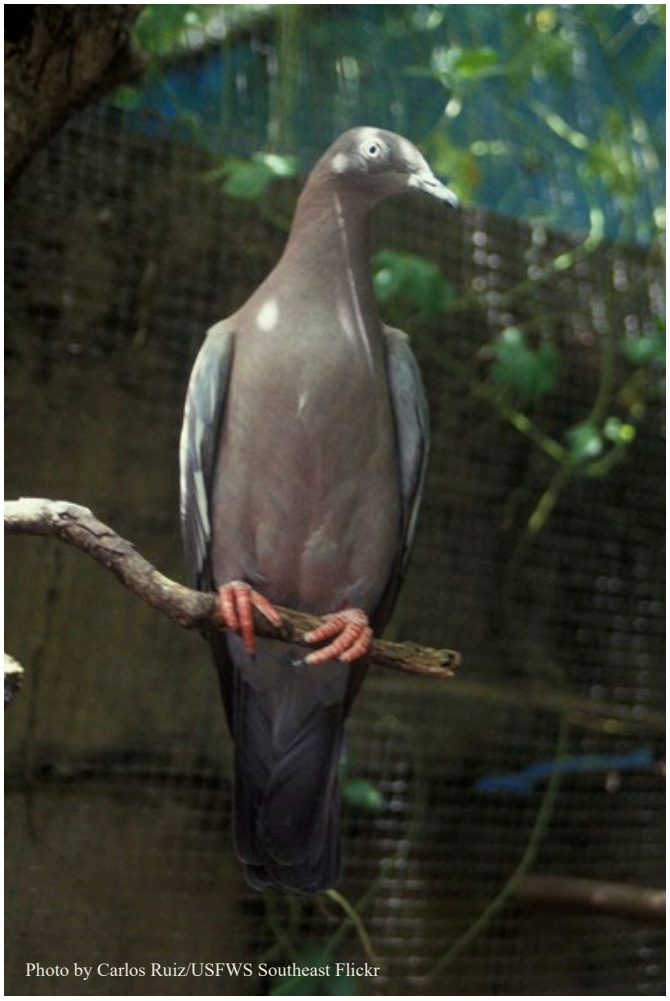
Puerto Rican Plain Pigeon or Paloma Sabanera (*Patagioenas inornata wetmorei*)

5-Year Status Review: Summary and Evaluation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U.S. Fish and Wildlife Service
Southeast Region
Caribbean Ecological Services Field Office
Mayagüez, Puerto Rico

August 2025

STATUS REVIEW
Puerto Rican Plain Pigeon or Paloma Sabanera
(*Patagioenas inornata wetmorei*)

GENERAL INFORMATION

Current Classification: Endangered

Lead Field Office: Caribbean Ecological Services Field Office, Mayagüez, Puerto Rico, caribbean_es@fws.gov

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Reviewers:
Lead Region: Atlanta Regional Office, Carrie Straight

Date of original listing: October 13, 1970 (35 FR 16047)

Methodology used to complete the review: In accordance with section 4(c)(2) of the Endangered Species Act of 1973, as amended (Act), the purpose of a status review is to assess each threatened species or endangered species to determine whether its status has changed and if it should be classified differently or removed from the Lists of Threatened and Endangered Wildlife and Plants. The U.S. Fish and Wildlife Service (Service) evaluated the biology, habitat, and threats of the Puerto Rican plain pigeon (plain pigeon; *Patagioenas inornata wetmorei*, previously known as *Columba inornata wetmorei*) to inform this status review.

We announced the initiation of this review in the Federal Register on May 11, 2023 (88 FR 30324) with a 60-day comment period and received no comments. The primary sources of information used in this analysis were the 1970 final listing rule (35 FR 16047), the 1982 recovery plan (Service 1982), peer-reviewed literature, agency reports, unpublished survey data and reports, reports from an ongoing project monitoring the breading activity of the species, and personal communication with recognized experts. All recommendations resulting from this review are the result of thoroughly reviewing the best available information on the Puerto Rican plain pigeon.

FR Notice citation announcing the species is under active review:
May 11, 2023; 88 FR 30324

Species' Recovery Priority Number at start of 5-year review (48 FR 43098): 3c. The Puerto Rican plain pigeon is a subspecies with a high degree of threat and high recovery potential. The "c" indicates conflict with development activities.

Review History:
Two previous five-year reviews were signed in 2011 and 2019 (Service 2011, 2019). These reviews recommended no status change.

REVIEW ANALYSIS

Listed Entity

Taxonomy and nomenclature

In the 2011 5 -year status review, we presented information indicating the New World pigeons formerly included in the genus Columba were placed under the genus *Patagioenas* Reichenbach, 1853 (Banks et al. 2003, Service 2011). Thus, while the Puerto Rican plain pigeon was listed as *Columba inornata wetmorei*, it is now recognized as *Patagioenas inornata wetmorei*. This taxonomic change has been accepted by the scientific community (Integrated Taxonomic Information System 2011). The updated nomenclature was accepted and published in the 7th edition of the American Ornithologists' Union's (AOU, now recognized as American Ornithological Society (AOS)) Checklist of North American birds (1998, as amended through 2021) and continues to be accepted in the 2024 checklist (Chesser et al. 2024). The correction to the scientific name was then formalized by the Service in a final rule with an effective date of August 30, 2023 (Service 2023).

Distinct Population Segment (DPS)

The Act defines species as including any subspecies of fish or wildlife or plants, and any distinct population segment of any species of vertebrate wildlife. This species was not listed as a DPS, and we have no new information that would indicate the species should be listed as a DPS under the Service's 1996 DPS Policy.

Recovery Criteria

Recovery Plan

Puerto Rican Plain Pigeon Recovery Plan, October 14, 1982 (Service 1982).

Recovery plans are not regulatory documents and are intended to provide guidance to the Service, States, and other partners on methods of minimizing threats to listed species and on criteria that may be used to determine when recovery is achieved. If the recovery criteria defined in the plan are still valid, meeting recovery criteria can indicate that the species no longer requires protections under the Act. However, when recommending whether a listed species should be delisted, the Service must apply the factors in section 4(a) of the Act (84 FR 45020).

The recovery plan establishes that the Puerto Rican plain pigeon could be considered for delisting when the following three criteria are met:

1. Achieve a minimum of two, distinct, wild Puerto Rican plain pigeon populations, each consisting of at least 250 nesting pairs (5-year average).
2. Secure most of the existing Puerto Rican plain pigeon habitat of the Cidra-Cayey population.
3. Commit the Río Abajo Commonwealth Forest or its equivalent as a reintroduction and management site for a second, disjunct population of plain pigeons.

None of the above delisting criteria have been met.

Biology and Habitat Summary

The Puerto Rican plain pigeon is a habitat generalist that often behaves as a forest edge species, frequently nesting, foraging, and roosting in trees near roads in the municipalities of east-central Puerto Rico including Aguas Buenas, Aibonito, Barranquitas, Bayamón, Caguas, Cayey, Cidra, Comerio, Guayama, Gurabo, Juncos, Naranjito, and San Lorenzo (Figure 1; Rivera-Milán et al. 2003a). The species inhabits areas of secondary forest (e.g., gallery forests), is known to cross agricultural and urban areas on its way to foraging or roosting sites, and is also frequently observed on dairy farms and croplands, where it supplements its diet with grass seeds and grain residues from agricultural activities (Pérez-Rivera and Collazo-Algarín 1976, Ruiz-Lebrón et al. 1995, Rivera-Milán et al. 2003a). The plain pigeon prefers mature secondary forest for both breeding and roosting, often near streams or rivers with dense vegetation (Pérez-Rivera 1978). Nests are typically built on bamboo branches, vines, or tree branches (e.g., mango trees (*Mangifera indica*)). The plain pigeon has not been found nesting outside of east-central Puerto Rico, which is considered the core range of the species (Figure 1; Pérez-Rivera and Collazo-Algarín 1976, Rivera-Milán 2001).

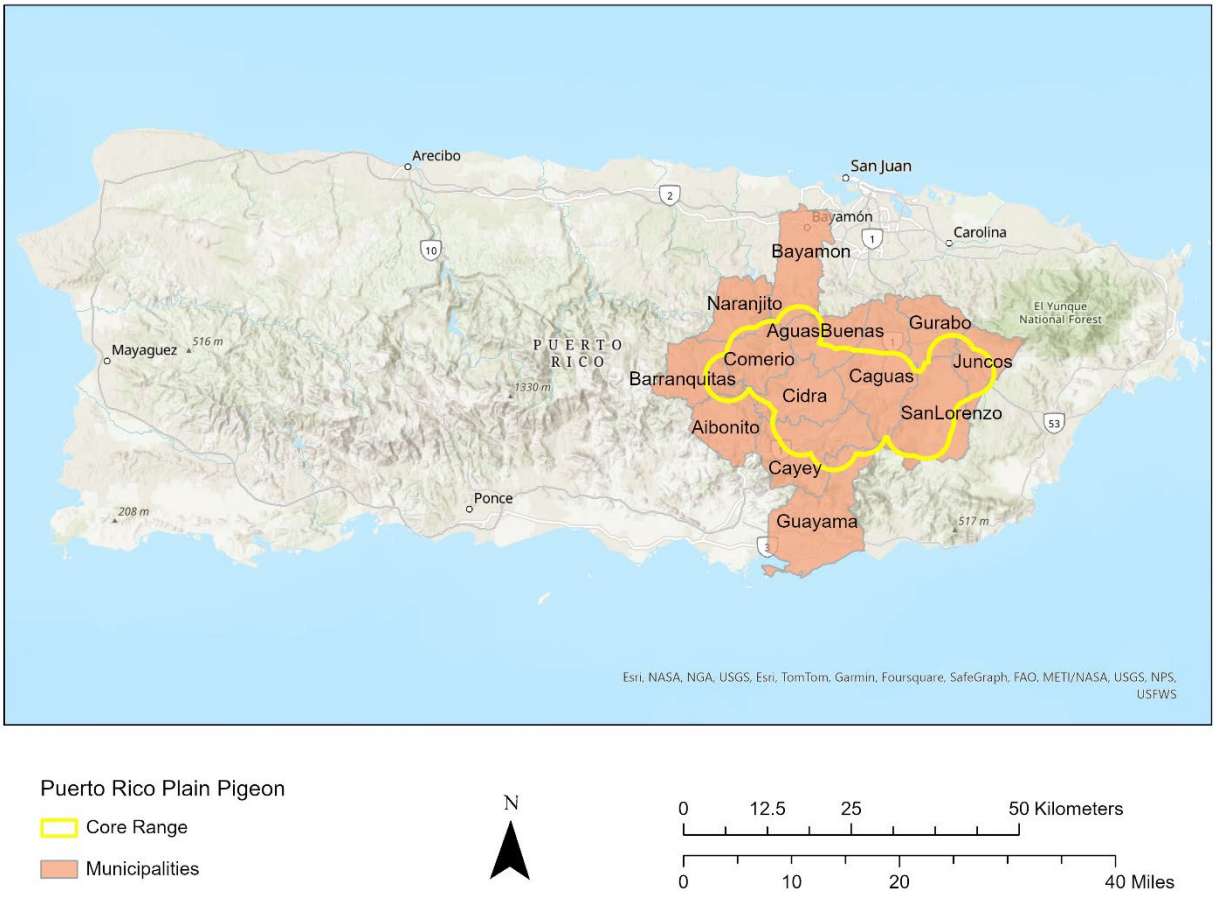

Figure 1. Core range of the Puerto Rican plain pigeon and associated municipalities (https://ecos.fws.gov/ecp/species/7955).

Widespread deforestation for agriculture in Puerto Rico beginning during the early 19th century, probably along with unregulated hunting, and increased nest predation in remnant forests, led to a substantial Puerto Rican plain pigeon population decline by the early 20th century (Service 1982, Rivera-Milán et al. 2022).

Estimates of Population Size

Population sizes of Puerto Rican plain pigeon has fluctuated in time, a list of estimated population sizes through time can be found below.

- **1963: approximately 52 individuals** were documented in the municipality of Cidra (Service 1982).
- 1980s-to 1990s: As agriculture and pasturelands were abandoned, second-growth forests recovered, increasing the quantity and quality of foraging and nesting habitat led to a positive population response, increasing from low numbers in the 1980s until the late 1990s (Rivera-Milán et al. 2003a, 2003b), although a population decline was observed in 1990 following the passage of hurricane Hugo in 1989.
- **1990: 1,534 (±571) individuals** following Hurricane Hugo in 1989 (Rivera-Milán 2001, Service 2011).
- **1998: 31,289 (±9,816) -** peak population levels (Rivera-Milán 2001, Service 2011).
- **1999: 11,350 (±5,828) individuals**, after the impact of Hurricane Georges in 1998 (Rivera-Milán 2001, Service 2011).
- **2001: 17,792 (±5,522) individuals** (Rivera-Milán 2001, Service 2011). Rivera-Milán (2011) stated that conservation and management of remaining forests and abandoned pastures are essential for the species' survival, and the observations of plain pigeons in the northern karst region suggested the species may be nesting outside its traditional range (i.e., east-central Puerto Rico).
- **2002-2017:** population fluctuation in east-central Puerto Rico between a peak abundance of **12,100 (±4,235)** individuals in 2002, and **4,257 (±1,822)** individuals in 2017 (Rivera-Milán et al. 2022).
- **September 2017: 550 (±110) individuals** in this same area as surveyed earlier in the year following the impacts of hurricanes Irma and María in September 2017 (Rivera-Milán et al. 2022). Hurricane María resulted in the lowest Puerto Rican plain pigeon population decline since monitoring of the species began in 1986 (Rivera-Milán et al. 2022). A rapid assessment following Hurricane María in five municipalities in east-central Puerto Rico (i.e., Aibonito, Aguas Buenas, Cayey, Cidra, and Comerío) revealed a decline in plain pigeon detections by more than 50% (15-17 individuals) compared to a pre-hurricane average of 50 or more individuals (Vilella and Weitzel 2018). While this assessment may not fully account for the status of the species before and after the hurricane due to the lack of data adjustment for changes in detection probability (Rivera-Milán, Service, 2018b, pers. comm.), these results strongly suggest the Puerto Rican plain pigeon did suffer a post-hurricane abundance decline.

  Following Hurricane María, 10 Puerto Rican plain pigeons were observed in a private property in the municipality of San Germán in southwestern Puerto Rico (Martínez-Muñoz, PRDNER, 2018, pers. comm.), suggesting those individuals were likely in search of food after the storm devastated the east-central area of the Island. Through time, food abundance has been a key predictor of nest density changes in columbids, including the

plain pigeon (Rivera-Milán 2001), and catastrophic events like Hurricane María (and as seen with declines after other hurricanes) likely reduced the availability of critical resources, impacting the species' demographic rates.

- 2018-2021: Surveys conducted from 2018 to 2021, indicated the Puerto Rican plain pigeon continued to decline, facing the risk of a prolonged bottleneck that could lead to its extinction (Rivera-Milán et al. 2022). In a recent study, Rivera-Milán et al. (in review) found that the species still has not recovered from the effects of Hurricane María.
- April-June data 2018-2024: 1,097 (±455) individuals island-wide (Rivera-Milán et al. in review).
- **April-June 2024: 407 (±125) individuals** in the core range of the species in east-central Puerto Rico (Rivera-Milán, Service, 2024, pers. com).

Reproductive / Breeding Data

Rivera-Milán et al. (in review) found that the Puerto Rican plain pigeon could eventually reach self-sustainable levels, but again emphasized it is currently experiencing a prolonged bottleneck, and the species could become extinct if its reproduction remains low, anthropogenic disturbances continue, and another major hurricane strikes the Island during the next decade. Moreover, they found the plain pigeon has the lowest maximum population growth rate (r_{max}) among all the resident columbids in Puerto Rico, except for the quail-doves (*Geotrygon* spp.), meaning the species has lower resiliency than the other columbid species (Rivera-Milán et al. (in review). All these constraints are exacerbated by the fact that the species has a clutch size of one egg, which limits its reproduction or recovery after a catastrophic event.

Until recently, the most recent breeding information on the Puerto Rican plain pigeon was from the 1990s (Service 2011, Rivera-Milán et al. 2003b). Between 1986 and 1999, 377 nests were monitored in the municipalities of Aguas Buenas, Caguas, Cayey, Cidra, and Comerío, with an average of 0.5 fledglings per nest, and overall nest survival rates of 40 percent during the nesting period, 63 percent during incubation, and 66 percent during the nestling period (Rivera-Milán et al. 2003b). Protection from hunting, poaching, and the recovery of second-growth forest during the late 20th century likely contributed to the improved survival of the species (Rivera-Milán et al. 2003b).

Unfortunately, no substantial or consistent breeding data was collected during the next two decades until 2020, when the Service partnered with the NGO Effective Environmental Restoration, Inc. to resume breeding monitoring efforts in the core range of the Puerto Rican plain pigeon in east-central Puerto Rico (EER 2022, 2023, 2024).

- February and July 2021, 44 plain pigeon individuals at five localities, with nine nests recorded in the municipalities of Comerío, San Lorenzo, Caguas, and Cidra (Table 1). Despite that only two fledglings were documented, nesting activity indicated the species has continued using these areas (EER 2022).
- In 2022, 39 individuals and seven nests were documented, but only one nest successfully fledged a chick (Table 1; EER 2023). While fewer nests were observed, Puerto Rican plain pigeon activity in the area suggested that additional nests may have been missed due to dense canopy cover (EER 2023).
- In 2023, a total of 42 plain pigeon individuals and 10 nests were documented, of which 6 successfully fledge a chick (Table 1; EER 2024).

It is important to note that nest searches were conducted in urbanized rural areas and no systematic nest searches were conducted in less accessible areas (e.g., second-growth forests in mountainous, rugged terrain). Therefore, there is the possibility of underestimating the abundance of plain pigeon nests and probably its reproductive success in areas with lower density of predators like rats and pearly-eyed thrashers.

Table 1. Minimum and maximum number of Puerto Rican plain pigeons observed, and number of nests and nest success documented by Effective Environmental Restoration, Inc. per location from February to July 2021, January to July 2022, and January to July 2023 (EER 2022 and 2023). Total Survey Visits = number of times each site was visited to conduct observations; Number of Nests with a Fledgling is a measure of nest success or number of nests that successfully fledged one young.

Year	Location	Minimum Number of Individuals Observed	Maximum Number of Individuals Observed	Total Survey Visits	Number of Nests	Number of Nests with a Fledgling
2021	Caguas (Bairoa)	1	9	8	0	0
2021	San Lorenzo	1	8	9	2	1
2021	Caguas (Borinquen)	1	14	11	3	0
2021	Comerio	1	10	22	3	1
2021	Cidra	1	3	2	1	0
Total in 2021		*5*	*44*	*52*	*9*	*2*
2022	Caguas (Bairoa)	0	2	2	0	0
2022	San Lorenzo	0	6	10	0	0
2022	Caguas (Borinquen)	1	12	20	3	0
2022	Comerio	0	13	25	4	1
2022	Cidra	1	6	8	0	0
2022	Aibonito	0	0	1	0	0
Total in 2022		*2*	*39*	*66*	*7*	*1*
2023	Caguas (Bairoa)	0	0	1	0	0
2023	San Lorenzo	0	7	8	0	0
2023	Caguas (Borinquen)	0	10	26	2	1
2023	Comerio	0	15	58	2	0
2023	Cidra	0	10	60	6	5
2023	Aguas Buenas	0	0	1	0	0
Total in 2023		*0*	*42*	*157*	*10*	*6*

Landscape changes such as the removal of important nesting trees contribute to the reduction in plain pigeon nesting habitat. In addition, free-roaming domestic cats (*Felis catus*), dogs (*Canis lupus familiaris*), and green iguanas (*Iguana iguana*), which are species that could disturb nesting or injure / kill individuals, were commonly observed in nesting areas (EER 2022, 2023; see Threats section below). Furthermore, despite some community outreach efforts by Effective

Environmental Restoration, Inc., interviews with local residents revealed that many were still unaware of the presence of the Puerto Rican plain pigeon in their neighborhoods, which could lead to unintentional disturbances during the breeding season, further exacerbating the challenges faced by this endangered species (EER 2024). These ongoing challenges underscore the importance of increased conservation efforts and community engagement to ensure the species' survival.

Other Relevant Information

We developed a species distribution model using bioclimatic variables (MaxEnt software and 30-arcsecond-resolution; Figure 2) as a tool to predict areas where the Puerto Rican plain pigeon is likely to occur (Phillips et al. 2006). The species' occurrence data were compiled from the Global Biodiversity Information Facility's repository (GBIF.org 2025), filtered to include only expert-validated records, and supplemented with recent confirmed locations (EER 2022, 2023, 2024). As predictor variables, we used the 19 standard bioclimatic layers and elevation data from the WorldClim database (Fick and Hijmans 2017), which reflect biologically relevant gradients in temperature and precipitation that are known to shape species distributions. The model estimates habitat suitability by comparing the environmental characteristics of known plain pigeon occurrence points to those available across the entire study area.

We categorized habitat in four classes: high-suitability areas (4,225 ha, darkest-red areas in Figure 2) - those that are most likely to support the species, moderate-suitability areas (36,873 ha, orange areas) - those that have a slightly lower probability of species occurrence, and moderate-low suitability areas (67,457 ha, yellow areas) – areas with a reduced but still feasible probability for the species occurrence (Figure 2). Areas in blue represent the lowest suitable habitat, where the probability of plain pigeon occurrence is very low. By identifying these suitability areas, resource managers can focus recovery efforts on high-probability sites to maximize the species' long-term viability.

As expected, most of the high-suitability habitat lies in the east-central region of Puerto Rico, which aligns with the plain pigeon's core range and highlights areas to maximize recovery benefits to the species. However, it is important to note that habitat suitability was not defined based on habitat or conditions that result in the highest reproductive success of the species. This could result in higher suitability in more continuous forest fragments than the highly fragmented degraded forests at the species' center of abundance, confounding abundance with nesting success. The model also identifies potentially suitable habitat beyond the plain pigeon's current range, providing opportunities for habitat restoration and future reintroduction efforts. This distribution map can also be used to refine the distance-sampling survey design for the species (e.g., adding point counts to "suitable" habitat areas) and including abundance of the species as a function of covariates.

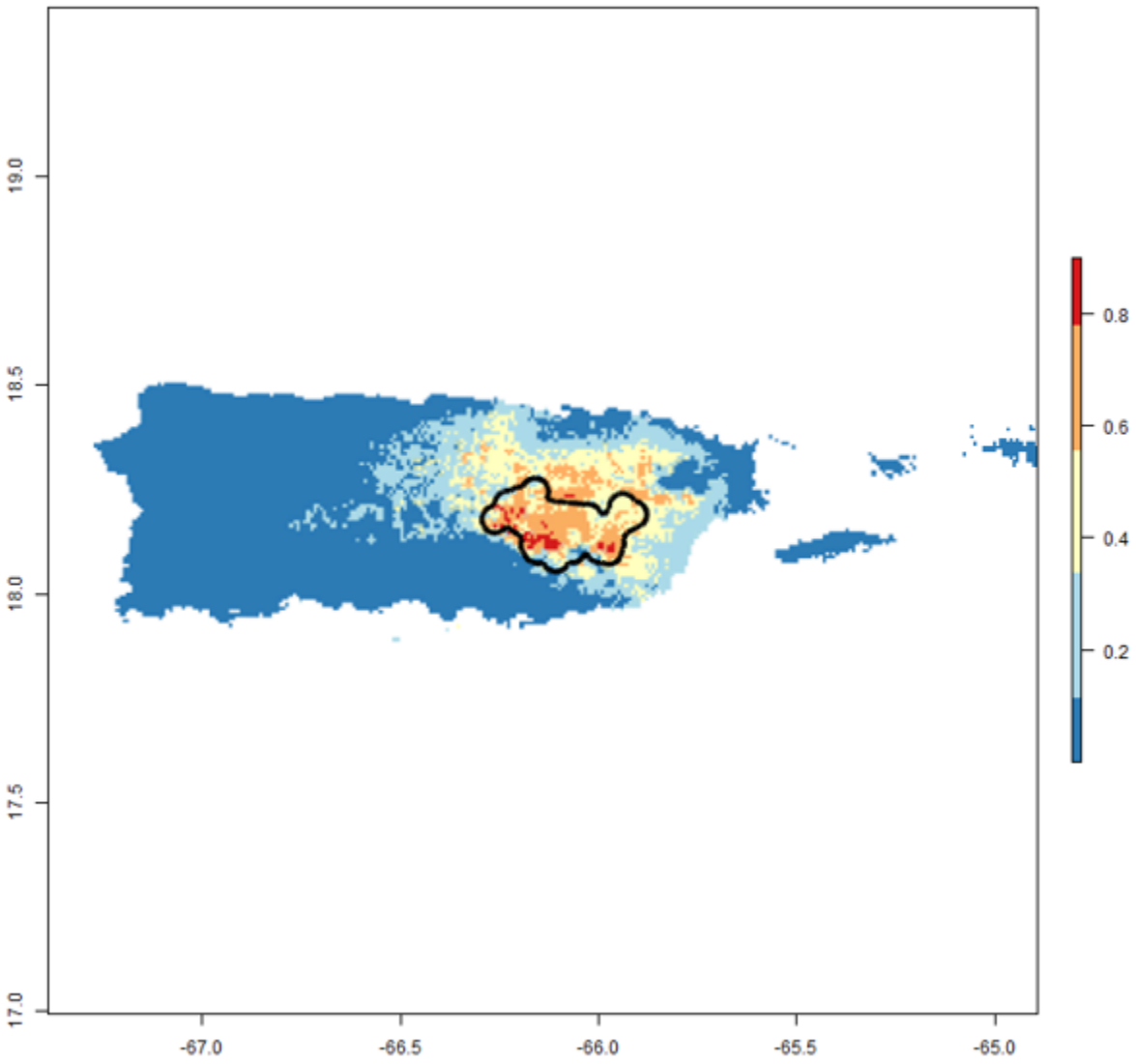

Figure 2. Predicted suitable habitat for the Puerto Rican plain pigeon. Warmer colors (red to yellow) indicate areas with higher predicted habitat suitability, while cooler colors (blue) represent areas of lower predicted suitability. The black polygon outlines the current known range of the species. Habitat suitability was modeled using bioclimatic variables at a spatial resolution of 30 arc seconds (approximately 1 km² per pixel); each pixel contains a unique combination of bioclimatic and elevation values used to estimate local habitat suitability.

Threats (Five-Factor Analysis) Summary

The status of a species is determined from an assessment of factors specified in section 4 (a)(1) of the Act. A detailed review of the species' threats can be found in the previous 5-year status reviews (Service 2011, 2019) and in the recovery plan (Service 1982) of the species. A summary of current threats is detailed below.

A. The present or threatened destruction, modification, or curtailment of its habitat or range

Habitat destruction and fragmentation remain as a threat to the Puerto Rican plain pigeon. Both public and private protected lands may help conserve some habitat in Puerto Rico (Catro-Prieto et al. 2016), but most of the Puerto Rican plain pigeon's breeding population occurs on private lands (Rivera-Milán et al. 2003b). Unprotected areas remain a concern as those lands can be impacted by future development as evidenced by the urban sprawl over the past several decades (Martinuzzi el at. 2007, Castro-Prieto et al. 2016). Moreover, following Hurricane María in 2017, the Puerto Rican plain pigeon population in east-central Puerto Rico experienced a drastic decline largely due to habitat destruction caused by the hurricane (Rivera-Milán et al. (in review)).

The Puerto Rican plain pigeon exhibits some degree of site fidelity (Conservation Planning Specialist Group 1989). Therefore, the removal of historically used nesting habitat could impact the species' breeding behavior and reduce the likelihood of returning to those areas in subsequent seasons. An example of a localized habitat impact was documented during the 2023 breeding season in the municipality of Comerío, when a *Terminalia buceras* tree that had used by the plain pigeon for nesting during the 2022 breeding season was cut down (EER 2024). This event coincided with a decrease in Puerto Rican plain pigeon nesting activity in that area, suggesting how habitat modification or removal can impact the species nesting behavior (EER 2024). In fact, cutting of tree branches supporting nests has been identified as one of the most common cause of human induced disturbance to plain pigeons (Rivera-Milán et al. 2003b).

Based on the above discussion, habitat destruction, modification, or curtailment continue to threaten the survival and recovery of the Puerto Rican plain pigeon, which coupled with habitat impacts caused by catastrophic weather events such as hurricanes, exacerbate the species' population decline.

B. Overutilization for commercial, recreational, scientific, or educational purposes

There is no evidence that the species is being overutilized for commercial, recreational, or educational purposes.

C. Disease or predation

Predation. Plain pigeons are commonly known to nest in fragmented areas close to human activity where predators like dogs, cats, and rats (*Rattus* spp.) are abundant, making their control difficult and expensive in the long term (EER 2019, 2022). These potential predators may disturb adults changing their natural behaviors and, in some cases, kill individuals or destroy nests. For example, dogs and cats have been documented near plain pigeon nesting areas, particularly a cat was observed foraging near the plain pigeon nest (EER 2022 and 2023). The invasive green iguana has been identified as a potential threat to the Puerto Rican plain pigeon. During the 2021-2023 breeding seasons, Effective Environmental Restoration, Inc. found green iguanas crawling on trees with active plain pigeon nests and even sitting as close as about four feet from a plain pigeon nest, leading to the conclusion that nests failures were likely caused by the constant presence of green iguanas near the nests (EER 2022, 2023, 2024). In second-growth forest, Rivera-Milán et al. (2003b) found that predator density had a significant negative

relationship with plain pigeon nesting success and fledgling production and, in fact, was the main reason for nesting failure during their study.

Based on opportunistic observations, Rivera-Milán et al. (2003b) concluded that pearly-eyed thrashers (*Margarops fuscatus*) were the most important plain pigeon nests predators. During the 2022 breeding season, Effective Environmental Restoration, Inc. documented a pearly-eyed thrasher harassing a nesting plain pigeon in east-central Puerto Rico, while the pigeon seemed to ignore the attacks, during a subsequent visit the nest had been abandoned (EER 2023).

Red-tailed hawks (*Buteo jamaicensis*) are another predator that may have impacts on the Puerto Rican plain pigeon population. For example, red-tailed hawk predation was one of the main reasons for unsuccessful reintroduction efforts of captive-bred plain pigeons during the mid-1990s (Ruiz-Lebrón et al. 1995). Furthermore, Rivera-Milán et al. (2022) suggested that due to red-tailed attacks on wild plain pigeons and scaly-napped pigeons (*Patagioenas squamosa*), the pigeons tended avoid areas with no or limited vegetation cover and medium to high hawk density. They also found that plain pigeon detections and occupancy were higher in absence of red-tailed hawks.

Other documented predators on eggs and young pigeons include red-legged thrushes (*Turdus plumbeus*), yellow-crowned night herons (*Nyctanassa violacea*), black-crowned night herons (*Nycticorax nycticorax*), and green herons (*Butorides virescens*) (Pérez-Rivera 1978, Ruiz-Lebrón et al. 1995, PRDNER 1999 and 2000, Rivera-Milán et al. 2003b).

Because the nesting activity of plain pigeon appears to be limited to east-central Puerto Rico, predation in key areas can adversely affect reproduction of the species, hence, reduce the plain pigeon capacity to self-sustain the population in the absence of immigration of individuals from other areas outside east-central Puerto Rico (Rivera-Milán et al. 2003b).

Disease/Parasitism. In terms of disease, parasitism by the warble fly (*Philornis pici*) was documented by Pérez-Rivera and Collazo-Algarín (1976). In their study, 42 percent of 36 captive-reared nestlings were infected with warble fly larvae (Pérez-Rivera and Collazo-Algarín 1976). Infestations of the trematode *Tanaisia bragai* have also been documented in captive birds, although their effect on wild plain pigeon populations remains unknown (Arnizaut et al. 1991). *Chlamydia* infections were detected in wild-caught plain pigeons between 1995 and 1996, but no mortality was reported (Pérez-Rivera and Ruiz-Lebrón, unpubl. Data, Service 2011). Despite historical accounts of parasitism by warble fly and *Chlamydia* infections, there are no recent studies evaluating whether these diseases continue to pose a threat to the Puerto Rican plain pigeon in the wild.

D. Inadequacy of existing regulatory mechanisms

The Puerto Rican plain pigeon is protected by both Federal and Commonwealth laws and regulations. Under the Endangered Species Act and Migratory Bird Treaty Act, listed bird species, their parts, nests, or eggs may not be possessed, imported, exported, exchanged, or offered for sale without a valid permit. In 1999, the Commonwealth of Puerto Rico approved the Law No. 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; declare property of Puerto Rico all wildlife species within its jurisdiction, and regulate permits, hunting activities, and exotic species, among other activities. In 2004, Puerto Rico Department of Natural and Environmental Resources approved the "Reglamento para Regir el Manejo de las Especies Vulnerables y en Peligro de Extinción en el Estado Libre Asociado de Puerto Rico" (Reglamento 6766; DRNA 2004a) to regulate management of threatened and endangered species in Puerto Rico. The Puerto Rican plain pigeon was included in the list of protected species under Regulation 6766 and designated as endangered. Under Article 2.05, this regulation prohibits to possess, hunt, kill, or damage, among other activities, any animal listed as threatened or endangered within the jurisdiction of Puerto Rico.

While these regulations provide a strong framework for protecting the species, enforcement remains a challenge, especially on private lands, where ongoing habitat impacts continue to fragment foraging and nesting habitat and causing localized damage such as cutting of trees and branches supporting nests (Rivera-Milán et al. 2003b, EER 2022, 2023). Illegal hunting also was identified as a potential threat to the Puerto Rican plain pigeon (Rivera-Milán et al. 2016). Although there is no data about the number of plain pigeons illegally hunted each year, Rivera-Milán et al. (2016) suggested that an increase in illegal hunting of the Puerto Rican plain pigeon might be responsible for some of its abundance decline during 2008-2014 and projected that population sustainability of this species might be affected by illegal hunting. Certainly, illegal hunting data is necessary to better address this potential threat to the species.

While Federal and Commonwealth laws provide protections to the Puerto Rican plain pigeon, their practical enforcement, particularly on unprotected lands, remains inadequate to fully mitigate the effects of habitat loss and degradation and has the potential to prevent the recovery of the species.

E. Other natural or manmade factors affecting its continued existence

Hurricanes. Hurricanes are a significant, ongoing threat to the Puerto Rican plain pigeon. Hurricane María caused over 90% loss of vegetation in several municipalities (Feng et al. 2018, Hu and Smith 2018), severely reducing habitat availability and negatively impacting pigeon reproduction (Vilella and Weitzel 2018, Rivera-Milán et al. (in review)). The combination of habitat loss and direct mortality of individuals from the storm's high winds and rain, and other factors has placed the species in a prolonged bottleneck, with low reproductive success since the hurricane (Rivera-Milán et al. (in review)). Moreover, climate models predict that hurricanes will become more frequent and intense, posing an ongoing threat to the survival of the species (Runkle et al. 2022, Intergovernmental Panel on Climate Change 2023). The plain pigeon pigeon's small population size and limited distribution make it particularly vulnerable to such natural disasters, compounding the challenges posed by human-induced habitat change.

Historically, hurricanes have destroyed nesting habitat and stripped trees of fruit and seeds, potentially starving surviving adult and young pigeons (Pérez-Rivera 1990, PRDNER 2000, Rivera-Milán et al. 2003b). Despite this, the Puerto Rican plain pigeon has shown some resilience, successfully reproducing following forest regeneration and increased food availability after hurricanes, as demonstrated after Hurricane Georges in 1998. Following this hurricane, population densities initially remained low but recovered in 2000-2001 (Rivera-Milán et al.

2003a). However, the short-term survival of the species after hurricanes depends largely on its ability to disperse and find food (Rivera-Milán et al. 2003b). In some cases, hurricanes may even act as dispersal agents, moving Puerto Rican plain pigeons away from their main distribution area in the east-central region of the Island, as was observed after Hurricane Georges, when plain pigeons were reported in western Puerto Rico in Mayagüez, Aguadilla, and Cabo Rojo, and San Germán after Hurricane María (PRDNER 1999, Martínez-Muñoz, PRDNER, 2018, pers. comm.). The species has not been recently observed in these municipalities, indicating that such dispersal events may be temporary. Unfortunately, the plain pigeon was at low numbers before Hurricane María (2017), and still it has not recovered from the severe decline suffered after Hurricane María. As previously discussed, the low reproductive capacity (one egg per clutch) slows the Puerto Rican plain pigeon's ability to rebound from population declines. These conditions coupled with other additive effects like predation and other anthropogenic disturbances may be keeping the species below self-sustainable levels (Rivera-Milán et al. (in review)).

Competition. Competition with the scaly-napped pigeon has also been considered a potential natural threat. Although both species share similar nesting sites and diets (Pérez-Rivera 1978), long-term data suggest that the densities of the two species are positively correlated, and that competition is not a significant factor limiting the Puerto Rican plain pigeon population (Rivera-Milán 2011, Rivera-Milán et al. 2022). Instead, both species appear to respond similarly to environmental conditions, particularly food abundance, rather than directly competing for resources. However, Effective Environmental Restoration Inc. (2023) documented scaly-napped pigeons trying to steal nest material from a plain pigeon nest. However, there is insufficient data to determine whether this type of competition is common or significant.

Human Activities. Another manmade factor that may affect the species is the unintentional killing during legal hunting of other pigeons and doves. The Puerto Rican plain pigeon is similar in size and appearance to the legally hunted scaly-napped pigeon, and as a result it may be mistakenly shot (Wetmore 1916, 1938). Although the plain pigeon is protected, and a hunting exclusion zone has been established throughout part of its range (DRNA 2004b), the Puerto Rican plain pigeon's tameness around humans, combined with its tendency to flock and nest near urban areas, increases the risk of poaching (PRDNER 2020). Nevertheless, there is a limited number of records regarding the poaching or unintentional killing of Puerto Rican plain pigeons (Wetmore 1916, Pérez-Rivera et al. 1994, PRDNER 2000).

Overall, hurricanes and nest predation are the most significant ongoing threats from natural or anthropogenic factors. While there is no recent evidence that unintentional killing, poaching, or human-caused disturbances are common, the increasing frequency and intensity of hurricanes along with nest predation resulting in low reproductive success, pose a significant risk to the recovery (resilience) of the Puerto Rican plain pigeon (Rivera-Milán 2011, Rivera-Milán et al. 2003b, Rivera-Milán et al. (in review)).

Synthesis

The Puerto Rican plain pigeon is a subspecies of plain pigeon, with its nesting concentrated in the east-central part of the island. It can be found in primary or secondary forest areas in close proximity to streams or rivers and also is frequently found in fragmented habitat along roads and

urban rural areas. Widespread deforestation for agriculture during the 19th century, along with hunting, predation, and hurricanes led to a substantial Puerto Rican plain pigeon population decline in Puerto Rico by the early 20th century. Population sizes fluctuated from highs of 31,000 to around 4,000 individuals in the first half 2017, when Hurricane María hit Puerto Rico in September of 2017. After Hurricane María, population estimates were around 550 individuals. Currently, the species is estimated at 407 individuals. The species remains threatened by habitat destruction and modification caused by anthropogenic activities. Also, predation and disturbance by native and non-native species (birds, cats, rats) reduces the plain pigeon's nesting success. Most recently, disturbance by invasive green iguanas has caused nest abandonment. In addition, the inadequacy of existing regulatory mechanisms may result in the illegal hunting and appears to remain inadequate to fully mitigate threats to the species. Catastrophic weather events such as hurricanes are a major threat to the Puerto Rican plain pigeon. The aftermath of Hurricane María led to a dramatic decline in the species' population, which exacerbated by anthropogenic disturbances and low reproductive capacity and success may lead the plain pigeon limit the species' recovery. Because of these ongoing and immediate threats and the limited number of individuals, we believe that the Puerto Rican plain pigeon continues to meet the definition of an endangered species.

RECOMMENDED FUTURE ACTIVITIES

The recovery actions and criteria presented in the Puerto Rican plain pigeon recovery plan (Service 1982) are basically obsolete and require updating based on current conditions of the species (e.g., population size, reproductive success, nest predations, habitat, etc.). We have identified following recovery activities in addition to the recommendations of the previous 5-year review:

Recovery Activities

- Develop predator removal efforts at nesting localities to increase reproductive success rates.
- Expand educational outreach and public engagement efforts to foster community support for Puerto Rican plain pigeon conservation efforts. Target audiences should include hunters.
- Implement habitat enhancement and protection on private lands through restoration projects and partnerships with landowners.
- Establish rapid response teams and develop restoration priorities to address immediate threats, and in the event of future catastrophic habitat destruction from natural disasters or illegal activities, to ensure rapid action can be taken to protect the species.
- Establish a team of experts to evaluate and prioritize proposed management activities using a structured expert-elicitation process. This process should include a formal assessment of each activity's expected benefit and costs to determine their relative priority for implementation.
- Evaluate the re-initiation of a captive breeding program to boost the Puerto Rican plain pigeon population and establish new populations in other sites around the Island.

Monitoring / Research Activities

- Design and conduct specific predator-prey relationship research to determine the extent of predation (i.e., limiting reproduction/population growth) on the Puerto Rican plain pigeon.
- Continue to assess Puerto Rican plain pigeon populations to determine species trends, abundance, and distribution by surveying traditional and non-traditional sites.
- Conduct radiotelemetry, banding, or genetic sampling to determine spatial use of corridors with the goal of assessing corridor functionality and genetic flow between forests.
- Investigate the impact of human disturbance (e.g., hunting, infrastructure development) on nesting and feeding sites.
- Assess the impact of different land-use practices (e.g., agriculture, forest restoration, urban development) on resource availability for the species.

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RESULTS / SIGNATURES

U.S. FISH AND WILDLIFE SERVICE
Status Review of Puerto Rican Plain Pigeon

Status Recommendation:

Based on this review, we recommend the following status for this species. A 5-year review presents a recommendation of the species status. Any change to the status requires a separate rulemaking process that includes public review and comment, as defined in the ESA.

____ Downlist to Threatened
____ Uplist to Endangered
____ Delist (Indicate reasons for delisting per 50 CFR 424.11):
    ____ The species is extinct
    ____ The species does not meet the definition of an endangered or threatened species.
    ____ The listed entity does not meet the statutory definition of a species.
_X_ No change needed

New Recovery Priority Number (48 FR 43098):

The Recovery Priority Number at the start of this review was a "3c" indicating the Puerto Rican plain pigeon is a subspecies with a high degree of threat and high recovery potential. The "c" indicates conflict with development activities. We are now changing the recovery priority number to 6c, indicating a subspecies with a high degree of threat and a low recovery potential. Because of threats to the species are pervasive and may be difficult to remediate, we believe the recovery potential of the subspecies is now classified as low. We still believe the species has a high degree of threat and that its recovery is in conflict with development activities.

FIELD OFFICE APPROVAL:
Field Supervisor, Caribbean Ecological Services Field Office, Fish and Wildlife Service

Approve LOURDES MENA Digitally signed by LOURDES MENA Date: 2025.08.26 07:23:19 -04'00' _____