

**Puerto Rican broad-winged hawk or guaraguao de bosque  
(*Buteo platypterus brunnescens*)**

**5-Year Review:  
Summary and Evaluation**



Photo Gabriel Lugo

**U.S. Fish and Wildlife Service  
Southeast Region  
Caribbean Ecological Services Field Office  
Boquerón, Puerto Rico**

**5-YEAR REVIEW**  
**Puerto Rican broad-winged hawk**

**I. GENERAL INFORMATION**

**A. Methodology used to complete the review**

The Service accomplished this review using information obtained from the final rule listing this species under the Act, the recovery plan, peer-reviewed scientific publications, several unpublished research projects, unpublished field observations by U.S. Fish and Wildlife Service (Service), State and other experienced biologists, and personal communications. The Service's lead Recovery biologist for this species prepared this review. On September 21, 2007, the Service published a notice in the Federal Register (72 FR 54061) announcing the 5-year review of the Puerto Rican broad-winged hawk (*Buteo platypterus brunnescens*). The notice requested new information concerning the biology and status of this species. We opened a 60-day public comment period with this notice, but we received no comments or information on this species. This 5-year review summarizes new information that the Service has gathered since the Puerto Rican broad-winged hawk was listed under the Endangered Species Act. The draft of this document was distributed for peer review and comments received were addressed (see Appendix A).

**B. Reviewers**

**Lead Region:** Kelly Bibb, Southeast Region, (404) 679-7132  
Nikki Lamp, Southeast Region, (404) 679-7118

**Lead Field Office:** Jorge E. Saliva, Ph.D., Caribbean Ecological Services Field Office, Boquerón, Puerto Rico, (787) 851-7297, extension 219

**C. Background**

1. **FR Notice citation announcing initiation of these reviews:**  
September 21, 2007; 72 FR 54061
2. **Species Status:** 2010 Recovery Data Call: Stable. The Río Abajo Commonwealth Forest supports close to 50% of the currently known population. The most recent study of the population within the Río Abajo Commonwealth Forest (Hengstenberg and Vilella 2004, p.101) indicates that this population continues to be stable since publication of the species' recovery plan in 1997.

3. **Recovery Achieved:** 2 (25-50%) of species recovery objectives achieved.
4. **Listing History:**  
Original Listing  
FR notice: 59 FR 46710  
Date listed: September 9, 1994  
Entity listed: Subspecies  
Classification: Endangered
5. **Review History:**  
The Puerto Rican broad-winged hawk and Puerto Rican sharp-shinned hawk (*Buteo platypterus brunnescens* and *Accipiter striatus venator*) Recovery Plan, approved and signed on September 8, 1997 (U.S. Fish and Wildlife Service 1997), is the most recent comprehensive analysis of the species' status and is used as a reference point document for this 5-year review.  
  
Recovery Data Call: 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009 and 2010
6. **Species' Recovery Priority Number at start of review** (48 FR 43098): A recovery priority number of 6 (high degree of threat, low recovery potential) is assigned to the Puerto Rican broad-winged hawk.
7. **Recovery Plan:**  
Name of plan: Puerto Rican Broad-winged hawk and Puerto Rican Sharp-shinned Hawk (*Buteo platypterus brunnescens* and *Accipiter striatus venator*) Recovery Plan  
Date issued: September 8, 1997

## II. REVIEW ANALYSIS

### A. Application of the 1996 Distinct Population Segment (DPS) policy

1. **Is the species under review listed as a DPS?** No
2. **Is there relevant new information that would lead you to consider listing this species as a DPS in accordance with the 1996 policy?** No

## B. Recovery Criteria

1. **Does the species have a final, approved recovery plan containing objective, measurable criteria?** Yes.

2. **Adequacy of recovery criteria.**

a. **Do the recovery criteria reflect the best available and most up-to-date information on the biology of the species and its habitat?** No. Knowledge on the biology, feeding ecology, and habitat use of the broad-winged hawk has expanded, particularly for the population within the Río Abajo Forest (Hengstenberg and Vilella 2004).

b. **Are all the 5 listing factors that are relevant to the species addressed in the recovery criteria (and there is no new information to consider regarding existing or new threats)** No. The plan did not address the five- listing factors in the recovery criteria.

3. **List the recovery criteria as they appear in the recovery plan and discuss how each criterion has or has not been met, citing information.**

The plan established the following downlisting criteria for the Puerto Rican broad-winged hawk:

1. Maintain a Puerto Rican broad-winged hawk breeding population of 60 pairs (20 breeding pairs in El Yunque National Forest, Carite Commonwealth Forest, and Río Abajo Commonwealth Forest, respectively).
2. Reach an island-wide Puerto Rican broad-winged hawk population of 200 individuals (60 individuals in Río Abajo and Carite Commonwealth forests, and 80 individuals in El Yunque National Forest).
3. Gather additional documentation on population trends (*i.e.*, conduct surveys, search for new populations, obtain population biology information, identify mortality factors and threats) and adequate support habitat for both hawk species (*i.e.*, characterize currently used habitat, identify additional habitat, determine spatial and temporal use of habitat).

Criteria #1 and #2 have not been met. Although Hengstenberg and Vilella (2004) estimated 52.2 hawks at the Río Abajo Commonwealth Forest, the sex composition of these 52.2 individuals is unknown. We also do not know if any of these individuals are non-reproductive juveniles. Therefore, there is no information on the numbers of breeding pairs in any of the forests.

Criterion #3 has been partially met through an agreement between the Service and the Mississippi Cooperative Wildlife Research Unit to study the reproductive biology, abundance, and movement patterns of the broad-winged hawk at the Río Abajo Commonwealth Forest (Hengstenberg and Vilella 2004, p. 20-115).

## **C. Updated Information and Current Species Status**

### **1. Biology and Habitat**

The Puerto Rican broad-winged hawk is a small hawk with dark chocolate-brown upperparts, heavily streaked rufous breast, and a broadly banded black and white tail. Adult male and female are similar in appearance, but the female is slightly larger. This species occurs in elfin woodland, sierra palm, caimitillo-granadillo, and tabonuco forest types of the Río Abajo Commonwealth Forest, Carite Commonwealth Forest, and El Yunque National Forest as well as within hardwood plantations, shade coffee plantations, and mature secondary forests. The Puerto Rican broad-winged hawk population is estimated at about 125 individuals island-wide.

#### **a. Abundance, population trends, demographic features, or demographic trends:**

The Puerto Rican broad-winged hawk is found in mature forests within the subtropical moist, subtropical wet, and rain forest life zones (Ewel and Whitmore 1973, p. 10). It shows a clumped spatial pattern within the forests, associated with certain types of habitats such as tabonuco-palo colorado forest types, tabonuco and caimitillo-granadillo forest types at El Yunque and Carite forests (Delannoy 1997, p. 25). At Río Abajo, they inhabit the limestone hillsides, sinkholes, and valleys between haystack hills or “mogotes” (Delannoy 1997, p. 25).

Puerto Rican broad-winged hawk density and population estimates varied considerably among forests, being highest at Río Abajo Forest and lowest in El Yunque Forest (Delannoy 1997, p. 25). New information on the abundance and demographic features of the population of Puerto Rican broad-winged hawks at the Río Abajo Commonwealth Forest indicates an abundance of approximately 52.2 individuals in the forest; high pair fidelity; a nest survival rate of 0.67 across breeding seasons; and an average annual productivity of 1.1 young per nest (Hengstenberg and Vilella 2004, p.34-35, 52, and 107). At Río Abajo Forest, Puerto Rican broad-winged hawks feed primarily on rats, lizards, and small birds (Hengstenberg and Vilella 2005, p. 411).

We do not have any information on the species abundance, population trends, demographic features or demographic trends for El Yunque and Carite forests.

**b. Genetics, genetic variation, or trends in genetic variation:**

No new information or research exists on the genetics of the Puerto Rican broad-winged hawk.

**c. Taxonomic classification or changes in nomenclature:**

No new information or research exists on the taxonomy of the Puerto Rican broad-winged hawk.

**d. Spatial distribution, trends in spatial distribution, or historic range:**

Llerandi-Román (2006, p. 31) found thirteen Puerto Rican broad-winged hawk territories just outside the boundaries of the Río Abajo Forest, at six different private localities with suitable broad-winged hawk habitat. The territories were along the Tanamá River valley in the northwestern region of Río Abajo Forest.

We do not have any new information on the species spatial distribution at El Yunque o Carite forests.

**e. Habitat or ecosystem conditions:**

Hengstenberg and Vilella (2004, p.69) reported an average annual home range of 106 hectares (ha) and a breeding home range size of 82.5 ha for the Puerto Rican broad-winged hawk at Río Abajo Forest. Delannoy and Tossas (2002, p.25) indicated that reforestation and regeneration of degraded forest lands have added important nest sites for broad-winged hawks at the Río Abajo Forest, which have allowed this species to thrive within this forest despite changing land uses and habitat modification. Hengstenberg and Vilella (2004, p.74) found that, within this forest, Puerto Rican broad-winged hawk nests are located in timber producing plantations and secondary forests, primarily *Callophylum calaba* (palo de María). Hengstenberg and Vilella (2004, p.41) described the nest sites of Puerto Rican broad-winged hawks at Río Abajo Forest as occurring in mature closed-canopy overstory stands sheltering a midstory, with dense understory, in close proximity to a limestone rock wall, and on southwest-facing slopes (sheltered from the easterly trade winds). Closed canopy forests may be the major structural characteristic describing the suitability of Puerto Rican broad-winged hawk habitat (Hengstenberg and Vilella 2004, p.73). Other habitat associations (*e.g.*, pasture, regenerating forests) may lack a closed canopy, but may advantageously offer areas to locate prey for Puerto Rican broad-winged hawks (Hengstenberg and

Vilella 2004, p.73). Hengstenberg and Vilella (2004, p.62) found that adult and juvenile Puerto Rican broad-winged hawks at Río Abajo Forest did not use habitats within the forest in proportion to their availability. Tossas (1995, p.44), Delannoy and Tossas (2000, p.114), and Hengstenberg and Vilella (2004, p.69) suggested that the Puerto Rican broad-winged hawk has reduced space requirements compared to their temperate counterparts, which may be a function of higher prey abundance and interspecific competition in a tropical habitat. Hengstenberg and Vilella (2005, p. 406) cited abandoned shade-grown coffee plantations as part of the secondary forest used by the Puerto Rican broad-winged hawk. They also indicated that the hawks readily used plantation trees such as palo de María and Honduras mahogany (*Swietenia macrophylla*) with thick understory vegetation (Hengstenberg and Vilella 2005, pp. 413 and 414). Hengstenberg and Vilella (2005, p. 414) suggested that Puerto Rican broad-winged hawks do not limit their activities to the Río Abajo Forest, and that their fate in the surrounding private lands may be uncertain. They suggested that Puerto Rico Department of Natural and Environmental Resources (DNER) forest managers should work proactively with the surrounding landowners to promote land-use practices to conserve and to enhance existing forest cover. Additionally, Hengstenberg and Vilella (2005, p. 414) believe that the future patterns of land use around the forest boundary directly and indirectly may affect the ability of the Río Abajo Forest to function as an effective conservation unit for the broad-winged hawk. They also recommended that DNER encourage surrounding private landowners to engage in agro forestry practices using fast-growing plantation species, and that programs for private lands that promote maintenance and enhancement of forest cover (*e.g.*, USFWS Partners for Wildlife) be brought to the attention of the landowners adjoining Río Abajo Forest (Hengstenberg and Vilella 2005, p. 414). The Partners for Fish and Wildlife program in Puerto Rico promotes agricultural land use practices that promote habitat diversity and enhance habitat for listed species and migratory birds, particularly shade-grown coffee plantations.

**f. Other:**

Hengstenberg and Vilella (2004, p.71) found that the vast majority (97%) of Puerto Rican broad-winged hawk movements and home ranges at Río Abajo Forest were confined to the boundaries of the forest. Adult birds used private lands less than 1% of the time, whereas juveniles used private lands 6% of the time, suggesting that adults are able to secure the most suitable tracts of continuous, closed canopy forest while juvenile birds used areas on the periphery of the forest. Hengstenberg and Vilella (2004, p.71) suggested that adult Puerto Rican broad-winged hawks at Río Abajo Forest maintain relatively exclusive territories; with overlap limited to the outside borders of their respective home ranges. Areas

shared by radio-marked Puerto Rican broad-winged hawks were usually limestone hill ridges that bounded the exterior of their territories (Hengstenberg and Vilella 2004, p.71).

## **2. Five Factor Analysis**

### **a. Present or threatened destruction, modification, or curtailment of its habitat or range:**

The final rule (US Fish and Wildlife Service 1994, p.46712) and recovery plan (US Fish and Wildlife Service 1997, p.11) list destruction and modification of habitat as one of the most significant factors that affect the numbers and distribution of Puerto Rican broad-winged hawk. The final rule further indicates that this species is only known from mature montane forests and has not been observed in other upland forested habitats in central parts of Puerto Rico. The Puerto Rican broad-winged hawk has been reported from Río Abajo and Carite Commonwealth forests, and El Yunque National Forest. The Maricao Commonwealth Forest and Toro Negro Commonwealth Forest do not have resident Puerto Rican broad-winged hawk populations. Although Delannoy (1997, p. 25) searched for the presence of Puerto Rican broad-winged hawk in other upland habitats in Utuado, Adjuntas, Orocovich, Jayuya, and Barranquitas, he did not find this species. However, there are unconfirmed reports of the species from these municipalities (Delannoy 1997, p. 27).

Timber harvest, road construction and/or repair in the forests, construction of recreational facilities, construction of power and communication structures, and other management practices that result in a reduction in numbers or diminished habitat quality for the species could be detrimental, since the species is limited in abundance and distribution (Delannoy 1997, p.29; US Fish and Wildlife Service 1997, p.12). The high degree of territory re-occupancy observed in Río Abajo Forest suggests little migration into adjacent habitats, making this population highly vulnerable to habitat alterations and destruction (Delannoy and Tossas 2000, p.115). Hengstenberg and Vilella (2004, p.101) suggest that, although the Rio Abajo broad-winged hawk population may be relatively stable, it may also be at carrying capacity. They also suggest that, although surrounding private lands may provide corridors or nesting habitat for dispersing individuals, land use practices surrounding private lands may also hinder movement into these areas (Hengstenberg and Vilella 2004, p.101). Permits to build new communication facilities or expand currently existing ones within or near Commonwealth forests are prevalent. There have been proposals to the DNER for the construction of cell towers within Commonwealth forests in the last five years (Toro Negro Commonwealth Forest, Gerardo Hernández, DNER, pers. comm., 2007), but DNER is currently recommending monopole, multiple-use towers whenever possible instead of constructing

new towers and antennae. Therefore, destruction, modification, or curtailment of habitat or range continues to be a threat to the Puerto Rican broad-winged hawk, and the immediacy of this threat is high because of the restricted distribution and limited abundance of the species.

**b. Overutilization for commercial, recreational, scientific or educational purposes:**

At the present time, we are not aware that overutilization of this species for commercial, recreational (*e.g.*, hunting), scientific, or educational purposes has occurred, or is currently occurring. Therefore, we believe that this factor is not a current threat for the Puerto Rican broad-winged hawk.

**c. Disease or predation:**

Parasitism by the warble fly is not currently considered a threat to the Puerto Rican broad-winged hawk because it has not been reported in populations of this species. Predation by red-tailed hawks (*Buteo jamaicensis*) on juvenile Puerto Rican broad-winged hawks has been reported at the Río Abajo Forest, where both species are sympatric (Hengstenberg and Vilella 2004, p.29). The intensity of the antagonistic response of Puerto Rican broad-winged hawks to the presence of red-tailed hawks intruding into their territories (Hengstenberg and Vilella 2004, p.29) suggests that predation and/or competition plays an important role in Puerto Rican broad-winged hawk nest-site selection, nest attendance, and juvenile survival. The magnitude of threat from disease or predation on the Puerto Rican broad-winged hawk is low, and the immediacy of this threat is non-imminent.

**d. Inadequacy of existing regulatory mechanisms:**

In 1999, the Commonwealth of Puerto Rico approved Law #241 known as the “Nueva Ley de Vida Silvestre de Puerto Rico” (New Wildlife Law of Puerto Rico). The purpose of this law is to protect, conserve, and enhance both native and migratory wildlife species within its jurisdiction, regulate permits, regulate hunting activities, and regulate exotic species, among others. In 2004, DNER approved the “Reglamento para Regir el Manejo de las Especies Vulnerables y en Peligro de Extinción en el Estado Libre Asociado de Puerto Rico” (Regulation 6766: To regulate the management of threatened and endangered species in Puerto Rico). The Puerto Rican broad-winged hawk is included in the list of protected species and designated as “critically endangered”. This classification describes species that “faces an extremely high risk of extinction in the immediate future”. This regulation (Article 2.06) prohibits collecting, cutting, or removing, among other activities, listed animals and plants within the jurisdiction of Puerto Rico. The Commonwealth Ley de Bosques #133 (Puerto Rico Forest Law #133) and Reglamento #6769 de Permisos Especiales para Uso de Comunicaciones

y Edificaciones Asociadas a Sistemas Electrónicos de Comunicaciones en los Bosques Estatales (Special Permits for the Use of Communications and Buildings Associated with Electronic Systems of Communication in Commonwealth Forests) further establish criteria for the protection of critically endangered species like the Puerto Rican broad-winged hawk. DNER also developed a Management Plan for the Río Abajo Forest addressing issues like timber harvest and habitat modification, as part of their initiative for the establishment of the second population of the Puerto Rican Parrot in the Rio Abajo Forest (DNER 2006).

Federal regulations also protect the Puerto Rican broad-winged hawk. Under the Migratory Bird Treaty Act (MBTA) (50 CFR Part 21), migratory birds, their parts, nests, or eggs may not be possessed, imported, exported, bartered, and offered for sale, purchase, or barter without a valid permit issued pursuant to the provisions of the MBTA.

Based on the presence of Federal and Commonwealth laws and regulations protecting the Puerto Rican broad-winged hawk, and the absence of evidence supporting lack of enforcement of regulations to protect this species, we believe that inadequacy of existing regulatory mechanisms is no longer a threat to this species.

**e. Other natural or manmade factors affecting its continued existence:**

The final rule and recovery plan state that the most important factors affecting the Puerto Rican broad-winged hawk are their limited distribution and low population numbers. The species is susceptible to natural habitat disturbances, such as strong storms and hurricanes, because of their limited distribution and specific habitat requirement of mature montane forests that may not be available in storm-damaged forests (Delannoy 1997, p.27, US Fish and Wildlife Service 1997, p.13). This hawk species has experienced drastic population declines (Delannoy 1997, p.27) attributed to possible direct and indirect effects of hurricane Hugo in 1989 and possibly due to the effect of Hurricane Georges in 1998 (Tossas 2010, pers. comm.).

The final rule states that the potential for illegal shooting of Puerto Rican broad-winged hawk constitutes a serious threat to the continued survival of the species. However, the recovery plan does not mention illegal shooting as a threat to the Puerto Rican broad-winged hawk. There are no records of illegal shooting of this species.

The similar nest-site habitat requirements of the red-tailed hawk may result in aggressive interactions (interference competition), or even red-tailed Hawk predation on the smaller Puerto Rican broad-winged hawk (Delannoy and Tossas 2002, p.24) at the Río Abajo Forest. Hengstenberg and Vilella (2004, p.29) observed intense territorial aggressive interactions between these two

species, where Puerto Rican broad-winged hawks were very successful at deterring intruding red-tailed hawks from their nesting territories. They also documented one instance of red-tailed hawk depredating a juvenile broad-winged hawk (Hengstenberg and Vilella 2004, p.29).

The recent (2006) release of captive-reared specimens of the endangered Puerto Rican parrot (*Amazona vittata*) in the Río Abajo Forest has resulted in interactions between Puerto Rican broad-winged hawks and Puerto Rican parrots, where a hawk was observed attacking a young parrot (M. López, USFWS, pers. comm. 2008). However, Hengstenberg and Vilella (2004, p.111) believe that resident broad-winged hawks in the Río Abajo Forest may indirectly provide some degree of protection to released parrots from predation by red-tailed hawks, because they effectively chase off intruding red-tailed hawks from their territories. Additionally, Hengstenberg and Vilella (2004, p.111) found that Puerto Rican parrots may exceed the size of avian prey taken by broad-winged hawks, and 61% of the prey deliveries to broad-winged hawk nests were rodents and *Anolis* lizards.

We believe that the magnitude of threat from other natural or manmade factors to the Puerto Rican broad-winged hawk is moderate, and the immediacy of threat is non-imminent. The Service is not aware of any records of shooting, poaching, or unintentional killing of this species. Even though major storms may affect habitat for the Puerto Rican broad-winged hawk, there is no evidence indicating that major storms would decimate the existing populations of these species or reduce them to non-sustainable levels.

#### **D. Synthesis**

The Puerto Rican broad-winged hawk is a subspecies endemic to Puerto Rico and restricted to the montane forests of the Cordillera Central, Sierra de Cayey, and Sierra de Luquillo. It was federally listed as endangered on September 9, 1994. This species occurs in elfin woodland, sierra palm, caimitillo-granadillo, and tabonuco forest types of the Río Abajo Commonwealth Forest, Carite Commonwealth Forest, and El Yunque National Forest as well as within hardwood plantations, shade coffee plantations, and mature secondary forests. The Puerto Rican broad-winged hawk population is estimated at about 125 individuals island-wide.

One of the recovery criteria for the Puerto Rican broad-wing hawk has been partially met through an agreement between the Service and the Mississippi Cooperative Wildlife Research Unit by studying the reproductive biology, abundance, and movement patterns of the hawk at Río Abajo Commonwealth Forest. However, information regarding the individuals of El Yunque National Forest and Carite Commonwealth Forest is lacking.

Habitat destruction or modification (Factor A) in the form of timber harvest, development, expansion or maintenance of roads, construction and maintenance of recreational facilities, and construction of power and communication structures have been identified as the primary factors threatening the Puerto Rican broad-winged hawk. In addition, Factor C (predation) and Factor E (other natural and manmade factors) threaten the species through natural events such as hurricanes, potential predation and competition with sympatric red-tailed hawks and human-induced disturbances (*e.g.*, people moving through and around nesting areas, harassment of nesting birds).

Potential conflicts with the establishment and management of Puerto Rican parrots, recently introduced in the Río Abajo Forest, appear to be minimal. There are no substantive data indicating that Factor B (overutilization for commercial, recreational, scientific, or educational purposes) is a threat to Puerto Rican broad-winged hawk. Evidence supporting lack of enforcement of regulations to protect the Puerto Rican broad-winged hawk is absent; therefore, Factor D (the inadequacy of existing regulatory mechanisms) is not a threat to this species.

Based on this analysis, the Puerto Rican broad-winged hawk continues to meet the definition of an endangered species.

### **III. RESULTS**

#### **A. Recommended Classification:**

No change is needed

### **IV. RECOMMENDATIONS FOR FUTURE ACTIONS**

1. Evaluate the abundance and distribution of Puerto Rican broad-winged hawks through island-wide surveys within traditional and non-traditional sites, particularly populations in El Yunque National Forest (due to significant declines between the early 1980s and mid 1990s) and the Río Abajo Commonwealth Forest [due to urban development (*e.g.* road construction) on nesting habitats]. Additionally, evaluate abundance and distribution of the Puerto Rican broad-winged hawk population in the Carite Commonwealth Forest and its adjacent lands. Surveys will need to be conducted during the breeding season between January and mid-July, using distance sampling with fixed points.
2. Using radio-telemetry, determine daily and seasonal movement patterns to obtain valuable information on habitat use and understand the home range dynamics of Puerto Rican broad-winged hawk, particularly at the El Yunque National Forest and the Carite Commonwealth Forest.

3. Establish buffer zones and effective controls to restrict human activities within established hawk territories, particularly during the breeding season. Sections of camping grounds, picnic areas, and plantation forests should be closed to the public during the breeding season.
4. To reduce habitat deterioration and maintain habitat effectiveness, protect and improve habitat adjacent to Puerto Rican broad-winged hawk ranges. This can be accomplished through land acquisition, conservation easements, or landowner incentive programs that promote sustainable land use practices.
5. Given the new information available since publication of the Puerto Rican broad-winged hawk recovery plan, delisting criteria for this species should be revised.

## V. REFERENCES

- Delannoy, C.A. 1997. Status of the broad-winged hawk and sharp-shinned hawk in Puerto Rico. *Caribb. J. Sciences* 33: 21-33.
- Delannoy, C.A. and A.G. Tossas. 2000. Nesting territories of the Puerto Rican broad-winged hawk in the Río Abajo Forest. *Caribb. J. Sciences* 36: 112-116.
- Delannoy, C.A. and A.G. Tossas. 2002. Breeding biology and nest site characteristics of Puerto Rican broad-winged hawks at the Río Abajo Forest. *Caribb. J. Sciences* 38: 20-26.
- Department of Natural and Environmental Resources. 2006. Plan de Manejo Forestal y de Vida Silvestre para el Bosque Estatal de Río Abajo, Arecibo y Utuado, Puerto Rico. (Forest Management and Wildlife Plan for the Rio Abajo Commonwealth Forest, Arecibo and Utuado, Puerto Rico), Department of Natural and Environmental Resources, Forestry Division. 433 pp.
- Ewel, J.L. and J.L. Whitmore. 1973. The ecological life zones of Puerto Rico and the U.S. Virgin Islands. USDA Forest Service. Res. Pap. ITF-18.
- Hengstenberg, D.W. and F.J. Vilella. 2004. Reproductive biology, abundance, and movement patterns of the Puerto Rican broad-winged hawk in a limestone forest of Puerto Rico. Final report submitted to the U.S. Geological Survey under Cooperative Agreement No. 14-45-009-1543-59.
- Hengstenberg, D.W. and F.J. Vilella. 2005. Nesting biology and behavior of broad-winged hawks in moist karst forests of Puerto Rico. *J. Raptor Res.* 39: 404-416.

- Llerandi-Román, I.C. 2006. Red-tailed hawk home range, habitat use, and activity patterns in north central Puerto Rico. MS Thesis, Mississippi State University, Mississippi. 173 pp.
- Tossas, A.G. 1995. Nesting site habitat description and space requirements of the Puerto Rican broad-winged hawk. MS Thesis, University of Puerto Rico, Mayagüez, Puerto Rico. 59 pp.
- Tossas, A.G. 2009. Population trends of montane birds in southwestern Puerto Rico eight years after the passage of Hurricane Georges. Proceedings of Symposium Climate Change and Biodiversity in the Americas. Smithsonian Institution, Panama. Smithsonian Institution Scholarly Press. *In press*.
- U.S. Fish and Wildlife Service. 1994. Endangered and threatened wildlife and plants; determination of endangered status for the Puerto Rican broad-winged hawk and the Puerto Rican sharp-shinned hawk. Federal Register Vol. 59 (174): 46710-46715.
- U.S. Fish and Wildlife Service. 1997. Puerto Rican broad-winged hawk and Puerto Rican sharp-shinned hawk (*Buteo platypterus brunnescens* and *Accipiter striatus venator*) Recovery Plan. U.S. Fish and Wildlife Service, Atlanta, Georgia. 23 pp.

## Appendix A

### Summary of peer review for the Puerto Rican broad-winged hawk 5-year review

This 5-year review was reviewed internally by Marelisa T. Rivera and Edwin E. Muñiz. They mostly provided editorial comments. Once the comments were added to the document, it was sent to four independent peer reviewers (see below) via electronic mail. The outside peer reviewers were chosen based on their qualifications and knowledge of the species. We indicated our interest in all comments the reviewers may have about this species, specifically in any additional information on the status and current threats to the species.

#### List of peer reviewers

Dr. Carlos A. Delannoy  
[cadelannoy@yahoo.com](mailto:cadelannoy@yahoo.com)

Dr. Adrienne Tossas  
[agtossas@gmail.com](mailto:agtossas@gmail.com)

Dr. Francisco Vilella  
[fvilella@cfr.msstate.edu](mailto:fvilella@cfr.msstate.edu)

Mr. Iván C. Llerandi-Román  
[llerandi\\_roman\\_i@yahoo.com](mailto:llerandi_roman_i@yahoo.com)

The deadline for submission of peer review comments was January 31, 2010. Comments were received from two of the four peer reviewers during the comment period. Peer reviewers' comments (C) and the Service's responses (R) are provided below.

#### Comments by Dr. Carlos A. Delannoy:

- C: *Unsuccessful Puerto Rican broad-winged hawk attack because the young parrot defended and repelled effectively against the predator, or a near miss due to misjudgment of the predator? Could the observer judge and tell the difference?* [In reference to a personal communication by M. López about an observation of a Puerto Rican broad-winged hawk interaction with a Puerto Rican parrot, in Factor C analysis]
- R: The policy of the Service is to include comments and information from the general public and scientific community. We do not know if the observer could tell the difference between an attack and a defensive strategy, since he did not provide further explanation or details about the interaction. We included data from scientists that strongly suggested that Puerto Rican broad-winged hawk attacks on Puerto Rican parrots are not likely to occur.
- C: *Shade coffee plantations? Could not find citation for this habitat type used by BWH. Llerandi (2006) cited BWH suitable habitat along the Tanamá River Valley, included shade coffee plantations? I believe you cited Henstenberg and Vilella (2004, page 111)*

*“land use practices may hinder BWH dispersal to adjacent lands to the Río Abajo Forest because these lands were apparently unsuitable for BWH occupancy”. Including shade coffee plantations?*

R: Llerandi-Román (2006) does not mention shade coffee plantations. We updated the literature citations and species background information to include Hengstenberg and Vilella (2005), which better addresses this issue.

C: *Are the Luquillo and Carite forest populations as tightly restricted to forest boundaries as the Río Abajo forest population? 97% of adult BWH home range movements in Río Abajo Forest were confined to forest boundaries (cited in page 6 of this review). Adults used surrounding lands of Río Abajo Forest less than 1%, juveniles 6% of the time. Are BWH interactions with RTH (interference competition) and predation (of BWH juveniles) same in Luquillo and Carite as in Río Abajo Forest?*

R: There are no data available to respond to these questions. However, Recommendation #2 suggests that studies be conducted to determine daily and seasonal movement patterns of Puerto Rican broad-winged hawks to obtain valuable information on habitat use and understand the home range dynamics of this species. We modified this recommendation to highlight the need for studies at El Yunque National Forest and Carite Commonwealth Forest.

Comments by Dr. Adrienne G. Tossas:

C: *What about the other populations? Also, since you are mentioning here the most recent study conducted, a reference should be cited for the previous study as well. For instance, the population continues to be stable in respect to the previous study conducted in... [In reference to the species' status]*

R: In making its determinations, the Service uses the best information and data available. Although we only have current and reliable information for one of the three populations, the one in Río Abajo Forest, it supports the majority of the known individuals, which is close to half (50%) of the currently known individuals. We believe that reliable information and data from 50% of the population of the Puerto Rican broad-winged hawk is reasonable to make inferences about the status of the population. As per Recommendation #1, which suggests conducting Puerto Rican broad-winged hawk population surveys throughout the island population, we acknowledge a need for data on abundance and distribution of the species throughout its known range. A note was included to indicate that the population continues to be stable since the species' recovery plan was published.

C: *Why is the answer no, when there are new data available? [In reference to adequacy of recovery criteria]*

R: It refers to the adequacy of the recovery criteria outlined in the approved recovery plan,

which was not adequate. In other words, the recovery criteria in the approved recovery plan do not reflect the new information available.

C: *I am confused with this category, because I would think that the Sharp-shinned Hawk has less recovery potential than the Broad-winged Hawk, but the former is category three.* [In reference to the species' Recovery Priority Number (RPN)]

R: This section states that the RPN for the Puerto Rican broad-winged hawk at the start of this five-year review is 6. Once the Service internally analyzes the available new information on this species, we evaluate the RPN to determine if it needs to be changed.

C: *Why?* [In reference to addressing the five-factor analysis in the recovery plan's recovery criteria]

R: At the time that the Puerto Rican broad-winged hawk recovery plan was finalized (1997), a five-factor analysis was not a requirement to complete and approve a recovery plan. The current policy of the Service, however, is that a five-factor analysis must be completed as part of any listing action, species status review, and species' recovery plan.

C: *Was criteria # 2 met through this agreement, or only #3?* [In reference to a cooperative agreement between the Service and the Mississippi Cooperative Wildlife Research Unit to study the reproductive biology, abundance, and movement patterns of the broad-winged hawk at the Río Abajo Commonwealth Forest]

R: No. Only criterion #3 was met through this agreement. Section B.3 has been amended to reflect the change.

C: *Average annual productivity.* [In reference to productivity of young per nest]

R: Section C.1.a has been amended to incorporate suggestion.

C: *So, do they under use the habitat, or is it that they need more?* [In reference to the species not using habitat types in proportion to their availability]

R: Hengstenberg and Vilella (2004, p.67) explain that marked Puerto Rican broad-winged hawks used the six general habitat associations within the Río Abajo Forest in a different manner than expected under the hypothesis of proportional use or no selection. Bonferroni confidence intervals were used to determine if a particular habitat was used more than expected, less than expected, or in equal proportion; and found that they used four of the six habitats available (Hengstenberg and Vilella 2004, p.68).

C: *Everything suggested here is really important. But in my opinion this is the most important recommendation!* [In reference to Recommendation #4]

R: We acknowledge the comment. However, we do not prioritize recommendations for actions in 5-year reviews.

**U.S. FISH AND WILDLIFE SERVICE**

**5-YEAR REVIEW of the Puerto Rican broad-winged hawk**

**Current Classification:** Endangered

**Recommendation resulting from the 5-Year Review**

  X   No change is needed

**Review Conducted By:** Dr. Jorge E. Saliva, Caribbean Field Office, Boquerón, PR

**FIELD OFFICE APPROVAL:**

**Edwin E. Muñiz, Lead Field Supervisor, U.S. Fish and Wildlife Service**

Approved Edwin Muñiz Date 10/5/2010

**REGIONAL OFFICE APPROVAL:**

*for*

**Cynthia Dohner, Lead Regional Director, Fish and Wildlife Service**

Approved Aaron L. Valer Date 10/28/2010