

# Echoes of El Yunque: The Recovery of the Puerto Rican Parrot and the Fight Against Extinction

## Introduction

Deep within the dense, rain-soaked canopy of El Yunque National Forest, a sharp call echoes through the trees—a sound that, until recently, was on the verge of disappearing entirely. The Puerto Rican parrot (*Amazona vittata*), once widespread across the island, is now one of the rarest birds in the world and a powerful symbol of both ecological loss and conservation success.

The experience of El Yunque is defined by its intensity—the smell of damp earth, the persistent humidity, and the overwhelming wall of green that seems to pulse with life. Standing amidst the giant tree ferns and sierra palms, it is easy to imagine the forest as it once was: a vibrant corridor of sound where thousands of *Iguaca* moved in sync with the seasons. The name *Iguaca*, given by the indigenous Taíno people, is an onomatopoeia, perfectly mimicking the bird's loud, rhythmic flight call that once rang out across the archipelago (U.S. Fish and Wildlife Service, n.d.). Historically, these birds were woven into the very fabric of the island's identity, so numerous that they were observed in nearly every forest type. To be in their presence today is to experience a "ghost" of that past, a reminder that the lushness of the rainforest can be deceptive; a forest can look healthy while its most vital voices are being silenced.

When I visited El Yunque and observed these parrots within their managed conservation environment, the reality of their situation became much more tangible. What might otherwise feel like an abstract concept—biodiversity loss—was clearly visible in the careful monitoring, protected habitats, and direct human intervention required to sustain this species. By the 1970s, the population had declined to just 13 individuals in the wild, placing the Puerto Rican parrot on the brink of extinction (U.S. Fish and Wildlife Service, n.d.).

As of March 2026, the population has reached approximately 1,125 individuals across both wild and captive populations, according to conservationists I spoke with on the ground in El Yunque. This remarkable increase reflects decades of intensive work and serves as a rare example of what long-term, science-driven conservation can achieve. This article explores the biology of the species, the causes of its decline, and the extensive recovery efforts that have contributed to its survival, while connecting its story to the broader global biodiversity crisis and the unique vulnerability of island ecosystems.



**Figure 1.** A Puerto Rican Parrot (*Amazona vittata*) highlighting the emerald-green plumage and characteristic red forehead.  
*Photo: Gloria Archilla via Birdshare.*

## **The Iguaca: A Jewel of the Canopy**

The Puerto Rican parrot (*Amazona vittata*) is a medium-sized, bright green parrot distinguished by its red forehead, blue-edged wings, and white eye rings (Animalia, n.d.; U.S. Fish and Wildlife Service, n.d.; Figure 1). As the only native parrot species of Puerto Rico, it plays an important ecological role in seed dispersal and forest regeneration.

In the wild, Puerto Rican parrots primarily feed on seeds, fruits, flowers, and bark from native tree species, making them vital architects of the forest's future through seed dispersal. They typically nest in tree cavities and have a low reproductive rate, often producing only two to four eggs per breeding season. Juvenile survival is naturally limited, even under stable conditions, which makes population recovery particularly slow and vulnerable to disruption (World Parrot Trust, n.d.).

Historically, this species occupied forests across much of Puerto Rico. Today, its range is limited to protected areas such as El Yunque National Forest and Río Abajo State Forest due to extensive habitat loss (U.S. Fish and Wildlife Service, n.d.; USDA Forest Service, n.d.). Puerto Rican parrots are highly social, forming long-term pair bonds and communicating through a variety of vocalizations. Research suggests that conservation practices, including captive breeding and reintroduction, may influence the development of vocal dialects within populations (Martínez & Logue, 2020). Despite these ecological roles and adaptations, the Puerto Rican parrot's survival would soon be challenged by forces far beyond its control.

## A Perfect Storm: The Path to Thirteen

The decline of the Puerto Rican parrot was not caused by a single event, but rather by a combination of long-term environmental changes and human activities that gradually reduced the population to a critically low level. Understanding these factors is essential to fully appreciating both the severity of the species' decline and the complexity of its recovery.



**Figure 2.** Freshly harvested sugar cane (*Saccharum officinarum*). Photo: The Sugar Association.

### Anthropogenic Pressures: Habitat Loss & Exploitation

Beginning in the 19th century, large areas of native forest were cleared for agriculture, particularly sugarcane production (Figure 2), removing the old-growth trees required for nesting (Beissinger et al., 2008). This created habitat fragmentation, isolating populations and stifling natural recovery. Historically, hunting and the illegal pet trade further thinned the species; for a slow-reproducing bird, even minimal human removal had devastating impacts (Herzog, 1995).

### Environmental Threats: Disasters & Predation

Puerto Rico's geography leaves the parrot vulnerable to hurricanes, which can destroy decades of progress in a single afternoon by stripping food resources and nesting sites (CBS News, 2022). Furthermore, introduced predators like black rats and mongooses prey heavily on eggs and chicks (Figure 3). As a cavity-nester, the parrot is particularly susceptible to these invasive species, which remain a primary factor limiting reproductive success (Lindsey, 1992).



**Figure 3.** A mongoose consuming an egg. Photo: Encyclopædia Britannica.



**Figure 4.** Puerto Rican Parrot nestlings. Photo: Proyecto Conservación Cotorra Puertorriqueña.

### The Genetic Bottleneck

By the 1970s, the population had declined to a critical bottleneck. This extreme loss of diversity increased the risk of inbreeding and limited the population's ability to adapt to a changing world (Brock & White, 1992). This struggle highlights the urgency of UN Sustainable Development Goal 15, proving that protecting island biodiversity requires more than just habitat—it requires a human lifeline (Figure 4).

## The Human Lifeline: Bringing Back the Green

Bringing the Puerto Rican parrot back from the edge of extinction has required one of the most hands-on and carefully managed conservation efforts ever attempted for a bird species. Unlike many conservation efforts that focus primarily on habitat protection, this program has required direct and ongoing human intervention at nearly every stage of the species' life cycle.

### Captive Breeding & Genetic Management

Captive breeding has been the foundation of recovery efforts since the population reached critically low levels in the 1970s. Facilities in El Yunque and Río Abajo manage breeding pairs under controlled conditions, with breeding pairs carefully selected to preserve the limited genetic variation that remained after the population bottleneck (Earnhardt et al., 2014). Conservationists frequently intervene in reproduction to improve success rates. Eggs may be artificially incubated, and chicks are sometimes hand-reared to reduce mortality. These techniques have significantly increased reproductive success compared to natural conditions alone. In addition, veterinary care, including health monitoring and reproductive assessments, ensures the long-term viability of both captive and released individuals (Clubb et al., 2015).

### Reintroduction & Habitat Support

Once captive populations stabilized, conservation efforts expanded to include reintroduction into protected forest habitats. Birds are typically released using “soft release” methods, allowing them to gradually acclimate while still receiving supplemental support. Researchers monitor released parrots using radio telemetry to track survival, movement, and adaptation, using this data to refine future releases (Earnhardt et al., 2014). Establishing multiple populations across different regions also reduces the risk that a single catastrophic event, such as a hurricane, could eliminate the species.

Because the species depends heavily on mature forests for nesting, requiring tree cavities found only in large, old-growth trees, decades of deforestation left the *Iguaca* without natural homes. To address this, conservationists have installed artificial nest boxes in suitable habitats (Figure 5). These innovative structures reduce predation risk and environmental exposure, and they are often actively monitored by ground teams. This intervention has significantly improved nesting success and remains a cornerstone of overall population growth.



**Figure 5.** A wild pair of Puerto Rican parrots (*Amazona vittata*) in a nest cavity at the Iguaca Aviary, El Yunque National Forest. Photo: Marisel López Flores/USFWS.

## Behavioral Adaptation & Long-Term Monitoring

Captive-reared parrots must develop essential survival behaviors before fully integrating into wild populations. As a result, conservation programs incorporate acclimation periods during which birds learn skills such as foraging and predator avoidance. Social behavior and communication also play a key role in survival. Research suggests that conservation practices may influence vocal dialects, which are important for group cohesion and successful integration (Martínez & Logue, 2020).

The long-term success of the recovery program depends on continuous monitoring and adaptive management. Conservationists track population trends, reproductive success, and survival rates, adjusting strategies in response to environmental changes and new data.

Today, the population has grown into the thousands across both wild and managed groups, reflecting decades of sustained conservation effort. The Puerto Rican Parrot is currently restricted to three primary locations: El Yunque National Forest, Bosque Estatal de Maricao, and Rio Abajo State Forest, with the latter two serving as key reintroduction sites (von Beren, 2023; Figure 6). While this represents a major conservation milestone, ongoing management remains essential to ensure long-term survival.



**Figure 6.** Current distribution of *A. vittata* in Puerto Rico: Maricao (red), Rio Abajo (blue), and El Yunque (green).  
Map: Gabriella von Beren.

## Lessons for a Warming World

The recovery of the Puerto Rican parrot reflects a much larger global challenge: the accelerating loss of biodiversity. Around the world, species are disappearing at rates far beyond what would occur naturally, driven largely by human activities such as habitat destruction, climate change, and the spread of invasive species (Beissinger et al., 2008; U.S. Fish and Wildlife Service, n.d.). While these patterns are often discussed on a global scale, the story of the Puerto Rican parrot brings those abstract trends into focus, showing how they unfold within a single ecosystem—and how they can be countered.



**Figure 7.** An *A. vittata* individual released in Maricao State Forest in 2022.

*Photo: Jan P. Zagarra/USFWS.*

Island species are especially vulnerable in this context. Because they evolve in isolation, they often depend on very specific environmental conditions and occupy limited geographic ranges (Wilson et al., 1994). In Puerto Rico, widespread deforestation and habitat fragmentation quickly reduced the parrot's available habitat, while introduced predators further limited reproductive success (Beissinger et al., 2008; Lindsey, 1992). Together, these pressures demonstrate how rapidly ecological balance can be disrupted in island systems.

At the same time, the recovery of the Puerto Rican parrot shows that decline is not always permanent. Unlike many species that continue to diminish without intervention, this case illustrates what can happen when conservation efforts are sustained, well-supported, and grounded in scientific research. Through captive breeding, genetic management, habitat restoration, and long-term monitoring, the population has not only stabilized but begun to recover in ways that once seemed unlikely (Earnhardt et al., 2014; Defenders of Wildlife, 2021; Figure 7).

This recovery also reflects an important shift in modern conservation thinking. For species that have already experienced severe population loss, protecting habitat alone is often not enough. Active management—sometimes involving direct human intervention—is necessary to rebuild populations and maintain their viability (Brock & White, 1992; Clubb et al., 2015). In this way, the Puerto Rican parrot serves as a practical model for conservation efforts facing similar challenges elsewhere. Ultimately, the importance of this species extends beyond its population numbers. The Puerto Rican parrot illustrates both the consequences of environmental disruption and the potential for recovery when those impacts are addressed directly. Its continued survival highlights a broader reality: conservation is not only about preventing further loss, but also about restoring what has already been diminished.

## Beyond the Canopy: A Zoologist's Perspective

Seeing the Puerto Rican parrots in El Yunque changed the way I understood conservation. What had previously felt like data and statistics became something immediate—living animals depending on human decisions for survival. Seeing individuals who rely on carefully managed systems for survival made the impact of human activity on ecosystems feel immediate and tangible, while also highlighting the responsibility to address those impacts.

As I pursue a career in zoology and wildlife conservation, this experience reinforced the importance of active, science-based management in protecting endangered species. The Puerto Rican parrot is not only an example of successful recovery, but also a reminder that conservation is an ongoing process that requires continued attention and adaptation.

In the grander scheme of conservation, the Puerto Rican parrot represents both a profound warning and a brilliant possibility. Its decline is a stark reflection of the synergistic consequences of habitat destruction, invasive species, and a rapidly changing climate—the very drivers of the global Triple Planetary Crisis. Yet, the *Iguaca's* recovery demonstrates that even species pushed to the absolute brink can be brought back through the marriage of sustained communal effort and precise scientific intervention.

This success story radiates far beyond the borders of El Yunque; it serves as a living laboratory for island biogeography and endangered species management worldwide. Although the population remains inherently vulnerable to the whims of nature, its progress offers something often missing in modern environmental narratives: tangible, data-driven evidence that recovery is not just a hope, but a reality. The future of the species will undoubtedly depend on continued, vigilant protection and adaptive management. However, its survival already stands as proof that the human footprint on this Earth does not have to be defined solely by loss. When guided by specialized knowledge and an unwavering commitment to the natural world, our impact can instead lead to a lasting, redemptive legacy of restoration.



*Leigh Ferrell*  
*Senior, Zoology & Scuba*  
*Ball State University - BIO 299X-890*  
*4/23/26*

***Dedicated to the avian  
ambassadors of the El  
Portal de El Yunque  
Rainforest Center:  
Pancho, Scarface, and  
Red Feather. May their  
voices continue to echo  
through the canopy for  
generations to come***

## References:

- Animalia. (n.d.). *Puerto Rican amazon*. <https://animalia.bio/puerto-rican-amazon>
- Archilla, G. (2017, December 14). [Photograph of a Puerto Rican Parrot]. *All About Birds*, Cornell Lab of Ornithology. <https://www.allaboutbirds.org/news/how-the-puerto-rican-parrots-survived-the-devastating-2017-hurricane-season/>
- Beissinger, S. R., Wunderle, J. M., Meyers, J. M., Sæther, B.-E., & Engen, S. (2008). Anatomy of a bottleneck: Diagnosing factors limiting population growth in the Puerto Rican parrot. *Ecological Monographs*, 78(2), 185–203. <https://doi.org/10.1890/06-2104.1>
- Brock, M. K. (1991). Semen collection and artificial insemination in the Puerto Rican parrot (*Amazona vittata*). *Journal of Zoo and Wildlife Medicine*, 22(1), 107–114.
- Brock, M. K., & White, B. N. (1992). Application of DNA fingerprinting to the recovery program of the endangered Puerto Rican parrot. *Proceedings of the National Academy of Sciences*, 89(23), 11121–11125. <https://doi.org/10.1073/pnas.89.23.11121>
- CBS News. (2022). *Puerto Rico parrot among most endangered species facing climate change*. <https://www.cbsnews.com/news/puerto-rico-parrot-most-endangered-species-climate-change/>
- Clubb, S., Vélez, J., Garner, M. M., Zaias, J., & Cray, C. (2015). Health and reproductive assessment of selected Puerto Rican parrots (*Amazona vittata*) in captivity. *Journal of Avian Medicine and Surgery*, 29(4), 313–325. <https://doi.org/10.1647/2014-049>
- Defenders of Wildlife. (2021). *El Yunque National Forest and the Puerto Rican parrot: A story of peril and perseverance*. <https://defenders.org/blog/2021/09/el-yunque-national-forest-and-puerto-rican-parrot-story-of-peril-and-perseverance>
- Earnhardt, J., Vélez-Valentín, J., Valentin, R., Long, S., Lynch, C., & Schowe, K. (2014). The Puerto Rican parrot reintroduction program: Sustainable management of the aviary population. *Zoo Biology*, 33(2), 89–98. <https://doi.org/10.1002/zoo.21109>
- Encyclopædia Britannica. (n.d.). *Mongoose* [Photograph]. <https://kids.britannica.com/students/article/mongoose/275901>
- Endangered Species Coalition. (n.d.). *Puerto Rican parrot*. <https://www.endangered.org/animals/puerto-rican-parrot/>

- Herzog, M. (1995). Efforts in conservation: The Puerto Rican parrot, past, present, and future. *Journal of Avian Medicine and Surgery*, 9(4), 271–275.
- Lindsey, G. D. (1992). Nest guarding from predators by Puerto Rican parrots. *Journal of Field Ornithology*, 63(4), 466–472.
- López Flores, M. (2023, January 18). *Wild pair of Puerto Rican parrots* [Photograph]. U.S. Fish and Wildlife Service. <https://www.fws.gov/media/wild-pair-puerto-rican-parrots>
- Martínez, T. M., & Logue, D. M. (2020). Conservation practices and the formation of vocal dialects in the endangered Puerto Rican parrot (*Amazona vittata*). *Animal Behaviour*, 166, 261–271. <https://doi.org/10.1016/j.anbehav.2020.06.004>
- Proyecto Conservación Cotorra Puertorriqueña de Río Abajo. (n.d.). *Puerto Rican Amazon* [Photograph]. World Parrot Trust. <https://parrots.org/encyclopedia/puerto-rican-amazon/>
- The Sugar Association. (2019, December). *Detail of fresh cut pieces of sugar cane* [Photograph]. <https://www.sugar.org/blog/a-brief-history-of-real-sugar-the-story-of-sugar-cane/>
- U.S. Fish and Wildlife Service. (n.d.). *Puerto Rican amazon (Amazona vittata)*. <https://www.fws.gov/species/puerto-rican-amazon-amazona-vittata>
- USDA Forest Service. (n.d.). *Puerto Rican parrot recovery program*. [https://www.fs.usda.gov/wildflowers/Rare\\_Plants/documents/esa40/ESAat40\\_PuertoRicanParrot\\_R8\\_EYNF.pdf](https://www.fs.usda.gov/wildflowers/Rare_Plants/documents/esa40/ESAat40_PuertoRicanParrot_R8_EYNF.pdf)
- von Beren, G. (2023, December 20). *Puerto Rican Parrot* [StoryMap]. ArcGIS StoryMaps. <https://storymaps.arcgis.com/stories/b08c452f0f4d4e52885ede52e03330d9>
- Wilson, M. H., Kepler, C. B., Snyder, N. F. R., Derrickson, S. R., Dein, F. J., Wiley, J. W., Wunderle, J. M., Lugo, A. E., Graham, D. L., & Cameron, W. D. (1994). Puerto Rican parrots and predictions of metapopulation limitations. *Conservation Biology*, 8(1), 114–123.
- World Parrot Trust. (n.d.). *Puerto Rican amazon*. <https://parrots.org/encyclopedia/puerto-rican-amazon/>
- Zegarra, J. P. (2022, March 3). *Puerto Rican parrot, Maricao Release 2022* [Photograph]. U.S. Fish and Wildlife Service. <https://www.fws.gov/media/puerto-rican-parrot-maricao-release-2022>