settlements originated

from an invasion of the PECh in 1996, which resulted in a reduction of its original area from 277 ha to 197 ha (Anonymous 1998). Despite PECh's relatively small surface area and its location in a highly altered environment, 124 species of birds have been registered there, 18 of which are raptors. This includes *B. urubitinga*, the largest of the resident species of the Accipitridae family recorded in this ANP (Sánchez-Soto 2012). Although this author did not take photographs or specify the observation dates of different bird species, his record of *B. urubitinga* corresponds to an adult observed in May 2012 inside a jungle fragment, where it was seen perching and vocalizing.

Methods

In 2013 and 2014, we visited the park five times each year in order to corroborate the presence of *B. urubitinga* in the PECh and to get an idea of this ANP's importance as a refuge for the survival of this bird in western Tabasco. Each visit lasted two to three hours, and was carried out in the western part of the park, mainly in the dry season. The sightings were made with the help of Brunton Eterna 11x45 binoculars. Photographs were taken with a Canon Power Shoot SX50 camera with 50x optical zoom. Identification was made by consulting Peterson and Chalif (1989) and Howell and Webb (1995).

Results

During our visits, we observed *B. urubitinga* six times. Five observations were of adults and one was of an immature bird. In addition, three records were obtained in 2016 using a camera trap (Bushnell Trophy Camera w / Viewscreen Model 119467). This had been installed next to a small pond in a forest fragment to document the presence of mammals (Table 1, Figures 1-3).

Table 1. **Records of Great Black Hawk in the Chontalpa Ecological Park, from 2013 to 2016.**

Date	Vegetation	Individuals	Activity
06 May 2013	Jungle	One adult	Perched
12 May 2013	Jungle	One adult	Perched
23 May 2013	Jungle	One adult	Perched and vocalizing
25 February 2014	Tree line	One adult	Perched
02 March 2014	Tree line	One adult	Perched
03 August 2014	Jungle (border)	One immature	Perched
24 May 2016	Jungle	One adult	Walking
26 May 2016	Jungle	One adult	Walking
01 June 2016	Jungle	One adult	Walking

Figure 1. **Sighting of Great Black Hawk in the Chontalpa Ecological Park. (Left above: 6 May 2013. Left below: 12 May 2013. Right.: 23 May 2013). Photos © Saúl Sánchez Soto.**

Although it was not possible to know if the records of adults corresponded to different individuals or to a few observed repeatedly, the record of an immature alludes to the fact that this raptor reproduces in the PECh, where at least one pair lives.

The species appears to mainly inhabit jungle vegetation and is likely to occasionally use tree lines located within or outside the park itself at nearby sites with differing vegetation. For example, between May 2013 and November 2014, an individual Great Black Hawk was recorded twice in secondary vegetation (acahual) in a sugarcane cultivation area adjacent to the western part of the PECh (Sánchez-Soto 2016).

Discussion

All sightings of *B. urubitinga* that took place within the PECh forest were located in places close to small swamps and drainage channels for rainwater. In the dry season, the water in these channels evaporates almost completely, leaving only a few ponds where different species of local fauna come to drink water., including Great Black Hawk Eagle.

***Figure 2* (*Above:*). Sighting of adult and immature Great Black Hawks in the Chontalpa Ecological Park (left: 2 March 2014, right: 3 August 2014). Photos © Saúl Sánchez Soto.**

***Figure 3 (Below)*. Sighting of Great Black Hawk in the Chontalpa Ecological Park. (camera trap: 24 May 2016). Photo © Saúl Sánchez Soto.**

In cases of severe or prolonged droughts, we suggest, as far as possible, supplying these and other areas within the PECh with this vital liquid as part of its management plan. Additionally, we suggest continuing studies with raptors in the PECh. This is especially important for resident species categorized as having some level of risk in the NOM-059 (SEMARNAT 2010). According to records these species include Snail Kite (*Rostrhamus sociabilis)*, Double-toothed Kite (*Harpagus bidentatus)*, Commong Black Hawk (*Buteogallus anthracinus)*, Aplomado Falcon (*Falco femoralis),* and Great Black Hawk (Sánchez-Soto 2012). All of these species fall into the category

termed "Species Subject to Special Protection," except *F. femoralis,* which is listed as a Threatened species (SEMARNAT 2010).

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* * *

Migration of Hook-billed Kite (*Chondrohierax uncinatus*) in Kèköldi, Costa Rica

By **Javier Tenorio** [1,2,] **Valentina Abarca-Fallas** [1,2] and **Oscar Ramírez-Alan** [1]

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The Accipitridae family is a cosmopolitan group made up of birds of prey that inhabit practically any type of terrestrial habitat and that vary in plumage, behavior and diet (Stiles and Skutch 1989). In addition, many species are long-distance daytime migrants and travel in groups of up to several thousand individuals (Bildstein 2004).

In Costa Rica this family is represented by 39 species (Stiles and Skutch 1989, Ferguson-Lees and Christie 2001, Winkler 2020), however, despite its wide distribution and being a fairly representative family, much remains to be known about these raptors. Thus it is necessary to implement strategies for their conservation (Tenorio and De la O 2020).

The Hook-billed Kite (*Chondrohierax uncinatus*) is a Neotropical bird of prey with a diet specialized in tree snails (Thorstrom and Mcqueen 2008, Bierregaard et al. 2020). It is distributed from the southern part of Texas and western Mexico to South America including in Central America, Trinidad, Guyanas, Peru, Bolivia, Paraguay and northern Argentina (de Melo Dantas et al. 2018). In Costa Rica *C. uncinatus* is widely distributed along both slopes and is considered an uncommon to rare species (Stiles and Skutch 1989).

Additionally, *C. uncinatus* is reported as a resident species (Stiles and Skutch 1989). Because there were no definitive records of migratory movements in Costa Rica, this species is considered a solitary bird with a range of distribution mainly determined by the presence of arboreal snails (Thorstrom and Mcqueen 2008, Whitacre and Vásquez 2012 and Melo Dantas et al. 2018).

The behavior described below occurred in Kèköldi, southwest of Talamanca in the province of Limón, Costa Rica, coordinates 09 ° 38'18 ”N,

***Figure 1. Chondrohierax uncinatus* adult female gliding on a thermal, Kèköldi, Costa Rica. Photo © Oscar Ramírez-Alán**

***Figure 2.* Pair of *Chondrohierax uncinatus* passing through the migratory route of the Mesoamerican Land Corridor, Kèköldi, Costa Rica. Photo © Oscar Ramírez-Alán.**

82 ° 46'53.41" W. Kèköldi is located at 150 masl and presents an average annual rainfall of 2370 mm. The rainiest months are from July to December (Ramírez-Alán et al. 2014). The area is entirely covered by tropical rainforest with temperature averages ranging from 24°C to 30°C (Ramírez-Alán et al. 2014).

Located on site is the Kèköldi Scientific Center, which has a 12m tower for birdwatching. The tower affords an almost full 360 degree view. Although some trees impeded full horizontal observation, up to 45 degrees from the tower it was possible to have a complete bird's-eye view of the area. Each year, the Kèköldi Scientific Center and Rò Brù Conservation Fund host a migratory bird count focused on birds of prey that use the Mesoamerican Land Corridor as a migratory route both in autumn and summer. Within this corridor, Kèköldi works as a funnel that concentrates raptors between the mountains of the Talamanca Mountain Range and the coastal area. It is one of only three sites in the world that register more than one million birds of prey per season, outnumbered only by Veracruz, Mexico (Porras-Peñaranda et al. 2004, Ramírez-Alán et al. 2014, and Tejeda-Tellez 2014).

On Saturday, 8 September 2018, while carrying out the protocol for the observation of migratory raptors (Ramirez-Alán et al. 2014), we recorded a total of 16 Hook-billed Kites. All individuals followed the same migration route as groups of Mississippi (*Ictinias mississippiensis)* and Plumbeous

(*Ictinias plumbea)* kites, traveling from north to south. The last group of Hook-billed Kites passed at 12:20 pm. We did not observe any individual traveling alone. The Hook-billed Kites traveled in four distinct groups. Two groups contained only two individuals, one group was composed of three individuals and one group had a total of nine birds. We did not observe any dark morph individuals. The only juvenile observed was traveling with the group consisting of three individuals. We did not observe any Hook-billed Kites either on Friday, 7 September or Sunday, 9 September, suggesting that these 16 individuals were migrating and were not local residents.

In Mexico, Belize, Nicaragua, Venezuela, Brazil, and French Guyana there are reports that show evidence of possible migratory as well as altitudinal displacements. (Paulson 1983, Ferguson-Lees and Christie 2001, Bildstein 2004, McCrary and Young 2008, Whitacre and Vásquez 2012, and de Melo Dantas et al. 2018). Because flocking in raptors is generally related to migratory movements, and because this report also coincides with the months (September-November and April-May) in which migratory movements of *C. uncinatus* have been reported in Central America and northern South America (de Melo Dantas et al. 2018) this record represents the first report of *C. uncinatus* migrating in Costa Rica and suggests that the status of this species for the country should change considering its migratory status.

Kèköldi represents an important ecosystem for migratory raptors not only as a transit site but also as a resting place (Tejeda-Tellez 2014). The loss of habitat and the degradation of natural ecosystems worldwide exposes birds of prey to vulnerable conditions, which makes it necessary to carry out more studies on Accipitridae (Smith and Temple 1982, Martínez-Gómez 1992, Seipke and Cabanne 2002, Thorstrom and Mcqueen 2008, Bierregaard et al. 2020, and Tenorio and De la O 2020). Therefore, we recommend joining conservation efforts and carrying out systematic monitoring that includes observation points along the migratory route of the Mesoamerican Land Corridor as well as more studies on *C. uncinatus* that allow us to better understand its ecology and natural history in order to implement management measures that support its conservation.

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* * *

The Chaco Eagle (*Buteogallus coronatus*): distribution, status of areas where it occurs, and implications for the conservation of the species in the state of Rio Grande do Sul, Brazil

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The Chaco Eagle (*Buteogallus coronatus* Vieillot, 1817) is one of the largest birds of prey in South America, with distribution in Argentina, Brazil, Bolivia, and Paraguay (Ferguson-Lees and Christie 2001, Birdlife International 2016). In the past it also occurred in Uruguay (Collar et al. 1992), where today it is considered extinct (Azpiroz and Cortés 2014). The species is considered threatened with extinction (Rio Grande do Sul 2014, Birdlife International 2016; ICMBio / MMA 2018) and the main known threats are habitat loss, persecution, electrocution and capture for captive breeding (Collar et al. 1992, Bencke et al. 2003, Capdevielle et al. 2010, ICMBio / MMA 2018).

In Brazil there are records of the species in the states of Maranhão and Bahia up to Rio Grande do Sul (Collar et al. 1992, Sick 1997). It inhabits semi-open fields and savannas (Azpiroz et al. 2012), and also occupies mountainous regions (Collar et al. 1992, Albuquerque et al. 2006). In Rio Grande do Sul, suitable fields are present in two distinct areas: the fields of the Pampa biome in the southern portion, and the Campos de Altitude in the northeast portion. Both integrate the Atlantic Forest biome (Boldrini 2009, Overbeck et al. 2009) and both face conservation problems, mainly due to the replacement of vast areas of native fields with agricultural cultivation (e.g. corn, soybeans, wheat, rice), forestry, cultivated pastures, as well as occupation by cattle and sheep for grazing, and erosion (Overbeck et al. 2009).

The objective of this work was to update the knowledge about the distribution area of the Chaco Eagle in the state of Rio Grande do Sul and to evaluate the availability of non-altered environments for the species.

Materials and Methods

We performed a search for all records of the Chaco Eagle in the state of Rio Grande do Sul (RS) by consulting the literature, citizen science databases (Ebird 2020, Ecoregistros 2020, Global Biodiversity Information Facility 2020, Wikiaves 2020) and our own data and that of third parties (unpublished).

The geographical coordinates of the records were plotted in the Google Earth program (Google Earth 2018) and the map was prepared using the QGIS 2.18 program (Qgis Development Team 2016). We used the minimum convex polygon (MCP) to determine the current area of distribution of the species in the state. In order to verify the changes that have occurred and the current situation of the environments within the species' distribution area, we used information from the Map Biomas database to learn about the municipalities between 1985 and 2018 (Mapbiomas 2020) a time period for which information is available. Likewise, we used only records of the species obtained up until 2018.

Results

We found 64 occurrences of the Chaco Eagle between 1898 and 2018 in Rio Grande do Sul, 35

Table 1. **Records of Chaco Eagle in the State of Rio Grande do Sul between 1898 and 2018.**

Year	Municipality(ies)	Reference
1898	São Lourenço do Sul	Ihering 1889
1914	São José do Norte	Gliesch 1930
1978	São Francisco de Paula	Bencke et al. 2003
±2000	Campestre da Serra	Bencke et al. 2003
2001	São Francisco de Paula, Canela	Barcellos e Accordi 2006
2002	Cambará do Sul	MMA/IBAMA 2004
2003	Vacaria	Barcellos e Accordi 2006
2004	Bom Jesus	Barcellos e Accordi 2006
2006	Bom Jesus, São Francisco de Paula	Albuquerque et al. 2006, Repenning et al. 2010
2007	São Francisco de Paula, Bom Jesus	Bencke e Duarte 2008, Repenning et al. 2010, Wikiaves 2020
2008	Bom Jesus, Caxias do Sul	Wikiaves 2020
2011	São Francisco de Paula, Bom Jesus	M. Knob (com. pess.), Wikiaves 2020
2012	Bom Jesus, Jaquirana, Cambará do Sul	Wikiaves 2020, Chiarani e Fontana 2019
2013	Jaquirana, São Francisco de Paula	Wikiaves 2020
2014	Jaquirana, Bom Jesus, Cambará do Sul	Wikiaves 2020
2015	Cambará do Sul, Jaquirana, Bom Jesus, Vacaria, São Marcos, Muitos Capões, São José dos Ausentes	Wikiaves 2020, próprios, R. Tomasi Jr. (com. pess.)
2016	Bom Jesus, Jaquirana, São Francisco de Paula, Caxias do Sul	Wikiaves 2020, Chiarani e Fontana 2019
2017	Jaquirana, Cambará do Sul, São Francisco de Paula	Wikiaves 2020
2018	Jaquirana, São Francisco de Paula	Wikiaves 2020, próprios

Figure 1. **Chaco Eagle records in the state of Rio Grande do Sul: A- adult male, São Francisco de Paula (11/25/2018); B- immature, São José dos Ausentes (05/09/2015); C-immature, Many Capões (06/13/2015); D- Typical environment of the Chaco Eagle in the Altitude Fields of Rio Grande do Sul, municipality of São Francisco de Paula. Photos A and D © Jonas C. Kilpp; Photos B and C © Roberto Tomasi Jr.**

from the Wikiaves website, 22 from literature and seven unpublished records (ours / from third parties) (Table 1, Figure 1). Three records are from prior to 1985 and the rest are starting from 2000, with a greater concentration of records from 2011 (64.1% of the total).

The current distribution area of the species in the state comprises 1,103,783 ha (Figure 2), covering 11 municipalities in the Campos de Altitude region (Figure 3). Nine municipalities have recent records (<5 years), and the municipalities of Canela and Campestre da Serra have had no records in the last 15 years.

Discussion

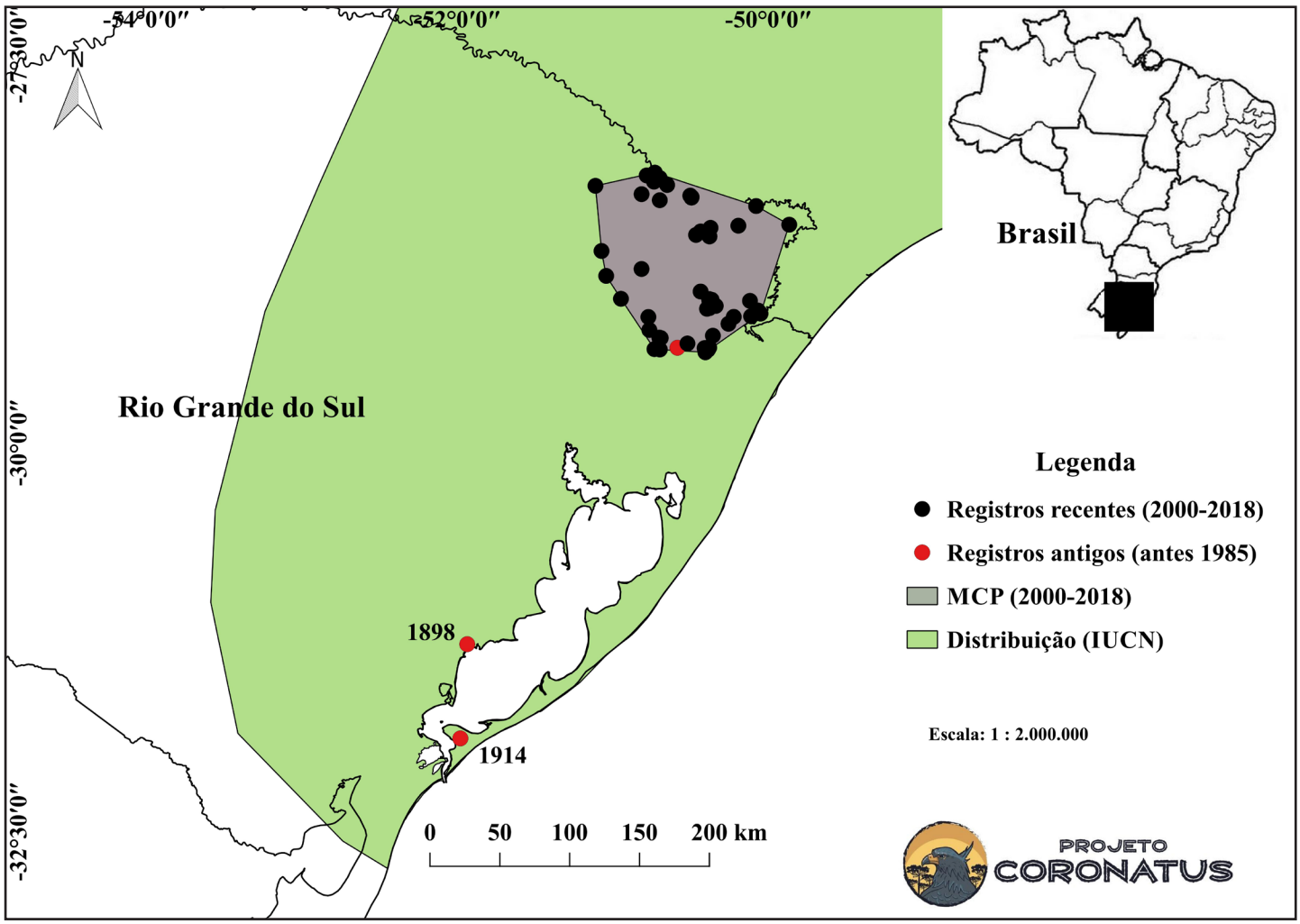
The compiled records indicate that the distribution area of the Chaco Eagle is currently restricted to the northeast portion in the state of Rio Grande do Sul, in the Campos de Altitude, as already suggested by other authors (Bencke et al. 2003). In this region, the species has been observed regularly, and there has been an increase in the number of records in the last five years (Figure 2), which

may lead to the impression that the Chaco Eagle may be increasing its population size. However, the most likely explanation for this increase is the growth of birdwatching in the country (Pivatto and Sabino 2007), consolidating citizen science as an important tool for the knowledge of biodiversity (Cohn 2008, Mamede et al. 2017). Of the 64 records of Chaco Eagle reported in this work, 35 (54.7%) come from a source of this type, the website Wikiaves (Wikiaves 2020).

The increase in the number of people observing and recording avifauna in the field, and the fact that this species is highly targeted by bird photographers (JCK pers. obs.) has resulted in an increase in the detection of this eagle. Despite this, there are no recent records from the fields in the southern portion of the state, where the first sightings for Rio Grande do Sul came from, in 1898 (Ihering 1889) and 1914 (Gliesch 1930).

The Chaco Eagle has low population density (Collar et al. 1992), with an estimated population of less than 1,000 mature individuals (Birdlife International 2016) and is little tolerant of changes in its environment (Kilpp et al. In prep.). The spe-

Figure 2. **Current and past distribution of the Chaco Eagle in the state of Rio Grande do Sul, using the minimum convex polygon.**



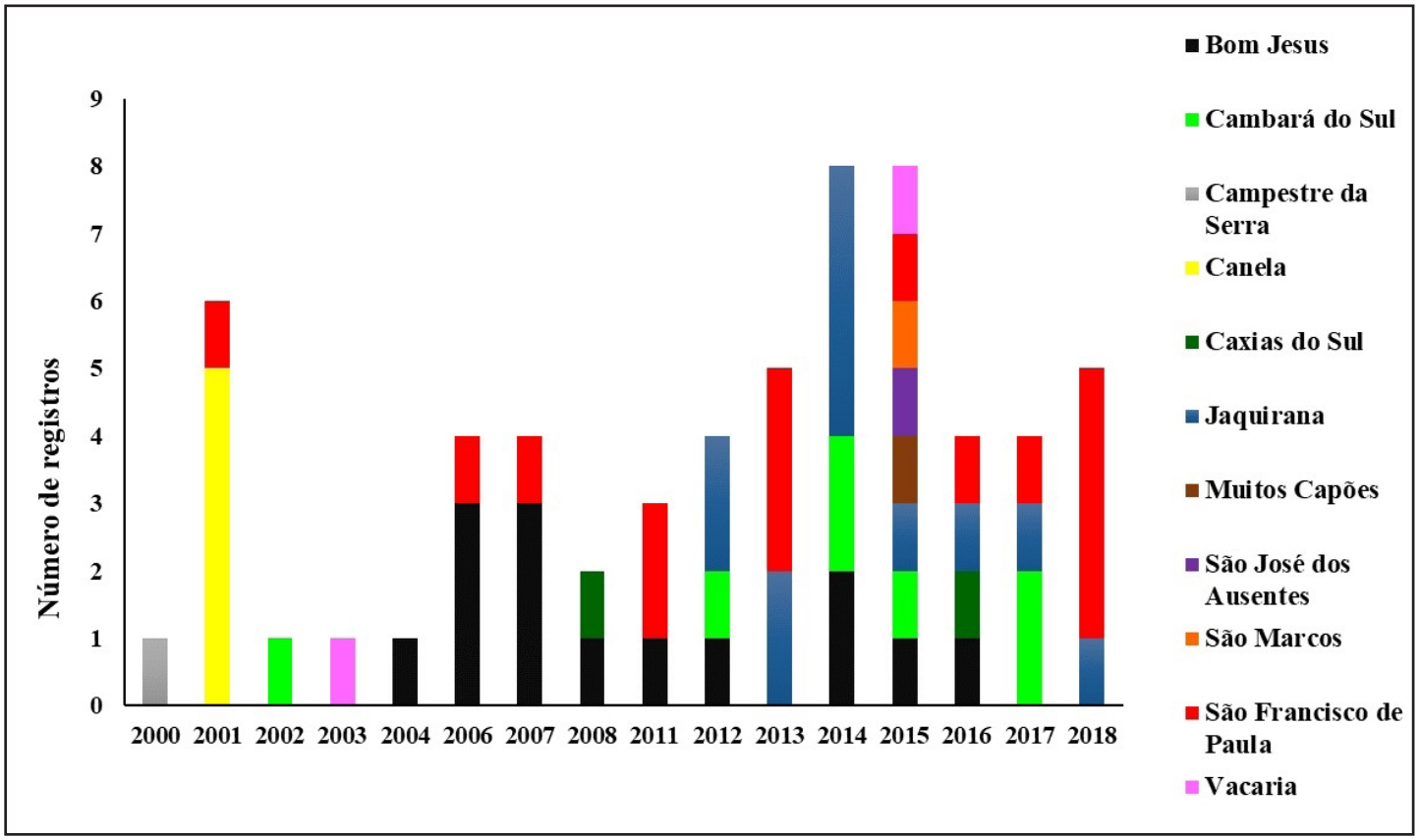


Figure 3. **Temporal and spatial distribution of Chaco Eagle records in Rio Grande do Sul (excluding records prior to 2000).**

cies needs large areas of land for its foraging and reproduction areas (De Lucca 1993). One adult used approximately 350 km^2 over eight months of monitoring in Argentina (Capdevielle et al. 2010).

The typical environments of the species in Rio Grande do Sul, the native fields, are rapidly being replaced by agricultural crops and forestry (Boldrini et al. 2009). There has been a reduction in field area of approximately 293,000 ha (about 36% in the 33 years considered in this study) (MapBiomas 2020). The destruction and alteration of habitats for agriculture are the main problems for populations of raptors threatened with extinction worldwide (McClure et al. 2018).

Additionally, the conversion of Campos de Altitude fields into forestry areas is considered by some authors to be the most serious threat to regional biodiversity (Bristot 2001, Fontana et al. 2009). These two forms of land use are advancing in Campos de Altitude, in areas originally covered by native fields.

Through the areas analyzed in this work (approximately 1,450,000 ha), the largest increase in area has been for agriculture, which currently occupies 20% of the total area of the municipalities with occurrence of the Chaco Eagle. In 1985, agriculture occupied only 5% (MapBiomas 2020). Likewise, the forestry areas, mostly characterized by commercial plantations of *Pinus spp.*, have been

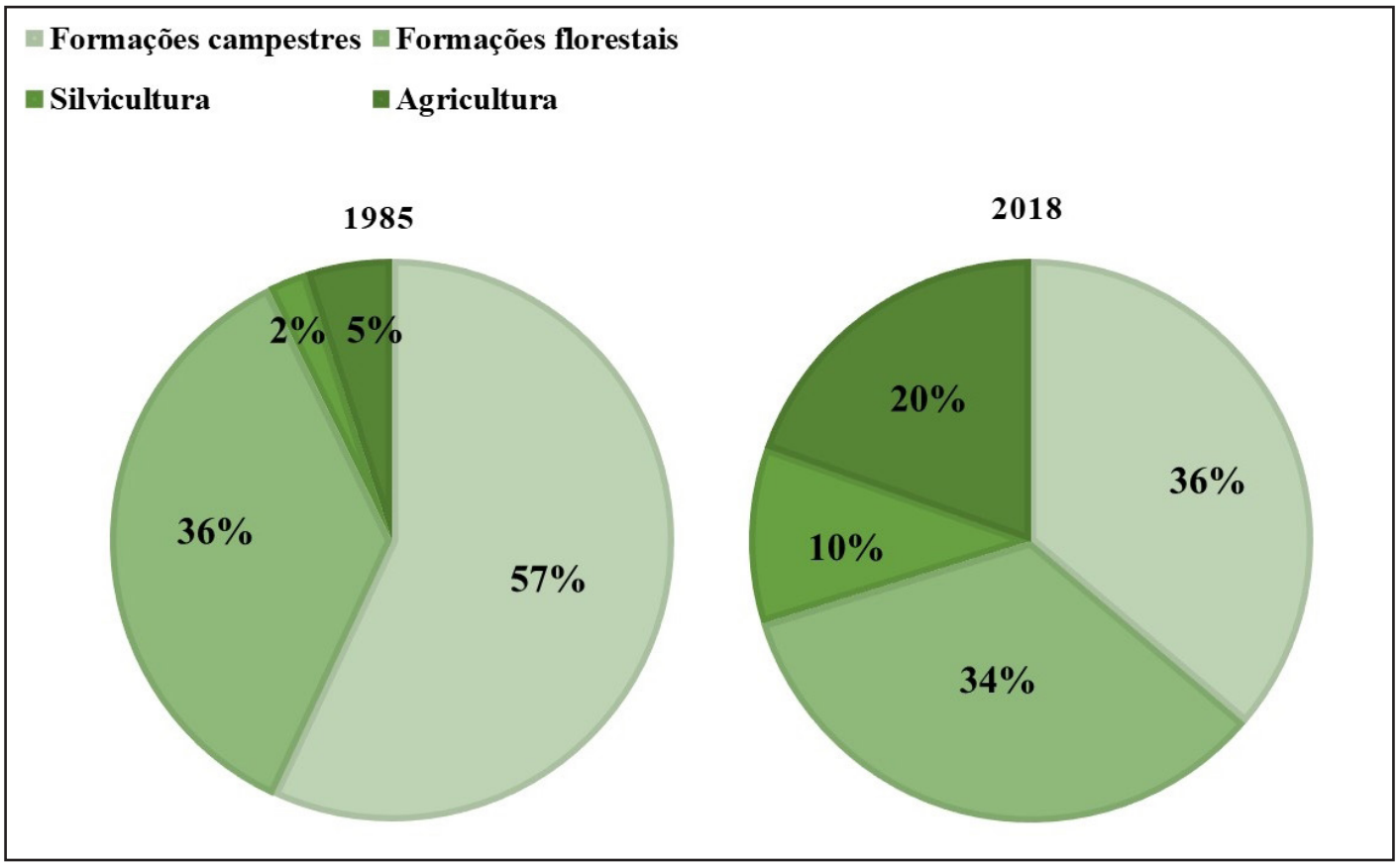


Figure 4. **Vegetation cover and land use in 1985 and 2018 in the municipalities where the Chaco Eagle occurs (data compiled from MAPBIOMAS, 2020).**

expanded mainly in the municipalities of Bom Jesus, Cambará do Sul, Jaquirana and São Francisco de Paula (about ± 106,330 ha), currently occupying 10% of the total area of the municipalities analyzed (Figure 4).

These two anthropogenic activities (forestry and agriculture) currently correspond to 30% of the total area of the 11 municipalities, an increase of 23% in the last 33 years, and a reduction of 21% of natural fields. In comparison, native forests had a smaller reduction in relation to the area occupied in 1985 (about 22,000 ha, or 4.3%). Some municipalities even showed an increase in forest areas (Bom Jesus, Campestre da Serra, São José dos Ausentes and Vacaria), possibly due to the natural expansion of the forest in abandoned areas, where grazing by cattle or burning does not occur (Overbeck et al. 2007).

Assessing the number of Chaco Eagle records in each municipality in the Campos de Altitude, we realized that it is significantly related to the extension of native field areas (P = 0.0010), demonstrating the importance that the conservation of the remaining fields has for maintaining populations of this species. The total area of native fields that still exists in Rio Grande do Sul (± 524,000 ha) has support capacity for a small population of the Chaco Eagle.

If we consider the living area required by the species (Capdevielle et al. 2010), we would have an environment available for approximately 15 individuals, or 5-7 mature pairs (524,000 ha / 35,000 ha). This projection is optimistic, as several other factors are not being considered, such as the environmental quality of the remaining fields, the extent and connection of fragments, the presence of forest areas for reproduction, human presence, inter, and intra-specific competitions and other ecological requirements.

We can conclude that the knowledge about the distribution area of the Chaco Eagle in the state of Rio Grande do Sul is up-to-date, largely due to the participation of citizen science, which is responsible for the increase in observations of this species in the last 10 years. In the northeastern part of the state, despite the increase in records, the situation for the Chaco Eagle tends to be worsening, due to the rapid and continuous loss of native land for agriculture and forestry. Another aggravating factor is the fact that there are few Conservation Units with adequate field fragments in the region: the Tainhas State Park, the São Francisco de Paula National Forest and the Aparados da Serra and Serra Geral National Parks (Bencke et al. 2003, Chiarani and Fontana 2019, Wikiaves 2020). These protected areas are extremely important for the Choco Eagle, but in the long run they are not sufficient to maintain adequate populations of the species (Bencke et al. 2003).

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Raptor Rehabilitation and Youth with Autism Spectrum Disorder

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The Horco Molle Experimental Reserve (REHM) is a protected natural area, managed and directed in technical, scientific, educational, and administrative aspects by the Faculty of Natural Sciences and the Miguel Lillo Institute (FCN-IML) of the National University of Tucumán. Within this complex is the Raptor Rehabilitation Center (CeRAR), where, since 2007, we have been carrying out the rescue, rehabilitation, and release of both diurnal and nocturnal raptors. In 2013, the Faculty of Natural Sciences formed a strategic partnership with the Minka Foundation - an NGO that promotes the development and inclusion of people with disabilities, centered on the individuals and their families. This association created an opportunity for young people with Autism Spectrum Disorder (ASD) to participate in the rehabilitation of birds of prey at CeRAR.

ASD is a condition that predominantly affects early development, with consequences in the areas of communication, social interaction, behavior, and sensory processing (Ratazzi 2018). Individuals with ASD have highly heterogeneous clinical presentations at many levels. This can include support (needs support, needs substantial support, needs very substantial support), language (without speech, single words, phrases, fluency), cognition (intellectual disability, average intelligence, superior intelligence), sensory profile, pattern of onset of symptoms (progressive, regressive), and specifiers (e.g., Fragile X, Aspergers, etc.). This also includes the psychological and biological characteristics of each individual and the concomitant medical problems (eg, gastrointestinal, immunological, metabolic, etc.). For this reason, it is known as an autistic "spectrum" (Ratazzi, 2018). Individuals with ASD imay also have very restricted interests, which can often present a challenge in terms of their inclusion and social participation.

When selecting the candidates to participate in this experience, we focused on those that expressed a special interest in animal life and behavior. Some had even developed knowledge of great precision and detail on their own. Their in-

A young man with ASD during distinctive stages of raptor rehabilitation and management. Photos © Manuel Sancho Miñiano

terest and knowledge served as the starting points for their work. The characteristics of their own behaviors, such as the unique rhythms and cadence, were shaped in the training of the birds.

Apart from selecting the young people who were to participate, we also needed to choose which raptors would be a part of this training. Taking into account that this was the first experience many of these young people would have with birds of prey, we needed to be very careful in our selection. We decided to use those raptors that had been rescued from captivity (kept as pets) and that were highly imprinted and thus not suitable for release. These individuals we call "school birds." School birds accompany us when we give environmental education talks in school settings and public spaces. They are also used for training volunteers in raptor rehabilitation techniques. However, not all imprinted birds can be used for these purposes, since many have disorders caused by the conditions of captivity to which they were subjected. Many of them are intolerant of the presence of children, others distinguish between sexes and individuals and can become aggressive, and some are frightened by some noises or sudden movements.

Thus the selection of individual raptors for this program can be very exhaustive (Becker & Morton 2003 and Ortiz et al. 2011). We selected smaller species, such as Chimango Caracara (*Milvago chimango*), American Kestrel *(Falco sparverius*), Roadside Hawk (*Rupornis maganirostris*) and Barn Owl (*Tyto alba*). We chose these species not only to lower the risk of accidents, but also for

their ease of handling. The versatility of smaller birds allows for easier control, a lower food requirement, and ease of transportation.

The challenge of working and promoting job integration experiences for these young people involved the training and systematization of routines (Ratazzi, 2018). For the well-being of the birds and the participants, the boys worked on inhibiting, during raptor encounters, inherent behaviors of their pathology such as stereotyped movements, echolalia, tics, anxiety, ambulation, inappropriate approaches and compulsive behaviors, among others. Participants were always accompanied by therapeutic assistants, thus the young people were able, in a very short time, to hold their attention and focus on working with the birds, using appropriate gestural and body language.

This experience proved to be very successful since the boys who participated were not only able to work efficiently with school birds, but also carried out tasks with birds undergoing rehabilitation. They took the birds out of the enclosures, placed them on perches, and flew them with creances. They also became comfortable performing these tasks with larger birds such as Black-chested Buzzard Eagle (*Geranoaetus melanoleucus*) and Choco Eagle (*Buteogallus coronatus*). Throughout the process, participants developed skills for bird handling, and assisted with placing leashes, filing beaks and talons, banding, and veterinary care. They also cleaned perches, enclosures, and drinking fountains, and prepared food.

This has been an enriching process for all participants. For these young people, having played a leading role in the care - and subsequent release in many cases - of the birds in their care has impacted their own growth and development. They gained a greater degree of autonomy which they have been able to transfer to other areas of their lives. It has also had an impact on their social insertion. By situating themselves in this environment, young people were able to expand their interpersonal relationships, and increase spaces for exchange and communication. They also took on different roles and activities, such as participating in talks given to visitors to the Reserve. They were also recognized for their work in the local media.

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Ecology and current conservation status of Strigiformes at Hacienda Guáquira, San Felipe, Yaracuy State, Venezuela

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Globally, 250 species of Strigiformes have been reported (König et al. 2008), of which 45 species have been registered for South America (Remsen et al. 2019). In Venezuela, this order is represented by 22 species (Ascanio et al. 2019) out of a total of 1393 bird species recorded in the country. (Remsen et al. 2019). Globally, this group of raptors is generally well-known, with quite complete references available (Marks et al. 1999 and König et al. 2008). This is also true in the neotropics (Whitacre and Jenny 2012 and Enríquez 2015).

Additionally, care has been shown in the study of Strigiformes, and authors have reached the point of standardizing sampling methodologies (König et al. 2008 and Enríquez 2015). However, in Venezuela, most of the studies on the ecology of bird populations at the regional level have focused on diurnal species, leaving nocturnal species aside (Naveda and Torres 2015). Only certain investigations are known, specifically those on the feeding ecology of Barn Owl (*Tyto alba)* and Burrowing Owl (*Athene cunicularia)* (Araujo 1997 and Limonggi 2014). There is an information gap in the knowledge of ecological attributes, habitat use, relative abundance, and conservation status of many other nocturnal raptor species in Venezuela (Naveda and Torres 2015). It is relevant to study the ecology and trophic importance of these species at the community level, particularly those that are little known.

Point counts combined with call backs are the most successful methods for the study of nocturnal birds of prey (König et al 2008 and Enríquez 2015), and they are essential in order to obtain as many records as possible. Using this methodology, the first community-level composition record of Strigiformes for Venezuela was obtained. Important data was collected about the ecology of communities in the westernmost portion of the Cordillera de la Costa.

Study Area

The investigation was carried out at Hacienda Guáquira, located south of the city of San Felipe, capital of the Yaracuy State, in Venezuela. The Hacienda Guáquira has an area of 3168 ha, of which about 500 ha are used for agricultural production, while the remaining territory is preserved between primary and secondary forests (Romero-Ríos 2017). It is located in the Protective Zone of the Nirgua Massif. In it are the Cerro Marimón and Cerro Zapatero. Cerro Marimón's humid forest ranges in altitude from 160 to 487 masl. Cerro Zapatero's humid forest ranges from 160 to 900 masl, while its cloud forest is at 1450 masl (Romero-Ríos 2017).

The study was carried out in three different vegetation units within the Hacienda Guáquira.

a) The altered area, designated as "Plots-Paddocks" contains bush vegetation represented by *Ricinus communis*, *Tithonia diversifolia*, *Bambusa sp. Gonolobus lasiostomus, Cecropia peltata* and *Mucuna altissima*, with some sporadic cover of *Enterolobium cyclocarpum, Guazuma ulmifolia, Cedrela odorata, Pouteria glomerata, P. peruviensis, Pseudopiptadenia pittieri* and *Pterocarpus rorhii*. Live fences of *Gliricidia sepium* and *Tabernaemontana undulata* are found here (Fedón, 2018).

b) Rain forest represented by *Ceiba pentandra, Guatteria sp., Adenocalymma cladotrichium, Protium tenuifolium, Hieronyma fendleri, Hura crepitans, Gustavia augusta, Mouriri rhizophoraefolia, Alseis labatioides, Chomelia polyantha, Rudgea hostmanniana, Rinorea lindeniana, Clavija ornata, Sorocea sprucei, Eschweilera venezuelica* and *Bactris gasipaes*, among others (Llamozas et al. 2003 and Fedón 2018).

c) Cloud forest represented by species such as *Anthurium sp., Monstera adansonii, Philodendron venezualensis, Guzmania lingulata, Hohenbergia stellata, Epidendrum stamfordianumm, Maxillaria rufescens, Asplenium serratum, Gyranthera caribensis, Inga sp., Bactris setulosa, Chamaedorea pinnatifrons, Wettinia praemorsa, Swartzia leptopetala, Geonoma spicenses, Brownea macrophylla, B. longipedicelata, Calathea lutea, Cyclanthus bipartitus, Palicourea sp.* and *Costus sp* (Fedón 2018).

Methods

Sampling. To obtain records of the species present in the study area, 12 censuses of one kilometer in length were carried out (the same six one-kilometer transects were surveyed in dry season and repeated in rainy season). We combined point counts with call backs every 250 meters, counting five count points per census or transect (Ralph et al. 1996) for a cumulative 60 count points. The routes (Table 3) were named as follows:

Las Torres Transect: primary and secondary humid forest, with a uniform topography in the lower area of Cerro Zapatero.

Marimón Transect: primary humid forest in Cerro Marimón.

Romagú Transect: represented by primary humid forest of Cerro Zapatero.

Corregidor Transect: primary humid forest, in Cerro Zapatero.

Nublado Transect: represented by primary cloud forest at the top of Cerro Zapatero.

Parcelas Transect: represented by live fences, pasture lands, fruit crops, bare soils for infrastructure (cattle) uses and relics of humid forest.

This type of sampling allowed us to obtain data on the relative abundance of each of the studied species and their preferred habitats. The records were also used to determine the composition of species per vegetation unit. In addition, we documented habits according to moon phases and times of the year. Visual and auditory records were obtained, which allowed for the state of conservation to be evaluated according to the SUMIN index, which is a statistical evaluation that involves a group of variables (Reca et al. 1994) applied to each one of the Strigiformes species found in Hacienda Guáquira.

Statistical Analysis.

Relative abundance - estimated as the abundance of individuals by species per kilometer traveled (ind / km) (Ojasti and Dallmeier 2000).

Shannon-Wiener Index- Species richness and species diversity fairness values were obtained from the relationship between species richness and the number of records per species with values ranging from 0 to logarithm of specific richness (Moreno 2001).

Species Richness - To estimate Alpha diversity we applied the Margalef index, which supposes a relationship between the number of species and the total number of individuals (Moreno 2001), where S is the total number of species and N is the total number of individuals (DMg = S-1 / lnN). To estimate Beta diversity, the Sørensen (similarity-quantitative coefficient) or Czekanowski Index was applied. Where aN = total number of individuals at site A, bN = total number of individuals at site B and pN = sum of the lowest abundance of each of the species shared between both sites (Moreno 2001), (IScuant = 2pN / aN + bN). The Schluter and Ricklefs 1993 (Moreno 2001) Gamma Index was applied to estimate the Gamma diversity, where average Alpha Diversity = average number of species in a community; and Beta Diversity = inverse of the specific dimension, that is, 1 / average number of communities occupied by a species and the sample size = total number of communities (Gamma = average Alpha diversity x Beta diversity x sample size).

SUMIN Index. To determine the conservation /threat status of the species under study at the sampling site, the method proposed by Reca et al 1994 was used. This method establishes a conservation priority index (SUMIN) based on 12 variables: Continental Distribution (DICON), National Distribution (DINAC), Amplitude in the

Variables	Value 0	Value 1	Value 2	Value 3	Value 4	Value 5
DICON	The whole continent or most of it	Approx. half the continent	Less than half of the continent, continuously or disjointly	Restricted	-	-
DINAC	The whole country or most of it	Approx.half the country	Less than half the country	Restricted	Very localized or endemism	Micro-endemism
AUHA	Can use 4 or more environments	Can use 2 or 3 environments	Can use only 1 environment or need more than 1	-	-	-
AUEVE	Can use 4 or more strata	Can use 2 or 3 strata	Can use only 1 strata or need more than 1	-	-	-
TAM	Less than 25 cm or less than 1 kg.	From 25 to 200 cm or from 1 to 12 kg.	Greater than 200 cm or 12 kg	-	-	-
POTRE	Elevado (>8 crías)	Medium (4-7 hatchlings)	Low (1-3 hatchlings)	-	-	-
AMTRO	Generalist omnivores and herbivorous	Herbivorous specialists, generalist carnivores and scavengers	Specialist carnivores	-	-	-
ABLOC	Abundand or common	Rare	Rare or very rare	-	-	-
SINTA	Absence	Belongs to a monotypic genus	Pertenece a una familia o taxón de nivel superior monotípicos	-	-	-
SING	Absence	Presence	-	-	-	-
ACEXT	None	Because of fear, repulsion, superstition, for being considered a pest or harmful, for small-scale or for sub-production use	Sport hunting and / or commercial exploitation on a medium scale or for being officially declared a pest	Extraction for 2 or more of the mentioned reasons	Intensive exploitation of fur, leather, wool, meat, others	-
PROT	Protected by 3 or more conservation units	Protected by 2 conservation units	Protected by 1 conservation unit	Not protected	-	-

Table 1. **Variables and values that make up the SUMIN index. DICON = Continental geographic distribution; DINAC = National geographic distribution; AUHA = Amplitude in habitat use; AUEVE = Amplitude in the use of vertical space; TAM = Body size; POTRE = Reproductive potential; AMTRO = Trophic amplitude; ABLOC = Local abundance; SINTA = Taxonomic singularity; SING = Singularity; ACEXT = extractive actions; PROT = Degree of protection of the species.**

Use of Habitat (AUHA), Amplitude in the Use of Vertical Space (AUEVE), Body Size (TAM), Reproductive Potential (POTRE), Trophic Amplitude (AMTRO), Local Abundance (ABLOC), Taxonomic Singularity (SINTA) (referring only to the presence of a monotypic taxon), Singularity (SING) (species with unique characteristics), Extractive Actions (ACEXT) and Degree of Species Protection (PROT) (Table 1). Each variable was assigned a numerical value within a determined range (0-5), with the highest value corresponding to the most adverse situation for the species, while values close to zero are presented as the most beneficial for the species. The SUMIN value belongs to the sum of the weightings of each variable, and can have final values between 0 and

Species	Dry Season						Rainy Season						
	T/LL	P/LN	R/LL	M/LL	C/LN	N/CM	T/LL	P/CM	R/LL	M/LL	C/LN	N/CM	Total
Megascops choliba	0	1	1	0	0	0	0	0	0	0	1	1	**4**
Megascops roraimae	1	0	3	1	0	1	3	0	0	1	1	2	**13**
Ciccaba virgata	2	0	0	1	0	1	1	0	0	1	0	4	**10**
Ciccaba nigrolineata	2	1	0	2	0	1	3	1	1	1	1	2	**15**
Pulsatrix perspicillata	2	2	0	0	0	0	0	2	0	0	0	0	**6**
Total:	**7**	**4**	**4**	**4**	**0**	**3**	**7**	**3**	**1**	**3**	**3**	**9**	**48**
	22						**26**						

***Table 2*. Species by transects, climatic season and lunar phase. Transects: Torres (T), Parcelas (P), Romagú (R), Marimón (M), Corregidor (C), Nublado (N). Moon phases: Full moon (LL), Waxing quarter, (CC) Waning quarter (CM), New moon (LN).**

30, which means that the highest valuation (30) would correspond to the most susceptible species or the one with the highest conservation priority (Table 2).

Subsequently, we calculated the mean value of the index for the evaluated set and although no categories were explicitly stated, three groups of species were determined: “Non-Priority”, those whose index is less than the mean minus the standard deviation; "Special Attention", if they have an index equal to or greater than the average; and “Maximum Priority”, when the index is equal to or greater than the mean plus the standard deviation (Reca et al. 1994).

Results and Discussion

We documented five species of Strigiformes: Tropical Screech-owl (*Megascops choliba)*, Foothill Screech-owl (*M. roraimae)*, Mottled Owl (*Ciccaba virgata)*, Black and White Owl (*C. nigrolineata)* and Spectacled Owl (*Pulsatrix perspicillata*). Of these, the most abundant was *C. nigrolineata,* matching pevious records (1.25 ind / km), followed by *M. roraimae* (1.08 ind / km), *C. virgata* (0.83 ind / km), *P. perspicillata* (0.5 ind / km) and *M. choliba* (0.33 ind / km), adding a total abundance for the Hacienda Guáquira of 4 ind / km, with 48 records in the 60 count points, applied in dry and rainy seasons (Table 2).

The transects with the highest Margalef biodiversity index were "Nublado" in the dry season, and "Marimón" and "Corregidor" in the rainy season (Table 5), corresponding to the relationship between the number of individuals with the number of species. The lowest value obtained was in the ¨Romagú¨ transect in dry season, corresponding to the largest difference in the relationship between the number of individuals and the number of species registered.

The cloud forest, in which two of the 12 study transects were carried out, represented greater

abundance with 6 ind / km (Table 4). We added 12 records of four species documented in the 10 count points corresponding to this vegetation unit (Table 2). *C. virgata* was the most abundant species in this vegetation unit with 2.5 ind / km (Table 4). Species diversity in this vegetation unit resulted in a Shannon Index of 1.27 (Figure 1).

The humid forest had a species abundance of 3.63 ind / km. The most abundant species were *C. nigrolineata* and *M. roraimae* with 1.25 ind / km (Table 4). Plots-Paddocks were the least abundant with 3.5 ind / km. *P. perspicillata* was the most abundant species with 2 ind / km (Table 4) and with the lowest value according to the Shannon index (0, 96) (Figure 1). The diversity of species in this vegetation unit turned out to be the highest according to the Shannon Index (1.50) (Figure 1).

Species considered as habitat generalists (*C. virgata*), forest generalists (*P. perspicillata*) and forest specialists (*C. nigrolineata*) (Eisermann and Avendaño 2015, Lee Jones and Meerman 2015 and Pérez et al. 2015) were found.

This indicates that in the "Plots-Paddocks" vegetation unit, there are still forest relics important for the conservation of the Strigiformes present in the Hacienda Guáquira. Specifically in areas where those species considered specialists and forest generalists dwell. *Ciccaba nigrolineata* presented the highest abundance in all the field sampling (1.25 ind / km), while the lowest was for *Megascops choliba* (0.33 ind / km) (Table 4).

We applied the SUMIN Index to determine the current conservation status of the Strigiform species found. Black and White Owl (*Ciccaba nigrolineata*) obtained an above average numerical value (SUMIN = 11), and is therefore considered to be a species with "Maximum Priority" for conservation. On the other hand, based on this index, *Pulsatrix perspicillata* and *Megascops roraimae*

***Table* 3. Values of the transects taken during the field work.**

Transect	Transect date (dry season/ rainy season)	Transect hours (dry season/rainy season)	Starting coordinates	End coordinates	Altitudinal gradient (msnm)	Moon phase and illumination(%) (dry season/rainy season)	Moon shcedule (h) (dry season/ rainy season)
Torres	29-12-2017 / 29-04-2018	2005-2340 / 1925-2204	10°17'62"N 68°39'38"O	10°17'08"N 68°39'31"O	91-109	Full moon (86) / Full moon (99)	1446-0335) / (1841-0604)
Parcelas	21-01-2018 / 05-05-2018	2000-2248 / 1935-2157	10°17'71"N 68°39'62"O	10°17'37"N 68°39'73"O	105-131	New moon (20) / Third quarter (69)	0941-2156) / (2309-1014)
Marimón	29-01-2018 / 23-08-2018	1935-2308 / 1900-2215	10°16'64"N 68°40'32"O	10°17'11"N 68°40'08"O	152-331	Full moon (97) / Full moon (94)	(1446- 0335) / (1657-0403)
Romagú	03-02-2018 / 02-06-2018	1900-2256 / 1945-2305	10°16'57"N 68°38'85"O	10°16'96"N 68°39'24"O	97-339	Full moon (84) / Full moon (82)	(2123-0948) / (2220-0926)
Corregidor	18-03-2018 / 06-10-2018	1906-2230 / 1900-2146	10°15'81"N 68°39'51"O	10°16'30"N 68°39'67"O	139-231	New moon (2) / New moon (6)	0731-1956) / (0329-1613)
Nublado	07-04-2018 / 31-08-2018	2055-0036 / 1950-0113	10°13'35"N 68°38'36"O	10°13'48"N 68°38'12"O	1152-1244	Third quarter (52) / Third quarter (71)	(0010-1202) / (2208-0959)

Especies	Ind/km (BH)	Ind/km (BN)	Ind/km (P-P)	Ind/km (HG)
M. choliba	0,25	0,5	0,5	0,33
M. roraimae	1,25	1,5	0	1,08
C. virgata	0,63	2,5	0	0,83
C. nigrolineata	1,25	1,5	1	1,25
P. perspicillata	0,25	0	2	0,5

***Table* 4. Relative abundance of registered species. Ind / km (individuals per kilometer traveled). Vegetation units: BH (humid forest), BN (cloud forest), P-P (paddocks-plots). HG (Hacienda Guáquira).**

D_{Mg}=1/InN	Sequía	Lluvia	Total	Promedio
Torres	1,54	1,03	**1,14**	1,29
Vaquera	1,44	0,91	**1,03**	1,18
Marimón	1,44	1,82	**1,03**	1,63
Romagú	0,72	-	**1,24**	0,36
Corregidor	-	1,82	**1,82**	0,91
Nublado	1,82	1,37	**1,21**	1,59

***Table* 5. Margalef Biodiversity Index (DMg=S-1/lnN)**

(both with SUMIN = 8) are categorized as "Special Attention" for conservation. Finally, *Ciccaba virgat*a and *Megascops choliba* are valued as "No Priority" for conservation as they obtained values lower than the average applied in the index (SUMIN = 7 and SUMIN = 6 respectively) (Table 8). It is worth mentioning that in a previous study, different numbers were obtained for two of these species (*C. virgata* = 9 and *C. nigrolineata* = 10), but, in this study, only 10 of the 12 variables of the index were considered (Quintero, 2017).

We recorded the greatest abundance during the third quarter (waning) lunar phase (5 ind / night), with all the species registered. We documented the second-greatest abundance during the full moon (4.33 ind / night) also with all five species recorded. The next highest abundance was during the new moon (2, 33 ind/night) with only three species registered. No surveys were carried out during the third quarter lunar phase (Table 9). *P. perspicillata* and *C. virgata* have been described as being more vocal on nights with a full moon (König et al 2008). This coincided with our findings on the Las Torres transect in dry season for *P. perspicillata*. However, we did not see or hear *C. virgata* during transects during a new moon (Table 9). It should be noted that these results could change with the use of call backs.

To summarize, we recorded Strigiformes with greater intensity during times of increased illumination by the moon. These results may differ if more uniform sampling is considered wherein the moon phases are included as a variable. This could lead to more accurate results that could inform sampling design of subsequent investigations.

I_{Scuant} =2pN/aN+bN	Rainforest	Cloud Forest	Plots-paddocks
Rainforest		0,35	0,29
Cloud forest			0,21

***Table* 6. Sørensen Index (similarity-quantitative coefficient) or Czekanowski Index applied to the different vegetation units.**

I_{Scuant} =2pN/aN+bN	Rainforest	Cloud Forest	Plots-paddocks
Rainforest		0,55	0,13
Cloud forest	0,33		0,17
Plots-paddocks	0,11	0	

***Table* 7. Sorensen index (coefficient of similarity-quantitative) or Czekanowski applied to the different vegetation units, results in brown (dry sesason) and light blue (rainy season).**

Especies	DICON	DINAC	AUHA	AUEVE	TAM	POTRE	AMTRO	ABLOC	SINTA	SING	ACEXT	PROT	TOTAL
M. choliba	0	0	0	2	0	2	2	0	0	0	0	0	6
M. roraimae	2	0	0	2	0	2	2	0	0	0	0	0	8
P. perspicillata	0	0	0	2	1	2	2	1	0	0	0	0	8
C. virgata	0	0	0	2	1	2	2	0	0	0	0	0	7
C. nigrolineata	2	2	0	2	1	2	2	0	0	0	0	0	11
											Promedio= 8		

***Table* 8. Variables and values that make up the SUMIN index. DICON = Continental geographic distribution; DINAC = National Geographic Distribution; AUHA = Amplitude in habitat use; AUEVE = Amplitude in the use of vertical space; TAM = Body size; POTRE = Reproductive potential; AMTRO = Trophic amplitude; ABLOC = Local abundance; SINTA = Taxonomic singularity; SING = Singularity; ACEXT = extractive actions; PROT = Degree of protection of the species.**

Phase	Range (%)	Records	Species	Nights	Ind/Night
LN	25 a 0; 0 a 25	7	4	3	2,33
CC	25 a 75	-	-	-	-
LL	75 a 100; 100 a 75	26	5	6	4,33
CM	75 a 25	15	5	3	5
	Total=	**48**	**5**	**12**	**4**

***Table* 9. Moon phases and their relation to the records of Strigiformes. % = Moonlight percentage, LN = new moon, CC = waxing quarter, LL = full moon, CM = waning quarter. Ind / Night = Average of individuals per night**

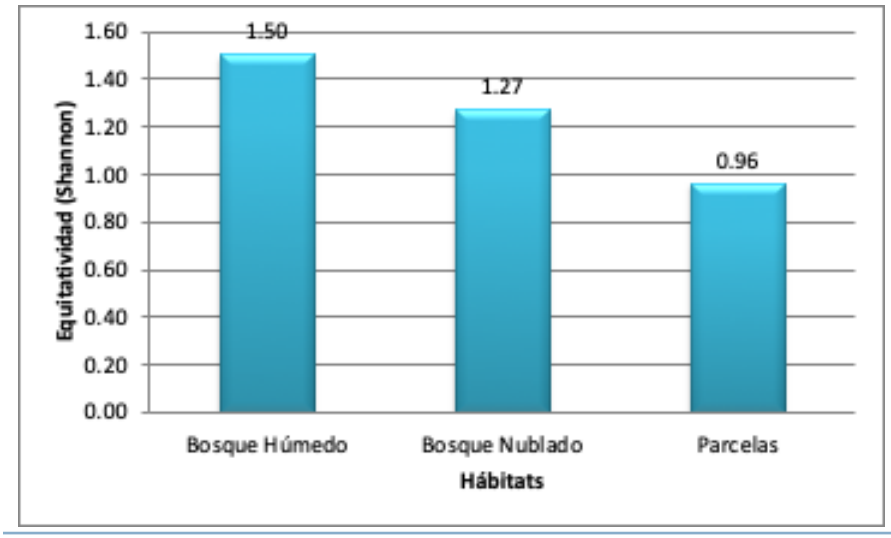

***Figure* 1. Strigiform diversity in terms of specific fairness (according to the Shannon-Wiener index) for the moist forest, cloud forest and plot vegetation units.**

According to findings of Romero-Ríos (2017), structural and functional analysis of the vegetation and the diurnal bird species of the Hacienda Guáquira demonstrated that by selecting focal species dependent on forests, it was possible to express the importance of woody patches that work as ecological corridors. The more highly connected these corridors are, the better it is for the species.

Of course, this also relates to the quality of habitat and the distance between patches (Eisermann and Avendaño 2015, Lee Jones and Meerman 2015 and Pérez et al. 2015). The consolidation of ecological corridors (Romero-Ríos, 2017) at Hacienda Guáquira is necessary for the conservation of the nocturnal birds of prey found here. This should include the buffer zones that overlap corridords where agroforestry or agroecological practices of cacao groves or other crops related to biodiversity conservation (Guiracocha et al. 2001and Provita 2019) will allow sustainable development in areas determined to have low functional connectivity (Romero-Ríos 2017).

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* * *

A Passion for Peregrines: A Tribute to Oscar Beingolea (1959-2019) and a New Grant in His Honor

By **Fernando Angulo** and **Nico Arcilla**

Oscar Beingolea, with Shijai, an Orange-breasted Falcon, at his home in Lima, Peru. Photo © Nico Arcilla

Raptors studies in Peru are up-and-coming, and much of our knowledge of raptors in Peru is due to one extraordinary man, Oscar Beingolea, who devoted his life to the study of raptors, especially Peregrine Falcons. Oscar worked as a professional falconer and avidly studied wild raptors, developing expertise on species including Orange-breasted Falcon, Tiny Hawk, Bicolored Hawk, Grey-bellied Hawk, and Harris's Hawk. He discovered the first breeding cassini (Austral) peregrines recorded in Lima, and his decades of studies informed numerous publications, both

in scientific journals and falconry magazines and books, on raptor behavior, natural history, breeding biology and migration.

Perhaps Oscar's greatest gift to Peruvian ornithology and the world was his promotion of research interest, spreading his zeal for raptors far and wide through the mentoring of raptor enthusiasts and researchers of all ages. I (Fernando) was a student of 12 in 1986 when I first met Oscar, who made an immediate impression. I was fascinated by his stories about raptors, especially Peregrine Falcons: how fast they are, how far they travel. Oscar was trapping and banding peregrines, and I begged him to take me on one of his trapping expeditions; the following January, Oscar took me to Chilca, south of Lima, to band a wintering male tundrius (Arctic) peregrine. Oscar also introduced Peru's incredible wealth of raptor species to visitors such as me (Nico), who first came to Peru in 2003 to do fieldwork for my PhD; Oscar treated me like family from the start. I never could have guessed how much our friendship would transform my life or ignite my own passion for peregrines.

Our fascination for raptors, especially peregrines, has only grown since meeting Oscar, and so did our friendship with him. Endless conversations about migration routes and timing, sex-based differential migration, subspecies distribution, and many other subjects engaged us for hours. Oscar raised so many questions about raptor biology that it will take decades to answer them. He was, by far, the greatest authority on Peruvian peregrines. Oscar passed away on August 30, 2019, after a long battle with cancer. We, along with his family and many friends in Peru and around the world, miss him enormously.

In celebration of Oscar's life and love of raptors, we partnered with RRF to create an award in his honor. Starting this year, the Oscar Beingolea Raptor Research Award will provide a $1,000 grant to a researcher continuing Oscar's legacy of original inquiry, dedication to research, and enduring fascination with questions about raptor ecology and evolution in Latin America and the Caribbean.

To learn more or apply for this award through the Raptor Research Foundation, please click here: https://www.raptorresearchfoundation.org/grants-and-awards/beingolea-grant/

To make a donation to support this award through the International Bird Conservation Partnership, please click here: https://www.bird-partners.org/news. 100% of your donation will go towards supporting original raptor research in Latin America and the Caribbean.

* * *

Of Interest...

Grants

François Vuilleumier Fund Grants

http://www.neotropicalornithology.org/funds-grants/

The goal of the Neotropical Ornithological Society's Francois Vuilleumier Fund is to award one or more cash grants per year for thesis studies of Neotropical birds to one or several graduate students from any country in Latin America and the Caribbean. The funds are provided to assist thesis research by students, enrolled in an institution in the Neotropics who have little or no access to funds within their country or at their institution.

Awards will be competitive and are expected to be in the range of $500–$1000. Students from Latin America and the Caribbean enrolled in a graduate degree program (Masters or Ph.D.) at an institution in the Neotropical Region are eligible to apply.

Application deadline: 15 September (email)
Announcement of Awards: 15 December

Future for Nature

https://futurefornature.org/apply-for-the-future-for-nature-award-2020/

Awards are given to young conservationists (under 35 years of age), who have achieved substantial and long-term benefit to the conservation status of one or more animal species. The award must be used for a conservation project of the winner's choice, initiated and implemented by him/her. The project focus should be on species conservation. The project may involve a (fundamental) research component, but this should not be the main focus. The main focus should be conservation action with a practical impact.

American Ornithological Society

https://americanornithology.org/awards-grants/student-postdoc/research-awards/

AOS awards annual student research awards to support research in various areas of avian biology by college students, graduate students, and postdocs.