

Chapter 18

The Owls of Paraguay

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Abstract Paraguay is located at the center of South America at the confluence of several biomes: Atlantic Forest, Cerrado, Mesopotamian Grasslands, Chaco, and Pantanal. Some 719 bird species are documented for the country, of which 16 are owls. No owls are endemic to Paraguay, but one species is endemic to the Chaco biome and three species and one subspecies are endemic to the Atlantic Forest. In Paraguay, ornithological research has experienced productive periods and other long periods without advances; currently there are no studies underway that focus on the ecology or conservation of owls, although some studies on diet and behavior have been published. Only one species, Rusty-barred Owl (*Strix hylophila*), is considered at risk internationally, but seven species are considered at risk at the national level. The principal threats to the owls of Paraguay are habitat destruction, lack of protected areas or poor implementation of existing areas, popular beliefs that nocturnal birds bring bad luck, forest management incompatible with owl conservation, and lack of information about the basic biology of these birds.

Keywords Atlantic Forest • ChacoCerrado • Local Attitudes • Strigidae

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Rusty-barred Owl (*Strix hylophilla*)

18.1 Introduction

Paraguay is a landlocked country located in the heart of South America between $54^{\circ}19'$ and $62^{\circ}38'$ west and $18^{\circ}18'$ and $27^{\circ}30'$ south. It is divided into two regions by the Paraguay River: the Occidental or Chaco region (with 61% of the land surface and less than 3% of the population) and the Oriental region (with 39% of the territory and 97% of the populace). Despite being one of the five smallest countries in South America with a total area of 406,752 km², Paraguay is home to a notable diversity of bird species as a result of its location at the interface of the Atlantic Forest, Cerrado, Mesopotamian Grasslands, Chaco (Dry and Humid Chaco), and Pantanal (Hayes 1995, Fig. 18.1). An important network of rivers also traverses the country, formed principally by the Paraguay, Paraná, and Pilcomayo and their tributaries. The gallery forests that line the banks of these rivers act as subhumid, mesic corridors which allow the exchange of forest species among biomes (Cardoso da Silva 1996).

To date, 719 species have been reported from Paraguay, including 16 species of owls (Guyra Paraguay 2004, 2005; Table 18.1). Five species are widespread throughout the country: Barn Owl (*Tyto alba*), Tropical Screech Owl (*Megascops choliba*), Ferruginous Pygmy Owl (*Glaucidium brasilianum*), Striped Owl (*Pseudoscops clamator*), and Burrowing Owl (*Athene cunicularia*). Burrowing Owl is a species of open habitats (grasslands, savannas, and human-modified areas), and

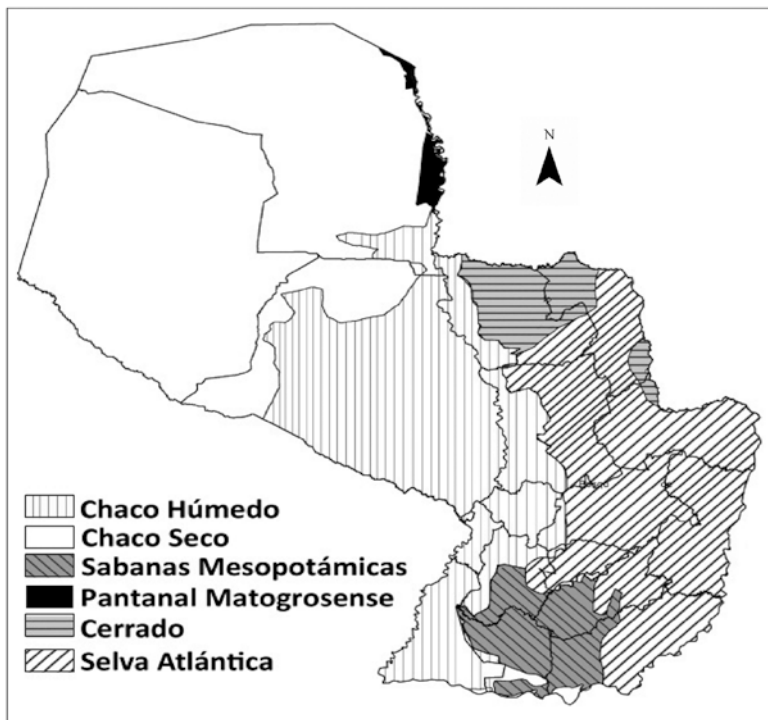


Fig. 18.1 Ecoregions of Paraguay (Guayra Paraguay 2005)

its distribution in Paraguay has increased dramatically in modern times as a result of the loss of much of the original coverage of the Atlantic Forest, a biome that it is only able to marginally penetrate.

Although no species of owl is endemic to Paraguay, five species are considered to be biome endemics. Chaco Owl (*Strix chacoensis*) is endemic to the Chaco biome with a distribution that also extends to Bolivia and Argentina. It is a relatively common species in much of the Chaco region, occurring in natural habitats as well as degraded forests and even close to human habitation (Guyra Paraguay 2004).

Black-capped Screech Owl (*Megascops atricapilla*), Rusty-barred Owl (*Strix hylophila*), Tawny-browed Owl (*Pulsatrix koeniswaldiana*), and a subspecies of the Black-banded Owl (*Ciccaba huhula albomarginata*) are endemic to the Atlantic Forest and share their distribution with Brazil and Argentina (Parker et al. 1996; Brooks et al. 1999; Marks et al. 1999; Bodrati and Cockle 2013). Black-capped Screech Owl (*M. atricapilla*) is locally common in Atlantic Forest, being more numerous in the remnants of forest in the northern and eastern Oriental region and less common in those farther south (Lowen et al. 1997; Guyra Paraguay 2004; Cockle et al. 2005). It has also been recorded in transitional areas with Cerrado (Robbins et al. 1999). Rusty-barred Owl (*S. hylophila*) occurs in larger remnants of mature and degraded Atlantic Forest and is one of the more frequently encountered large owls in forests of the southern Oriental region (Bodrati and Cockle 2006).

Table 18.1 Species of owl known to occur in Paraguay (Guyra-Paraguay 2004, 2005)

English	Scientific name	Guaraní	Spanish name	Biomes
Barn Owl	<i>Tyto alba</i>	Suindá	Lechuza de campanario	AR
Tropical Screech Owl	<i>Megascops choliba</i>	Kavuré	Lechucita común	AR
Black-capped Screech Owl	<i>Megascops atricapilla</i>	Kavuré	Lechucita grande	AF, CE
Spectacled Owl	<i>Pulsatrix perspicillata</i>	Urukuré'a guasú	Lechuzón mocho grande	AF, PA, HCH, CE
Tawny-browed Owl	<i>Pulsatrix koenigswaldiana</i>	Urukure'a mini	Lechuzón mocho chico	AF
Great Horned Owl	<i>Bubo virginianus</i>	Ñakurutú guasú	Ñacurutú	DCH, HCH, CE, PA, MG
Rusty-barred Owl	<i>Strix hylophila</i>	Suindá ka' aguy o guasú	Lechuza listada	AF
Chaco Owl	<i>Strix chacoensis</i>	Suindá chaco	Lechuza chaqueña	DCH, PA
Mottled Owl	<i>Ciccaba virgata</i>	Kavure guasú, Suindá kaagui	Lechuza estriada	AF, CE
Black-banded Owl	<i>Ciccaba huhula</i>	Suindá hũ	Lechuza negra	AF
Ferruginous Pygmy Owl	<i>Glaucidium brasilianum</i>	Kavure'i	Caburé	AR
Burrowing Owl	<i>Athene cunicularia</i>	Urukurea chichi	Lechucita vizcachera	AR
Buff-fronted Owl	<i>Aegolius harrisi</i>	Kavure'i pytã	Lechucita canela	HCH, DCH, PA, AF
Striped Owl	<i>Pseudoscops clamator</i>	Ñakurutú'i	Lechuzón orejudo	AR
Stygian Owl	<i>Asio stygius</i>	Ñakurutú hũ	Lechuzón negruzco	AF, HCH
Short-eared Owl	<i>Asio flammeus</i>	Suindá ñu	Lechuzón de campo	HCH, DCH, AF, CE, MG

Taxonomy follows Remsen et al. (2012). Common names in Guaraní and Spanish (the official languages of Paraguay) follow Guyra Paraguay (2004, 2005). The following abbreviations are used for biomes: *HCH* Humid Chaco, *DCH* Dry Chaco, *AF* Atlantic Forest (includes Alto Paraná forest and Paraguay Central forest), *CE* Cerrado, *MG* Mesopotamian Grasslands, *PA* Pantanal, *AR* species found in all regions of the country. Distribution data is compiled from Bertoni (1901, 1939), Short (1976), Storer (1989), Hayes (1995), Brooks et al. (1995), Cardoso da Silva (1996), Ericson and Amarilla (1997), Lowen et al. (1997), Robbins et al. (1999), Capper et al. (2001), Zyskowski et al. (2003), Cockle et al. (2005), Guyra Paraguay (2004, 2005), Tierno de Figueroa and Padial (2005), Bodrati and Cockle (2006), Esquivel et al. (2007), Ramírez Llorens and Bellocq (2007), and Bodrati et al. (2012)

Tawny-browed Owl (*P. koeniswaldiana*) also appears to be more common in the south of the country and is able to inhabit even small patches of well-preserved forest (Guyra Paraguay 2004). The presence of Black-banded Owl (*C. huhula*) was first confirmed in the 1990s. It remains extremely scarce and seems to have a restricted range in a few well-preserved blocks of the Atlantic Forest (Brooks et al. 1995; Lowen et al. 1997; Ericson and Amarilla 1997; Cockle et al. 2005; Velázquez and Bodrati in Guyra Paraguay 2004).

The remaining six species of owls can be found in various biomes. Known records of Spectacled Owl (*Pulsatrix perspicillata*) suggest a distribution associated with gallery forests in the Paraguay and Paraná River watersheds (Ramírez Llorens and Bellocq 2007). It occurs in Cerrado in the northern Oriental region (Concepción Department) (Robbins et al. 1999), Atlantic Forest at the Reserva de Bosque Mbaracayú (Canindeyú Department), islands of forest in the Mesopotamian Grasslands (Itapúa department), and in the northern Dry Chaco (Capper et al. 2001; Zyskowski et al. 2003).

Great Horned Owl (*Bubo virginianus*) is a common owl in the forests of the Dry and Humid Chaco but occurs only marginally east of the Paraguay River in Cerrado, where it is much less numerous (Short 1976; Robbins et al. 1999; Zyskowski et al. 2003; Guyra Paraguay 2004; Tierno de Figueroa and Padial 2005). Mottled Owl (*Ciccaba virgata*) occurs predominantly in remnants of the Atlantic Forest in eastern Paraguay, being more frequent in the north and east of that region and less common in the south (Guyra Paraguay 2004; Cockle et al. 2005). There are recent reports from gallery forest in the Cerrado region (Concepción Department along the Apa River), and marginal presence in the Chaco is suspected (Bodrati et al. 2012). Buff-fronted Owl (*Aegolius harrisi*) is a rarely recorded species in Paraguay, being uncommon in the Atlantic Forest and having been recently recorded in the Pantanal and Dry and Humid Chaco (Guyra Paraguay 2004; Bodrati and Cockle 2006b). Striped Owl (*Pseudoscops clamator*) is widespread and apparently fairly common, with records from across the country in all the major biomes and even urban areas. However, the species is likely under-recorded because of its secretive habits. Stygian Owl (*Asio stygius*) is known from few records mainly in the east and south of the Oriental region, and there have been few modern reports. The species would seem to be rare (Guyra Paraguay 2004, 2005), though again it is probably overlooked.

Four other species of owls have been reported for Paraguay but lack documentation. König et al. (1999) include southeastern Paraguay in the range of Long-tufted Screech Owl (*Megascops sanctaecatarinae*), but there are no reports of the species from the country and this appears to be an error or overextrapolation of distribution. Short (1976), König et al. (1999), and Mikkola (2012) treat Chaco Pygmy Owl (*Glaucidium tucumanum*) as a distinct species, but the majority of authors consider this taxon to be a subspecies of Ferruginous Pygmy Owl (*G. brasilianum*) (Guyra Paraguay 2004; Remsen et al. 2012) and that arrangement is followed here. Howell and Robbins (1995), König et al. (1999), and Marks et al. (1999) report the Least Pygmy Owl (*G. minutissimum*) for Paraguay, but Guyra Paraguay (2004) affirms that no reliable evidence exists that the species occurs in Paraguay. The reference to Sick's Pygmy Owl (*G. sicki*) in eastern Paraguay by Mikkola (2012) refers to the

same erroneous reports. Short-browed Owl (*Pulsatrix pulsatrrix*) was listed for Paraguay by Ihering (1904), Kelso (1934), and Bertoni (1914, 1939), but this is a misapplication of the name in reference to Spectacled Owl (*P. perspicillata*). Perhaps as a result of this, the form has also been listed more recently for Paraguay in error by Marks et al. (1999) who treated it as a subspecies of Spectacled Owl (*P. perspicillata*).

18.2 A Short History of Paraguayan Ornithology

The Paraguayan avifauna has been studied since colonial times, due principally to the contribution of various explorers, Jesuits, and European, North American, and Argentinian naturalists (Hayes 1995). The pioneering work of Félix de Azara (1805), considered the “father of ornithology” in southern South America, stands out for its meticulous attention to detail at a time when the discipline was still in its infancy. He listed eight species of owls: the Ñacurutú (*Bubo virginianus*), Ñacurutú mocho (*Pulsatrix perspicillata*), Ñacurutú chorreado (*Pseudoscops clamator*), Suindá (*Asio flammeus*), Lechuza (*Tyto alba*), Urucureá (*Athene cunicularia*), Choliba (*Megascops choliba*), and Caburé (*Glaucidium brasilianum*).

Almost a century had passed before the next great “Paraguayan” naturalist emerged Arnaldo de Winkelried Bertoni, who plied his trade from his base at Puerto Bertoni in Alto Paraná Department, collecting birds and other local fauna. Being the most prolific Paraguayan ornithologist of the early twentieth century, his publications were frequent (Hayes 1995), and his contribution to regional ornithology was significant, including the discovery and description of Tawny-browed Owl (*Pulsatrix koenigswaldiana*) (Bertoni 1901), as well as two subspecies still considered valid today, of Mottled Owl (*Ciccaba virgata borelliana*) (Bertoni 1901) and Stygian Owl (*Asio stygius barberoi*) (Bertoni 1930). Other substantial contributions to the Paraguayan avifauna around this time were published by Laubmann (1939–1940a, b), Podtiaguín (1941–1945), and Schade and Masi Pallarés (1967, 1970a, b, c, 1971).

More recently, Hayes (1995) published the first modern revision of the Paraguayan avifauna, providing a list with distribution and abundance data comprising 645 species (Guyra Paraguay 2004). Beyond this point there was a notable increase in field work aimed at improving our knowledge of the Paraguayan avifauna. Various projects performed inventories of different areas of the country, and their results were published in ornithological journals (Brooks et al. 1993, 1995; Lowen et al. 1996). The Asociación Guyra Paraguay was created in 1997 and brought together numerous naturalists and ornithologists, both Paraguayan and foreign, to carry out hundreds of field expeditions covering all of the national territory. These campaigns contributed up-to-date information about distribution, abundance, and status, raising the number of species documented as occurring in the country to almost 700 (Guyra Paraguay 2004, 2005). The latter of these two works included for the first time a review of the threat categories of all Paraguayan species, and this was later followed by a book on the Important Bird Areas (IBAs) of Paraguay (Cartes and Clay 2009). In the last few years, there have been occasional publications on the diet

of some Paraguayan owls (*A. cunicularia*, Andrade et al. 2004; *T. alba*, Pardiñas et al. 2005; Teta and Contreras 2003; *A. flammeus*, Torres et al. 2014), one on reproduction (del Castillo 2014) and one on behavior (*A. cunicularia*, Austin et al. 2016).

However, Paraguay continues to be one of the least ornithologically studied of the Neotropical countries (Esquivel Mattos 2010). As with other countries in the region, owls are among the most poorly known species of Paraguayan birds due to their inconspicuous behavior, nocturnal habits, and lack of commercial importance.

18.3 Conservation

All Paraguayan Strigiformes are included on CITES (2012) Appendix II, but only one species (*S. hylophila*) is classified as Near Threatened at international level as a result of presumed declining populations (BirdLife International 2012). Seven species are considered to be under some degree of threat at the national level. Tawny-browed Owl (*P. koeniswaldiana*) is “Endangered.” Rusty-barred (*S. hylophila*) and Black-banded Owls (*C. huhula*) are treated as “Vulnerable” (Guyra Paraguay 2005). The principle threat to these species is continued loss of habitat coupled with their natural low density, and they do not adapt well to fragmented habitats. Spectacled Owl (*P. perspicillata*), Black-capped Screech Owl (*M. atricapilla*), and Mottled Owl (*C. virgata*) are all classified as “Near Threatened” for essentially the same reasons. Stygian Owl (*A. stygius*) is an extremely rare species, and little concrete data about its status is available. As a result it is considered “Data Deficient” nationally, though it may be suspected that the species is under some degree of threat (Guyra Paraguay 2004, 2005).

18.4 Local Attitudes to Owls

The nocturnal habits of owls have attached to them an air of mystery, sometimes associated with malign forces. The calls of *Megascops choliba* and *Tyto alba*, for example, have been considered predictors of illness or harbingers of death (Laprovitta 2016). Consequently in contemporary times owls have often been seen as a bad omen, and some are killed as a result (Bodrati and Cockle 2012).

However the perceived strength of owls also wins them admiration. *Athene cunicularia* was considered a celestial protector whose role was to prevent the uncontrolled reproduction of bats which will signal the end times. The possession of amulets made from owls can thus be understood to pass the gifts of strength on to the wearer (Laprovitta 2016). As an extension of this idea, in some areas, the possession of feathers or wings of *Glaucidium* and *Megascops* is thought to bring good luck, especially in business dealings, and may even assist in finding a life partner (Laprovitta 2016). Such beliefs are still strongly held in Paraguay and neighboring countries and may be an important source of mortality for owls in some rural areas. Small owls such as *Glaucidium*, *Megascops*, and *Athene cunicu-*

laria are occasionally offered for sale as pets in markets in Asunción, with the presumed “luckiness” of these birds perhaps also contributing to the willingness to own one.

The Aché indigenous group of Canindeyú Department hunts and consumes several species of owls including *Glaucidium brasilianum*, *Megascops atricapilla*, *Strix virgata*, and *Pulsatrix perspicillata*. The feathers of the latter species are also used to make arrows (Chachugi 2013). In Guaraní cosmology, owls were seen as celestial “observers,” sent by the God Tamandú to judge those that are worthy of a place in the heavens (Micó 2001).

18.5 Threats

The principal threat to Paraguayan owls is the massive scale deforestation and conversion of land to monoculture and cattle ranches. Eleven of the sixteen species of Paraguayan owls depend on forested habitats, and four of these are found exclusively in Atlantic Forest which, since 1945, has seen its coverage reduced from 88,000 km² to 12,000 km² (Cartes 2006). Today, little of Paraguay’s remaining Atlantic Forest is protected by law, and many of the protected areas that do exist are poorly administrated or virtually unpoliced. The degradation of existing native forests through selective logging is a serious threat to many species of Atlantic Forest owls, as they require, for both nesting and roosting, holes or platforms in large trees – the same trees that are targeted by selective loggers (Cockle et al. 2010, 2011, 2012; Bodrati and Cockle 2013).

The habit of many owls of hunting near to roads means that many owls fall victim to roadkill. This is a significant source of mortality in some species such as *Athene cunicularia*, *Bubo virginianus*, *Megascops choliba*, *Strix chacoensis*, and *Tyto alba*.

Unfortunately, the conservation of owls is made more complex by the near total lack of knowledge of their reproductive biology, habitat requirements, and diet, making it difficult to propose effective conservation strategies to combat the challenges posed to them by the modern world.

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Black-banded Owl (*Ciccaba huhula*)



Black-capped Screech Owl (*Megascops atricapilla*)



Chaco Owl (*Strix chacoensis*)



Rusty-barred Owl (*Strix hylophilla*)

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