ORNITOLOGIA NEOTROPICAL 19 (Suppl.): 587–594, 2008

BIRD CONSERVATION IN AGUARUNA-JÍVARO COMMUNITIES IN THE CORDILLERA DE COLÁN, PERU

Nico Dauphiné[1], Segundo Tsamajain-Yagkuag[2], & Robert J. Cooper[1]

[1]Warnell School of Forestry and Natural Resources, University of Georgia, Athens, GA 30602, USA. *E-mail*: dauphinen@warnell.uga.edu

[2]Comunidad Nativa de Alto Wawas, Departamento Amazonas, Perú.

Resumen. – La conservación de aves por las comunidades nativas Awajún-Jíbaros en la Cordillera de Colán, Perú. – Entre Julio del 2003 y Marzo del 2005, hemos realizado estudios de campo en aves dentro de la Cordillera de Colán. Los estudios fueron realizados en colaboración con dos comunidades nativas Awajún-Jíbaro, usando observaciones de campo, redes de neblina y entrevistas con la gente local. El área de nuestro estudio había permanecido hasta ahora inexplorada por los ornitólogos. Durante el estudio registramos un total de 315 especies de aves, incluyendo tres especies en peligro de extinción: Angel-del-Sol Real (*Heliangelus regalis*), Tangara Gargantinaranja (*Wetmorethraupis sterrhopteron*), y Pibí Boreal (*Contopus cooperi*). Colaboradores Awajún demostraron conocimientos sustanciales sobre taxonomía, ecología, y comportamiento de las aves. Se encontró poca destrucción del bosque en territorios Awajún y mucha destrucción de bosque en áreas recientemente colonizadas por inmigrantes de otras partes del Perú. Actualmente el bosque en territorios Awajún parece estar protegido de la destrucción a gran escala que se origina en malas prácticas agrícolas y madereras. También se ha declarado la zona como prohibida para el asentamiento de nuevos inmigrantes. Sin embargo, nosotros anticipamos que la extensiva deforestación y la caza intensiva continuaran en las áreas recientemente colonizadas, sean adyacentes o dentro de la Cordillera del Colán, y todo ante la ausencia de una efectiva acción de conservación. Entre las iniciativas para la conservación de las comunidades nativas Awajún, se incluye el nombramiento de una reserva de 7000 ha, dentro de la que se prohíbe la tala, la destrucción del bosque, la colonización y la caza de especies de aves que se encuentran en peligro de extinción local. Los residentes Awajún de la Cordillera de Colán se mostraron muy motivados en conservar las aves de la zona. Su preocupación y motivación residen en gran medida en que la existencia de su cultura en el tiempo y la de las aves, a las que otorgan un gran valor tradicional, dependerá también de la existencia de los bosques.

Abstract. – Between July 2003 and March 2005 we conducted field research on birds in the Cordillera de Colán in collaboration with two indigenous Aguaruna-Jívaro communities in an area previously unexplored by ornithologists, using field surveys, mist net sampling, and interviews with local residents. We detected 315 bird species, including the globally threatened and near-threatened species: Royal Sunangel (*Heliangelus regalis*), Orange-throated Tanager (*Wetmorethraupis sterrhopteron*), and Olive-sided Flycatcher (*Contopus cooperi*). Aguaruna collaborators exhibited substantial knowledge of bird taxonomy, ecology, and behavior. We observed a low rate of deforestation in Aguaruna communities and a high rate of forest clearance in adjacent areas recently colonized by immigrants from elsewhere in Peru. Forest within Aguaruna territories currently appears to be protected from large-scale destruction by existing management practices and a general prohibition on immigration. We expect that extensive deforestation and overhunting in recently colonized areas elsewhere in the Cordillera de Colán will continue in the absence of effective conservation action. Conservation initiatives by Aguaruna communities include a moratorium on

hunting a number of bird species whose populations were perceived to be in decline due to overexploitation, and the designation of a 7000-ha reserve where logging, forest clearance, and human settlement is prohibited. Aguaruna residents of the Cordillera de Colán appear to be motivated conservationists of forest birds, due in part to their concern with long-term forest protection and to the high cultural value traditionally placed on birds. *Accepted 11 December 2007.*

Key words: Cordillera de Colán, Neotropical birds, endangered species, conservation, Aguaruna indigenous communities.

INTRODUCTION

An isolated mountain range in northern Peru, the Cordillera de Colán (Fig. 1), is one of the most important centers of bird endemism in Peru, and a global priority area for bird conservation (Davies *et al.* 1997, Myers *et al.* 2000, BirdLife 2005). The northern Cordillera de Colán is part of a semi-autonomous territory controlled by Aguaruna-Jívaro residents who are its indigenous inhabitants. The Cordillera de Colán is located just east of the arid Marañón river valley, which is a major barrier to dispersal of birds restricted to humid montane forests (Parker *et al.* 1985). Biogeography in this region is extremely complex and bird species diversity correspondingly high (Cracraft 1985). Four endemic bird areas (EBAs) intersect on the Cordillera de Colán, including the Andean ridge-top forests where the majority of our fieldwork took place (Davies *et al.* 1997, BirdLife 2005). In 2002, the government of Peru established the 64,115 ha Zona Reservada Cordillera de Colán to protect a number of threatened, range-restricted and endemic species in a remote, high altitude region of the northern Cordillera de Colán that remains uninhabited and largely inaccessible by people (APECO 2005).

Despite field expeditions to adjacent areas (Fitzpatrick *et al.* 1977, Berlin & Prance 1978, Parker *et al.* 1985, Davis 1986, Hornbuckle 1999), the ecology of the Cordillera de Colán remains poorly known (Davies *et al.* 1997, Rodriguez & Young 2000). Prior ornithological research has focused on high altitudes in the southern part of the mountain range, which has been colonized by agrarian settlers (cf. Weske & Terborgh 1977, Schulenberg & Williams 1982, Graves *et al.* 1983, Davies *et al.* 1997, Johnson & Jones 2001). During the past several decades, these colonists have implemented rapid, large-scale deforestation, which appears to continue unabated (Davies *et al.* 1997, BirdLife 2005, N. Dauphiné pers. observ.).

To our knowledge, no systematic ecological surveys have been carried out in the reserve or, until now, in the northern Cordillera de Colán or any other land under Aguaruna control. This is probably partly due to remoteness, and partly to the fact that the Aguaruna, as a cultural group, have a reputation for fierceness and indomitability and a history of sensitive relations with settlers and visitors to the region (cf. Larson & Dodds 1985, Stap 1990). On the other hand, Aguaruna residents tend to be exceptional local collaborators in ecological field research, as they exhibit substantial knowledge of bird taxonomy, ecology and behavior, and their knowledge corresponds strongly to scientific taxonomy and findings on bird ecology and behavior (Berlin *et al.* 1983, Boster *et al.* 1986, Berlin 1993, Jernigan & Dauphiné in prep.). Birds occupy a prominent position in traditional Aguaruna culture as central figures in folklore. Birds are described as having had human form before they became birds, and men are described as having been able to fly (Chumap Lucía & García Rendueles 1979). Many folk tales demonstrate Aguaruna tradi-

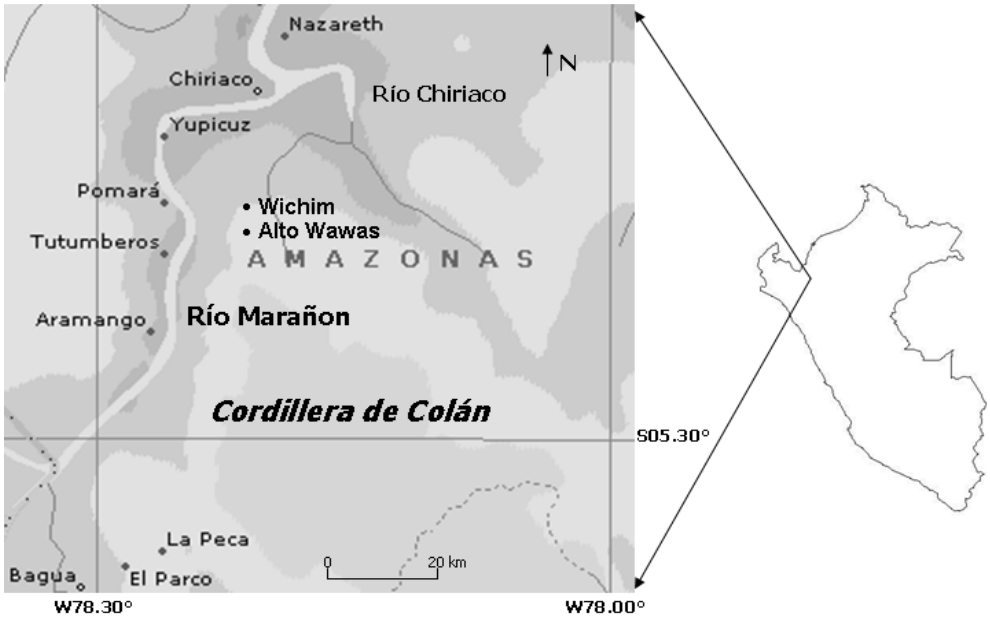

FIG. 1. Map of the study region in the Cordillera de Colán.

tional knowledge of bird ecology; an example is a story where a toucan (*Ramphastos* sp.), a secondary cavity-nester, requests and is given a home by a woodpecker (*Campephilus* sp.) (Chumap Lucía & García Rendueles 1979). Birds are also highly valued for their use in subsistence and traditional ornamentation (Berlin & Berlin 1983, Berlin 1993).

The Aguaruna occupy one of the many remote areas in the world where insufficient scientific information currently exists to formulate wildlife management decisions. Our premise is that, in this situation, Aguaruna ecological knowledge can serve as a useful, complementary data source to current scientific knowledge of the region (Huntington 2000, Gilchrist *et al.* 2005). Our purpose in documenting Aguaruna ecological knowledge in this context is to bring to light and apply an additional source of reliable data to contribute to more informed decisions for conservation in the region (Gilchrist & Mallory 2007).

Traditional ecological knowledge, which may resemble adaptive management in its emphasis on dynamic responses to change, can make significant contributions to the understanding and conservation of biodiversity by scientists and resource managers (Gadgil *et al.* 1993, Berkes *et al.* 2000). Particularly in remote areas, indigenous knowledge can surpass scientific knowledge, such as in the case of Bedouin people in Syria who demonstrated that a bird species thought extinct by scientists did, in fact, persist in the wild (Serra 2003). However, according to one survey, only 0.1% of recently published ornithological or wildlife management articles incorporated local ecological knowledge (Gilchrist & Mallory 2007). We find this doubly unfortunate, if potentially valuable contributions to our knowledge of ecological systems in remote areas are being neglected together with valuable opportunities to collaborate with the people who make decisions that affect conservation on the ground. Our aim in this paper is

TABLE 1. Survey and sampling effort in the Cordillera de Colán

Site	Dates	Field-h	Net-h	Elevation (m a.s.l.)
La Peca	22-26 July 2004	20	—	900–1400
Wichim	30 July-2 August 2003, 29 July-7 August 2004, 12-31 October 2004, 4 February-22 March 2005	197	1548	400–900
Alto Wawas	2-6 August 2004, 13-30 October 2004, 20 February-26 March 2005	83	516	550–1000
Duran Elfin Forest	20-30 October 2004, 7 March 2005	33	—	500–1000
Wichim Elfin Forest	3 August 2004, 13 February-16 March 2005	16	—	600 –1200

to present Aguaruna ecological knowledge of an area virtually unknown to science to complement scientific data collection, as well as to enhance opportunities for collaboration with the Aguaruna people adjacent to a new protected area in its future management and monitoring.

METHODS

Between 30 July 2003 and 26 March 2005, we conducted bird surveys in collaboration with two Aguaruna communities, the Comunidades Nativas de Wawas–Anexo Wichim and Alto Wawas (hereafter, Wichim and Alto Wawas, respectively), located 10–20 km north of the Zona Reservada Cordillera de Colán (Fig. 1). We surveyed birds in, and adjacent to, the Andean Ridge-top Forests EBA, named as an urgent priority for conservation and research due to moderate habitat loss and poor knowledge of its ecology (BirdLife 2005), Fieldwork was focused in low and mid-altitude tropical moist montane forest and elfin forest in the northwestern part of the mountain range, south of the confluence of the Marañon and Chiriaco rivers. We made additional surveys in the adjacent areas of Duran and La Peca, which are controlled by agrarian colonists. During the course of surveys, we made incidental observations on land-use patterns, regional harvest pressure, and other local threats and/or conservation efforts directed toward regional birds. We also conducted group and individual interviews with residents about the presence of particular bird species in the study area, their habitats, ecology, behavior, population trends, land-use patterns, awareness of the new protected area in the area, and attitudes towards conservation and any actions taken for the purpose of conservation. We had in-depth interviews with 11 individuals, including nine men between the ages of 32 and 84 (six of them Aguaruna and three of them mestizo) and two women (one Aguaruna and one mestizo), and briefly interviewed several dozen additional Aguaruna and mestizo residents of the area during the course of our travel and fieldwork.

Study design. Table 1 summarizes survey and sampling efforts made during four expeditions to the Cordillera de Colán between 31 July 2003 and 26 March 2005. Over 12 weeks of fieldwork at five sites. We devoted a total of 349 field-h to surveys and 2064 net-h to mist net (10 x 10 m by 3 m, 36 mm mesh) sampling for birds in cloud forest, elfin forest, secondary forest, and agricultural habitats. A field hour is defined as one hour of field observation carried out by one or more people; a net hour is defined as the operation of a single mist net for one hour. Areas surveyed included elfin forest and humid montane forest on foothills, and

lower mountain slopes. Surveys were primarily diurnal.

Study sites. La Peca (05.36ºS, 78.26ºW; Fig. 1) is a rural settlement of several thousand people, mainly recent colonists, located c. 15 road km northeast of Bagua (05º38'S, 78º32'W; Fig. 1). Wichim (05º16'S, 78º20'W; Fig. 1) is an Aguaruna community of c. 120 people, located c. 95 road and trail km northeast of Bagua. Alto Wawas (05º19'S, 78º20'W; Fig. 1) is an uninhabited Aguaruna territory managed by residents of the neighboring communities of Wichim and Sukutin in the Comunidad Nativa de Wawas. Duran is a settlement of several hundred colonists immediately west of Wichim; elfin forest (hereafter, Duran Elfin Forest) occurs on the mountain at Duran's eastern boundary on the west bank of the Wawas river at 05º15'S, 78º22'W. Elfin forest also occurs on an uninhabited mountain northeast of Wichim (hereafter, Wichim Elfin Forest) at 05º15'S 78º19'W up to a summit of c. 1200 m a.s.l.

RESULTS AND DISCUSSION

We detected a total of 315 bird species during our surveys, including including three globally threatened and near-threatened species: the Royal Sunangel (*Heliangelus regalis*), the Orange-throated Tanager (*Wetmorethraupis sterrhopteron*), and the Olive-sided Flycatcher (*Contopus cooperi*). Aguaruna residents reported the presence of a number of additional species not detected in our surveys. The complete species list is presented elsewhere (Dauphiné *et al.* in prep.) and is also available from the first author upon request. We found large areas of intact low to mid altitude tropical moist montane and elfin forests in Aguaruna territories in the northern Cordillera de Colán, and large areas of extensively deforested mid altitude montane and elfin forests in land occupied by recent immigrants to the region. The intact forest within Aguaruna territories currently appears to be effectively protected from large-scale deforestation by existing management practices. We expect that extensive habitat loss in recently colonized areas of the Cordillera de Colán will continue in the absence of effective conservation action.

In contrast to the lack of harvest pressure on birds reported by Davies *et al.* (1997), we found direct and anecdotal evidence of extensive human predation on birds in the Cordillera de Colán. Birds commonly hunted by Aguaruna residents for subsistence include species of Tinamidae, Cracidae, Columbidae, Psittacidae, and Ramphastidae (N. Dauphiné pers. observ.). Aguaruna residents are known to harvest Spotted Sandpiper (*Actitis maculari*), Amazonian Oropendula (*Gymnostinops bifasciatus*), and some species of Trochilidae and their eggs (Larson & Dodds 1985, K. Jernigan pers. com.). Both Aguaruna and colonist residents reported observing declines in some bird populations including species of Cracidae and Psittacidae, which they attributed to overhunting. There are no protective measures for the majority of harvested bird species in the Cordillera de Colán. While colonist residents reported observing the decline and disappearance of a number of bird species due to overhunting and habitat destruction, no conservation action appeared to have been taken to attempt to mitigate these trends. By contrast, Aguaruna authorities recently prohibited the hunting of some birds, including Andean Cock-of-the-Rock (*Rupicola peruana*), Blue-headed Parrot (*Pionus menstruus*) and other species of Psittacidae, in response to perceived population declines due to overhunting; they have also designated a 7000-ha nature reserve in Alto Wawas where logging, forest clearance, and human settlement are prohibited.

An Oilbird (*Steatornis caripensis*) colony in Duran Elfin Forest is under intense harvest

pressure by local people and appears to be threatened with extirpation. Oilbirds are widespread in the Neotropics, but are extremely vulnerable to human predation and habitat destruction (Roca 1994). The Oilbird colony in Duran is located on land that previously belonged to Aguaruna people but that was claimed by the state of Peru c. the 1960s and opened for colonization shortly thereafter. In the past, Aguaruna people regularly harvested juvenile birds during the end of the breeding season (March–May); now settlers also harvest nestlings, increasing the harvest pressure on the colony, and the encroaching deforestation and influx of new immigrants pose an increasing threat to this Oilbird population (A. Tsamajain Yagkuag pers. com.). According to Aguaruna residents, local people now harvest every juvenile from every nest that may be reached (O. Tsamajain Shiwig pers. com.). The number of nests that remain inaccessible to human predation is unknown, but appears to be the only factor limiting the complete reproductive failure of this colony. While Holyoak & Woodcock (2001) report that protection exists or is planned for Oilbird colonies in Peru, the local Oilbird colony remains entirely unprotected from intensive exploitation and appears likely to decline or disappear in the near future (A. Tsamajain Yagkuag pers. com.).

Birds are also locally hunted in Aguaruna communities for use in ornamentation, traditional medicine, and the pet trade. Birds used in traditional ornamentation include Andean Cock-of-the-Rock, Paradise Tanager (*Tangara chilensis*) and other species of Thraupidae, and species of Ramphastidae, among many others. Birds locally harvested for use in traditional medicines include Sunbittern (*Eurypyga helias*) and Slate-colored Grosbeak (*Saltator grossus*) (A. Tsamajain Yagkuag pers. com.). Birds locally harvested for the pet trade include Yellow-tufted Woodpecker (*Melanerpes cruentatus*) and other species of Picidae, Shiny Cowbird (*Molothrus bonariensis*), Painted Parakeet (*Pyrrhura picta*) and other species of Psittacidae, and species of Columbidae and Ramphastidae; parrots are trapped at a clay lick in the neighboring community of Sukutín. Hunting for the pet trade appears to be uncommon in Wichim and Alto Wawas, and very few Aguaruna residents of these communities appear to keep birds as pets; however, we observed many wild-caught bird kept as pets by colonist residents in the adjacent areas of Duran, Imaza and Bagua (N. Dauphiné pers. observ.).

While all the Aguaruna people we interviewed were aware of the Zona Reservada Cordillera de Colán, residents we interviewed in the surrounding colonist settlements, almost without exception, did not appear to be aware of its existence. The designation and categorization of the Zona Reservada Cordillera de Colán is an important conservation step, but does not in itself guarantee protection of the wildlife or habitat within its limits. An investment in local environmental education and management will be necessary to ensure that the reserve will achieve a real measure of protection.

The Peruvian government has a stated objective of increasing participation of indigenous people in protected area management (World Bank 2000). Such efforts should ideally include further documenting Aguaruna knowledge of regional bird taxonomy and ecology, and investigating local populations of globally threatened species such as Royal Sunangel and Orange-throated Tanager, as well as locally threatened species, such as Oilbird. Effective conservation in the Cordillera de Colán will require investing in reserve staff and infrastructure, educating local settlers about the value of the new reserve and of protecting area biodiversity, and researching and promoting sustainable alternatives to resource management practices that currently threaten the unique cultural and biolog-

ical heritage of this region. Aguaruna residents, with their demonstrated competence as both field ecologists and land managers, have great potential to make valuable contributions as partners in any regional conservation efforts.

ACKNOWLEDGMENTS

Funding for this project was made possible through grants from the Critically Endangered Neotropical Species Fund at Conservation International (CI), the IDEAS program at the University of Georgia, the Georgia Ornithological Society, the Tinker Foundation, and the Warnell School of Forestry and Natural Resources. We are indebted to Michael Hoffmann for the invitation to apply for research funding from CI. We thank the Comunidades Nativas de Alto Wawas and Wawas–Anexo Wichim for inviting and hosting fieldwork and INRENA for granting permission to conduct research. For field and logistical support, we are grateful to Anika Mahoney, Augustin Tsamajain Yagkuag, Martha and Oscar Tsamajain Shiwig, José Lirio, Roberto Jeremías Wampush, Enrique Tsamajain Chumpi, Juan Díaz Alvan, José Alvarez Alonso, Daniel M. Brooks, and staff at Warnell. In addition, ND wishes to express heartfelt gratitude to Oscar Beingolea, Miguel and Wilfredo Aguilar Torres, Flor Idiáquez Acevedo, Flor and Jaso Angulo, and Yolanda Rojas for their generous help and gracious hospitality during her extended stays in Peru. Finally, we thank the Cooper Lab and three anonymous referees for constructive comments on earlier drafts of this manuscript.

REFERENCES

APECO. 2005. Asociación Peruana para la Conservación de la Naturaleza. Lima, Perú. http://www.apeco.org.pe

Berkes, F., J. Colding, & C. Folke. 2000. Rediscovery of traditional ecological knowledge as adaptive management. Ecol. Appl. 10: 1251–1262.

Berlin, B. 1993. Ethnobiological classification: principles of categorization of plants and animals in traditional societies. Princeton Univ. Press, Princeton, New Jersey.

Berlin, B., & E. A. Berlin. 1983. Adaptation and ethnozoological classification: theoretical implications of animal resources and diet of the Aguaruna and Huambisa. Pp. 301–325 *in* Hames, R. B., & W. T. Vickers (eds.). Adaptive responses of native Amazonians. Academic Press, New York, New York.

Berlin, B., & G. T. Prance. 1978. Insect galls and human ornamentation: ethnobotanical signficance of a new species of *Licania* from Amazonas, Peru. Biotropica 10: 81–86.

Berlin, B., J. Boster, & J. P. O'Neill. 1983. The perceptual bases of ethnobiological classification: evidence from Aguaruna Jívaro Ornithology. J. Ethnobiol. 1: 95–108.

BirdLife International. 2005. BirdLife's online world bird database. Cambridge, UK. http://www.birdlife.org

Boster, J., B. Berlin, & J. P. O'Neill. 1986. The correspondence of Jívaroan to scientific ornithology. Am. Anthropol. 88: 569–583.

Chumap Lucía, A., & M. García Rendueles. 1979. Duik Muun: Universo mítico de los Aguaruna. Centro Amazónico de Antropología y Aplicación Práctica, Lima, Perú.

Clements, J. F., & N. Shany. 2001. A field guide to the birds of Peru. Ibis Publishing Co., Temecula, California.

Cracraft, J. 1985. Historical biogeography and patterns of differentiation within the South American avifauna: areas of endemism. Ornith. Monogr. 36: 49–84.

Davies, C. W. N., R. Barnes, S. H. M. Butchard, M. Fernandez, & N. Seddon. 1997. The conservation status of the Cordillera de Colán. Bird Conserv. Int.. 7: 181–195.

Fitzpatrick, J. W., J. W. Terborgh, & D. E. Willard. 1977. A new species of wood-wren from Peru. Auk 94: 195–201.

Gadgil, M., F. Berkes, & C. Folke. 1993. Indigenous knowledge for biodiversity conservation. Ambio 22: 151–156.

Gilchrist, G., & M. L. Mallory. 2007. Comparing

expert-based science with local ecological knowledge: what are we afraid of? Ecology and Society 12(1): r1. [online] URL: http://www.ecologyandsociety.org/vol12/iss1/resp1/

Gilchrist, G., M. Mallory, & F. Merkel. 2005. Can local ecological knowledge contribute to wildlife management? Case studies of migratory birds. Ecology and Society 10 (1): 20. [online] URL: http://www.ecologyandsociety.org/vol10/iss1/art20/

.Graves, G. R., J. P. O'Neill, & T. A. Parker, III. 1983. *Grallaricula ochraeceifrons*: a new species of antpitta from northern Peru. Wilson Bull. 95: 1–6.

Holyoak, D., & M. Woodcock. 2001. The nightjars and their allies: the Caprimulgifomes. Oxford Univ. Press, Oxford, UK.

Hornbuckle, J. 1999. The birds of Abra Patricia and the upper Rio Mayo, San Martín, nothern Peru. Cotinga 12: 11–28.

Huntington, H. P. 2000. Using traditional ecological knowledge in science: methods and applications. Ecol. Appl. 10: 1270–1274.

Johnson, N. K., & R. E. Jones. 2001. A new species of tody-tyrant (Tyrannidae: *Poecilotriccus*) from northern Peru. Auk 118: 334–341.

Larson, M., & Dodds, L. 1985. Treasure in clay pots: an Amazon people in the wheel of change. Person to Person Books, Palm Desert, California.

Myers, N., R. A. Mittermeier, C. G. Mittermeier, G. A. B. de Fonseca, & J. Kent. 2000. Biodiversity hotspots for conservation priorities. Nature 40: 853–858.

Parker, III, T. A., T. S. Schulenberg, G. R. Graves, & M. J. Braun. 1985. The avifauna of the Huanacabamba region, northern Peru. Ornithol. Monogr. 36: 169–197.

Roca, L. R. 1994. Oilbirds of Venezuela: ecology and conservation. Publications of the Nuttall Ornithological Club 24, Cambridge, Massachusetts.

Rodriguez, L. O., & K. R. Young. 2000. Biological diversity of Peru: determining priority areas for conservation. Ambio 29: 329–337.

Schulenberg, T. S., & M. D. Williams. 1982. A new species of antpitta (*Grallaria*) from northern Peru. Wilson Bull. 94: 105–240.

Serra, G. 2003. The discovery of Northern Bald Ibises in Syria. World Birdwatch 25: 10–13.

Stap, D. 1990. A parrot without a name: the search for the last unknown birds on earth. Alfred A. Knopf, Inc., New York, New York.

Weske, J. S., & J. W. Terborgh. 1977. *Phaethornis koepckeae*: a new species of hummingbird from Peru. Condor 79: 143–147.

World Bank. 2000. Indigenous management of protected areas in the Peruvian Amazon: project appraisal document. World Bank, Washington DC.