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Surveys and Breeding Biology of *Buteo ridgwayi* (Ridgway's Hawk) in Los Haitises, Dominican Republic

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ABSTRACT.—We conducted surveys for the endangered Ridgway's Hawk, *Buteo ridgwayi*, in Los

Haitises National Park, Dominican Republic, and in areas outside the park during the breeding seasons 2002 and 2003. In 2002, we recorded 47 individuals comprised by 19 territorial pairs and 8 single hawks. Of the former, 9 pairs attempted nesting and 2 pairs were successful in fledging 3 young. In 2003, we recorded 93 individuals composed of 37 territorial pairs, 9 single hawks, and 10 fledglings. Of 37 pairs, 30 attempted nesting and 8 pairs were successful in fledging 10 young. Of the 28 nests, 32% (9/28) were built on top of Palmchat, *Dulus dominicus*, and on living trees, having a nest success of 25%. Outside Los Haitises region, 2 hawks were observed on the Samaná Peninsula. During 2002, no hawks were observed in the Sierra Bahoruco National Park and outlying areas in southwestern and central Dominican Republic.

KEYWORDS.—**Ridgway's Hawk, Dominican Republic, Los Haitises National Park, surveys, breeding biology, nesting success, Hispaniola**

The poorly known and critically endangered Ridgway's Hawk, *Buteo ridgwayi*, is endemic to Hispaniola (Dominican Republic and Haiti) and its satellite islands (Wiley and Wiley 1981; Wiley 1986, Bird Life International 2000). Based on historical records of specimen collections, Ridgway's Hawk were common in the eastern half of Dominican Republic and on several islands of Haiti (Christy 1897; Wetmore and Swales 1931; Wetmore and Lincoln 1934; Wiley and Wiley 1981). In the last 20 years, the hawk has not been documented in Haiti where it is considered extinct (Keith et al. 2003).

Ridgway's Hawks inhabit a variety of habitats, but prefer mature subtropical wet forests, woodlands, and forest edge habitat, ranging from sea level to 1,800 m (Wiley and Wiley 1981). The only detailed information on this small woodland *Buteo* comes from a study conducted on its ecology and behavior in the Los Haitises region, northeastern Dominican Republic, during the breeding season of 1976 (Wiley and Wiley 1981). Presently, the last known stronghold for the Ridgway's Hawk was recorded in Los Haitises National Park and bordering forest fragments in northeastern Dominican Republic. In this work, we present information collected during surveys from February to November 2002 and March to October 2003 based on sightings of individuals, territorial pairs, nests, and productivity of this endangered raptor in Dominican Republic.

Nearly all surveys were conducted in Los Haitises National Park (19°00'N, 069°30'W), which encompasses approximately 1600 km^2 (Marizán 1994), and on several areas bordering the park. This park, located in the northeastern coast of Dominican Republic and south of Samaná Bay (Fig. 1), lies in the Subtropical Wet Forest region and it has an annual mean rainfall of 1,800 to 2,100 mm (Holdridge 1967; Wiley and Wiley 1981). The topography is composed of limestone karst hills (*mogotes*) and valleys, sinkholes, caves, and cliffs with elevations ranging from sea level to 380 m (Wiley and Wiley 1981; Marizán 1994). The park is made up of numerous blocks and fragments of broadleaf forest intermixed with human-cultivated habitat consisting of *conucos* (e.g., mixed plantings of root crops, banana, citrus, and cocoa), coconut plantations, pastures, grasslands, and secondary forests in various states of regeneration (Wiley and Wiley 1981; Rivera et al. 2000).

Ridgway's Hawks sightings, either individuals or pairs, and their nests were spotted during surveys either by foot searches or visual and aural responses to playback calls of the hawk. We entered the park from two access points along the southern side of Samaná Bay, Los Naranjos and Hervedera, and inland from the southern side of the park at Trepada Alta, Los Limones, and Pilancon. We searched for Ridgway's Hawks during the breeding season for 43 days from February to November 2002 in Los Haitises National Park and spent 5 days in southwestern Dominican Republic in and around Sierra Bahoruco National Park and Sierra de Neiba. From March to October 2003 (61 days), we searched for Ridgway's Hawk in and around Los Haitises National Park and visited the same sites as in 2002 and new sites farther inside the main forest block. The greatest concentration of territorial pairs was in the areas

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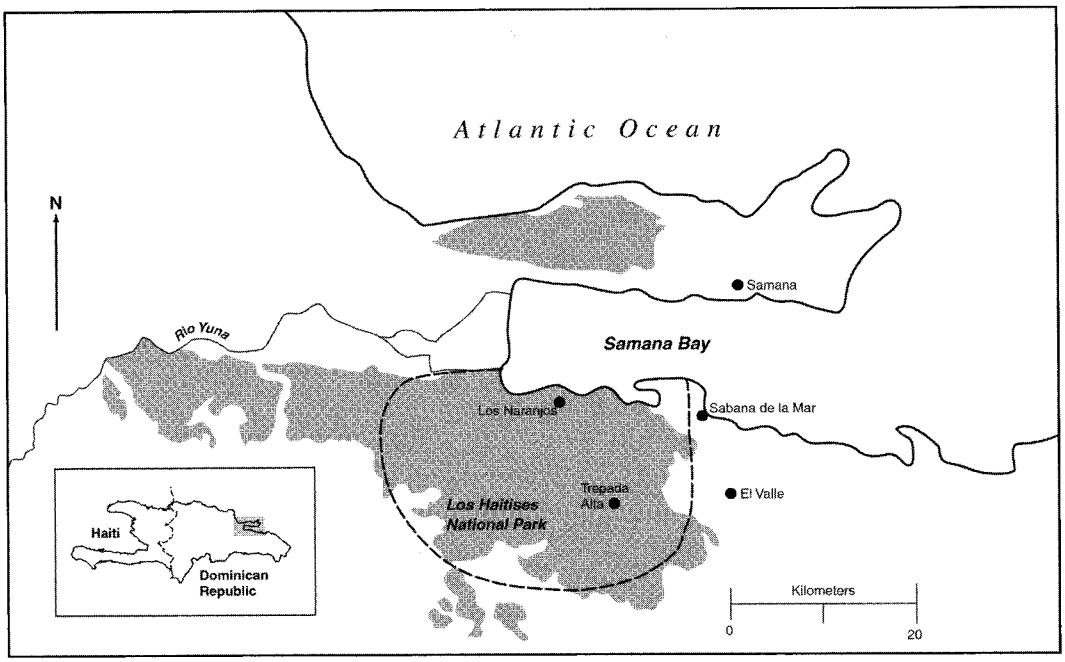

FIG. 1. Location of the study area of Ridgway's Hawk, *Buteo ridgwayi*, in Los Haitises National Park, northeastern Dominican Republic, from 2002 to 2003. Entry points to park were at Trepada Alta and Los Naranjos. Gray highlighted area shows the limestone karst formation.

Los Naranjos and Trepada Alta of Los Haitises National Park. Hawks attending nests and showing signs of incubating behavior were considered as pairs making breeding attempts. Reproductive variables were defined as (1) productivity: number of young fledged per nesting attempt, (2) overall productivity: number of young fledged per territorial pair, and (3) nest success: number of total breeding attempts that fledged at least one young.

In Los Haitises National Park, we located 47 Ridgway's Hawks, including 19 territorial pairs and 9 single birds. Of these pairs, at least 9 attempted breeding and 2 (22%) were successful in fledging 3 young. We did not observe any hawks in southwestern Dominican Republic. In 2003, we located 93 hawks, made up of 37 territorial pairs, 9 single birds, and 10 fledglings. Thirty pairs attempted breeding, of which 44 nestling were observed in the nests and 26.6% (n = 8) pairs were successful in producing 10 fledglings. Thirty-four young disappeared from the nests due to unknown causes. Of the 30 breeding attempts, 30% (9/30) were built in nests on top of Palmchat, *Dulus dominicus*, and in living trees of Puerto Rican Royal Palm, *Roystonea borinquena*. Two Ridgway's Hawks were also found on the Samaná Peninsula (Miguel Angel Landestoy and Pablo Weaver, pers. obs.) of Sociedad Ornitológica de la Hispaniola (SOH). This sighting represents the first record in nearly a decade for this species on the Samaná Peninsula.

For both 2002 and 2003, 39 pairs attempted nesting with 13 young fledging from 10 nests, for a productivity of 1.3 young fledged per successful breeding attempt. The overall productivity for both years was 0.38 (13/39) young per breeding attempt and 0.32 (15/46) per territorial pair. Nest success for both years was 25% (10/39). One recorded cause of nest failure was due to human-caused wildfires during the incubation period at 2 nests inside Los Haitises National Park. There were at least 5 reported cases of hawks being persecuted by local people during 2003 (pers. comm.)

Historical knowledge of Ridgway's

Hawks was based only on few specimen records and reported observations. During the late 19th and early 20th centuries, the status of Ridgway's Hawks was described as "uncommon to rare in Hispaniola, with a localized population in the northeastern part of Dominican Republic" (Wiley and Wiley 1981). For mainland Haiti, few records exist probably due to the lack of ornithological work conducted in this latter country, and probably due to the scarcity of this hawk throughout Hispaniola. Until 1962, early ornithologists regarded Ridgway's Hawk as common on Cayemite Islands, and possibly on Île à Vache (Wetmore and Swales 1931; Wetmore and Lincoln 1934; Wiley and Wiley 1981). We consider that one of the reasons for the greater concentration of sightings of this hawk in northeastern Dominican Republic stems from its greater density and the easier boat access to this area through the Samaná Bay and the Yuna River (Christy 1897).

Ridgway's Hawks have been reported from lowland tropical forests, woodlands and semi-open habitat, lowland scrub, pine forest, and lowland riparian woods with marshland (Bond 1928; Wetmore and Swales 1931; Wetmore and Lincoln 1934). Ridgway's Hawk appears to be closely related to Red-shouldered Hawks, *Buteo lineatus*, and possibly the Roadside Hawk, *B. magnirostris* (Bond 1978; Wiley and Wiley 1981); both of which are woodland *Buteo* species adaptable to a wide degree of human-altered habitats (del Hoyo et al. 1994). Wiley (1986) noted that Ridgway's Hawks appear tolerant to varying habitat types, which is a likely reason for its continued survival in the Dominican Republic. However, with the extensive loss of forests in Haiti (Wiley 1986; Raffaele et. al 1998; Keith et al. 2003) its survival there is doubtful. Our observations of Ridgway's Hawks in Los Haitises confirmed the greatest numbers and nesting density in the national park forest; however, we also recorded hawks, and a few pairs attempting nesting, in degraded forest fragments and human-altered habitats within and surrounding the national park. In both survey years, we recorded several nesting and territorial pairs occupying pasturelands (i.e., open habitat), coconut plantations, secondary forests, and forest edges.

The Ridgway's Hawks productivity of 1.3 young fledged per successful breeding attempt was similar to Wiley and Wiley (1981); a probable 1.5 (3 young per 2 successful nests) young fledged per successful attempt. In comparison to other neotropical raptors, productivity was higher in the Bicolored Hawks, *Accipiter bicolor* (1.8) (Thorstrom and Quixchan 2000), but lower in the Puerto Rican Sharp-shinned Hawk, *A. striatus venator* (0.8) (Delannoy and Cruz 1988), and Puerto Rican Broad-winged Hawk, *Buteo platypterus brunnescens* (0.66) (Delannoy and Tossas 2002). The closely related Roadside Hawk, *B. magnirostris*, nesting in mature forests in Guatemala had a productivity rate of 0.08; apparently related to one-egg clutches and a high rate of nest failures caused by predation (Panasci and Whitacre 2002). The nesting success was very low for the Ridgway's Hawk at 25% when compared to the Bicolored Hawk at 76%, the Puerto Rican Broad-winged Hawk at 50%, and similar to Puerto Rican Sharp-shinned Hawk at 29% which suffered not only from high nestling mortality like the Ridgway's Hawk, but also desertion of clutches (see Delannoy and Cruz 1988).

We suspect the low productivity due to the nestling mortality and nesting success exhibited by Ridgway's Hawks was caused by human activity and persecution, habitat degradation, wildfires, and harassment from White-necked Crows, *Corvus leucognaphalus*, which may have preyed on eggs and nestlings. Wiley and Wiley (1981) did not observe Ridgway's Hawk on the Samaná Peninsula during their reconnaissance [1975-1982, 1986, 1996, 2001], and noted mostly human-modified habitat (J. Wiley, pers. comm.). Apparently, at one time the hawk was common in this region (Bond 1956). During July 2003, the two recent sightings of Ridgway's Hawks in human-altered landscapes of the Samaná Peninsula are of relevance. It is not known whether these birds are recent arrivals to the area or represent remnants of a once larger population. If the hawks are recent arrivals, they could have come from the Los Haitises region which is the only nesting

area currently known for Ridgway's Hawk in Dominican Republic. Wiley and Wiley (1981) did report occasional sightings of the hawk in degraded wet forests on the northern coast at the south of Los Haitises near Miches in the mid 1970s, suggesting that Ridgway's Hawks may use some human-altered habitats.

Many recent birder trip reports listed Ridgway's Hawk occurring in other areas throughout Dominican Republic, especially in the southwest near Sierra Bahoruco National Park (Wauer 1996; Oberle and Beaton 1995). We investigated some of these reported sightings and areas, but were unsuccessful in identifying or observing hawks. Most of these purported sightings in southwestern Dominican Republic seem dubious, but we believe Ridgway's Hawk may exist in some specific areas outside of the Los Haitises region. Our findings indicate that the last stronghold of Ridgway's Hawks population is in the Los Haitises National Park and outlying areas. We propose that the hawk's population in Dominican Republic is highly threatened and its critical endangered status is justified (BirdLife International 2000). Many areas within Los Haitises remain unsurveyed, and the park is extremely important for preserving not only the hawk but all fauna and flora. Outside this region, other forest blocks and fragments need to be surveyed for the presence of this endangered woodland hawk.

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Literature Cited

Birdlife International. 2000. Threatened birds of the world. Barcelona and Cambridge, UK: Lynx Editions and BirdLife International.

Bond, J. 1928. The distribution and habits of the birds of the Republic of Haiti. *Proc. Acad. Nat. Sci. Phila.* 80:483-521.

Bond, J. 1956. *Check-list of birds of the West Indies.* Philadelphia, Pennsylvania: Academy of Natural Sciences.

Bond, J. 1978. Derivations and continental affinities of Antillean birds, ed. F. B. Gill, 119-128. *Zoogeography in the Caribbean.* Acad. Nat. Sci. Phila. Spec. Publ. No. 13.

Christy, C. 1897. Field-notes on the birds of the island of San Domingo. *Ibis* 3:317-343.

Delannoy, C. A., and A. Cruz. 1988. Breeding biology of the Puerto Rican Sharp-shinned Hawk (*Accipiter striatus venator*). *Auk* 105:649-662.

Delannoy, C. A., and A. G. Tossas. 2002. Nesting territories of the Puerto Rican Broad-winged Hawk in the Rio Abajo Forest. *Caribb. J. Sci.* 38:20-26.

del Hoyo, J., A. Elliot, and J. Sargatal. 1994. *Handbook of the birds of the world,* Vol. 2 *New World vultures to guinea fowl.* Spain, Barcelona: Lynx Editions.

Holdridge, L. 1967. *Life zone ecology.* San José, Costa Rica, Tropical Science Center.

Keith, A. R., J. W. Wiley, S. C. Latta, J. A. Ottenwalder. 2003. The birds of Hispaniola: Haiti and the Dominican Republic. An annotated checklist. BOU No. 21, British Ornithologists' Union, Tring, UK.

Marizán, G. R. 1994. Deforestation in protected areas: case study of Los Haitises National Park. *Third International Conference on Environmental Enforcement* 1:253-260.

Oberle, M., and G. Beaton. 1995. Birding the Americas Trip Report and Planning Repository: Dominican Republic and Puerto Rico. http://maybank.tripod.com/Caribbean/DomRep-PR-05-95.htm

Panasci, T., and D. Whitacre. 2002. Roadside Hawk breeding ecology in forest and farming landscapes. *Wilson Bull.* 114:114-121.

Raffaele, H., J. Wiley, O. Garrido, A. Keith, and J. Raffaele. 1998. *A Guide to the Birds of the West Indies.* Princeton, NJ: Princeton University Press.

Rivera, L. W., J. K. Zimmerman, and T. M. Aide. 2000. Forest recovery in abandoned agricultural lands in a karst region of Dominican Republic. *Plant Ecology* 148:115-125.

Thorstrom, R., and A. Quixchan 2000. Breeding biology and nest site characteristics of the Bicolored Hawk in Guatemala. *Wilson Bull.* 112:195-202.

Wauer, R. H. 1996. *A birder's West Indies.* Austin, Texas: University of Texas Press.

Wetmore, A., and F. C. Lincoln. 1934. Additional notes on the birds of Haiti and the Dominican Republic. *Proc. U.S. Natl. Mus.* 82:1-68.

Wetmore, A., and B. H. Swales. 1931. The birds of Haiti and the Dominican Republic. *U.S. Natl. Mus Bull.* 155.

Wiley, J. W., and B. N. Wiley. 1981. Breeding season ecology and behavior of Ridgway's Hawk (*Buteo ridgwayi*). *Condor* 83:132-151.

Wiley, J. W. 1986. Status and conservation of raptors in the West Indies. *Birds of Prey Bull.* 3:57-70.