

CURRENT STATUS OF CUBAN THREATENED BIRDS: CASE STUDIES OF CONSERVATION PROGRAMS

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Abstract.—Cuba is the largest island in the Caribbean, with many ecosystems supporting high biodiversity. The island has three main mountain groups as well as the major natural wetlands of the Caribbean. It is home to over 350 bird species. Twenty-three Cuban species are considered threatened, and nine of these are under study by several institutions, including the Universidad de La Habana, the Instituto de Ecología y Sistemática (Institute of Ecology and Systematics), and the Empresa para la Conservación de la Flora y la Fauna (Agency for the Conservation of Flora and Fauna). Here, we describe some of the results of our studies of Cuba's threatened birds, as well as discuss current conservation efforts. Study cases where research and management have been successful in improving the current status of the birds are presented. Efforts to manage Cuban Parrots (*Amazona leucocephala*) and Greater Flamingos (*Phoenicopterus ruber*) have been the most successful of the conservation efforts.

Key words: *Amazona leucocephala*, *Charadrius melodus*, *conservation*, *Cuba*, *Cuban Parrot*, *Dendrocygna arborea*, *Greater Flamingo*, *Grus canadensis nesiotes*, *Phoenicopterus ruber*, *Piping Plover*, *research institutions*, *Sandhill Crane*, *threatened birds*, *West Indian Whistling-Duck*

Resumen.—ESTADO ACTUAL DEL CONOCIMIENTO DE LAS AVES AMENAZADAS DE CUBA: ESTUDIOS DE CASO DE PROGRAMAS DE CONSERVACIÓN. Cuba es la mayor isla del Caribe, con un gran número de ecosistemas diferentes que soportan una elevada biodiversidad. La isla posee tres cadenas montañosas y los humedales más importantes del Caribe. Alberga una ornitofauna de más de 350 especies de aves. Veintitrés especies de aves se consideran amenazadas y, de ellas, nueve están bajo estudio en diferentes instituciones que incluyen La Universidad de La Habana, el Instituto de Ecología y Sistemática y la Empresa para la Conservación de la Flora y la Fauna. En el trabajo se describen algunos de los esfuerzos y resultados de nuestros estudios sobre las aves amenazadas. Se presentan además algunos estudios de caso donde la investigación y el manejo han tenido exitosos resultados y han mejorado el status de las especies involucradas. Entre los casos de manejo más exitosos se plantean el de la Cotorra (*Amazona leucocephala*) y el del Flamenco (*Phoenicopterus ruber*).

Palabras claves: *Amazona leucocephala*, *aves amenazadas*, *Charadrius melodus*, *conservación*, *Cotorra*, *Cuba*, *Dendrocygna arborea*, *Flamenco*, *Frailecillo Silbador*, *Grulla*, *Grus canadensis nesiotes*, *instituciones de investigación*, *Phoenicopterus ruber*, *Yaguasa*

Résumé.—STATUT ACTUEL DES OISEAUX MENACÉS DE CUBA: ETUDE DE CAS DE PROGRAMES DE CONSERVATION. Cuba est l'île la plus grande des Caraïbes avec de nombreux écosystèmes à forte biodiversité. L'île possède trois groupes de montagnes importants ainsi que les plus grandes zones humides de la Caraïbe. C'est l'habitat de plus 350 espèces. 23 espèces cubaines sont considérées comme menacées et neuf d'entre elles font l'objet d'études par plusieurs institutions, dont l'université de La Havane, l'institut d'Ecologie et de Systématique ainsi que l'Agence pour la Conservation de la Flore et de la Faune. Nous décrivons ici certains des résultats de nos études sur les oiseaux menacés de Cuba et nous discutons des efforts de conservation en cours. Des études de cas sont présentées où la recherche et la gestion ont été efficaces en améliorant le statut actuel des oiseaux. Les efforts de gestion les plus couronnés de succès concernent l'Amazone de Cuba (*Amazona leucocephala*) et le Flamant rose (*Phoenicopterus ruber*).

Mots-clés: *Amazona leucocephala*, *Charadrius melodus*, *conservation*, *Cuba*, *Amazone de Cuba*, *Dendrocygna arborea*, *Flamant rose*, *Grus canadensis nesiotes*, *Phoenicopterus ruber*, *Pluvier siffleur*, *institutions de recherche*, *Grue du Canada*, *oiseaux menacés*, *Dendrocygne des Antilles*

CUBA, WITH AN AREA of 110,992 km², a great diversity of ecosystems, and more than a thousand keys, constitutes the most important territory for birds within the Caribbean. Some ecological features are outstanding for bird distribution in this

country: Cuba is at the mouth of the Gulf of Mexico, close to Florida and Yucatán, making it a key locality for many species of migratory Neotropical birds. The three main mountain groups are in the east, center, and west of Cuba, where semideciduous

and evergreen forests are conspicuous. In contrast to the northern coast, the lower southern coast has extensive wetlands, notably the Zapata, Biramas, and Lanier swamps, which are important not only for Cuban biodiversity but for the entire Caribbean. Only two seasons occur: the rainy season from May to September, and the dry season from October to April. Island ecosystems are extremely fragile and the rate of extinction there is high. These characteristics, among others, drive the process of variation or endemism, restricted or broad distributions, and development or extinction of species.

Additionally, for more than four centuries, deforestation and some agricultural practices have affected the distribution and abundance of many species of birds. By 1960, when forests covered only 14% of Cuba, the government began the difficult task of increasing the amount of forest cover. In the ensuing 40 years, forested land increased to 21% of land cover. Many other measures were taken to preserve and recover our natural heritage, most importantly the creation of the National System of Pro-

tected Areas (which includes many National Parks), Fauna Refuges, and Biosphere Reserves, among other categories of protected areas.

Currently, the Cuban avifauna is composed of 368 species. Among these, 132 are permanent residents, 24 are endemics, and 23 are endangered to different degrees. Several scientists from diverse Cuban scientific institutions are studying the ecology of the most-endangered species. Here, we present a general overview of threatened birds of Cuba and the Cuban institutions that are focusing on the research of these birds. Below, we summarize current studies of endangered species being conducted within our scientific institutions and give an overview of what we will present in this report.

Empresa para la Conservación de la Flora y la Fauna

An active Group for the Study of the Globally Threatened Birds has been formed. Their on-going work includes:

1. Basic ecological studies useful for future man-

Table 1. Current research and conservation efforts by the Empresa para la Conservación de la Flora y la Fauna for seven threatened species of Cuban birds.

Species	Locality	Nature of the research
Ivory-billed Woodpecker <i>Campephilus principalis</i>	Turquino National Park	Species search
Hook-billed Kite <i>Chondrohierax uncinatus wilsonii</i>	Alejandro de Humboldt National Park	Species search
Greater Flamingo <i>Phoenicopterus ruber ruber</i>	Río Máximo Fauna Refuge	Breeding ecology, management
Sandhill Crane <i>Grus canadensis nesiotis</i>	Los Indios Ecological Reserve	Population trends, monitoring, daily activity, behavior, feeding biology, reproduction
	Mantua, Morón, north & south of Ciego de Ávila, Ciénaga de Zapata, & Ciénaga de Guayaberas	Population trends
Cuban Parakeet <i>Aratinga euops</i>	Banao & Jumagua Ecological Reserves	Movement, abundance, nesting (artificial nests)
	La Belén Protected Area	Abundance, feeding ecology, reproduction
Cuban Parrot <i>Amazona leucocephala</i>	Monte Cabaniguan Fauna Refuge	Abundance, nest selection, growth
	Los Indios Ecological Reserve	Population trends, monitoring, reproduction, feeding ecology
	Hanabanilla Protected Natural Landscape	Abundance, feeding ecology, nesting
	La Belén & Morón Protected Areas	Population trends
Fernandina's Flicker <i>Colaptes fernandinae</i>	Monte Cabaniguan Fauna Refuge	Abundance, reproduction

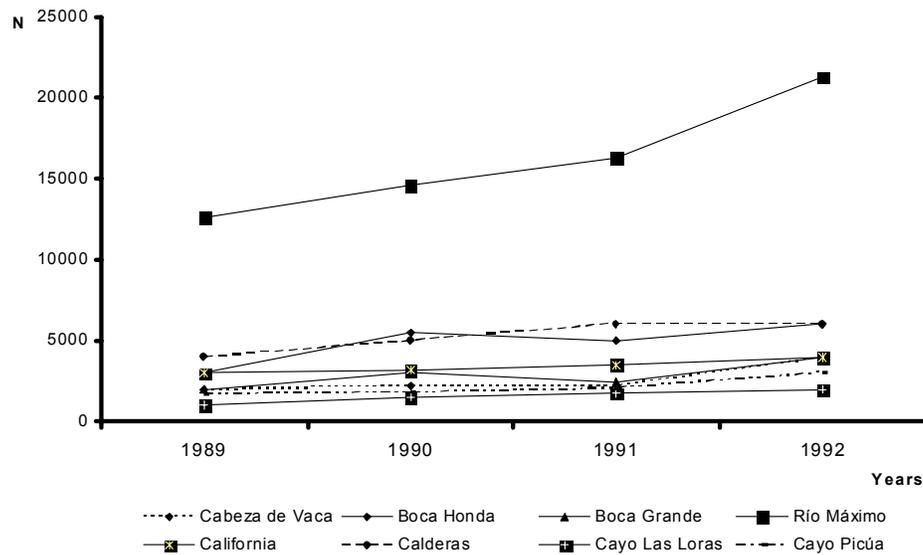


Fig. 1. Number of active Greater Flamingo (*Phoenicopterus ruber*) nests at eight Cuban localities, from 1989 to 1992.

agement of the Cuban Parrot (*Amazona leucocephala*), Cuban Parakeet (*Aratinga euops*), and Sandhill Crane (*Grus canadensis nesiototes*), among others.

2. We will showcase two cases where management has been successful; i.e., Cuban Parrot in Los Indios, Isla de Pinos (now Isla de la Juventud), and Greater Flamingos (*Phoenicopterus ruber*) in the Río Máximo Fauna Refuge, Camagüey.

Universidad de La Habana (Faculty of Biology)

1. We are studying the ecology of the bird community associated with wetlands, with a primary focus on the West Indian Whistling-Duck (*Dendrocygna arborea*). Here, we will present some results in relation to distribution, ecological aspects, and the environmental education program that is part of the whistling-duck project.
2. We will present a brief overview of the current status of eight species of endemic and threatened bird species in the Sierra de Escambray of central Cuba.

Instituto de Ecología y Sistemática (CITMA)

We present a summary of the ongoing research on Piping Plover (*Charadrius melodus*) ecology, distribution, and status.

INSTITUTIONS AND PROGRAMS

Empresa para la Conservación de la Flora y la Fauna

This Institution of the Agriculture Ministry manages much of Cuba's natural areas, many of them belonging to the National System of Protected Areas, and develops various programs for biodiversity protection. One of these efforts is the Conservation Program for Threatened Species, which includes research on some species considered globally threatened (Gálvez and Berovides, pers. comm.).

When the Conservation Program began, the Empresa had little information that was useful for the implementation of management plans for natural resources. Since 1987, however, an uninterrupted study of the Cuban Parrot has been conducted in Los Indios Ecological Reserve in the Isla de Pinos. This intensive study has yielded valuable information on which an effective management plan has been based, resulting in a substantial increase in numbers within this parrot population (see case study below).

Encouraged by the results of the parrot research and management, since 1998 other investigations have begun on the Sandhill Crane, Cuban Parakeet, Hook-billed Kite (*Chondrohierax uncinatus wilsonii*), Ivory-billed Woodpecker (*Campephilus principalis*), and Fernandina's Flicker (*Colaptes fernan-*

dinae) (Table 1). The Sandhill Crane study, in particular, has produced exciting results (see case study below).

In general, the conservation strategy used by the Empresa for threatened and endangered species is based on the use of charismatic “flagship” species to justify the maximum possible protection for their ecosystems. Environmental education and local participation are essential elements of these conservation plans. An additional factor in the conservation strategy is whether several threatened species occur in an area or if certain of them occur in substantial numbers.

The work of the Empresa has focused on three important flagship species: Greater Flamingo, Cuban Parrot, and Sandhill Crane, each of which is the subject of case studies presented below.

Greater Flamingo.—Flamingos are among the most beautiful and appealing colonial waterbirds in the Caribbean and, as such, they play an important role as a flagship species for wetlands conservation. In fact, this species is a good example of the efforts that the Cuban government has made to preserve its natural areas. Before 1978, habitat degradation and hunting threatened flamingo populations. In that year, the Empresa para la Conservación de la Flora y la Fauna initiated a protection plan for the flamingo. Eleven years later the Empresa created a National Project for the flamingo’s conservation. Currently, this species is not considered endangered in Cuba and, in fact, its populations are increasing substantially in some regions of our country, in large part as a result of the protective measures that were taken. In Cuba, the main breeding populations are in eight localities, including Granma, Camagüey, Ciego de Ávila, and Villa Clara provinces, all in central and eastern Cuba (Fig. 1).

In general, Cuban flamingo numbers are increasing, with the largest breeding population in the Río Máximo Fauna Refuge in northern Camagüey prov-

ince. There, important management measures have been undertaken for the flamingo; e.g., increasing the supply of freshwater from the río Máximo to reduce salinity and manage water levels in the rainy season as a means of reducing egg losses. In 2002, 90,000 flamingos bred in the area (Morales 1996).

In spite of these successes, it is necessary to maintain the conservation effort for flamingo populations because they are quite susceptible to many environmental pressures. Nesting in huge colonies in specialized habitat leaves flamingos vulnerable to human disturbances, including hunting and disturbance by aircraft and boats. Further, feral dogs and cats are extremely effective predators of nesting flamingos and cause catastrophic disturbances within colonies. Because of these threats, a vigorous environmental education campaign is being developed for the children of the communities near the protected areas, in addition to direct flamingo and habitat management measures.

Cuban Parrot.—Fragmentation and destruction of habitats, isolation and fragility of island ecosystems, as well as the illegal marketing of nestlings led to the extinction of the Cuban Macaw (*Ara tricolor*) about 1864. The same factors were responsible for the extirpation of the endemic Cuban Parakeet and the decrease of the previously abundant and well-distributed Cuban Parrot from western Cuba. The parrot is now considered near threatened.

In the 1970s, a program of research, restoration, and conservation for the Cuban Parrot was begun in Los Indios Ecological Reserve, where the parrot’s numbers and distribution had been diminishing alarmingly. At Los Indios, parrots commonly nest in natural palm cavities excavated by West Indian (*Melanerpes superciliaris*) and Cuban Green (*Xiphidiopicus percusus*) woodpeckers. A trial program of subsidizing parrots with additional nesting cavities was undertaken in the Reserve, wherein fallen palms were erected and, where needed, fitted with suitably sized cavities. In 1992, 417 palms (including provided and natural palms) were under study, and had high occupancy by parrots (Table 2). Investigators determined that the optimum density of nesting cavities was 1.2 per hectare. The provisioning of dead palms with cavities resulted in a three-fold increase in Los Indios parrot population from 1979 to 1994. Depending on food abundance and availability, the present parrot population now varies from 300 to 400 breeding pairs.

Many other activities have been developed as part of Los Indios parrot management effort, including environmental education programs and public in-

Table 2. Cuban Parrot (*Amazona leucocephala*) use of natural and provided palms at Los Indios Ecological Reserve, Isla de la Juventud, Cuba, 1992.

Palm source ¹	Chicks per active nest (%) ²
Natural palms	1.8 (73.1)
Provided palms	2.4 (80.1)

¹Provided palms are fallen trunks that were set vertically into the ground and provisioned, when needed, with created cavities.

Natural palms are growing trees.

²Nests with chicks.

volvement in the conservation campaign for the parrot.

Cuban Sandhill Crane.—The Cuban form is an endemic subspecies of the northern Sandhill Crane. It is an endangered permanent resident in Cuba, where it has a restricted distribution. Before the 1990s, only four crane populations were known, with a total estimated at no more than 200 individuals.

In 1994, the Empresa para la Conservación de la Flora y la Fauna began an intensive research project and a conservation program for the protection of the crane, supported by the International Crane Foundation and Cuban Ministry of Agriculture. From 1994 to 2003, extensive surveys were conducted throughout Cuba and Isla de Pinos with the goal of locating populations of the species. Historical data suggested 23 sites of known populations, of which 12 were corroborated, although one was already extirpated. Of the 11 extant populations surveyed, two are perhaps ephemeral, whereas the others are stable or increasing in numbers of birds. The total population of the Cuban subspecies is estimated at 550 individuals (Gálvez, pers. comm.).

Cuban Sandhill Cranes inhabit flooded savannas, marshes, and grassy fields near pine forests. Two main threats have been identified for the population: loss of natural habitats and man-made changes in the hydrology of the wetlands, primarily by altering river drainages.

Most research on the reproductive ecology of the crane was conducted at Los Indios Ecological Reserve, where reproductive parameters, habitat use, and home range were determined. Using radio telemetry, Gálvez (pers. comm.) found a highly variable home range of from 1 to 16 km². Further, she found that 87.8% of nesting sites were inside the protected area, but birds foraged equally within both reserve and outside areas. She recommended a redesign of the protected area to create a more efficient reserve for protecting the crane.

Beginning in 1995, annual environmental events, “Cuban Crane and Parrot Festivals,” were prepared in locations targeted for conservation education. During these events, local people were involved in such events as painting contests, simultaneous bird surveys, workshops, and conferences, among many others, resulting in high levels of interest in children and adults.

Universidad de La Habana

Ecology of wetland birds.—The Bird Ecology

Group of the Universidad de La Habana is studying the ecology of the bird community associated with wetlands, with a primary focus on the West Indian Whistling-Duck (WIWD), an endemic bird from the Caribbean which is listed as Vulnerable in the IUCN (2000) Red List of Threatened Species.

Preliminary data on WIWD ecology were gathered through a survey of the public, mostly hunters and forest guards (Mugica *et al.* 2002). The main findings of the opinion poll were:

- Feeding: more than 11 items were reported in the whistling-duck’s diet. They included various weed seeds, yucca, sweet potato, royal palm (*Roystonea regia*) seeds, tomato, corn, and beans. Rice was the main food resource, however, reported by more than 40% of the people surveyed.
- Nesting: Nests were observed throughout the year, with an increase in May and June, the two most important months for breeding. Almost 40% of the nests were reported as placed on the ground.
- Habitat use: Rice paddies were the most important habitat (30%) for these birds, although dams, mangroves, lakes, and swamps were visited frequently as well.
- Distribution and flock size: The whistling-duck is distributed widely throughout Cuba; i.e., it was reported in all Cuban provinces except La Habana City, but usually in small flocks.
- Legal Protection: Even though the WIWD is legally protected in Cuba, most people reported that it is until under considerable hunting pressure. Historically, the whistle-duck was considered an important game species by Cuban farmers.

The survey revealed that the species is still important in our aquatic ecosystems, but to effectively protect it, a strong environmental education program should be implemented. Consequently, an education program was organized as part of the West Indian Whistling-Duck Working Group of the Society for the Conservation and study of Caribbean Birds, and had been active since 1996. During this time:

- A network of collaborators from different Cuban provinces was organized and two workshops were given in relation to the program.
- The program has involved 34,557 people from seven provinces.
- Fifty undergraduate students from the Universidad de La Habana have collaborated.
- In 1999, a festival was celebrated at the Habana

Table 3. Status of and threats to avian species of concern in the Sierra de Escambray, Cuba.

Species	Status	Threats
Gundlach's Hawk <i>Accipiter gundlachi</i>	Very rare	Persecution & deforestation
Cuban Parakeet <i>Aratinga euops</i>	Scarce	Pet trade & deforestation
Blue-headed Quail-Dove <i>Starnoenas cyanocephala</i>	Very rare	Deforestation
Fernandina's Flicker <i>Colaptes fernandinae</i>	Scarce	Deforestation
Giant Kingbird <i>Tyrannus cubensis</i>	Very rare	Deforestation
Bee Hummingbird <i>Mellisuga helenae</i>	Very rare	Deforestation
Gray-headed Quail-Dove <i>Geotrygon caniceps</i>	Uncertain	Deforestation
Cuban Parrot <i>Amazona leucocephala</i>	Relatively abundant	Pet trade & deforestation

Zoo, with several activities for children of La Habana province.

- A video was prepared for use in the program.

Research on the status of the WIWD in Cuba is on-going, although progress has been slow because of the difficulties in surveying the resting sites during the day (sites are far from swamps and coastal areas, and are difficult to access) and the feeding sites (usually rice paddies when they are being sowed) during the night.

Three methods have been used to monitor WIWD populations: aerial surveys, boat surveys, and fixed point counts along the feeding flyway. Fixed-point counts have been the most effective, but use of the method requires previous knowledge of the flyway, which may be quite variable and dependent on food availability. This method was used in Ciénaga de Biramas, where a maximum of 300 individuals was recorded in the paddies surrounding the wetland during one night. At Río Máximo Faunal Refuge, northern Camagüey province, 160 individuals were recorded feeding in nearby rice paddies, whereas in Los Indios Ecological Reserve, a small population of more than 50 individuals is resident.

Conservation of the West Indian Whistling-Duck in Cuba requires that both research and the awareness program continue, with the addition of more areas and involvement of more people as the only way to guarantee the survival of the species in the long term.

Current status of Cuban endemic birds in the Sierra del Escambray and their relationship with the local human community.—The Sierra del Escambray, in south-central Cuba, has a high diversity of flora and fauna. The main sources of income for the rural community in the region are coffee and timber. A body of Forest Guards safeguards the natural areas, of which only 1% is protected area.

The Universidad de La Habana has undertaken research to determine the status of endemic birds and the effects of human activities on their populations in the region. This research is relevant because the region is being developed economically, including for tourism. Thus, public education and establishing a policy of sustainable use of resources are essential for the maintenance of the region's biodiversity.

Some of the endemic bird species, their status, and main threats in the region are summarized in Table 3. The research will provide, among other results, information on:

- Abundance and distribution of the 17 endemic species of the region.
- Effects of humans on the endemic and threatened species.

In 2001, Gundlach's Hawk (*Accipiter gundlachi*), Giant Kingbird (*Tyrannus cubensis*), Blue-headed Quail-Dove (*Starnoenas cyanocephala*), and Fernandina's Flicker were confirmed as occurring in the area under study, but the presence of the Gray-headed Quail-Dove (*Geotrygon caniceps*) is uncertain, and the Bee Hummingbird (*Mellisuga helenae*) has not been confirmed there. Various actions designed to increase the environmental awareness of the community have been undertaken.

Instituto de Ecología y Sistemática

This group is working principally with the Piping Plover. The plover is a North American species that has declined drastically since the 1950s and, for that reason, has been considered Vulnerable (BirdLife International 2000). Piping Plovers spend most of their annual cycle associated with wintering areas (Haigh and Oring 1985), but little was known of the species' wintering distribution and ecology before 1990 (Nicholls and Baldassarre 1990).

Since 1991, Cuba has been involved in the Inter-

national Census of the Piping Plover, with the objectives of confirming the species' presence in the national territories and providing useful data on its current distribution and population trends. The research has been developed in three stages: (1) compilation and analysis of the historical records of the species from 1800 to 1987, (2) evaluation and characterization of the habitats where the species has been seen, and 3) surveys for the presence of the plover in the historical localities and potential coastal habitats.

The research (1991–2001) has shown better results than were expected, based on historical records. Twenty-five records of Piping Plovers in 11 localities were reported, including seven new localities for the species. These surveys revealed a Cuban wintering population of 60–80 individuals (Blanco 2001). North-central keys, such as Cayo Coco and Cayo Paredón Grande in Ciego de Ávila province, were the main wintering grounds for the Piping Plover in Cuba, with approximately 68% of individuals observed there (Blanco 2001). Because of the considerable amount of potential habitat along the Cuban coasts, the investigators estimated that the wintering population of Piping Plover may be more than 100 individuals.

The Cuban winter resident population of Piping Plover comprises 2.0–2.7% of the current world population of the species (Wetlands International 2002). The tourism development plan for Cuba and the rest of the Caribbean could threaten the important remaining habitats of the plover. For this reason, the Piping Plover population wintering in Cuba requires special attention. Conservation efforts should focus on monitoring population trends and developing studies of specific sites available to this species.

CONCLUSIONS

Our threatened bird species are an important concern for Cuban research teams. It is of note that nine of the 23 threatened bird species in Cuba (Birdlife

International 2000) are being studied, and that all have populations within in the National System of Protected Areas.

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