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Quiet Canopies

Climate Change Risk for Latin America's Threatened Forest Birds

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Background

Globally, more than half of all bird species are in decline, driven primarily by human activities such as habitat loss, degradation, and the accelerating impacts of climate change.¹ Latin America, the world's richest region for avian biodiversity,^{2,3} faces particularly acute risks: five of the ten countries with the highest numbers of globally threatened bird species are in this region.⁴ Climate change is compounding pressure from land cover change by altering temperature and rainfall patterns, shifting habitats upslope or poleward, and intensifying extreme weather events.⁵ These changes are projected to cause substantial range contractions, population declines, and local or global extinctions—especially among tropical, montane, and forest-dependent species with narrow ecological tolerances.^{6–12} Without rapid emissions reductions and habitat protection and restoration, the pace and magnitude of climate and land cover change pose a grave and existential threat to birds, people, and the ecosystems that sustain them.^{5,8,13,14}

To understand the risk of climate and land cover change to bird species in Latin America, we mapped the current and predicted future ranges of 170 International Union for the Conservation of Nature (IUCN) Red List globally threatened forest bird species in Latin America, species that are already at risk of extinction according to Birdlife International.² We predicted changes in species distributions under climate and land cover change scenarios. The IUCN Red List of Threatened Species is the most comprehensive data source on the conservation status of biodiversity globally and provides critical information for conservation decision makers.¹² Species are considered globally threatened with extinction if they fall within the Red List categories of Vulnerable (VU), Endangered (EN), or Critically Endangered (CR) based on past or projected trends in population or geographic range size.

We used species distribution models to relate expert-vetted observations of each species to current environmental conditions, including climate, land cover, and topography. These present-day distribution models captured the current range of environmental conditions inhabited by the species. We then predicted the future range of each species by substituting projected future climate and land cover conditions as inputs to

the models. To understand the impacts of climate change on these threatened forest bird species across Latin America, we compared the current and future ranges for each species to estimate the percentage of range loss and gain under multiple climate change emission scenarios.

We then used these projected changes in species range to assess the three components of climate change vulnerability identified by the IUCN: climate change exposure (severity of future climate change scenario), sensitivity (range loss), and adaptive capacity (range gain).^{13,15} We assigned each bird species a climate change vulnerability score based on future range loss or gain: neutral, low, moderate, high, or very high.

This five-category scoring emphasizes the greater impact of range loss over range gain, assigning species projected to lose 60% or more of their suitable range to the very high vulnerability category.¹⁶ Species in the high and very high vulnerability categories are projected to experience the highest percentage of current range loss with limited opportunity for future range gains. We considered a species as climate vulnerable—at risk of extinction to climate change—if it fell within the moderate, high, or very high vulnerability categories. We included one future projected land cover change scenario across all the future climate change scenarios; hence, these results

Globally, more than half of all bird species are in decline, driven primarily by human activities such as habitat loss, degradation, and the accelerating impacts of climate change.¹

 Cover: Reserva Natural La Planada, a nature reserve in the southwestern department of Nariño, Colombia.

Below: Landscape of San Cristobal de Pucitá, Junín (Peru).



represent the expected impact of climate change under constant projected land cover change trajectories.

In this report, we assess climate change vulnerability of 170 IUCN globally threatened forest bird species under three policy-relevant climate change scenarios: increases in global mean temperature of 1.8 °C (3.2 °F), 2.6 °C (4.7 °F), and 5.0 °C (9 °F). These scenarios reflect current and potential climate change emissions-reduction targets, pledges, policies, and actions and provide relevant context for national policies on climate change mitigation. The 1.8 °C scenario reflects an

optimistic scenario where countries meet their net zero emissions climate targets, 2.6 °C aligns with the trajectory based on climate policies currently in place and 2030 Nationally Determined Contributions (NDCs) targets (submitted through Nov 2024),¹⁷ while the 5.0 °C scenario reflects a worst-case scenario where emissions rise significantly with the absence of climate action.¹⁸ The Intergovernmental Panel on Climate Change (IPCC) recommends limiting end of century (2100) global mean temperature increase to less than 2.0 °C (3.6 °F) above pre-industrial levels, and, if possible, to 1.5 °C (2.7 °F).^{19,20}

Key Findings

More than 75% of threatened forest bird species in Latin America are vulnerable to extinction due to climate change if we fail to keep global warming under 2.0 °C.

We found that 83% (141/170) of threatened forest bird species in Latin America had moderate, high, or very high vulnerability to climate change in the highest climate warming scenario (5.0 °C; Figure 1) with ~70% of species falling in the high and very high vulnerability categories. Even under a more moderate 2.6 °C scenario, 75% of species (128/170) would be climate vulnerable (Figure 1), highlighting the importance of stabilizing the climate to under 2.0 °C global warming.

Climate Change mitigation will reduce climate change vulnerability for over 60% of threatened forest bird species.

If we stabilize climate change to under 2.0 °C global warming, 62% of species drop at least one climate vulnerability category lower. Similarly, only 64% of species will be climate vulnerable (moderate, high, or very high categories), a reduction by nearly 20%, with only 34% of species falling in the high and very high vulnerability categories (Figure 2).

Average range loss under the highest climate change scenario (5.0 °C) is 63%. This drops to 33% under a climate stabilization scenario (1.8 °C). Thus, climate change mitigation is imperative for the future of threatened forest bird species in Latin America. Further, anthropogenic land cover change will exacerbate these losses unless actions are taken to slow the rate of habitat loss and increase forest restoration and sustainable management practices.

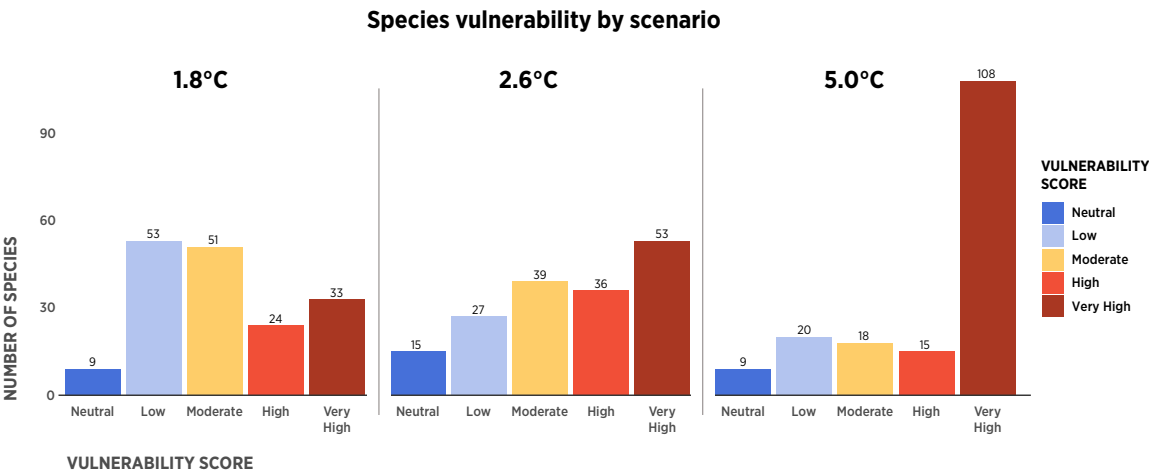


Figure 1. Climate change vulnerability classification of 170 threatened forest birds in Latin America under 1.8 °C (3.2 °F), 2.6 °C (4.7 °F), and 5.0 °C (9 °F) global warming scenarios. Vulnerable species are those within the moderate, high, or very high vulnerability classes, whereas non-vulnerable species are within the neutral or low vulnerability classes.

Climate change impacts on threatened forest bird species

With unmitigated climate change (5.0 °C), 14 species are projected to lose 100% of their current range with no ability to shift their ranges into new suitable habitat (0% range gain; Table 1), drastically increasing their risk of extinction. This includes the Gold-ringed Tanager (*Bangsia aureocincta*) and the Banded Cotinga (*Cotinga maculata*; Figure 2). In this scenario (5.0 °C), 108 species could lose 60% or more of their range, indicating high potential of range loss for many species under high emissions scenarios with no climate action taken.



Gold-ringed Tanager *Bangsia aureocincta*

The Gold-ringed Tanager (*Bangsia aureocincta*) is an IUCN Red List Vulnerable species that occurs within a restricted range of humid and mossy montane forests along the Pacific slope of the Western Andes in Colombia. Under a 5.0 °C warming scenario, the Gold-ringed Tanager would rank as very high vulnerability to climate change, potentially losing 100% of its current range without any potential range gains by end of century. The Gold-ringed Tanager would lose approximately ~70%, under the lower 1.8 °C and 2.6 °C warming scenarios.



Banded Cotinga *Cotinga maculata*

The Banded Cotinga (*Cotinga maculata*) is an IUCN Red List Critically Endangered species, noted as a rare endemic that has a very restricted range within the lowland Atlantic forests of Brazil. Under a 5.0 °C warming scenario, the Banded Cotinga would rank as very high vulnerability to climate change, potentially losing 100% of its current range without any potential range gains by end of century. However, the Banded Cotinga is a species we can help: Under the 2.6 °C scenario, this species would lose approximately ~70% of its current range, and more optimistically, 40% under the 1.8 °C scenario.



Banded Cotinga

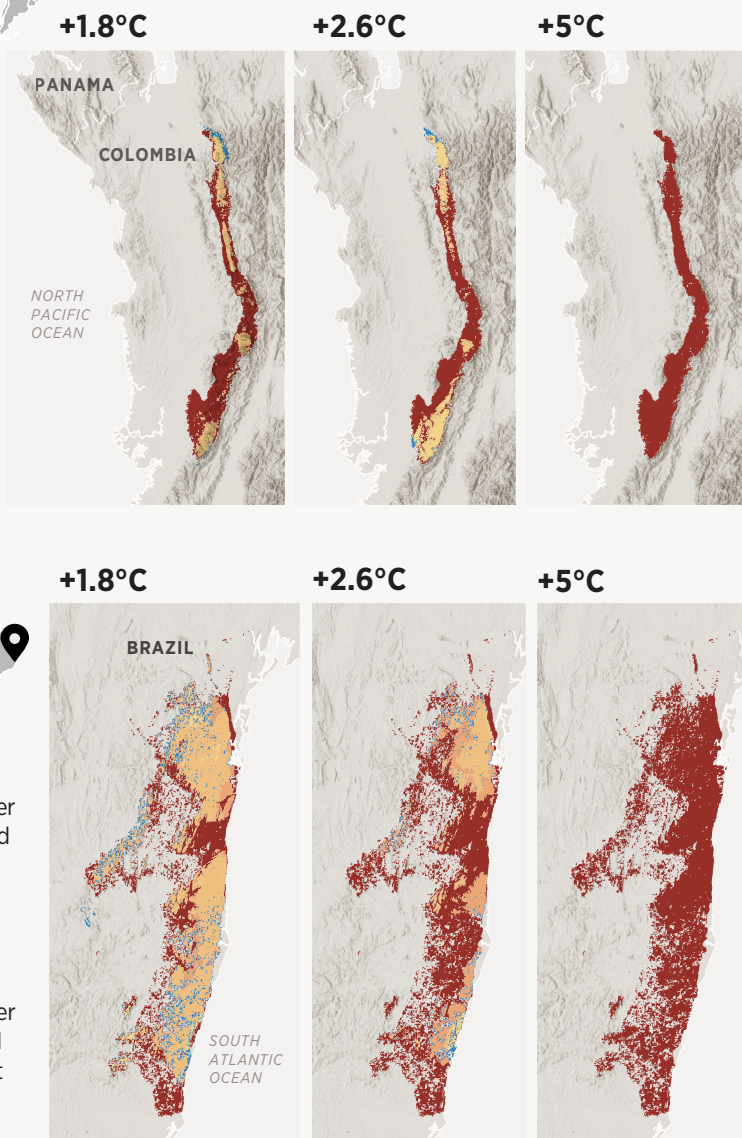


Figure 2. Climate change-driven range contractions for two IUCN Red-listed birds found in unique habitats, the Gold-ringed Tanager (*Bangsia aureocincta*), and the Banded Cotinga (*Cotinga maculata*). These species are predicted to lose 100% of their range with no range gain under the highest global warming scenarios, potentially resulting in their global extinction.

Species	Scientific Name	IUCN Red List Status
Bahia Tapaculo	<i>Eleoscytalopus psychopompus</i>	EN
Banded Cotinga	<i>Cotinga maculata</i>	CR
Cundinamarca Antpitta	<i>Grallaria kaestneri</i>	EN
Gold-ringed Tanager	<i>Bangsia aureocincta</i>	VU
Golden-backed Mountain Tanager	<i>Cnemathraupis aureodorsalis</i>	EN
Gorgeted Wood-quail	<i>Odontophorus strophium</i>	VU
Hook-billed Hermit	<i>Glaucis dohrnii</i>	VU
Long-whiskered Owlet	<i>Xenoglaux loweryi</i>	VU
Nava's Wren	<i>Hylorchilus navai</i>	VU
Ochre-fronted Antpitta	<i>Grallaricula ochraceifrons</i>	VU
Perija Starfrontlet	<i>Coeligena consita</i>	EN
Rondonia Warbling Antbird	<i>Hypocnemis ochrogyna</i>	VU
Rufous Twistwing	<i>Cnipodectes superrufus</i>	VU
Short-crested Coquette	<i>Lophornis brachylophus</i>	CR

Table 1. A list of the 14 species that could lose up to 100% of their range with no potential for range gain under the highest global warming scenario. IUCN Red List status is also listed for reference. Globally threatened IUCN Red List categories are as follows; Vulnerable (VU), Endangered (EN), and Critically Endangered (CR).



Gold-ringed Tanager

The places in greatest need of climate change adaptation

Latin American ecoregions ([Griffith Ecoregions](#))²¹ differed greatly in their anticipated changes in temperature, precipitation, and land cover, leading to spatially varying changes in bird species community composition. Based on this analysis, some ecoregions may lose up to 15 threatened forest bird species under a 5.0 °C scenario, with a pronounced loss of species in Amazonia (Amazonian-Orinoco Lowland/Amazon Coastal Lowlands/Brazilian Shield Moist Forests) and the Atlantic Forest (Eastern Highlands/Atlantic Forest) ecoregions (Figure 3; areas in shades of orange to red). Projected losses are also high in parts of the North-Central Moist Andes (Northern Andes/Northern Andean Highlands).

Some ecoregions may gain up to 10 new species due to range shifts under the 5.0 °C scenario. Peak gains were in the Cerrado (Eastern Highlands/Cerrados) and to a lesser extent in Moist Meso-America (Middle American Tropical Wet Forest/Humid Gulf of Mexico Coastal Plains and Hills and Middle American Tropical Wet Forest/Central American Isthmus), and the Chaco (Gran Chaco/Western Dry Chaco; Figure 3, areas in shades of purple to blue). Gains along mountain ranges include the Andes (North-Central Moist Andes -Northern Andes/Northern Andean Highlands and South-Central Dry Andes-the Central Andes/Yungas/Central High Andes and Puna and the Southern Andes/Fuegian Fiords and Forests), as well as general gains in species across Central America and Mexico (with the exception of losses seen in the highlands of these regions; Figure 3; areas in shades of purple to blue).

This information tells us where climate change adaptation actions can have the greatest impacts. Areas of high projected change (Figure 3; areas of the darkest red and blue), should be focal points for adaptation.²²⁻²⁴ There, conservationists can enhance species' resilience through

increasing habitat connectivity, disturbance mitigation, and targeted management actions. This includes working with private landowners across working lands to implement sustainable management practices that improve connectivity among protected areas and improve carbon storage through natural climate solutions.¹⁴ In areas of low change, conservation should focus on maintaining existing conditions, preventing habitat loss, reducing stressors, and restoring natural habitats to support current bird communities.²³

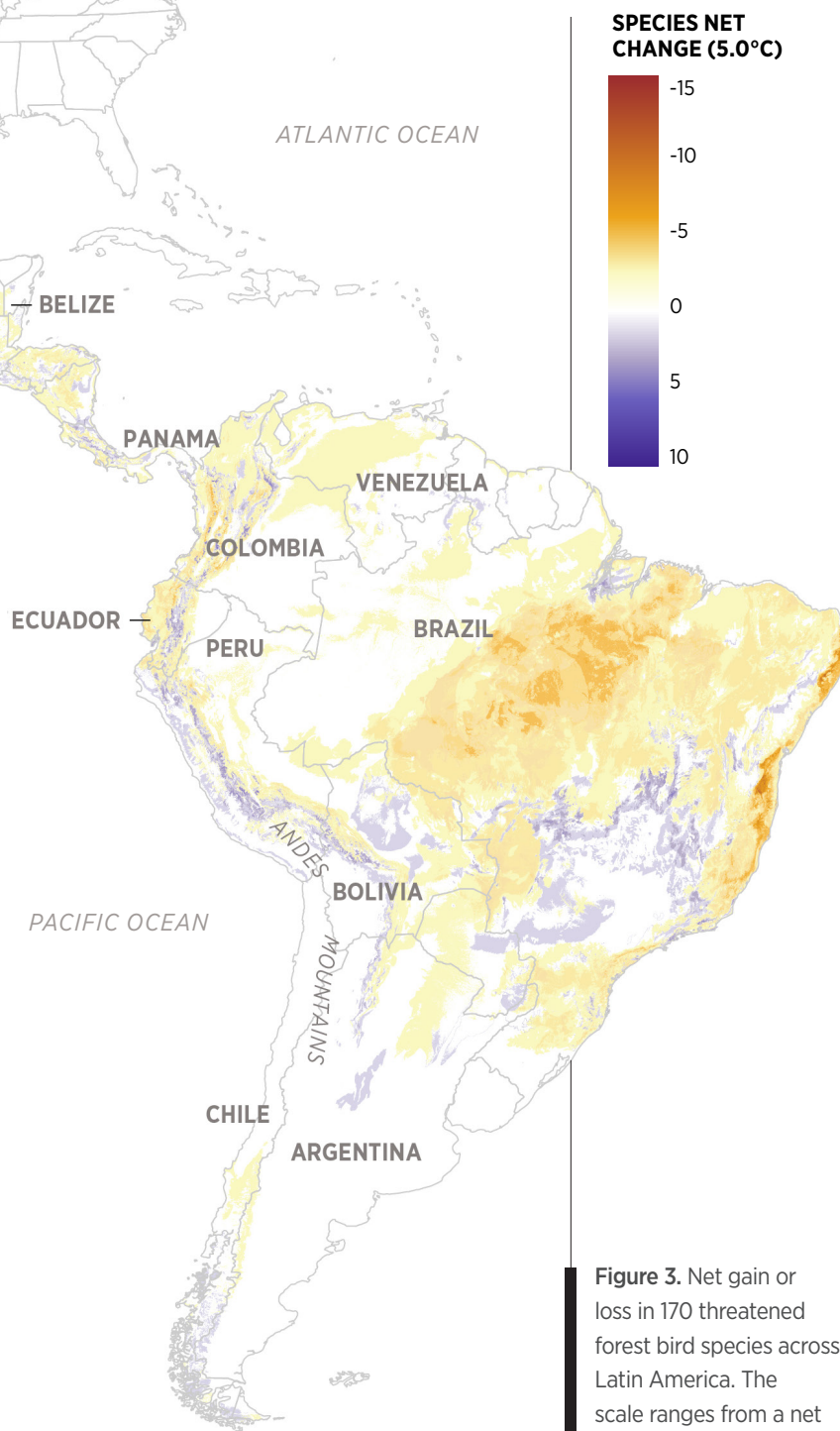


Figure 3. Net gain or loss in 170 threatened forest bird species across Latin America. The scale ranges from a net loss (shades of orange to red) to a net gain (shades of purple to blue) species with 5.0 °C. Net species change ranged from a negative 15 to positive 10. For an interactive view of the net gain or loss map and the associated ecoregions, please visit the interactive [Quiet Canopies Explorer tool](#).

Climate Strongholds— key conservation focal areas under climate change

Here, we identified Climate Strongholds within each level 2 ecoregion for threatened forest bird species across Latin America (Griffith Ecoregions Level 2; Figure 4). Climate Strongholds are areas predicted to have high climate suitability and low human modification and anthropogenic land use change for bird species at present and in the future, under climate scenarios.^{25,26} These areas capture critically important habitat for conserving every threatened forest bird species we assessed. The Andes ecoregion (including the Northern Andes, Northern Andean Highlands, Central Andes, and Yungas) had the highest proportion of its area designated as a Climate Stronghold (21%; Figure 4), reinforcing its status as a global hotspot for bird diversity and a critical refuge under climate change. In terms of total area, the Cerrado (Eastern Highlands/Cerrados) ecoregion contained the largest extent of Climate Strongholds (118 million acres), reflecting the vastness of the region (Figure 4). Both ecoregions are expected to gain new species in the future, further increasing their conservation importance in a changing climate.

Climate Strongholds can aid in the identification of potential new protected areas, improve design of reserve networks or highlighting key locations to engage local communities and landowners to implement bird-friendly practices around and between protected areas, and create healthier habitats for birds and people. By identifying Climate Strongholds within each ecoregion, we provide opportunities to conserve and protect threatened forest birds across the region, allowing us to work locally to incorporate bird conservation into national and local development plans in collaboration with partners and community leaders.



Figure 4. Threatened Forest Species Climate Strongholds map by Ecoregion. We identified Core Climate Strongholds, which are the highest priority regions with ranks ranging from 0.8–1.0 (top 20%, in green) and Supporting Climate Strongholds with ranks of 0.7–0.8 (top 30%, in yellow). For an interactive view of the Climate Stronghold and the associated ecoregions, please visit the interactive [Quiet Canopies Explorer tool](#).

Translating science into action on climate

Audubon's science tells us what this means for birds: more than 75% of the 170 threatened forest bird species in Latin America assessed in this study will be vulnerable to severe range loss and possible extinction due to the various pressures caused by the changing climate in the absence of meaningful action. The hopeful news is that we can reduce the vulnerability of 60% of those species by limiting warming to below 2.0 °C by 2100.

Audubon has dedicated 10 years to conservation and policy outcomes to address climate change, including mitigation and adaptation measures, by leveraging the findings of our science to advance climate action in North America. This includes the 2019 report [Survival by Degrees: 389 Bird Species on the Brink](#),^{13,27} which identified that two-thirds of North American birds are at increasing risk of extinction from global temperature rise, and the 2021 [Natural Climate Solutions Report: Maintaining and Restoring Natural Habitats to Help Mitigate Climate Change](#).²⁶ Now, Audubon is using this latest climate science to look across Latin America, translating these scientific findings to further prioritize bird conservation actions and public policy change. Birds are sentinel species and are nature's early indicators of harm to the environment that people, and all life, depends on. The findings of this report make it clear that we must not only protect birds and the places they need but also advance solutions that address the underlying causes of climate change.

This is a call to action to halt, and ultimately reverse, the decline of birds across the Americas while also taking actions to stabilize the climate. This work requires us to work efficiently across habitats and national borders, with partners, governments, and local communities sharing the same resources as their local birds. This is why Audubon is working in Latin America to establish new protected areas, improve management within already established protected areas, and engaging private landowners in bird-friendly agriculture. Well-managed protected areas are essential to sustaining bird populations and reversing their decline. They also serve to mitigate climate change and help local communities thrive sustainably.

The core of Audubon's Latin American protected areas strategy is [Conserva Aves](#), an innovative partnership among Audubon, BirdLife Interna-

tional, American Bird Conservancy, Birds Canada and the Latin American and Caribbean Network of Environmental Funds (RedLAC). Conserva Aves aims to support local and community-led organizations to establish more than 100 new subnational protected areas covering 3 million hectares (7.4 million acres). Stretching from Mexico to Chile, the initiative targets sites that complement national protected area networks to represent Latin American birds of conservation concern, Important Bird Areas (IBAs), and priority areas for migratory birds.

A second regional conservation effort, the [America's Flyways Initiative](#), is a partnership between the Development Bank of Latin America (CAF), Audubon, and BirdLife International, which mobilizes a hemispheric response to the intertwined crises of biodiversity loss and climate change. It will protect and restore over 30 critical landscapes and seascapes across the Americas, advancing nature-based climate solutions through locally driven conservation and sustainable development.

The Climate Strongholds identified in this report are designed to support conservation work by helping identify areas of climate resilience that can sustain bird populations now and in the future. These results will be included in Alas Seguras, a digital decision-support system funded by [NASA's Biological Diversity & Ecological Conservation Program](#) and developed by Audubon in partnership with BirdLife International and local conservation practitioners in Latin America to help facilitate conservation action in the region.

Birds are telling us to act on climate.

Through initiatives such as Conserva Aves and the Americas Flyways Initiative, we are helping to create and strengthen protected areas, work in collaboration with private landowners on conservation in working lands, promote responsible siting of clean energy, and invest in nature-based climate solutions.



Ochre-fronted Antpitta

The time to act is now

Climate change is reshaping Latin America's habitats and the lives of the birds that depend on them. These findings show that over 75% threatened forest bird species in the region face heightened vulnerability to a warming climate. Many of these species are projected to lose much of their current range on a high-emissions path and potentially go extinct. These birds—many found nowhere else on Earth—are sending us a clear warning about the fragility of the natural systems we all rely on. Yet the science also gives us reason for hope: if we act decisively to limit global warming to below 2 °C, we can cut the vulnerability for 60% of threatened forest species and give these species a fighting chance.

Protecting birds in a changing climate means protecting the places they need today while preparing for the world of tomorrow. That starts by focusing on Climate Strongholds—key regions that will continue to provide suitable habitat even as conditions shift—and by supporting local communities and governments working to conserve and restore these landscapes. Through initiatives

By keeping global warming below 2° C and protecting key Climate Strongholds, we can give Latin America's threatened forest birds a fighting chance—cutting climate vulnerability for 60% of species and ensuring a healthier, more resilient future for both birds and people.

such as Conserva Aves, the Americas Flyways Initiative, and regenerative agriculture efforts, we are helping to create and strengthen protected areas, work in collaboration with private landowners on conservation in working lands, promote responsible siting of clean energy, and invest in nature-based climate solutions. Birds connect people across borders, reminding us that the fight against climate change and biodiversity loss is one and the same. By listening to what birds are telling us and taking bold, collective action, we can ensure a future where both people and birds can thrive.

Birds connect people across borders, reminding us that the fight against climate change and biodiversity loss is one and the same.



Hyacinth Macaw

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