The Journal of Caribbean Ornithology

RESEARCH ARTICLE

Vol. 32:17–25. 2019

A general assessment of White-crowned Pigeon (*Patagioenas leucocephala*) populations in western Cuba

Martín Acosta Lourdes Mugica

Birds Caribbean

The Journal of Caribbean Ornithology
jco.birdscaribbean.org ISSN 1544-4953 https://doi.org/10.55431/jco.2019.32.17-25
RESEARCH ARTICLE Vol. 32:17–25. 2019
Birds Caribbean
www.birdscaribbean.org

A general assessment of White-crowned Pigeon (*Patagioenas leucocephala*) populations in western Cuba

Martín Acosta[1,2] and Lourdes Mugica[1,3]

Abstract The White-crowned Pigeon (*Patagioenas leucocephala*) is now considered a Vulnerable species in the Cuban Red Data Book. The species was historically widespread in the Cuban Archipelago. Most of the research on the species is from the 1980s and early 1990s, but in the last 25 yr no study has been done to update its current status. We made a general assessment of the species in the western part of Cuba (five provinces included) using results obtained through interviews with experts, field trips, and a literature search (including the revision of 26 management plans of all protected areas in the western provinces). All the information regarding feeding, breeding, and migration were summarized. This species was documented in 21 protected areas; in 6 areas it was considered abundant, and it was present in the remaining 15. The most important colonies were found in Guanahacabibes National Park (Pinar del Río Province), Los Indios Cays (Isla de la Juventud Special Municipality), and Traviesa Cay in the south of Zapata Swamp (Matanzas Province). The breeding colonies were of similar distances apart, between 130 km and 140 km, and all were situated in the south, far away from any urbanization or settlement. Three measures have contributed to their conservation in the country: the removal of White-crowned Pigeon from the official hunting list in Cuba, its inclusion in the Red Data Book, and its recognition as a species with special significance for Cuban biological diversity. These results will be used as a baseline to develop a feasible, comprehensive strategy for future management and conservation of White-crowned Pigeon in western Cuba in years to come.

Keywords breeding colonies, Cuba, *Patagioenas leucocephala*, White-crowned Pigeon

Resumen Evaluación general de las poblaciones de *Patagioenas leucocephala* en el occidente de Cuba—La Torcaza Cabeciblanca (*Patagioenas leucocephala*) es considerada como Vulnerable en el Libro Rojo de los Vertebrados de Cuba. Esta especie cuenta con una amplia distribución en nuestro archipiélago. La mayoría de las investigaciones realizadas sobre ella se desarrollaron en los años 80 y principios de los 90 del siglo pasado, pero en los últimos 25 años no se ha llevado a cabo ningún estudio que permita conocer el estado actual de sus poblaciones. En este trabajo se realizó una evaluación general en las cinco provincias occidentales, usando los resultados obtenidos en encuestas, muestreos de campo y búsqueda bibliográfica, incluyendo 26 planes de manejo de las áreas protegidas incluidas en estas provincias y se resumió toda la información relacionada con la alimentación, reproducción y migración. La especie ha sido registrada en 21 áreas protegidas, en 6 de las cuales se considera abundante, mientras que en las 15 restantes solo está presente. Las colonias más importantes se encuentran en el Parque Nacional Guanahacabibes, en la provincia de Pinar del Rio, en Cayos Los Indios, al oeste de la Isla de la Juventud, y en Cayo Traviesa, al sur de la Provincia de Matanzas. Estas colonias reproductivas se encuentran separadas a distancias que variaron entre los 130 km y 140 km, todas relacionadas con la costa sur del país, alejadas de cualquier asentamiento humano. Tres medidas han contribuido a la conservación de la especie: su eliminación como especie cinegética, su inclusión en el Libro Rojo de los Vertebrados de Cuba y su reconocimiento como especie de especial significación para la diversidad biológica cubana. Los resultados obtenidos pueden ser usados como una línea base para el desarrollo de una estrategia de manejo y conservación de esta paloma en los años venideros.

Palabras clave colonias de reproducción, Cuba, *Patagioenas leucocephala*, Torcaza Cabeciblanca

Résumé Une évaluation générale des populations du Pigeon à couronne blanche (*Patagioenas leucocephala*) de l'ouest de Cuba—Le Pigeon à couronne blanche (*Patagioenas leucocephala*) est maintenant considéré comme une espèce vulnérable dans le Livre rouge de Cuba. L'espèce était naguère répandue dans l'archipel cubain. La plupart des recherches sur l'espèce datent des années 1980 et du début des années 1990, mais aucune étude n'a été réalisée au cours des 25 dernières années pour actualiser son statut. Une évaluation générale de l'espèce dans la partie occidentale de Cuba (dans cinq provinces) a été menée en utilisant des résultats issus d'entretiens avec des spécialistes, de visites sur le terrain et d'une recherche

[1]Faculty of Biology, University of Havana, Calle 25 entre J e I Vedado, Ciudad Habana, Cuba; [2]e-mail: macosta@fbio.uh.cu. Full list of author information is available at the end of the article.

bibliographique (incluant l'examen de 26 plans de gestion de toutes les aires protégées des provinces occidentales). Toutes les informations concernant l'alimentation, la reproduction et la migration ont été résumées. Cette espèce a été signalée dans 21 aires protégées. Elle était considérée comme abondante dans 6 d'entre elles et présente dans les 15 autres. Les colonies les plus importantes ont été trouvées dans le parc national de Guanahacabibes (Province de Pinar del Río), aux Cayos Los Indios (Municipalité spéciale de l'Isla de la Juventud) et au Cayo Traviesa au sud du marais de Zapata (Province de Matanzas). Les colonies de reproduction étaient situées à des distances similaires les unes des autres, comprises entre 130 km et 140 km, et toutes au sud, loin de toute zone urbanisée ou peuplée. Trois mesures ont contribué à la conservation de l'espèce dans le pays : son retrait de la liste officielle des espèces chassables de Cuba, son inclusion dans le Livre rouge et sa reconnaissance en tant qu'espèce revêtant une importance particulière pour la diversité biologique de Cuba. Ces résultats serviront de base à l'élaboration d'une stratégie applicable et complète pour la gestion et la conservation futures de cette espèce de pigeon dans l'ouest de Cuba dans les années à venir.

Mots clés colonies de reproduction, Cuba, *Patagioenas leucocephala*, Pigeon à couronne blanche

The White-crowned Pigeon (*Patagioenas leucocephala*) was once widespread in the Cuban Archipelago. Before the 20th century, the species was scarcely referenced in the ornithological literature (Godínez 1993). Continuing through the first half of the 20th century, Barbour (1923, 1943) provided information on the general biology of the species, yet its breeding biology remained largely understudied (but see Veiga-Azcune 1942). Later, during the 1980s and early 1990s, several studies were aimed at describing various ecological aspects including its distribution, food preferences, and breeding biology (Vázquez and Nieves 1980, Godínez 1982, Chamizo and Fagundo 1983, Chamizo *et al.* 1983, Godínez *et al.* 1983, Godínez *et al.* 1984, Chamizo *et al.* 1984, Godínez 1985, Godínez and Fuentes 1987, Godínez *et al.* 1987, Godínez and Viñola 1988, Godínez and Bridón 1989, Godínez 1993).

In the last 25 yr, there has been no research on this species in Cuba. In this paper our main goals were: 1) to update the population status and distribution of White-crowned Pigeon in five western Cuban provinces and Isla de la Juventud; 2) to discuss current knowledge of the feeding habits and diet of the species; and 3) to identify the main colony sites and feeding grounds. The results will be used as a baseline to develop a feasible, comprehensive strategy for future management and conservation of this species in western Cuba in years to come.

Methods

This assessment was carried out through interviews, field trips, a literature search on the topic in Cuba, and the review of recent technical reports referring to the Cuban Protected Areas released by The National Office for Protected Areas and The Enterprise for the Conservation of Flora and Fauna (Collective of Authors 2014).

We conducted interviews during 2014 with 36 individuals in seven localities including Pinar del Rio Province (Los Palacios, La Coloma, and Guanahacabibes), Matanzas Province (Zapata Swamp), Havana Province, and Isla de la Juventud, a special municipality. Hunters, fishermen, farmers, people residing near historical nesting sites, and authors who had published papers on White-crowned Pigeon were targeted for interviews. The objectives were to contact local people and corroborate the current importance of historical breeding and feeding sites for White-crowned Pigeon.

In addition, some preliminary population surveys (birds/hr) were conducted to confirm the presence of White-crowned Pigeon and estimate its abundance, with the goals of organizing a future population census of the species, assessing research

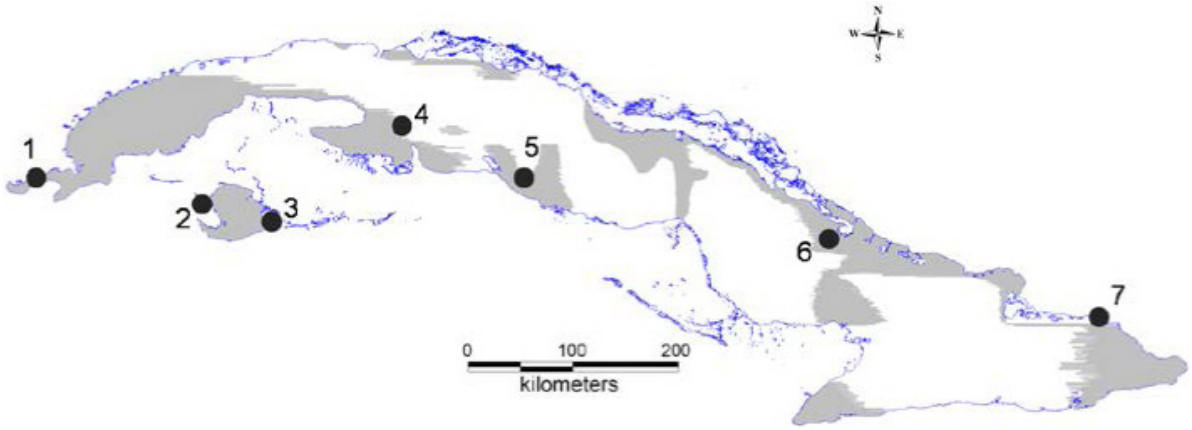

Fig. 1. Location of the main nesting colonies (dots) and geographical distribution (gray shading) of White-crowned Pigeon in Cuba during the 1980s and 1990s. Names and localities in western Cuba, the focus of this study (sites 1 to 4), can be found in Table 1. Source: Godínez 1993.

Table 1. Characteristics of the main nesting colonies surveyed in western Cuba between 1979 and 1992 and their current status.

Number and Location	Area	Status	Population Size
1 Guanahacabibes	123 ha	still active	4.7×10^4 birds in 1983 (Godínez *et al.* 1987)
2 Cayos Los Indios	310 ha (92% of the cay's surface)	still active	2.3×10^5 birds in 1983 (Chamizo *et al.* 1983)
3 Cayo Matías	611 ha (the whole cay)	unknown	unknown
4 Jagüey Grande (several small colonies)	57 ha and 59 ha	no longer exists	8.2×10^4 birds in 1980 (Vázquez and Nieves 1980) 4.3×10^4 birds in 1982 (Godínez and Viñola 1988)

needs, and establishing conservation priorities. The surveys (n = 63) took place from January to November between 2006 and 2014, early in the morning (in the 2 hr following sunrise) or late in the afternoon (in the 2 hr preceding sunset) on the north and south coast of Pinar del Río Province, Matanzas Province (Las Salinas in Zapata Swamp), the northern coast of Havana and Mayabeque Provinces, the National Botanical Garden, and the southwest of Isla de la Juventud.

Management plans (supplied by the National Office for Protected Areas) of 26 protected areas from five western provinces (Pinar del Río, Artemisa, Havana, Mayabeque, and Matanzas) and the Isla de la Juventud special municipality were consulted with the aim of collecting additional information on the occurrence, abundance, and breeding colonies of the species (Collective of authors 2014). Two categories of observations were established: Abundant (areas with nesting colonies, main feeding areas, or both), or Present (areas used during non-reproductive periods, generally by small flocks, pairs, or individuals).

Results and Discussion

Distribution and Breeding Range

The distribution and breeding status of White-crowned Pigeon were reviewed in the 1980s and early 1990s (Godínez 1982, Chamizo and Fagundo 1983, Godínez *et al.* 1983, Godínez *et al.* 1984, Godínez and Bridón 1989, Godínez 1993). The resulting understanding of the location of the main nesting colonies and overall distribution of the studies are shown in Fig. 1. According to the distribution map, the species has a generally broader geographical range in the western provinces, and so the current study focused efforts on the four western-most areas identified by the earlier studies (Table 1).

Of the four western nesting colonies reported in the 1980s and 1990s, only two are still active today, namely, Guanahacabibes and Cayos Los Indios (Table 1). In Jagüey Grande, where there were once several nesting colonies, all are gone due to development of extensive citrus plantations in the 1980s. Because of community pressure, the nesting area was maintained as a preserve rather than being included in the plantation. However, feeding habitat was destroyed and slowly the nesting population decreased until the colony disappeared (Godínez 1993).

White-crowned Pigeon is currently known to occur in 24 of the 28 Important Bird Areas in Cuba (Fig. 2; Aguilar 2010) and is also included in the management plans of 21 protected areas in the provinces of western Cuba (Pinar del Río, Artemisa, Habana, Mayabeque, Matanzas) and the Isla de la Juventud special municipality (Table 2; Collective of Authors 2014).

Feeding and Diet

In Florida, 36 items in the diet of White-crowned Pigeon were identified through behavioral observations and stomach content analysis (Bancroft *et al.* 1990, Bancroft and Bowman 2001). In Cuba, 43 items were reported by Godínez (1993) and Chamizo *et al.* (1984) through the stomach content analysis of 152 individuals, and during the current study, eight new food items were added from interviews and personal observations (Table 3). Food items varied by season and region depending on availability. Only five items were found in common between the diet of White-crowned Pigeons in Cuba and those in Florida.

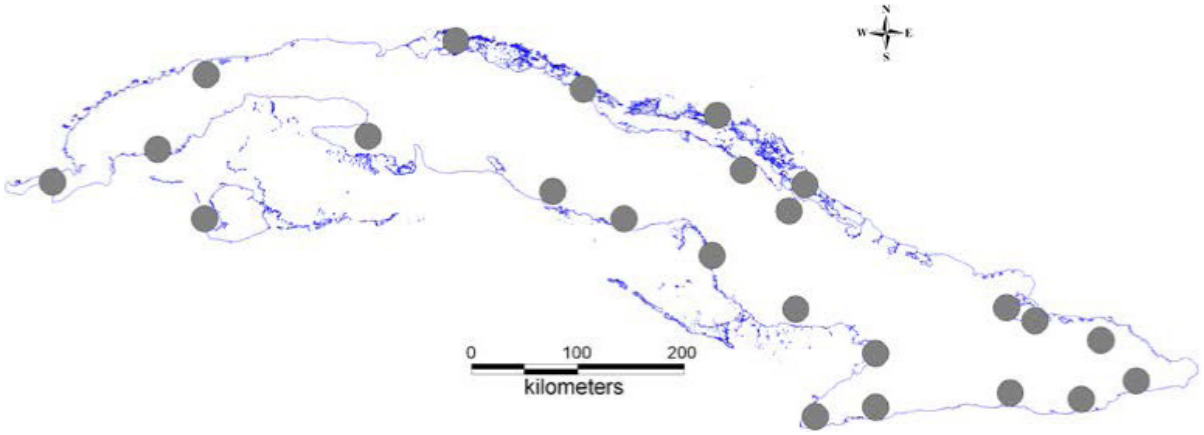

Fig. 2. Important Bird Areas in Cuba where the White-crowned Pigeon is known to occur. Source: Aguilar 2010 and Gonzalez *et al.* 2012.

Table 2. Distribution of White-crowned Pigeon in protected areas from the provinces of western Cuba: Pinar del Río, Artemisa, Habana, Mayabeque, Matanzas, and the Isla de la Juventud special municipality. The Cuban management categories of the protected areas included in the table are PN (National Park), RFM (Managed Floristic Reserve), APRM (Protected Area of Managed Resources), PNP (Natural Protected Landscape), and RE (Ecological Reserve).

Protected Area by Province		Area	Observations
Pinar del Río			
1	PN Guanahacabibes	39,830 ha	Abundant (2 nesting colonies)
2	PN Viñales	11,120 ha	Present
3	RFM San Ubaldo Sabanalamar	5,212 ha	Abundant
4	APRM Mil Cumbres	17,521 ha	Present
5	PN Cayos de San Felipe	26,250 ha (2,043 terrestrial ha)	Present
Artemisa			
6	APRM Sierra del Rosario	25,000 ha	Present
7	PNP Guajaibón	177 ha	Present
Mayabeque			
8	PNP Escaleras de Jaruco	2,482 ha	Abundant
9	PNP Lomas de Galindo	853 ha	Present
Habana			
10	PNP Laguna del Cobre-Itabo	784 ha (224 terrestrial ha)	Present
11	PNP Rincón de Guanabo	1,000 ha	Present
12	RE La Coca	1,156 ha	Present
Matanzas			
13	RFM Tres Ceibas de Clavellinas	406 ha	Present
14	RE Cinco Leguas	3,611 ha	Present
15	PN Ciénaga de Zapata	418,925 ha (281,861 terrestrial ha)	Abundant (nesting colony)
16	PNP Valle Río Canímar	538 ha	Present
17	PNP Varahicacos	124 ha	Present
18	RE Laguna de Maya	966 ha (565 terrestrial ha)	Present
Isla de la Juventud			
19	RE Cayos Los Indios	5,395 ha	Present
20	APRM Sur de la Isla de la Juventud	131,122 ha	Abundant
21	PN Punta Francés	4,598 ha (1,596 terrestrial ha)	Abundant

One of them, poisonwood (*Metopium toxiferum*), known locally as "guao de costa," is very important for the species in Cuba (Godínez 1993; Fig.3). It has been reported as a dietary item mainly during the breeding season, when the species shifts its diet from figs (*Ficus* spp.) to poisonwood. Poisonwood has more energy per gram than figs, and is richer in lipids, whereas figs are richer in carbohydrates. White-crowned Pigeons can digest poisonwood seeds but not fig seeds, and it tends to be more abundant than figs during periods of peak ripening (Bancroft and Bowman 2001). In general, birds assimilate Anarcadiaceae fruits (like poisonwood) more efficiently than fruits of the Moraceae (fig) family (Herrera 1981). Because White-crowned Pigeons forage in semi-deciduous forests and coastal vegetation during the breeding season, nesting colonies are usually located within 50 km to 60 km of significant densities of one or both of these plant communities.

In the non-breeding period, individuals disperse and use other habitats, often with an abundance of royal palms (*Roystonea regia*), known locally as "palmiche" (Fig. 3). Chamizo *et al.* (1984) found that royal palm fruit were present in 57% of their 152 samples. Mastic (*Mastichodendrum foetidissimum*) may also be an important food item during the non-breeding season (Godínez and Oviedo 1995). Occasionally, White-crowned Pigeons have been observed feeding on the ground in mangrove cays in Cuba (L. Cotayo pers. comm.). Perhaps individuals are looking for grit or salt in the ground, or feeding on small land snails (Wiley and Wiley 1979).

Migration

Between 1979 and 1984, 1,207 White-crowned Pigeon nestlings were banded, and 13 banded individuals were recovered at a distance ranging from 34 km to 130 km away from the banding sites (Godínez 1993). This confirmed that White-crowned Pigeon is a partial, short-distance migrant. In Puerto Rico and the Do-

Table 3. Fruits known to be consumed by the White-crowned Pigeon in Cuba. Source: Chamizo *et al.* 1984 and Godínez 1993; the last eight items mentioned (44–51) are a result of the interviews made during the current study.

	Common Spanish Name	Scientific Name
1	Boniato, aguacatillo	*Ocotea leucoxylon*
2	Cabo de hacha, guabán	*Trichilia hirta*
3	Jia	*Casearia aculeata*
4	Guairaje	*Eugenia buxifolia*
5	Guara macho	*Cupania glabra*
6	Jagüey	*Ficus membranacea*
7	Jagüey macho	*F. crassinervia*
8	Almácigo	*Burcera simaruba*
9	Boniato blanco	*Cinnamomum elongatum*
10	Boniato blanco	*C. montana*
11	Resinero, resinilla	*Rapanea ferruginea*
12	Uva caleta	*Coccoloba uvifera*
13	Pendejera macho	*Solanum verbascifolium*
14	Yagruma	*Cecropia peltata*
15	Zarzaparrilla	*Smilax havanensis*
16	Guasimilla de costa	*Prockia crucis*
17	Palma manaca	*Calyptrogyne occidentalis*
18	Júcaro mastelero	*Buchenavia capitata*
19	Almendrillo, cuajanicillo	*Prunus myrtifolia*
20	Nigua, cayaya macho	*Tournefortia bicolor*
21	Cordobán	*Rhoeo* spp.
22	Vigueta de naranja	*Chione cubensis*
23	Ateje	*Cordia collococca*
24	Guao prieto	*Comocladia dentata*
25	Rascabarriga	*Espadea amoena*
26	Caimitillo	*Chrysophyllum oliviforme*
27	Guara hembra	*Cupania cubensis*
28	Cogote de toro	*Huefelandia pendula*
29	Yaya	*Oxandra lanceolata*
30	Parra cimarrona	*Vitis tiliifolia*
31	Malaguetas	*Xilopis* spp.
32	Yagruma macho, zapatón	*Didymopanax morototoni*
33	Guasimilla, guásima boba	*Trema micrantha*
34	Bledo carbonero	*Phytolaccaico sandra*
35	Manca montero	*Strychnos grayi*
36	Cuajaní, cuajanímacho	*Prunus occidentalis*
37	Nigua, cayaya hembra	*Tournefortia virautissima*
38	Yaya macho	*Mouriri acuta*
39	Vigueta de lechuza	*Tapura cubensis*
40	Bijáguara	*Colubrina ferruginosa*
41	Guao de costa	*Metopium toxiferum*
42	Palmiche	*Roystonea regia*
43	Naranja	*Citrus sinensis*
New species included		
44	Yanilla	*Picodendron macrocarpum*
45	Guayaba	*Psidium guajaba*
46	Aroma	*Vachellia farnesiana*
47	Jibá	*Erythroxylum havanense*
48	Cebolleta	*Cyperus rotundus*
49	Arroz	*Oryza sativa*
50	Jobo	*Spondia mombin*
51	Guanito	*Coccothrinax miraguana*

minican Republic, most individuals move from coastal nesting sites to higher elevations in interior forests during winter (Wiley 1979). Although philopatry has been suggested based on the occurrence of recaptured banded nestlings near their natal site, winter philopatry is unknown in Cuba and elsewhere (Bancroft and Bowman 2001). However, three birds tagged in Florida with VHF transmitters wintered in the same respective areas of the Bahamas for two successive years and eight birds tracked by satellite from breeding areas in Florida, Jamaica, Cayman Islands, and Puerto Rico wintered in the same respective locations in successive years (K. Meyer and G. Kent unpubl. data).

On the other hand, the recoveries of White-crowned Pigeons banded as nestlings in Florida and the Bahamas have shown that inter-island movements are common. Several adults banded during the non-breeding season (October–March) in Florida and the Bahamas were recovered in Cuba (three and five, respectively), while one nestling banded in the Bahamas during the breeding season was found in Cuba (Bancroft and Bowman 2001). These reports are evidence that White-crowned Pigeons may disperse to different habitats during the non-breeding season, as they are capable of embarking on long-distance flights of more than 150 km (Bancroft and Bowman 2001), apparently in response to food availability (Arendt *et al.* 1979).

Breeding

The mangrove ecosystem is the most important nesting habitat for White-crowned Pigeon in Cuba, although the species can also use semi-deciduous and gallery forests. Black mangrove (*Avicennia germinans*) is usually preferred over other mangrove species for nesting sites (Chamizo *et al.* 1983). Godínez (1993) described the characteristics of the nesting and feeding sites and reproductive success in Guanahacabibes, Jagüey Grande, and Zapata Swamp. The breeding season runs from April to August, and there are possibly two peaks in nesting activity. Tes-

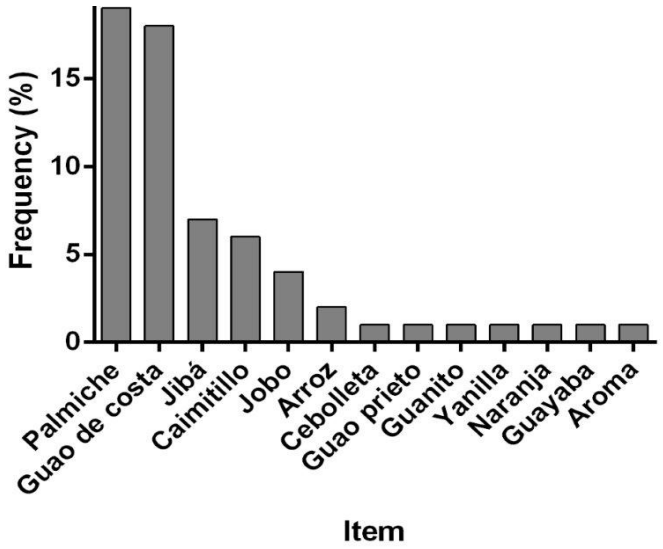

Fig. 3. Frequency of food items used by the White-crowned Pigeon. Source: 36 interviews conducted in 2014. (Common names in Spanish and scientific names are shown in Table 3.)

Table 4. Preliminary results of White-crowned Pigeon surveys conducted at sites in the western Cuban provinces. (For surveys from Isla de la Juventud, see Fig. 7.)

Province/Site	Mean (birds/hr) ± SD	Time of Presence
Pinar del Río		
Los Pretiles	7.2 ± 5.4	Oct–Nov
Sur de Los Palacios	49.3 ± 66.4	Oct–Nov
Havana		
National Botanical Garden	6.0 ± 2.0	Jan–Mar
North Coast	3.33 ± 2.6	Mar–Apr
Matanzas		
Las Salinas	17.0 ± 11.2	May–Jun
Las Salinas	3.4 ± 4.0	Sep–Oct

tes and ova are fully developed during May and June (Godínez 1993). In general, the number of birds displaying courtship behaviro, forming pairs, and attempting to nest appears to be related to food supply (Bancroft *et al.* 2000).

Interview Results

The White-crowned Pigeon was seen by 88% of the observers interviewed, so the species seems common in the provinces where interviews were conducted. The species was observed in flocks ranging in size from 3 to 100 individuals; one person reported flocks of 500 individuals in Guanahacabibes National Park. Seventy-five percent of those interviewed observed the species while feeding and reported 13 different food items, with royal palm fruit ("palmiche") and poisonwood ("guao") the most commonly noted items (Fig. 3).

The White-crowned Pigeon was observed in several cays in the southwestern archipelago Los Canarreos (Juan García, Sijú, Los Indios, Cayo Largo, El Coco, Cayo Matías, and Rosario), but only Cayo Los Indios and Cayo Traviesa were referred to as important breeding sites. Other areas were only known to be used as foraging sites. The species used a variety of habitats, including mangroves, forested mountain sides, palm groves, coastal vegetation, and semi-deciduous forests.

In relation to the current status of the species, 55% of those interviewed thought that populations were decreasing and 15% thought that they were increasing. The distributional range was believed to be shrinking according to 36% of the people interviewed; 15% said it was increasing. The main threats to the species were thought to be posed by hurricanes and the harvest of nestlings for food—mainly by fishermen—from the nesting colonies in the cays. Several locals mentioned that the hurricane of 2008 was very strong and severely affected the White-crowned Pigeon population, including observations of thousands of nestlings dead in Cayos Los Indios.

Conservation Status

Based on its abundance in each province, the White-crowned Pigeon was legally hunted in seven Cuban provinces and Isla de la Juventud until 2010. In that year, advisors to the National Hunting Committee provided the scientific arguments to decision-makers to justify removal of the White-crowned Pigeon from the hunting list. This important step toward the species' protection has been further reinforced by two additional factors. First, White-crowned Pigeon has been listed as a Vulnerable species in the Red Data Book on Cuban Vertebrates (González Alonso *et al.* 2012); species included in this book are officially recognized by the government as threatened. Second, the Ministry of Science and Technology promulgated Resolution 160/2011 with the goal of regulating the management of species with special significance for Cuban biological diversity. In this resolution, those species classified in Appendix 1 (threatened species, or those included in different conventions and agreements like the Convention on International Trade in Endangered Species of Wild Fauna and Flora, the Convention on Migratory Species and Specially Protected Areas and Wildlife) can only be used for research and conservation purposes under a special environmental license; White-crowned Pigeon is one of the species included in this appendix.

Preliminary Population Surveys

We surveyed five western Cuban sites for the presence of White-crowned Pigeon (Table 4). In Pinar del Río Province, there are two small protected areas: Los Pretiles on the north coast, and Sur de Los Palacios in the south. In both areas, White-crowned Pigeon was observed only during the non-breeding season, when the birds disperse after breeding. In Havana Province, in the coastal area to the east of the city ("North Coast" Table 4), the birds are present year-round, but in low abundance. They usually rest at night in mangrove forest near the coast (Laguna del Cobre Itabo Protected Area), and from there fly inland to nearby mountainous areas, possibly in search of foraging areas. The presence of White-crowned Pigeon in the National Botanical Garden from January to March, south of the city of Havana, is a more recent development. This place has been monitored several times in the last 30 yr and White-crowned Pigeon was never before reported. These observations likely reflect the species' ability to disperse to new habitat, such as the improved density of vegetation and food sources in the area. Las Salinas, in Zapata swamp, is used more by White-crowned Pigeon during the breeding period, when individuals nest in a cay in the southern part of the swamp; birds were also detected in the non-breeding season at lower densities.

Current Breeding Colonies in Western Cuba

Based on interviews as well as our personal observations on field trips, four main colonies were considered active (Fig. 4). Two were on the Guanahacabibes Peninsula: one in La Bajada and the second between La Bajada and the town of Manuel Lazo. The third colony was in Cayos Los Indios, near the west coast of Isla de la Juventud. The fourth was in Cayo Traviesa in the south of Zapata Swamp.

A noteworthy result is that the breeding colonies are of similar distances apart, between 130 km and 140 km, and all are situated in the south, removed from any urbanization or settlement. Although the species breeds colonially in some areas, there were also many reports of isolated nests in these provinces. These two breeding strategies help maintain the widespread distribution of the White-crowned Pigeon in western Cuba. The breeding

Fig. 4. Current breeding areas of the White-crowned Pigeon in the western region of Cuba.

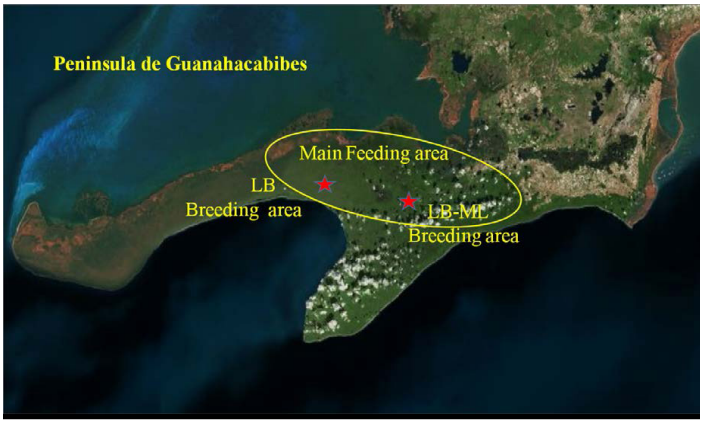

Fig. 5. White-crowned Pigeon breeding colonies and feeding areas in the west of Pinar del Rio province from 2006 to 2014. (LB: La Bajada; LB-ML: site near the town of Manuel Lazo).

colony from La Bajada on Guanahacabibes Peninsula was estimated to be 5,000 nesting pairs; the other nesting colony noted in this area, between La Bajada and the town of Manuel Lazo, was smaller, with approximately 3,000 nesting pairs (R. Varela and J. A. Camejo pers. comm.). Both colonies used an extensive area for feeding (Fig. 5). To the west, individuals foraged in the semi-deciduous forest and coastal vegetation of Guanahacabibes National Park. In the east, they frequently used several areas for feeding, including the nearby areas of Uvero Quemado, the south of the Del Valle Community, the south of La Jarreta in the Dagame trail, and the Limon area. White-crowned Pigeons were common throughout the year in the Guanahacabibes Peninsula, a protected area where the ecosystems are well-preserved and food is abundant during all seasons.

Due to difficulties in accessing the nesting colony in the Cayos Los Indios area, west of Isla de la Juventud, we monitored movements to feeding sites in only two localities of southern Isla de la Juventud (Fig. 6). Two areas were heavily used by the species, one in San Pedro river mouth (Siguanea inlet) and the other in Punta Frances National Park, in the extreme southwest of the island. Surveys showed an increase in the population starting in March, with a peak in May (Fig. 7). The majority of observations occurred near the San Pedro River, because all the individuals entering or leaving the semi-deciduous forest in the protected area in the south of the island flew across this river to the nesting colony. In July and August, two factors may have reduced the number of White-crowned pigeons surveyed in the San Pedro River. One is that the nesting period may have ended by June; the other is that there may have been less food available. Information gleaned from our interviews suggests that, after breeding, White-crowned Pigeons fly to the north of the island, outside the forest areas, and feed more frequently on royal palm fruit. Until 2010, the species was hunted in these areas of Isla de la Juventud, and an annual hunting competition was organized every September and October based on the wide distribution of the species over these areas during the non-breeding season.

Fig. 6. White-crowned Pigeon breeding colony in Cayos Los Indios and main feeding grounds from 2006 to 2014.

In Matanzas province, we found the colonies that have undergone the most change. The original colony, located in the northern Zapata Swamp near Jagüey Grande, was gone. Due to deforestation and human predation, the number of birds was reduced and eventually the species was extirpated. Information obtained during this project revealed that there is a new White-crowned Pigeon breeding colony in southern Cayo Traviesa, south of Zapata Swamp (Fig. 8). The birds from this colony use Macurije and San Lázaro on the mainland as feeding areas. Macurije and San Lázaro have well-preserved semi-deciduous forests, and were the same feeding grounds for the species when the Jagüey Grande colony was active. We should emphasize that many birds use the nearby cays as feeding sites (Cayo Matias, Cayo Hicacos, Cayo Rosario, Cayo Largo, etc.), but the main communities there are in coastal vegetation, where the White-crowned Pigeon feeds mainly on hicaco (*Chrysobalanus icaco*).

Future Priorities

The largest nesting populations of White-crowned Pigeon in the Caribbean region may still be found in Cuba, but knowl-

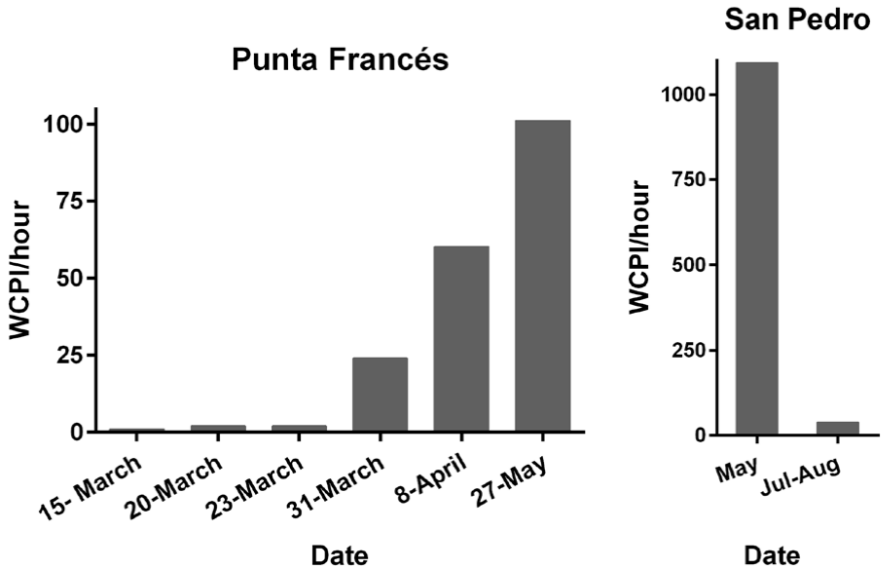

Fig. 7. Surveys of White-crowned Pigeon (birds observed/hr) in Punta Frances National Park (left) and San Pedro river mouth (right) in 2014.

edge gaps and logistical challenges make a comprehensive assessment of its current population status extremely difficult. In western Cuba, two of the four main breeding colonies are in the westernmost portion of the mainland (which is more accessible for conducting research),with an estimated 8,000 nesting pairs combined. The other two—possibly the largest colonies, based on interview results—are situated in cays in the south: Cayos Los Indios (12 km from Isla de la Juventud and 30 km from the nearest marina) and Cayo Traviesa (56 km from the mainland). Neither breeding population size nor possible threats have been properly evaluated at these two sites in recent years, and the fact that they are situated in cays makes accessibility difficult and very expensive. The four colonies are located in protected areas that are within 50 km of potential feeding habitats. However, it is critical that nesting, natal dispersal, and foraging habitats associated with these colonies be evaluated in the near future. Legal hunting no longer imposes pressure on White-crowned Pigeon populations in Cuba, but the impact of local illegal shooting is not well known. Disturbance at nesting sites caused by poaching of eggs and nestlings should also be quantitatively assessed, as it is a potential threat in both colonies. Furthermore, a greater effort should be made to educate fishermen and other people with access to these cays about the negative impacts of poaching.

Fig. 8. Current White-crowned Pigeon breeding colony in Cayo Traviesa, south of Zapata Swamp.

Acknowledgments

We wish to express our appreciation to the following people who contributed with information or logistic support: Roberto Varela (Guanahacabibes), Jose Alberto Camejo (Guanahacabibes), Zaimiuri Hernández (Cayos San Felipe), Rodolfo Castro (Sur de Los Palacios), Lázaro Cotayo (Ciénaga de Zapata), Lázaro Viñola (Ciénaga de Zapata), Anmary Rodriguez (Center for Marine Research), all participants in the interviews, and Alienys Gonzalez and Ianela Garcia for their help with figures and maps respectively. Ken Meyer had the patience to review our English, we are very grateful for his contribution to improve the text. Many thanks to the SPAW-RAC for its financial support of this research.

Author Information

[1]Faculty of Biology, University of Havana, Calle 25 entre J e I Vedado, Ciudad Habana, Cuba; [2]e-mail:macosta@fbio.uh.cu; [3]e-mail:lmugica@fbio.uh.cu

Literature Cited

Aguilar, S. (ed.). 2010. Áreas Importantes para la Conservación de las Aves en Cuba. Editorial Academia, La Habana, Cuba.

Arendt, W.J., T.A. Vargas Mora, and J.W. Wiley. 1979. White-crowned Pigeon: status range-wide and in the Dominican Republic. Proceedings of the Annual Conference of the Southeastern Association of Fish and Wildlife Agencies 33:111–122.

Bancroft, G.T. and R. Bowman. 2001. White-crowned Pigeon (*Columba leucocephala*). *In* The Birds of North America, no. 596 (A. Poole and F. Gill, eds.). The Birds of North America, Inc., Philadelphia, PA.

Bancroft, G.T., R. Bowman, R.J. Sawicki, and A.M. Strong. 1990. Relationship between the reproductive ecology of the White-crowned Pigeon and the fruiting phenology of tropical hardwood hammock trees. Nongame Wildlife Program technical report. Florida Game and Freshwater Fish Commission, Tallahassee, FL.

Bancroft, G.T., R. Bowman, and R.J. Sawicki. 2000. Rainfall, fruiting phenology, and the nesting season of White-crowned Pigeons in the Upper Florida Cays. Auk 117:416–426.

Barbour, T. 1923. The birds of Cuba. Memoirs of the Nuttall Ornithological Club no. 6.

Barbour, T. 1943. Cuban ornithology. Memoirs of the Nuttall Ornithological Club no. 9

Chamizo, R. and G. Fagundo. 1983. Importancia de las áreas del monte semicaducifolio sobre caliza de Jagüey Grande, para la reproducción de la Torcaza Cabeciblanca. Boletín Técnico Forestal 1:15–44.

Chamizo, R., E. Godínez, M. Padrón and A. Comas. 1984. Trofodinámica y características de la base alimentaria de la Torcaza Cabeciblanca (*Columba leucocephala*) en Cuba. Unpublished manuscript. Centro de Investigación Forestal, La Habana, Cuba.

Chamizo, R., R. Rodríguez, C. Marcos and E. Godínez. 1983. Aspectos de la reproducción de la Torcaza Cabeciblanca (*Columba leucocephala*) en cayos Los Indios, Isla de la Juventud. Revista Forestal Baracoa 13:65–82.

Collective of authors. 2014. Management plans of the Protected Areas of Cuba between 2009-2014. National Company for the Conservation of Flora and Fauna, Cuba.

Godínez, E. 1982. Inventarios de colonias de nidificación de *Columba leucocephala*. Revista Forestal Baracoa 12:75–80.

Godínez, E. 1985. Tamaño de muestra de la Torcaza Cabeciblanca (*Columba leucocephala*) para estudios biométricosy alimentariosen dos poblaciones de Cuba. Revista Forestal Baracoa 15(2):55–64.

Godínez, E. 1993. Situación de las poblaciones de *Columba leucocephala* (Aves: *Columbidae*) en Cuba entre 1979 y 1987. Editorial Academia, La Habana, Cuba.

Godínez, E., R. Chamizo, V. Fuentes and M. Rosales. 1983. Registros sobre el estado de la fauna cinegética; 1981 y 1982. Revista Forestal Baracoa 13:39–55.

Godínez, E., S. Vargas, A. Comas, G. Pérez, M. Rosales, V. Fuentes and M. Padrón. 1984. Registros sobre el estado de la fauna cinegética: 1983. Boletín Técnico Forestal 4:1–16.

Godínez, E. and V. Fuentes. 1987. Éxito reproductivo en poblaciones cubanas de Torcaza Cabeciblanca (*Columba leucocephala*). Reporte de Investigación del Instituto de Ecología Sistemática, Academia de Ciencias de Cuba 37:1–14.

Godínez, E., M. Gómez, J.A. Puentes and S. Vargas. 1987. Características reproductivas de la *Columba leucocephala* en la península de Guanahacabibes, Cuba. Poeyana 340:1–8.

Godínez, E. and L. Viñola. 1988. Comportamiento reproductivo de una colonia de nidificación de *Columba leucocephala* en Jagüey Grande, Matanzas. Revista Forestal Baracoa 18(1): 95–102.

Godínez, E. and D. Bridón. 1989. Riqueza de especies cinegéticas. *In* Nuevo Atlas Nacional de Cuba: Recursos Naturales. Academia de Ciencias de Cuba e Instituto Geográfico Nacional de España.

Godínez, E. and R. Oviedo. 1995. Fruits of jocuma (*Mastichdendrum foetidissimum*) as food item of pigeons at Zapata Swamp, Cuba. Pitirre 8:5.

González Alonso, H., L. Rodríguez Schettino, A. Rodríguez, C.A. Mancina and I. Ramos García (eds.). 2012. Libro Rojo de los Vertebrados de Cuba. Editorial Academia, La Habana, Cuba.

Herrera, C.M. 1981. Are tropical fruits more rewarding to dispersers than temperate ones? American Naturalist 118:896–907.

Vázquez, A. and E. Nieves. 1980. Aspectos de la reproducción de la Torcaza Cabeciblanca (*Columba leucocephala* Linneo) en la EFI Playa Larga. Tesis en opción al grado de Ingeniero Forestal. Centro Universitario de Pinar del Río,Pinar del Río, Cuba.

Veiga-Azcune, J.A. 1942. Anidando torcazas. Memorias de la Sociedad Cubana de Historia Natural "Felipe Poey" 16(1):57–60.

Wiley, J.W. 1979. The White-crowned Pigeon in Puerto Rico: status distribution and movements. Journal of Wildlife Management 43:402–413.

Wiley, J.W. and B.N. Wiley. 1979. The biology of the White-crowned Pigeon. Wildlife Monographs 64:3–54.

Cite this article as:

Acosta, M., and L. Mugica. 2019. A general assessment of White-crowned Pigeon (*Patagioenas leucocephala*) populations in western Cuba. Journal of Caribbean Ornithology 32:17–25. https://doi.org/10.55431/jco.2019.32.17-25