

THE PUERTO RICO BREEDING BIRD ATLAS. Jessica Castro-Prieto, Joseph M. Wunderle, Jr., José A. Salguero-Faria, Sandra Soto-Bayo, Johann D. Crespo-Zapata, and William A. Gould. 2021. General Technical Report IITF-53. U.S. Department of Agriculture Forest Service, International Institute of Tropical Forestry, Rio Piedras, PR. 311 pp. <https://doi.org/10.2737/IITF-GTR-53>.

As a boy growing up between Guaynabo and Orocovis, I distinctly remember the bright-green colors of the Puerto Rican Tody. The Puerto Rican Parrot was another favorite of mine, with its loud calls resonating across the forested hillsides of El Yunque.

The beauty of these birds came rushing back to me as I read the excellent Puerto Rico Breeding Bird Atlas, the 2021 compendium of the commonwealth's bird species, their habitats, and the threats they face. The 311-page report was compiled by the U.S. Department of Agriculture (USDA), researchers, and hundreds of volunteers who documented the geographical whereabouts and breeding behaviors of 130 bird species on Puerto Rico and the nearby islands and cays. This work represents the first bird atlas ever undertaken in the Caribbean, as well as the most comprehensive breeding bird database in Puerto Rico.

Its importance, though, goes well beyond a cataloguing of the commonwealth's treasure trove of avian species. More than 300 volunteers registered nearly 46,000 bird observations—a citizen science initiative that bodes well for the region's conservation future. The myriad partners responsible for such a massive research project, including the USDA, the Puerto Rico Department of Natural and Environmental Resources, the U.S. Fish and Wildlife Service, the Puerto Rican Ornithological Society, BirdsCaribbean, the University of Puerto Rico, and others, demonstrate the level of collaboration needed for effective region-wide conservation efforts. The entire project also underscores my agency's conservation vision of connecting "lands and waters to sustain fish, wildlife, and plants (while) working with and for people."

The scope of the atlas is breathtaking. For the first time, it puts a Caribbean bird survey on par with those in Europe and North America. Discussions around the atlas began during a bird conference on the island of Tobago in 2003. Surveys for the atlas began in 2005 and continued annually through 2009, with most conducted between February and July when many species were known to breed.

Given Puerto Rico's diversity of climates and terrains—upland rain forests, drier coastal plains, tropical islets, to name a few—surveying wasn't easy. To tally bird diversity and breeding habits, the territory was divided into 479 geographical hexagons, each measuring 24 km², or roughly 5,900 acres. Most of the hexagons (309) encompassed dry land; the rest included coastal and marine areas filled with reefs and cays. The species within each hexagon were counted and ranked based on their likelihood of

reproduction: possible, probable, or confirmed, with a fourth category, observed, indicating that a species was present, but there was no evidence of breeding.

In all, volunteer observers documented the breeding habits of 130 bird species, which represent 98 percent of the birds known to reproduce in Puerto Rico. Gray Kingbirds (*Tyrannus dominicensis*), Bananaquits (*Coereba flaveola*), White-winged Doves (*Zenaida asiatica*), Northern Mockingbirds (*Mimus polyglottos*), and Zenaida Doves (*Zenaida aurita*) were the most frequently reported. The most prolific non-native breeders included Rock Pigeons (*Columba livia*), House Sparrows (*Passer domesticus*), Scaly-breasted Munias (*Lonchura punctulata*), Orange-cheeked Waxbills (*Estrilda melpoda*), and Bronze Mannikins (*Spermestes cucullata*).

Unsurprisingly, most species were documented breeding in the lowlands, close to San Juan, or on the island of Vieques and other federally protected, biodiverse regions. Hexagons in the hard-to-reach, less-populated mountains, or on the out-islands, posted the lowest number of breeding species.

There were some fascinating discoveries. Limpkins (*Aramus guarana*), for example, were all but considered extirpated from the island; however, they were discovered nesting in Canóvanas. Barn Owls (*Tyto alba*), which were absent from previous surveys, were found breeding in Aguada.

Despite the bounty of bird species, challenges loom, especially as the climate changes, the world warms, the seas rise, and storms become more intense. Hurricanes Irma and Maria hammered bird populations. The number of wild and federally endangered Puerto Rican Parrots (*Amazona vittata*) in the Luquillo Mountains, for example, dropped from more than 50 individuals to just two. The population of endangered Sharp-shinned Hawks (Puerto Rican subspecies, *Accipiter striatus venator*) declined 75 percent. Plain Pigeons (*Patagioenas inornata*) and Elf-woods Warblers (*Setophaga angelae*), too, suffered greatly from Hurricane Maria. Seabirds, shorebirds and waterfowl, with few places for shelter, are most vulnerable to increasing high winds and storm surges.

Habitat change accompanies climate change. Puerto Rico's second-growth forests, shaded-coffee plantations, swamps, mangroves, and lagoons are also subject to urbanization and agriculture. As a result, freshwater-dependent aquatic birds suffer, as does the Antillean Mango (*Anthracothorax dominicus*), once the most-abundant hummingbird species in Puerto Rico according to the breeding survey. Currently, a total of 20 native species are threatened or endangered.

Some species thrive in their new habitats. For example, Adelaide's Warbler (*Setophaga adelaidae*) numbers have increased substantially since 1989 on the mainland and Vieques, the atlas shows. They are also now found on St. Thomas and St. John, U.S. Virgin Islands. Cattle Egrets (*Bubulcus ibis*) and Shiny Cowbirds (*Molothrus bonariensis*) from South America now alight in Puerto

Rican cattle pastures and grasslands.

The USDA Forest Service, I'm proud to say, has worked hard to bolster Puerto Rico's avian abundance. After the hurricanes hit, we re-established wild populations of Puerto Rican Parrots and Sharp-shinned Hawks in El Yunque National Forest. We also designated more than 27,000 acres as critical habitat for the Elf-in-woods Warbler in El Yunque and the Maricao Forest Preserve. We did this work in concert with many partners.

As far back as 1999, as a young biologist, I launched the US Fish and Wildlife Service's Partners for Wildlife program in Puerto Rico, a voluntary, financial assistance program to help landowners restore wetlands and other valuable avian habitats.

The breeding bird atlas underscores our commitment to Puerto Rican conservation. It is another tool we can use to gauge our progress. But it is also an easy-to-read roadmap that local governments, non-profits, and the people of Puerto Rico can follow to further the ecological health of the commonwealth.

Collaborative conservation, as the atlas shows, is the way to ensure that what is best for the birds is best for Puerto Rico too.

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