Spizaetus

Neotropical Raptor Network Newsletter

Issue 20

December 2015

SPIZAETUS
NRN NEWSETTER

Issue 20 © December 2015
English Edition, ISSN 2157-8958

Cover Photo: *Harpia harpyja* photographed in Darien, Panama
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Translators/Editors: Carlos Cruz Gonzalez, F. Helena Aguiar-Silva, and Marta Curti

Graphic Design: Marta Curti

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Red de Rapaces Neotropicale

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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.

Harpy Eagle (*Harpia harpyja*) Monitoring Project in São Geraldo do Araguaia, South-eastern Brazlian Amazon

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The Harpy Eagle (*Harpia harpyja*) is a forest raptor and is one of the most powerful birds of prey in the Americas (Brown and Amadon 1968, Sick 1997). An adult eagle's wingspan can measure up to 2 m. Its feet and talons are very strong and favor the predation of a large variety of mammals, birds and reptiles (Cope and Fowler 1968, Aguiar-Silva et al. 2014). Harpy Eagles nest in larage intact forests (Pinto 1964). However, there are records of these eagles breeding in fragmented habitat and within managed forests (Álvarez & Ellis 1994, Aguiar-Silva et al. 2011).

In October 2011, members of the Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis (IBAMA) were in the Araguaia Area for Environmental Protectin (APA Araguaia) to control a forest fire (J. Procopio pers. comm). One of the work crews observed a pair of adult Harpy Eagles and a juvenile at a nest within this protected area, which is located in the region known as Valle de Sucupira, São Geraldo do Araguaia, in the state of Pará (Figure 1).

This sighting prompted the creation of the Harpy Eagle Monitoring Project (PMGR – for its acronym in Portuguese - Projeto de Monitoramento do Gavião-real), which was formed in response to the need for the conservation and study of this species, as well as the need to develop programs

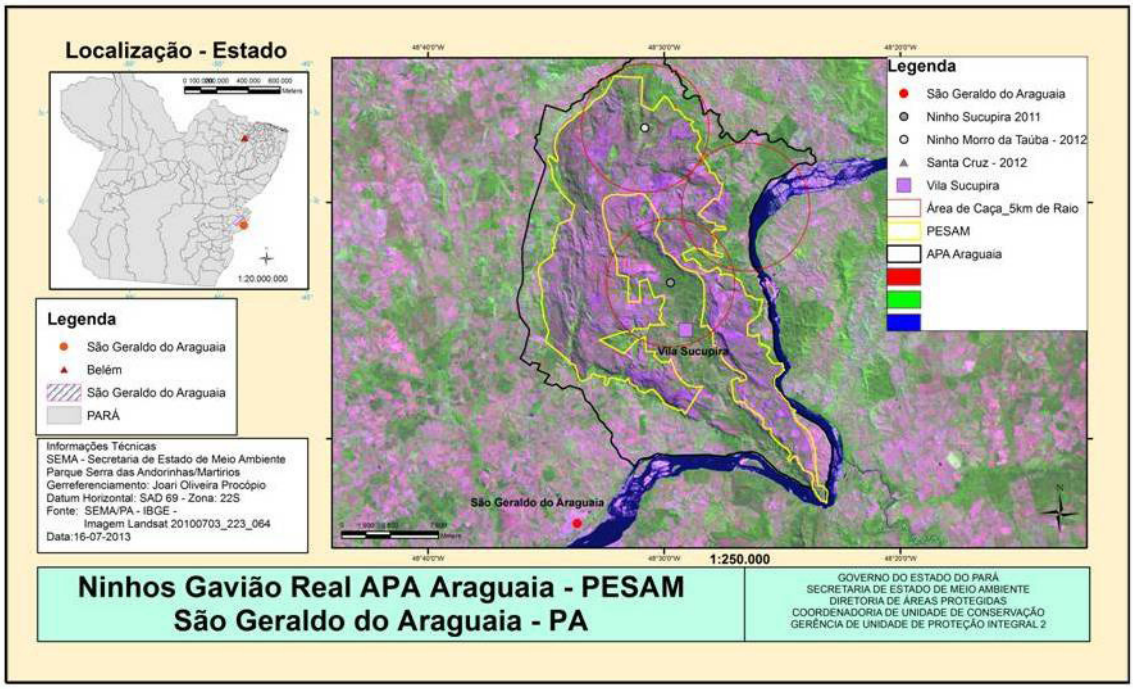

Figure 1. Harpy Eagle *Harpia harpyja*) nest map ed in 2011 and 2012 in the APA Araguaia and PESAM, São Geraldo do Araguaia, Pará.

that are systematic and integrated with other programs planned within this protected area.

Between 2011 and 2014, the Office of the Secretary of the Environment and Sustainability (SEMAS) (Secretaria de Estado de Meio Ambiente e Sustentabilidade) - whose mission is to promote integrated and efficient management of the natural environment, sustainable development to ensure biodiversity conservation and improve quality of life - provided support to the PMGR. They took part in integrated management programs which included protection, monitoring, research and environmental education in protected areas of Sao Geraldo do Araguaia. This paper describes the activities carried out by PMGR in Sao Geraldo do Araguaia, Pará. The program's goal is to contribute effective actions for the conservation of wildlife and contribute to the maintenance of environmental quality in the region through the integration of research, monitoring and awareness raising, using the Harpy Eagle as a flagship.

Study Site

Pará State currently has 144 municipalities distributed over six regions. One of these is Sao Geraldo do Araguaia, located in the southeast, with a population of 25,587 inhabitants in 3, 168.383 km^2 (IBGE 2010). This town was created on 10

May 1988, and its boundaries include the Araguaia River (Xambioá-Tocantins), Maraba, do Araguaia Santo Domingo, Palestina do Pará, Eldorado dos Carajas and Piçarra.

The APA Araguaia (29.655,39 ha) and the Serra dos Andorinhas/Martírios State Park (PESAM - for its acronym in Portuguese) (28.780,41 ha) are officially protected areas, created by state laws No. 5982 and No. 5983 on 25 July 1996 (Pará 1996), and are home to a significant number of species, several of which are threatened or endangered such as the jaguar (*Panthera onca*) and the giant anteater (*Myrmecophaga tetradactyla*) (IUCN 2014). Both protected areas are in the region of Serra das Andorinhas, a transition zone between the Cerrado biome of Central Brazil and the Amazon jungle, home to forests with "Cerrado" vegetation types,with a predominance of xeromorphic plant species, low montane forest montano and floodplain vegetation (Amaral et al. 2008). According to the Köppen classification, the climate is Aw, with an average annual temperature of 26° C, and annual rainfall ranging from 1000-1500 mm, with a rainy season from October to April.

Our project was focused on the Harpy Eagle nests that had been mapped in Sao Geraldo do Araguaia, with the aim of protecting these nests from anthropogenic threats through preventative control and isolation of the area. Our efforts included nest monitoring, collecting ecological data, and carrying out awareness raising campaigns, which occurred in the last five months of this study.

Mapping the Harpy Eagle Nests

Sharing our project activities with the landowners and community members around these two protected areas helped increase our knowledge and our ability to map two Harpy Eagle nests, one in the Sucupira region - also located within APA Araguaia - and the other in the Morro da Tauba in PESAM.

During the study, based on information provided by the Surui-Sororo indigenous group, two other Harpy Eagle nests were discovered in another preserve, approximately 55 km from the center of Sao Geraldo do Araguaia. In this preserve there are several species of endangered chestnut trees (*Bertholletia excelsa* Bonpl), (Albernaz and Avila-Pires 2009), which are the main tree species used by the Harpy Eagle (Luz et al. 2010). We georeferenced these two nests. One was occupied at the time, while the other showed no evidence of recent use. Though these nests were located in the forests of São Geraldo do Araguaia, they were not part of the results analyzed in this paper.

For each Harpy Eagle nest, we identified the nest tree species; nesting activity - based on obvious signs of nest occupation such as accumulation of feces, pellets and prey remains (bones, teeth), and molted feathers of both adults and juveniles;

Figure 2. Observing Harpy Eagle behavior at the nest in the APA Araguaia, São Geraldo do Araguaia, Pará, 2011.

vocalizations or direct observation of the eagles (Hardey et al. 2009, Aguiar-Silva et al. 2012a). Accordingly, the observation points for each nest (Fig. 2) were set at an appropriate distance from the nest trees to avoid interference with the eagles' behavior and nest use. The three nests mapped in APA Araguaia and PESAM were 10 km from each other, and located high in the canopy of the tallest trees (Luz et al. 2010), situated in branches near the trunk.

Monitoring the Harpy Eagle Nests

The three Harpy Eagle nests mapped in APA Araguaia and PESAM were monitored 18 times between 2011-2012 (Table 1). We did not visit each nest an equal number of times, due to difficulty in accessing some nesting sites (location, weather conditions, availability of transport and fuel). Preventative surveillance was carried out twice a month at the nests and in the surrounding areas. With these surveillances we hoped to stop elicit activities that could occur in the forested area.

To monitor the Harpy Eagles, we used direct observation of birds in the nest and also collected prey remains (bones, teeth, and feathers) that had been left in the nests or that were found at the base of the nest trees. To collect remains accumulated inside the nest, the expert climber O. Jaudoin, of the Harpy Eagle Project team, climbed the Sucupira (n = 2) and Santa Cruz (n = 2) nests. Eight species of vertebrate were consumed by Harpy Eagle, including six mammals: sloths (*Bradypus variegatus* and *Choloepus didactylus*), monkeys (*Sapajus apella* and *Alouatta belzebul,* coati

(*Nasua nasua*), agouti (*Dasyprocta spp.*), common opossum (*Didelphis marsupialis*), and an unidentified bird.

The Sucupira nest was the one we most often monitored as it was the first nest discovered with young in November 2011 (Table 1). This was the only nest where we recorded successful reproduction, and the juvenile dispersed in 2013. The Santa Cruz nest had no nestling and this Harpy Eagle pair has not bred again. The Morro da Tauba nest was only identified during the mapping efforts and was not occupied; in addition the trails to this nest were difficult to access in most months of the year.

Main Threats to Harpy Eagle Nests

Interviews with inhabitants of the APA Araguaia and the areas surrounding PESAM were carried out simultaneously with our monitoring activities. The questions were designed to measure if local residents could identify Harpy Eagle nests, if they had seen the species in the region, and if they knew of any people hunting or wood collecting in the area. In this way, we discovered some threats to the survival of the species, such as the illegal timber trade on the property where the nests are located, the presence of hunters and recent fires

Figure 3. Harpy Eagle nest in *Hymenaea courbaril*, mapped inNovember 2011 in the Sucupira community in APA Araguaia, São Geraldo do Araguaia, Pará. April 2012. Photo: O. Jaudoin

in the area, such as the one that occurred at one Harpy Eagle nest, in Morro da Tauba, where the base of the tree was burned. We documented the illegal wood trafficking through photographs and geographic coordinates using GPS. All this information was included in a report.

The main threats detected during nest monitoring activities included poaching, forest fires, and wood harvesting. These threats are some of the main causes for the reduction of Brazil's flora and fauna (IUCN 2014). This information shows the urgency for the adoption of definitive conservation measures, such as the preservation of habitats for endangered species in protected areas (Machado et al. 2008).

Awareness Campaigns for Harpy Eagle Conservation

We participated in the following presentations and meetings highlighting Harpy Eagles, wildlife conservation and PMGR activities held in the São Geraldo do Araguaia: we gave presenations at four schools in APA Araguaia with the participation of 80 students and their parents; we gave three presentations at municipal schools in urban areas, with about 150 students during the culmination of educational projects focused on the en-

Figure 4. Harpy Eagle nest in *Bertholletia excelsa*, mapped in 2012 in the Santa Cruz community, APA Araguaia, São Geraldo do Araguaia, Pará. Photo: F.H. Aguiar-Silva/PCGR.

Figure 5. Environmental Education activity about the Harpy Eagle at Portinari School, where we donated a copy of a book about Harpy Eagles. APA Araguaia. São Geraldo do Araguaia, Pará. 12 December 2012. Photo: N. Amaral

Figure 6. PMGR Logo.

cil, for an audience of 20 people. These meetings with local communities have helped raise awareness among local residents about both protected areas and the need for Harpy Eagle conservation. We also shared information about the sanctions that are likely to be placed on those who commit crimes against wildlife and flora in accordance with the relevant legislation (Law No. 9.605 / 98, Decree No. 3,179 / 99).

Final Thoughts

We conclude that the interviews with residents of the APA Araguaia and the areas surrounding PESAM were effective as a technique to locate nests and to provide relevant information to plan protection and conservation actions. This technique helped locate other Harpy Eagle nests in

Table 1. Information on the nests which were mapped and studied in the PMGR in 2011 and 2012 in the APA Araguaia and PESAM, São Geraldo do Araguaia, Pará.

Nests	Localization	Date	Nest Height (m)	Tree Species	# of Visits
Sucupira	R. Agrop. Andorinha, APA Araguaia, Região Sucupira	11/2011	24	*Hymenaea courbail L*	12
Morro da Taúba	PESAM/ Morro da Taúba	02/2012	17	*Terminalia* spp.	1
Santa Cruz Araguaia	R. Agrop. Adorinha APA Araguaia, Região Santa Cruz	12/2012	32	*Bertholletia excelsa*	5

the region and identify threats to the nests and to these protected areas, such as hunting, slashing-and-burning, and illegal logging.

Monitoring of nests allowed the identification of the community of vertebrates consumed by Harpy Eagles in Serra das Andorinhas, composed during the study period by eight species, without domestic animals records. The nests are located in the mosaic of different vegetation types (Cerrado, lower montane forest and vegetation alluvial floodplain) and land use (grazing and agriculture).

We obtained effective sensitization of the residents of APA Araguaia and in the surroundings of PESAM, regarding the conservation of the Harpy Eagle, because everyone agreed about its importance to the forests. As well as ensuring that help protect the species, mainly by inhibiting the action of hunters in the areas of the nest and surrounding areas.

Meetings with PMGR team allowed: the consolidation and implementation of the work and the creation and definition of the logo (Fig. 6) to promote identification of the people of the region with the species and the developed project; the production and the inclusion of PMGR activities in Operational Planning Annual 2012 and 2013; and implementation of environmental education activities inserted in PMGR held in schools of APA Araguaia.

Considering the threats (hunting, cut-and-burning and illegal logging) inside the protected areas (APA Araguaia and PESAM) and in the surrounding of the Harpy Eagle nests, surveillance,

monitoring and protection actions should be intensified, in addition to environmental awareness activities that have obtained positive results, in order to get the effective conservation of this species and the forests of São Geraldo do Araguaia, especially the ecotone between Cerrado and Amazon rainforest in this region of the Brazilian Amazon.

Acknowledgements

Our sincere thanks to: Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis (IBAMA), Instituto Chico Mendes de Conservação da Biodiversidade (ICMBio), Instituto Nacional de Pesquisas da Amazônia (INPA), Fundação Nacional do Índio (FUNAI), Agente Ambiental Voluntário, Instituto de Desenvolvimento Florestal e da Biodiversidade (Ideflor-Bio), Diretoria de Gestão e Monitoramento das Unidades de Conservação (DGMUC), Gerência Regional Administrativa do Araguaia (GRA), Parque Estadual Serra dos Martírios/Andorinhas, Prevfogo – Programa de Prevenção e Combate a Incêndios Florestais, Secretaria de Estado do Meio Ambiente e Sustentabilidade (SEMAS).

We also thank the Association Floresta Nacional de Carajás, Parauapebas, the Zoo and Botanical Gardens -Vale em Carajás - for help with visiting the Harpy Eagle nests in this protected area, the donation of 17 copies of *Arpia* by João Marcos Rosa. To the Agropecuária Andorinha and Fazenda Cachoeira who gave us authorization to access the properties to carry out our activities. To the group Agentes Ambientais Voluntarios de São Geraldo do Araguaia. To the members of the communities in APA Araguaia, especially those that are close to the nests, such as Mr. Cícero and his family, and from Vale do Sucupira, Mrs. Madalena and her husband Getúlio de Vila Santa Cruz dos Martírios. We thank Ideflor-Bio en GRA, and the current manager, Ernildo Serafim, Evandra Priscila Vilacoert, Evânio Cunha, Maria Leila Alcântra, Antônio Costa de Sousa and Edvan Lírio.

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New Record of *Buteogallus coronatus* in the Provincial Natural Reserve of Ibera, Corrientes, Argentina

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The Crowned Solitary Eagle (*Buteogallus coronatus*) is a large species corresponding to the order Accipitriformes (Bierregaard et al. 2015, Remsen et al. 2015). This species is threatened globally, and is considered Endangered because there has been a drastic decline in its populations throughout much of its range (Birdlife International 2015a). The species has been classified as Endangered in Argentina (Lopez-Lanus et al. 2008) and Critically Endangered in Rio Grande do Sul (Bencke et al. 2003). The main threats to their populations are related to various human activities that have diminished and fragmented the habitats used by this species (Collar et al. 1992, Birdlife International 2015a). In addition to the loss of habitat the species is suffering from direct persecution and collisions with power lines and other hazards (2006 Sarasola & Maceda, Maceda 2007 Chebez et al. 2008, BirdLife International 2015a).

Crowned Solitary Eagle (*Buteogallus coronatus*) in the Reserva Provincial Natural del Iberá, Corrientes, Argentina. Photo: Adrián Antúnez.

This species inhabits grasslands, shrublands and open areas in the Monte, Espinal, Campos and Pampas ecoregions (Bellocq et al. 2002, Maceda 2007). An important feature of the nesting habitat of the species is the presence of tall trees, whether isolated or in open forests (eg *Prosopis* spp.) (Bellocq et al. 1998, Maceda 2007).

Crowned Solitary Eagle distribution mainly covers the South Central region of South America, eastern Brazil, Bolivia, Paraguay and northern and central Argentina (Collar et al. 1992 Bierregaard et al. 2015). In Argentina the species has been recorded in the provinces of Tucumán, Formosa, Chaco, Corrientes, Santa Fe, Jujuy, Salta, Santiago del Estero, Córdoba, Catamarca, La Rioja, San Juan, San Luis, Mendoza, La Pampa, Neuquen, Rio Negro and formerly in the southern end of the Province of Buenos Aires (Chebez et al. 2008).

In this note we provide information on a new, recent record of the species for the Ibera Provincial Natural Reserve, Province of Corrientes, Argentina. The Ibera Provincial Natural Reserve covers an area of 13,000 km^2 and encompasses the high basin of the Corrientes River. The protected area was created in 1983 by the provincial Law No. 3771. In turn, the Ibera Lagoon, which is associated with the area, became part of the

Crowned Solitary Eagle (*Buteogallus coronatus*) in the Reserva Provincial Natural del Iberá, Corrientes, Argentina. Photo: Adrián Antúnez.

national and international network of RAMSAR sites in 2002. This reserve is characterized by a significant diversity of species and ecosystems of great conservation concern. In particular, within this protected area, an additional area of importance for the Conservation of Birds and Biodiversity (IBA) was added, (BA AR146,) and is called the Rincón del Socorro-Iberá. This area was designated as such, due to the presence of populations of globally threatened birds such as the Strange-tailed Tyrant (*Alectrurus risora*), Saffron-cowled Blackbird (*Xanthopsar flavus*), Yellow Cardinal (*Gubernatrix cristata*) and the Crowned Solitary Eagle among other species (BirdLife International 2015b).

Published records of the Crowned Solitary Eagle in Ibera are scarce and do not allow us to adequately determine their conservation status in the area nor to pinpoint their local threats (Waller et al. 2004). According to Waller et al. (2004) it is a rare species in Ibera, with records in Colonia Carlos Pellegrini (Wege and Long 1995) and San Gará (Giraudo et al. 2003) (total 4 records). Meanwhile, in the EcoRegistros database, before the record presented in this paper, there were five documented records for the Crowned Solitary Eagle in Ibera. The first record present in the database dates back to 25 March 2010 and was documented by Andres Teran (Photo ID: 52157). Three of the remaining records occurred on 5 December 2010 and were also documented by Andres Teran (Photo ID: 4203, 4204 and 4205). Finally, there is a documented record for 8 May 2011, also made by Andres Teran (Photo ID: 52158).

The individual Crowned Solitary Eagle documented in this paper was observed and photographed on 4 September 2015 in the Municipality of Colonia Carlos Pellegrini, province of Corrientes, Argentina (Figure 1). The eagle was flying over a village street (28 ° 32'7.74 "S, 57 ° 10'31.00" W). It crossed the village at a medium height and was chased insistently by a Southern Crested Caracara (*Caracara plancus*) until it left the area. The eagle was not observed again in subsequent days. Registration was admitted to the EcoRegistros database by Adrian Antúnez (Photo ID: 113985).

Regarding the presence of this species in Ibera, it will be important to determine if a viable population exists there in order to direct conservation efforts (Waller et al. 2004) to the area. In this regard and in the case of a species that has few documented records for the zone, our record is intended to provide information about the current presence of the species in the area and provide input to encourage further studies to estimate the population status of the Crowned Eagle in Ibera and its surroundings.

Acknowledgements

The authors thank Lucia Bergós, Nadia Bou,

Cristhian Clavijo, Verónica Etchebarne, Andrés Ligrone and Cecilia Suárez.

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Ñankulafkén Raptor Center: An Opportunity for Raptor Conservation in Nahuelbuta, Southern Chile

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Birds of prey, like other top predators, have interrelated characteristics that make them especially vulnerable to environmental disturbances caused by humans, such as: i) relatively large body sizes, ii) small population sizes, iii) low reproductive rates, iv) high demand for energy, and v) requirement of large extensive territories (Rivas-Fuenzalida & Figueroa 2009). Agricultural pesticide poisoning, destruction of habitat and direct persecution are the three main causes of population declines in raptors. In more developed areas of the world, these factors have caused the current populations of birds of prey to represent only a fraction of what they were 100-200 years ago (Newton 1979).

In the middle of last century, the widespread use of the pesticide DDT, a powerful organochlorine chemical that affected the reproduction and survival of raptors (when they consumed prey that had DDT accumulated in their bodies), caused catastrophic declines in populations of many species around world, emerging with it a number of conservation initiatives. The Peregrine Falcon (*Falco peregrinus*) was one of the most affected species and came to the brink of extinction in its breeding grounds in North America and Europe (Ratcliffe 1980). Thanks to captive breeding and release efforts developed and carried out by biologists and falconers, populations recovered remarkably and today it is considered a non-threatened species (Burnham 1990). Thus, captive breeding programs can be vital tools for recovery of raptor populations that have declined dangerously in number, provided there is availability of suitable nesting habitat and prey for subsequent reintroduction.

Those species that specialize in a particular type of habitat, such as forest birds of prey, are usual-

At the Center we have developed diverse studies focused on the conservation of forest-specialist raptors, the most threatened group of raptors in Chile. In this phote, the first author is holding *Buteo ventralis***, which was trapped for banding and to obtain morphometric measurements. Photo: Luis Villagrán**

ly more sensitive to changes in the landscape, and are threatened with increasing pressure through the exploitation of the forests around the world; and raptors in southern temperate forests are no exception (see Jaksic & Jiménez 1986, Trejo et al. 2006, Pincheira-Ulbrich et al. 2008, Rivas-Fuenzalida et al. 2011, 2013).

Globally, habitat destruction, more than any other factor, is responsible for the greatest population decline in birds of prey; and with the continued growth of human populations and development, it is turning into their main long-term threat (Newton 1979).

Moreover, because many raptors occasionally feed on domestic animals (ie: cattle, poultry, etc.), they have been exterminated by the millions over the last 150 years (Newton 1979). Persecution can act synergistically with other factors, becoming the final blow to raptor populations that were already diminished by other causes (Rivas-Fuenzalida & Figueroa 2009). Direct persecution seems to be a difficult factor to mitigate, as it requires

Light morph Austral Peregrine Falcons (*Falco peregrinus cassini)* **successfully breeding at the Kreyenborgi breeding facilities.**
Photo: Christian González

far-reaching environmental and educational policies, which in most cases can be complex and expensive, involving monitoring efforts, mitigation, and education programs. Although today many countries have legislation to protect birds of prey, direct persecution is still one of the main threats to these species worldwide.

The apparent incompatibility between human activities and the biological needs of birds of prey, and other predators, reflects the socio-environmental nature of this problem, which complicates the search for viable long-term solutions.

Therefore, the development of multidisciplinary initiatives which consider environmental and social factors and seek not only the conservation of endangered species, but also to promote the overall conservation of raptor communities, and the fundamental role they play in the ecosystems they inhabit. Such initiatives may include strengthening research (both i*n situ* and *ex situ*) as well as environmental education programs and outreach associated with the development of sustainable

economic activities, such as nature tourism.

The benefits of these activities are evident: i) research delivers critical information to establish conservation programs or guidelines, ii) environmental education and outreach contribute to the awareness of the importance of conserving species and ecosystems by citizens and iii) nature tourism provides benefits for local communities and national and international financial support for protected areas, conservation of endangered species and research (Langholz 1996, Fennell & Weaver 2005).

The attitude of people towards birds of prey, whether positive, negative or neutral, has determined the current state of conservation of these predators. Although one might think that a neutral or indifferent attitude towards birds of prey has no impact on its conservation, this attitude often results in indirect negative effects through land use practices, environmental pollution, habi-

The evironmental education activities are supported by raptor shows using raptors form Ñankulafkén Raptor Center, providing emotional experiences which contribute to learning. Photo: Nicol Asciones.

Raptor flight shows are very attractive to tourists, which helps spread the conservation message to a great spectrum of people, and at the same time generate revenue for the Center.
Photo: Cristian Fierro

tat loss, electrocutions and other abuses (Parry-Jones et al. 2007). Negative and neutral attitudes toward raptors are not inevitable.

There is evidence that many cultures have different attitudes towards similar wildlife (e.g., Kellert 1991, Bjerke et al. 1998 Seddon & Khoja 2003). The challenge, then, is to create new learning opportunities that influence positive public attitudes toward raptors (Parry-Jones et al. 2007). These new attitudes can result in behaviors that help conserve these predators (Broun 1949, Fraser et al. 1996, Bildstein 2001).

An attitude contains three main components: a cognitive component (reason), an affective component (emotion) and a change in behavior as a direct result of cognitive and affective elements (Manzanal et al. 1999). Thus, an education program with raptors must provide a combination of cognitive and emotional experiences (Parry-Jones et al. 2007). Cultivating positive attitudes toward raptors through participatory learning experiences is more useful than just distributing

During the flight shows, the students and tourists can learn a lot about raptors, their ecological role and their conservation, thanks to educational talks given at the Center. At the same time, they get a close up view of these birds, which turns their visit into an unforgettable experience. Photo: Tomás Rivas

information passively (Everitt et al. 2002).

An effective way to give the public a meaningful educational experience related to raptors and their protection is one being developed by zoos and raptor centers around the world – one which combines interpretive talks with exhibitions of live free-flying birds, providing people with a unique opportunity to learn about these magnificent animals up close (Parry-Jones et al. 2007). In Chile we have recently successfully developed such experiences at the Metropolitan Zoo and through traveling exhibitions of raptors from the Kreyenborgi Breeding Center.

So far, the biggest outreach efforts and conservation of raptors nationwide have been concentrated in the Metropolitan region, through the Talagante Center for Rehabilitation of Raptors, administered by AvesChile (ex - Unorch), which rehabilitates and reintroduces a significant number of individual raptors of various species. The center also carries out captive breeding programs and environmental education (Pavez 2004). In

the south of the country, apart from the efforts made by some ornithologists, veterinarians, falconers and conservationists who have contributed to the knowledge, rescue and education related to raptors locally, this subject has been poorly addressed. For this reason, it is important to highlight the advances in knowledge about forest-specialist raptors that have been made (Figueroa et al. 2000; Rivas-Fuenzalida 2015, b, Rivas-Fuenzalida et al. 2011, 2013a, b, Norambuena et al. 2012, 2015, b, c, d, e, f, Medel et al. 2013, 2015, Raimilla et al. 2013, 2015, Norambuena et al. 2013), the work of rehabilitation and education developed by the Center for Wildlife Rescue (CEREFAS) of the Universidad Austral de Chile, the valuation of raptors as biological pest controllers through work carried out by the Centre for Agrarian Studies (CEA) and the education and outreach initiatives of civil society organizations such as Contulmo Natural Heritage Conservation Network (Rivas-Fuenzalida & Figueroa, 2009), among others.

However, in most cases the work of these groups has been sharply limited by the lack of financial resources to develop activities on a permanent basis, which greatly minimizes the potential scope of these initiatives. Thus, research activities are carried out intermittently, rescue centers and wildlife rehabilitation work with minimal resources and environmental education programs are usually very short-term and low impact. Given this scenario, we provide a useful initiative which emerged in the south, which aims to provide new tools for the conservation of birds of prey and their habitats.

Ñankulafkén is a center which specializes in raptors, where research activities, environmental education and nature tourism are carried out. We call these three activities the "Pillars of Conservation" because they holistically contribute to this purpose. The Center is located in the El Natri Natural Reserve, a private protected area located in Contulmo (Bío-bío Region), at the foot of the Nahuelbuta Mountains, which protects an important remnant of native forest (310 hectares) on the shores of Lanalhue Lake. This Center has the participation and collaboration of experts in different disciplines including ornithologists, falconers, biologists and veterinarians, all of whom are linked to the study and management of raptors.

The Center's mission is to contribute to the effective conservation of raptors and the ecosystems they inhabit through research and education related to nature tourism, to promote positive interactions between the local communities and the natural environment.

The research focuses on the establishment and strengthening of *in situ* studies on birds of prey communities in general and of forest specialist raptors in particular (*Buteo ventralis, Buteo albigula,*

Accipiter chilensis and *Strix rufipes*). We also hope to start a project of ex situ research through captive breeding of forest specialist raptors, developing studies on difficult aspects to observe in nature, such as the molting process in different forms of plumage and sex, clutch size, details of the reproductive biology, physiology, genetics, etc., in addition to establishing methodological parameters for future programs of captive breeding and restoration in the wild.

To help carry out these efforts, we count on the extensive experience in breeding and management of raptors in captivity developed by Christian Gonzalez at the Kreyenborg Raptor Breeding Center, whose facilities have been able to successfully breed several species of raptors including Harris' Hawk (*Parabuteo unicinctus*), American Kestrel (*Falco sparverius*), Peregrine Falcon (*Falco peregrinus*) and Lesser Horned Owl (*Bubo magellanicus*).

In the area of education we will develop three environmental education programs with birds of prey: i) Environmental Education School Program with Raptors: intended for primary and secondary education levels; ii) Special Courses: advanced courses for students in higher education institutions and officials linked to the environment, among others; iii) Mitigation Programs: experimental educational programs for people who, through their attitudes or activities, adversely affect raptors, for example through direct persecution by farmers because of the depredation of poultry and the destruction of nests during agricultural and forest harvest. These programs will include theoretical and practical activities (see Figueroa 1995), in addition to providing positive experiences with trained raptors, encouraging positive public attitudes toward these birds.

Tourism plays a key role, and we hope to use it to generate resources for many of the research activities and for financing the Centre. Tourism activities will be developed through exhibitions of raptors trained by falconry techniques accompanied by scientific and educational lectures, a model that has worked very successfully in most of the world, especially in North America, Europe and recently in Chile. In addition, we will begin to implement scientific tourism as a way to support local research. This will be developed through scientific monitoring of wild populations of birds of prey where individuals can participate directly in collecting data, observations and graphic documentation, contributing firsthand knowledge and conservation of these species.

Considering the lack of resources for research and environmental education on the local level, the Ñankulafkén Raptor Center presents an opportunity for conservation, providing new socio-environmental tools for the protection of raptors and the ecosystems they inhabit.

Acknowledgements

Thanks to civil organizations Nahuelbuta Natu-

ral and Contulmo Natural Heritage Conservation Network for supporting this initiative, especially the president of the Network, Lily Rivas, who also provided part of their property for the establishment of the Center. Thanks to falconers Alvaro Garcia, Fernando Andrade, Alex Ospina, Jose Antonio Otero, Santiago Castrilli, Frederick Pallinger, Claudio Peña and Joep Hendrix for their valuable comments and recommendations concerning the Center. We thank the veterinarians Luis Salgado, Robert Lucero and Enzo Basso. We thank the Municipality of Contulmo and Ms. Silvia Concha for her contribution to the development of this initiative. Finally, we thank our families and friends who have supported us throughout this process, especially the Rivas Fuenzalida family, Cristian Fierro "Pindingo," Daniel Herrera and Luis Villagran. This project is co-financed by CORFO, Turismo Innova Biobio. The Ñankulafkén Raptor Center operates under authorization of Agriculture and Livestock through Resolutions No. 0647 and No. 9079.

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* * *

Opportunistic attack of Mottled Owl (*Ciccaba virgata*: Strigidae) on White-tipped Dove (*Leptotila verreauxi*: Columbidae) in the El Copal Biological Reserve, Costa Rica

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The Mottled Owl (*Ciccaba (Strix) virgata*) is probably the most common and widely distributed member of the order Strigiformes in the Neotropics (Gerhard et al. 1994), including in Costa Rica. Here, this species can be found from the lowlands to 1500 m, where it uses open areas, edges and clear forest areas for hunting (Stiles and Skutch 1989). This owl's reported diet mainly includes arthropods (beetles, Orthoptera, cockroaches) and a few small vertebrates (rodents, bats, frogs, lizards and snakes) (Gerhard et al. 1994, Stiles and Skutch 1989, Cadena-Ortiz et al. 2013).

However, the diet of this species and similar owls is not well detailed in the Neotropics according to Gerhard et al. (1994) and Cadena-Ortiz et al. (2013), despite the efforts put forth by these authors in Guatemala and Ecuador respectively, in studying the pellets of this species. Although remains of small birds have been reported in their pellets, and birds attack this owl during the day, there seems to be no clear records of predation on birds according to Stiles and Skutch (1989). This manuscript describes an account of this owl predating on a White-tipped Pigeon (*Leptotila verreauxi*) in a montane forest on the Caribbean side of Costa Rica.

On 17 September 17 2015, at approximately 22h, my students and I witnessed the predation event during an evening walk on a trail in the El Copal Reserve, located in Pejibaye Jimenez, Canton of Turrialba, Cartago Province (9°47'02.7"N, 83°45'06.1"O (WGS84); 1000 m). Originally we detected a Mottled Owl vocalizing from a perch at the edge of a wooded trail but after a few minutes, as we passed by the same place again, we

Figure 1. *Leptotila verreaxi* **dead, in the talons of** *Ciccaba virgata***. Photo © V. Acosta-Chaves.**

heard the sound of strong flapping in the tangled understory vegetation, and we saw some White-tipped Pigeons fluttering randomly - something had disrupted their sleep. After a few seconds, a Mottled Owl came flying out of the vegetation with a White-tipped dove in its talons.

Due to the weight of this prey species, which accounts for 74% of the owl's size, the owl flew with difficulty up into the branches of a nearby tree, which was no more than ten meters away. Apparently the pigeon was already dead by that time (Figure 1). Finally, the owl flew back into dense vegetation where he was out of sight, thus we could not observe it feeding on its prey.

Apparently this is the first record, at the species level, of a medium-sized bird being preyed upon by a Mottled Owl. Although it is known that *Leptotila*, and other large pigeons (e.g. Red-billed Pigeon) are part of the diet of some predators such as the Barn Owl (*Tyto alba*) (Flickweert et al. 2007), the Striped Owl (*Pseudoscops clamator*) (From O 2015) or the Ornate Hawk-eagle (*Spizaetus ornatus*) (Acosta-Chaves et al. 2012), these raptors are larger than the Mottled Owl.

Based on this, and as reported by Stiles and Skutch (1989), I suggest that this event could have been an opportunistic predation by this nocturnal predator, since the prey was proportionally larger

and the event occurred while the dove slept.

This record highlights the value of reporting raptor predation events on other birds in the field, as occasionally pellet studies do not allow for the identification of birds or other small animals to the species (Acosta-Chaves et al. 2012), as is exemplified in the study of Gerhard et al. (1994). Systematic and observational studies are needed on the diet of Neotropical owls, including Mottled Owl, to understand their spatial and temporal variation in both peri-urban and forest environments..

Acknowledgements

This observation was made with the collaboration of my students in the Biosystematic Elements Course, School of Tourism Ecology, University of Costa Rica, Recinto de Paraíso: Kevin Gómez, Diego Ramírez, Karolina Quirós, Karen Leiva, Jacqueline Herrera, John Lewis, Mariana Marín, David Aguilar, Ellén Valerio, Daniela Bejarano, Francis León, Javier Barrantes, Joseph Cordero, Adriana Orozco, Byron Araya, Anthony Salas, Hilary Bejarano, Ángelo Rivera, Laura Valverde, Yulicsa Zamora, Daniela Chacón and Sharon Hernández. I thank the El Copal Biological Reserve and its employees for the facilities provided during our visit.

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Visit Costa Rica!
IV Neotropical Raptor Conference, La Fortuna, from 10 to 13 October 2016

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The first Neotropical Raptor Conference was held in Panama in October 2002. Then, in June 2006, the following confeence took place in Iguazú, Argentina. The conference once again returned to Argentina, specifically to Bariloche, in 2013. Now, it is La Fortuna's turn! This tourist-friendly city - a small paradise located in the Caribbean slope of Costa Rica - will be the next destination for the IV Neotropical Raptor Conference (which will also probably include the II Symposium on Neotropical Owls). But, why Costa Rica?

Costa Rica, despite its small size (51,100 km^2), is quite privileged in terms of biodiversity. It is one of the countries with the highest biological diversity per km^2 in the world. In Costa Rica today, 911 bird species have been recorded, of which 74 are birds of prey (Table 1). Of these, more than 78% are residents (58 species) (Obando-Calderón et. al 2014). This diversity represents 72% when compared to the Neoptropical country with the most raptor diversity, which is Colombia with 103 species (Márquez et al. 2005; Chaparro-Herrera et al. 2015).

Table 1. Raptor diversity in Costa Rica as of November 2015. Source: Obando-Calderón et. al 2014

Order	Family	Total
Accipitriformes	Cathartidae	4
	Pandionidae	1
	Accipitridae	39
Total Accipitriformes		**44**
Falconiformes	Falconidae	13
Total Falconiformes		**13**
Strigiformes	Tytonidae	1
	Strigidae	16
Total Strigiformes		**17**
Total general		**74**

Figure 1. Volcán Arenal National Park, La Fortuna. Costa Rica. Photo © Diego Quesada.

La Fortuna, in San Carlos, Alajuela Province (Figuras 1 y 4), is a very privileged area, not just for the extensive tourism development they have achieved (local businesses, bankss, nearby airports, hotels, restaurants, etc.), but, more importantly, for its scenic beauty and biological richness.

Fortuna is located beneath the imponent Arenal Volcano (Figura 1), and surrounded by the National Park of the same name, The Arenal Monteverde Protected Zone, and innumerable other adjacent private reserves. There have been a total of 522 bird species recorded in the area (Quesada & Carballo 2015), among them, 50 species are raptors: 31 Accipitriformes, 9 Falconiformes and 10 Strigiformes (Figura 2). There are also four out of the six large eagles present in Costa Rica, such spectacular eagles as the Crested Eagle (*Morphnus guianensis*), as well as the three representantives of the *Spizaetus* genus, which were the inspiraton for the conference logo, created by the Costa Rican artistel artist José Alberto Pérez (Cope) (Figura 3).

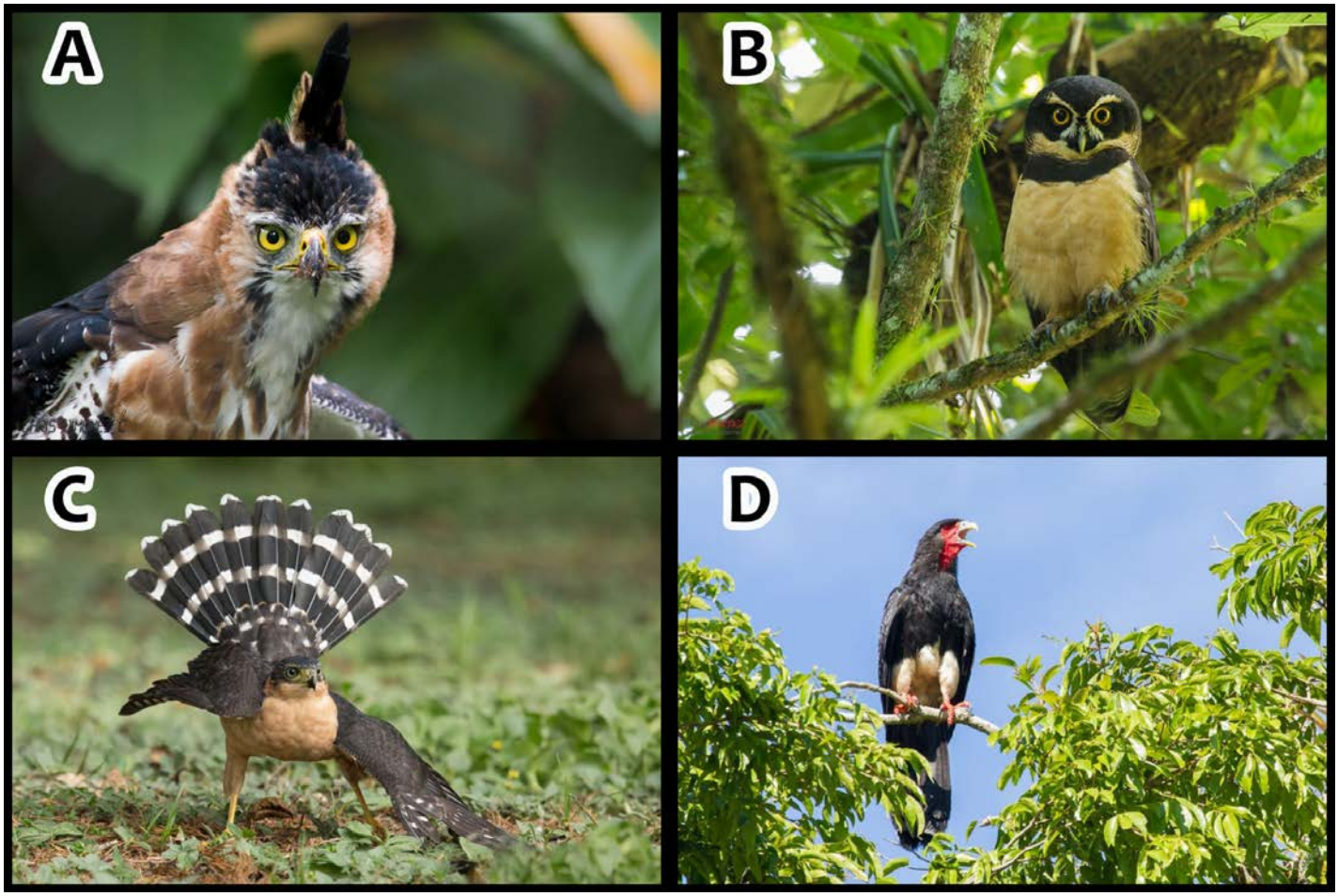
There is still another reason to hold the conference in this country, and during the specific dates chosen: 10 to 13 October. These dates coincide with the fall migration (August to December), and Costa Rica, has the second largest raptor migration in the world (Porras et al. 2004). Kèköldi, in the lowlands of the Costa Rican Caribbean (Talamanca, Cahuita and Puerto Viejo), is one of the only three places in the world where it is pos-

sible to observe more than a million migrating birds of prey during the fall season (Porras et al. 2004, Batista et al. 2005). Additionally, the largest concentration of Peregrine Falcons (*Falco peregrinus*) in fall migration have been recorded her (Tilden 2007), with more than 3000 individuals per season.

This is due to the orientation of the mountain ranges (Volcánica de Guanacaste, Central and Talamanca). Their, Northwest-southeast orientation forces the Peregrine Falcons that are migration from North America through the Pacific slope, to cross the Atlantic slope, bringing them together with those peregrines already traveling along the Atlantic, forming what is known in Costa Rica as the "Peregrinación"

This is an open invitation to all colleagues working for raptor conservation in the Neotropics. Come to Costa Rica, as this will be an opportunity to get to know its raptorses, its natural riches, its people and its culture. Pura vida (Costa Rican motto)!

Figure 2. Some raptor species documented in the La Fortuna area: A. Ornate Hawk-Eagle (*Spizaetus ornatus*); B. Spectacled Owl (*Pulsatrix perspicillata*); C. Bicolored Hawk (*Accipiter bicolor*) y D. Red-throathed Caracara (*Ibycter americanus*). Photos © Chris Jiménez (FRCR).



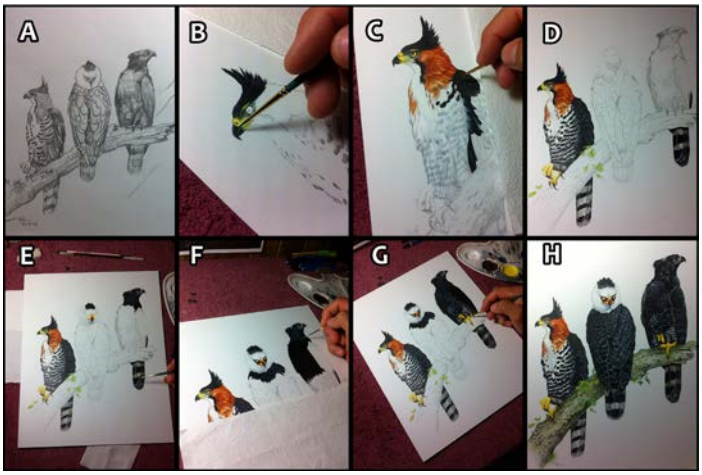


Figure 3 (top). Conference logo: "Spizaetus of Costa Rica" by Cope.

Figure 4 (right). Raptor migration routes in Costa Rica and geographic location of La Fortuna, San José and Kèköldi.

venidos a Costa Rica, una oportunidad de conocer sus rapaces, su riqueza natural, su gente y su cultura. Pura vida (¡Costa Rican motto!).

For more information visit: http://nrn.peregrinefund.org

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Conversations from the Field

By **Markus Jais** and **Yennifer Hernandez**

Markus Jais has been interested in nature since he was a kid. His main interests are the ecology and conservation of predators like big cats, wolves and large birds of prey, particularly eagles. He runs the www.europeanraptors.org website and is a contributor to www.africanraptors.org. He recently interviewed Santiago Zuluaga, Director of Fundación Proyecto Águila Crestada-Colombia (PAC-C), whose goal is the long-term conservation of the Black and Chestnut Eagle (*Spizaetus isidori)* in Colombia.

Adult female and her young of 3 months, hatched in January 2014. Photo © F. Saenz

Markus Jais: *How many raptors species currently inhabit Colombia? And which is the least studied species?*

Santiago Zuluaga: Currently, we know of 77 species that inhabit Colombia, the country with the greatest raptor species diversity in the world. The Red-tailed Hawk (*Buteo jamaicensis*) is a species that was recently registered, though it is not reported in the Book "Aves Rapaces Diurnas de Colombia"

(Marquez et al. 2005). However, according to the authors, due to a lack of physical evidence to support this finding, the species has been recorded mainly in the northern (San Andres, Providencia, and Santa Catalina) and western (Antioquia) regions of the country. Having high species richness in Colombia is a defining factor when carrying out studies in order to learn about the biology and ecology of these species, since we have many species but most exist at very low abundances. Regarding the least studied species, I could say that half of the species we have can be put in this category. There have been very few researchers interested in studying raptors, so our knowledge of most species is very limited. If we consider the species with real possibilities of being studied in the country, and those that are in risk of extinction, I consider the Black-and-chestnut Eagle (*Spizaetus isidori)* to be the least studied species. I hope that this changes in upcoming years, since we are beginning to learn about the different aspects of its biology, ecology, and interaction with the communities, under the PAC-Colombia framework, and from the studies carried out by C. Márquez, H. Delgado, F.A. Gutiérrez and M. Pinzón in Boyacá.

MJ: *What are the main threats for raptors conservation in Colombia?*

SZ: Raptors in Colombia are being threatened mainly because of direct killing, hunting of their natural prey, habitat transformation, and illegal trafficking; factors that reinforce each other, leading to declining populations, which in some cases are already greatly reduced. For small species, like Plumbeous Forest-falcon (*Micrastur plumbeus*), Semi-collared Hawk (*Accipiter collaris*) and Cinereous Harrier (*Circus cinereus*), habitat transformation is without a doubt the greatest threat. Also, we know very little of their biology and requirements, making it difficult to implement conservation measures or plans. Large species, like Black-and-chestnut Eagle, Ornate Hawk-eagle (*Spizaetus ornatus*), Harpy Eagle (*Harpia harpyja*), Black Solitary Eagle *(Buteogallus solitarius*) and Crested Eagle (*Morphnus guiaensis*), are being threatened mainly because of direct killing, hunting of their natural prey, habitat transformation, and, in some cases, illegal trafficking. These species are little known and no long term projects had been developed to study them until now, through the development of PAC-Colombia.

The Andean Condor (*Vultur gryphus*) is a species in a very critical situation in Colombia, due to three main factors: 1) the wild mammals on which it has historically fed on are currently very scarce, so that they now depend on a high percentage on domestic mammals; 2) carrion poisoning, as a measure to control livestock predators such as the puma (*Puma concolor*) and feral dogs, leads to the death of Andean condor individuals due to intoxication; and 3) hunting or capture of condors for illegal tenancy or because they are considered responsible for the death of newborn domestic animals (cattle).

MJ: *Are the government and local communities interested in raptor conservation?*

SZ: Yes, but only some charismatic or umbrella species have had this fortune. For example, the Andean Condor is a national symbol and for many years important resources have been invested in this species, as well as support from the government and different local communities as part of the National Program for the Conservation of the Andean Condor in Colombia.For the Harpy Eagle, there have also been important resources invested in the reintroduction of an eagle pair in the north of the country; however, although this project counted on State support and interest from the communities, it was terminated before reaching important achievements.

In the last few years, the different government entities have invested important technical and financial resources into the conservation of the Black-and-chestnut Eagle, under the framework of the Proyecto Águila Crestada-Colombia (PAC-C). Through an alliance between the "Corporación Autónoma Regional del Guavio" (government entity), the "Fundación para el Manejo y Conservación de los Ecosistemas Neotropicales" (non-government organization), and support from leaders of the "Grupo Campesino para la conservación del Águila Crestada, AGUILEROS" (from farmer communities of the Guavio region), the installation of the first GPS/GSM transmitter on a juvenile Black-and-chestnut Eagle was achieved - an unprecedented event in the country – which I will talk about later.

MJ: *Is bush-meat hunting a problem for raptor conservation in Colombia?*

SZ: Bush-meat hunting is a great problem for raptor conservation in Colombia.The hunting of wild

Left: 6 month old juvenile, hatched in December 2012; Right: 5 month old juvenile, hatched in December 2012. Photos © Santiago Zuluaga

animals for food is a major problem for the conservation of large raptors in Colombia. This practice reduces the populations of large and medium-sized mammals and birds - potential prey for eagles like Black-and-chestnut Eagle, Crested Eagle and Harpy Eagle. In this situation, some of these species are being forced to search for food on farms and agricultural land and hunt domestic animals, a situation, which in turn, contributes to the conflict between these species and local communities. Furthermore, the loss of large-sized wild mammals in the high and medium mountains is considered one of the causes of the population decline of Andean Condor. Additionally, we have some records of this type of practice in indigenous communities in southeastern Choco where people may occasionally hunt Swallow-tailed Kite (*Elanoides forficatus yetapa*) individuals for consumption. Although it is necessary to study this situation in order to gain a better understanding, I consider that the impact on resident populations of this species is minimum, unlike that which occurs with large eagle species that are hunted because they are considered a threat to domestic animals.

MJ: *Why and when was the PAC-C "Proyecto Águila Crestada-Colombia" (or Black-and-chestnut Eagle Research Project – Colombia) started?*

SZ: PAC-C was began in 2008 when a group of 15 Biology and Veterinary Medicine students of the Universidad de Caldas decided to work on a proposal for conserving the Black-and-chestnut Eagle, driven by a wish to promote the conservation of this species. The initial work proposal included three

Director of PAC climbing the nest tree of *Spizaetus isidori* to install a camera. Photo Archive PAC

components: *in situ*, *ex situ*, and environmental education, with subgroups of five students working on each component. Several years passed and since it was difficult to find economic resources to begin the work, most students graduated and found jobs in areas different from raptor conservation. I never lost hope in obtaining resources for beginning the field activities and I continued visiting private and government entities, until in April of 2012, the Peregrine Fund, through its Education Program in Latin America, granted me economic support to observe the feeding habits and reproductive biology of two nests located in the Eastern Andes mountain range of Colombia. From this first field work, PAC-C began. We recently concluded our second year of field work and have signed several agreements with government and private institutions that have supported the conservation of this species. Together with these institutions and with support from the rural communities, we are working hard to gain a better understanding of its biology and ecology, and mitigating hunting threats.

MJ: *What is known about the population size and trend of the Black-and-chestnut Eagle in Colombia?*

SZ: The newest version of the Libro Rojo de Aves de Colombia (Renjifo et al. 2014) has estimated that the Black-and-chestnut Eagle population is between 320 and 640 individuals, located in a potential habitat of 16,007.4 km^2. These values suggest that most of the species' total population is found

Female and young Black and Chestnut Eagle in a nest built in a large tree of *Ficus* genus. Foto © S. Zuluaga

Four-month-old juvenile, hatched in January 2014. Foto © S. Zuluaga

in Colombia, as was also proposed by the researcher Federico Carlos Lehmann in the 50's, when he suggested that the species was more abundant in Colombia than in the other country of the region. It is evident that its population is decreasing, so it is necessary to carry out field work throughout its distribution, since the estimation of its population was done based on ecological niche models and habitat remnants. Considering that hunting is affecting juvenile recruitment in the population, these values could be overestimating the species' actual population size.

MJ: *What are the main difficulties studying the Black-and-chestnut Eagle?*

SZ: The areas where we are studying the Black-and-chestnut Eagle in Colombia are difficult locations to access, far from cities, and with extremely difficult environmental and topographic conditions, all of which represent serious logistic challenges when monitoring the species. Besides, it is not easy to find active nests of this species and, although we suspect possible nests and places where there is a strong conflict between the eagle and humans, many times it is very challenging to obtain economic resources to carry out investigations.

MJ:*Are you using GPS transmitters and what have they contributed so far?*

SZ: Recently, we installed a GPS/GSM transmitter on a juvenile Black-and-chestnut Eagle. This is the first time in Colombia that an eagle chick has been captured in the wild to be marked with a transmitter, and that GPS/GSM technology - never before used in the country - is put to the test. We are very satisfied with the results we have obtained until now, because we are determining that juveniles are highly dependent on native forests, while transformed areas, such as livestock pastures and forest-pasture ecotones, are used at a very low percentage.

During the previous reproductive cycle (2014), we field-monitored a young eagle from hatching to nine months of age, and although we obtained very interesting results, the efforts invested in the field were very high, obtaining approximately 900 GPS points. We are have also obtained data from a juvenile marked with a transmitter (DUCK-H 30 gr ECOTONE) since 30 March 2015, gathering approximately 120 GPS points a month. At the moment, we are gathering the most important data, because the juvenile is leaving its parents' territory and trying to establish its own. We are very much looking forward to working with those farming communities through which the young bird travels, in order to mitigate hunting threats and offer development opportunities to the communities.

MJ: *What needs to be done to secure the future of the Black-and-chestnut Eagle in Colombia?*

SZ: To secure the future of the Black-and-chestnut Eagle it is necessary to consider four aspects: as a first measure, we need to increase the knowledge of its biology and ecology and measure tolerance levels of the human-eagle conflict. Second, we must establish environmental education programs directed at children, teenagers, and adults in relation to the importance of conserving the species and its environment for mankind's own welfare: third, we must create protected areas around the nesting sites and possible species' dispersion areas; and last, we must generate economic income sources related directly or indirectly to the species, in a win-win situation where both parties in the conflict can benefit.

MJ: *Where should future research and conservation efforts be directed?*

SZ: Our future research efforts are directed to monitoring Black-and-chestnut Eagle juveniles and adults through telemetry, monitoring the species' feeding habits, monitoring and conserving the species' wild prey, obtaining information on its reproductive biology, and investigating the man-Eagle conflict. Through this, we aim to determine its dispersion and home range, such that we can estimate more accurately its habitat requirements, prey community status, population density, juvenile sur-

vival, and the impacts of the community hunting this species.

Regarding conservation strategies, we are aiming at generating capacities in the rural communities, so they can obtain alternative income sources, different from domestic animal raising, such that the impact generated by the Black-and-chestnut Eagle can be compensated through tourism focused on the species. This would represent a win-win situation where the communities and the species would benefit. Also, we consider it of great importance to establish protected areas in historical nesting zones of the species, in order to limit land use and mitigate the expansion of the agricultural frontier in these areas.

PAC-C was born from the need to carry out conservation actions for the Black-and-chestnut Eagle, but we are also working with the Andean Condor, and hope to contribute in the next years to the conservation of the Harpy Eagle, Solitary Eagle, Crested Eagle, Ornate Hawk-Eagle, among other raptors in risk of extinction in Colombia. For this, we are going to begin receiving donations from different people and entities that have shown interest to this cause, and we are going to present project bulletins beginning in January of the year 2016.

To read the full interview, please visit http://www.neotropicalraptors.org/S.Zuluaga%20Interview%20Full.pdf

* * *

Of Interest...

Grants

AOU Research Awards

http://americanornithology.org/content/aou-research-awards-eligibility-and-guidelines

The American Ornithologists' Union (AOU) gives Research Awards annually in amounts up to a maximum of $2,500US. Typically, awards would be for an M.S. project and, later, for a Ph.D. project. However, undergraduate students, postdoctoral research associates, and individuals engaged in independent research (not associated with a university) also may apply. The **Deadline to submit proposals is Friday, January 29, 2016**

COS Mewaldt-King Award

http://americanornithology.org/content/cos-mewaldt-king-award-eligibility-and-guidelines

The COS gives Mewaldt-King Student Research Awards annually in amounts of $1000US supports research in any area of ornithology that relates to the conservation of birds. Studies that involve demographics, breeding biology, or disease ecology are particularly relevant (especially if the species is endangered, threatened). **The deadline to submit proposals is 15 January 2016.**

Resources

eBird

http://ebird.org/content/ebird/about/

eBird is a project developed by the Cornell Lab of Ornithology. It is utilized by birders, scientists, wildlife managers and conservationists who would like to know more about the distribution and movement patterns of birds around the world. You can use it to track your personal observations and maintain lists of all the birds you have seen. You can access these lists by specific locations, or for specific time periods. You can also create bird lists reported by other users and for distinct locations and dates.