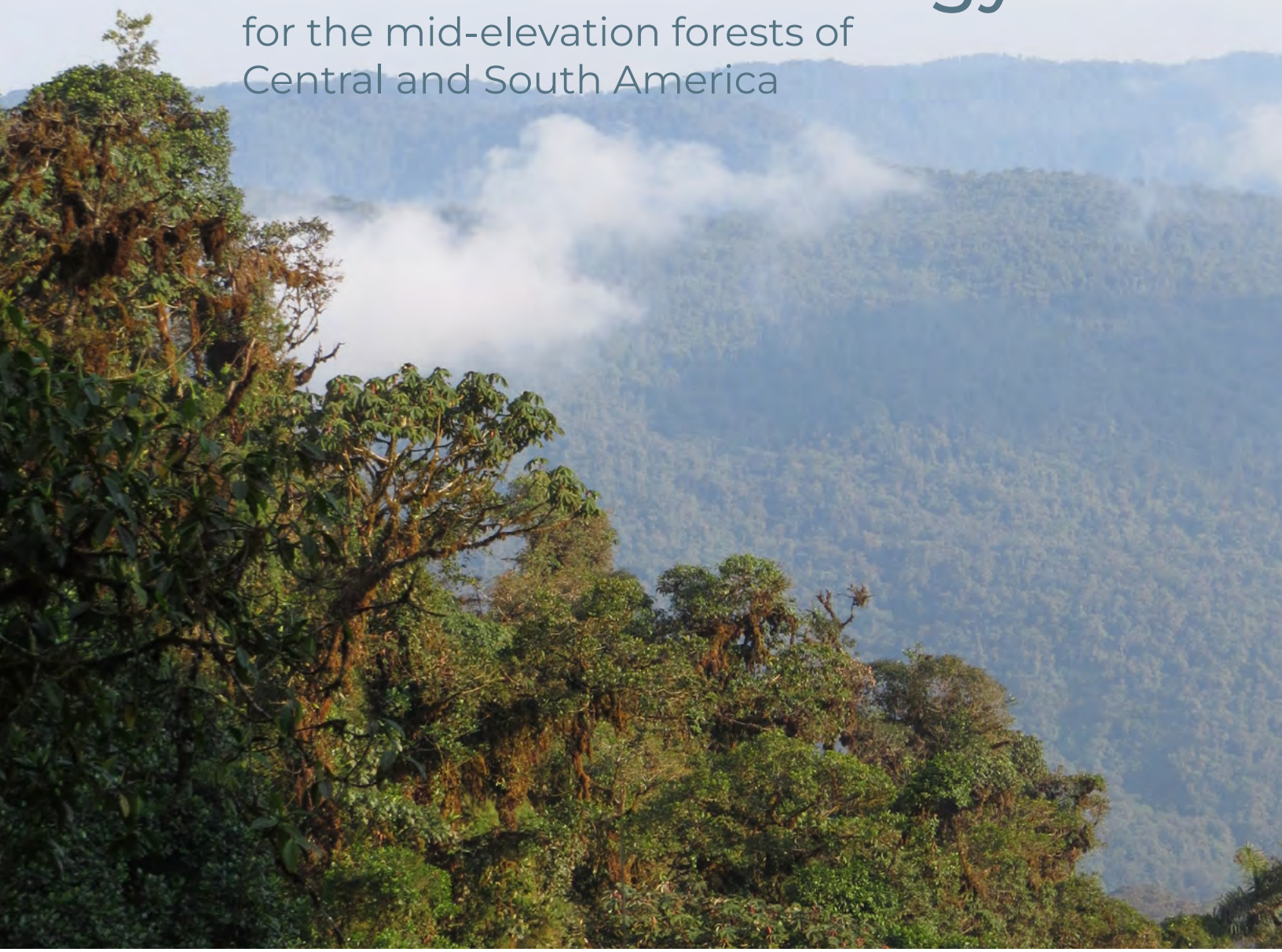
Conservation Investment Strategy

for the mid-elevation forests of Central and South America



SELVA

U.S. FISH & WILDLIFE SERVICE

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ACKNOWLEDGEMENTS

The development of this plan would not have been possible without the participation and expertise of over 200 individuals representing around 79 organizations/institutions. We cannot thank all of you enough and we hope the plan reflects your vision of how to bring about meaningful conservation in mid-elevation forests as closely as possible.

We thank the following organizations and institutions for their commitment to the planning process. A detailed list of all the individuals involved in the workshops is presented in Appendix 1.

México: Comisión Nacional de Áreas Naturales Protegidas-CONANP, Instituto para el Desarrollo Sustentable-en Mesoamérica – IDESMAC, Pronatura Sur, Secretaría de Medio Ambiente y Recursos Naturales – SEMARNAT; **Guatemala:** Consejo Nacional de Áreas Protegidas-CONAP, Centro de Estudios Conservacionistas-CECON de la Universidad de San Carlos-USAC, Instituto de Investigaciones del Centro Universitario de Zacapa-CUNZAC, Fundación Defensores de la Naturaleza; **El Salvador:** Asociación Territorios Vivos, Salva Natura; **Honduras:** Asociación Hondureña de Ornitología-ASHO, Centro Zamorano de Biodiversidad, Instituto Nacional de Conservación Forestal y Áreas Protegidas-ICF, Mesoamerican Development Institute, Mi Ambiente, Secretaría de Relaciones Exteriores y Cooperación Internacional; **Nicaragua:** Fundación Cocibolca, Global Communities, Quetzalli Nicaragua S.A., Universidad Centroamericana; **Costa Rica:** Asociación Ornitológica de Costa Rica, Escuela de Biología de la Universidad de Costa Rica, Proyecto Cafetal, Proyecto Cerúlea, Sistema Nacional de Áreas de Conservación de Costa Rica-SINAC (Parque Internacional La Amistad); **Panamá:** Adopta Bosque, Sociedad Mesoamericana para la Biología de la Conservación-Capítulo Panamá, Sociedad Audubon de Panamá, Fundación Naturaleza y Ciencia PTY, Mi Ambiente, Red de Reservas Privadas de Panamá, Secretaría para la Aplicación de la Legislación Ambiental del Tratado de Promoción Comercial Estados Unidos-Panamá (SALA); **Colombia:** Anthocephala, Asociación de Usuarios del Río Bolo (ASOBOLO), Asociación Calidris (BirdLife), Asociación de Usuarios del Río Frayle ASOFRAYLE, Asociación SELVA, Audubon Colombia, Birding Times Colombia S.A.S, Bosque Modelo Risaralda, Corporación Autónoma Regional del Cauca (CRC), Corporación Autónoma Regional de Cundinamarca (CAR), Corporación Autónoma Regional del Valle del Cauca (CVC), Corporación Autónoma Regional de Risaralda (CARDER), Corporación Autónoma Regional de Nariño (Corponariño), Centro para la Investigación en Sistemas Sostenibles de Producción Agropecuaria (CIPAV), Conservación Internacional, Corpopalo, Corporación para la Gestión Ambiental Biodiversa,

Escuela de Restauración Ecológica (Universidad Javeriana), Federación Nacional de Cafeteros, Fundación Ambiental Dapaviva, Fundación Ecológico, Fundación Natura, Fundación Solidaridad Latinoamericana, Fundación Trópico, Fundación Xye, Gobernación de Cundinamarca, Hacienda la Leona Bird Watching, Instituto Humboldt, Jardín Botánico de la Universidad Tecnológica de Pereira, Parques Nacionales Naturales, Fundación ProAves, Secretaría de Ambiente, Wildlife Conservation Society (WCS); **Ecuador:** Aves y Conservación, Bosque Modelo Chocó Andino, Birdlife International, Comité Ecuatoriano de Registros Ornitológicos, Consorcio para el Desarrollo Sostenible de la Ecorregión Andina (CONDESAN), Mindo Cloud Forest, Naturaleza & Cultura Internacional; **Perú:** Centro de Ornitología y Biodiversidad (CORBIDI), Asociación de Ecosistemas Andinos (ECOAN), Servicio Nacional Forestal y de Fauna Silvestre; **Canada:** Canadian Wildlife Service-CWS; **United States:** American Bird Conservancy, Smithsonian Migratory Bird Center, US Fish and Wildlife Service-USFWS.

The following planning team was central to the coordination of the conservation standards workshops, stakeholder engagement and revising drafts of this plan: Becky Stewart, ECCC-CWS; Randy Dettmers, USFWS; Rosabel Miro, Audubon Panamá; Yenifer Lisbet Díaz Wong, Audubon Panamá; Nicholas Bayly, SELVA; Ana M. González, SELVA & ECCC; María Alejandra Meneses, SELVA; Estuardo Secaira, independent consultant in Conservation Standards.

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Author contributions:

A.M.G. and N.B. led the planning team, researched and compiled the information for the development of the Conservation Standards and directed the writing of the Plan.

E.S. led the Conservation Standards process including the development of the situational models and theories of change.

N.B. coordinated the development of the spatial analyses and associated maps, with support from M.A.M., as well as calculations related to population and restoration indicators and targets.

S.E. and N.B. prepared the Plan budgets.

R.M. and Y.L.D. were part of the planning team and coordinated Central American participation in the Conservation Standards workshops.

A.M.G., N.B. and M.A.M. coordinated South American participation in the Conservation Standards workshops.

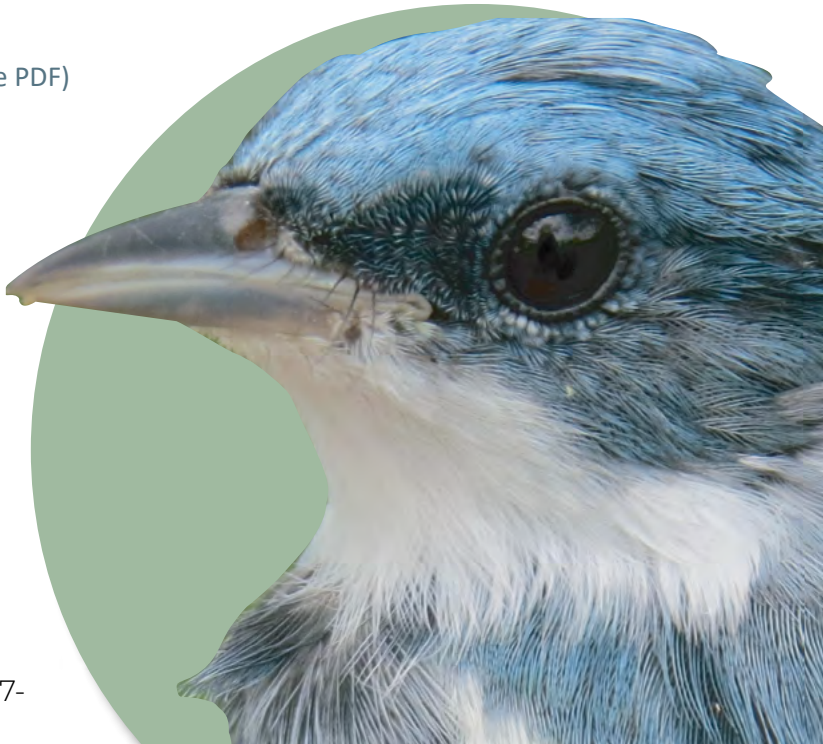
B.S. and R.D. conceived and executed the idea for the development of the Plan, were part of the planning team, oversaw the development of the plan, and contributed to the review and editing of the final document. B.S. arranged funding for the implementation of the Plan. R.D. wrote the background.

Photography:
Nicholas Bayly.

Edition English version:
Nicholas Bayly and Becky Stewart

Design:
Andrea Olarte Flórez

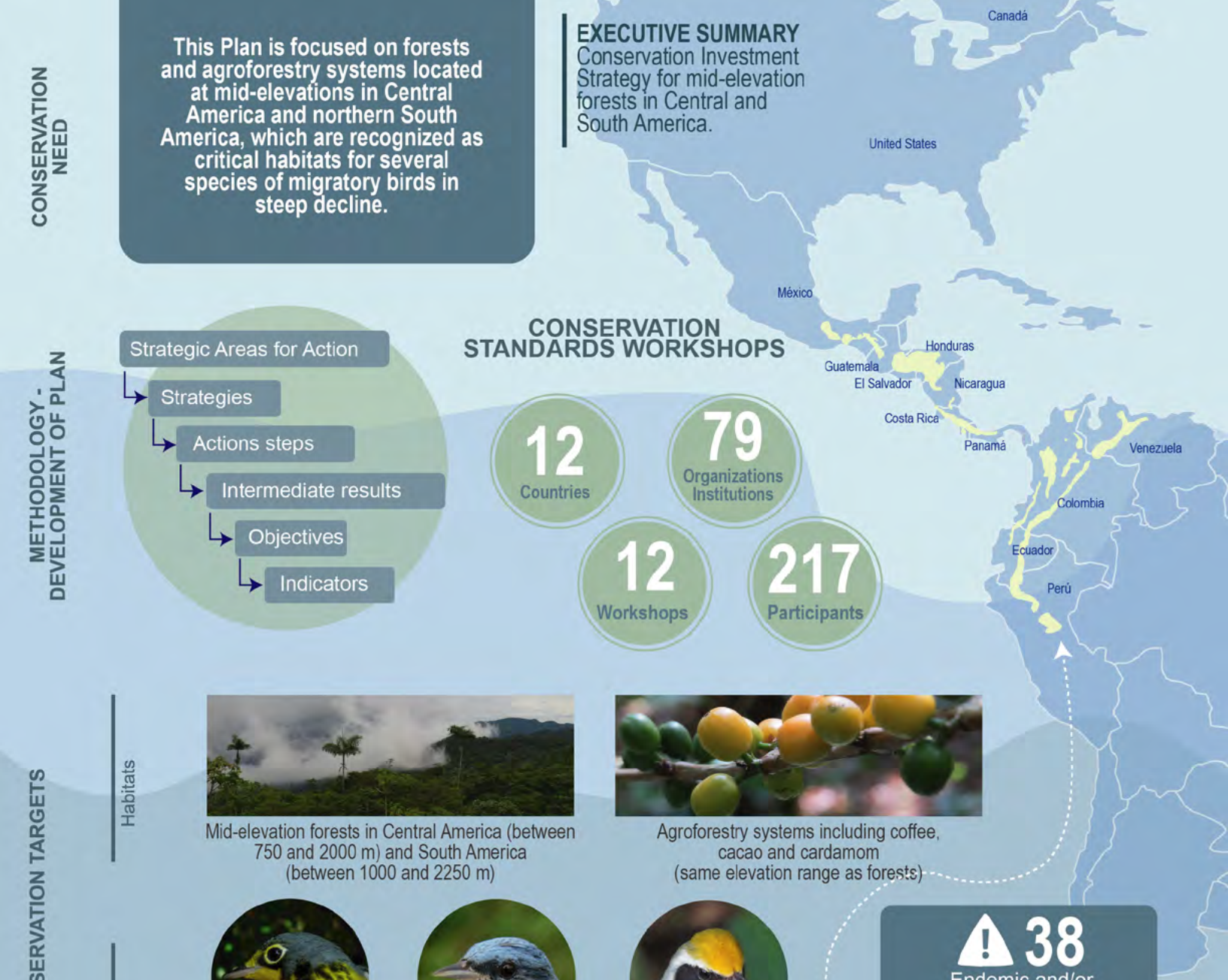
CONTENT



CONSERVATION NEED

This Plan is focused on forests and agroforestry systems located at mid-elevations in Central America and northern South America, which are recognized as critical habitats for several species of migratory birds in steep decline.

EXECUTIVE SUMMARY
Conservation Investment Strategy for mid-elevation forests in Central and South America.



METHODOLOGY - DEVELOPMENT OF PLAN

- Strategic Areas for Action
  - Strategies
    - Actions steps
      - Intermediate results
        - Objectives
          - Indicators

CONSERVATION STANDARDS WORKSHOPS

- **12** Countries
- **79** Organizations Institutions
- **12** Workshops
- **217** Participants

CONSERVATION TARGETS

Habitats

Mid-elevation forests in Central America (between 750 and 2000 m) and South America (between 1000 and 2250 m)

Agroforestry systems including coffee, cacao and cardamom (same elevation range as forests)

Species

Canada Warbler (*Cardellina canadensis*)
Population decline
63%

Cerulean Warbler (*Setophaga cerulea*)
Population decline
73%

Golden-winged Warbler (*Vermivora chrysoptera*)
Population decline
61%

38 Endemic and/or threatened birds

27 Species in South America

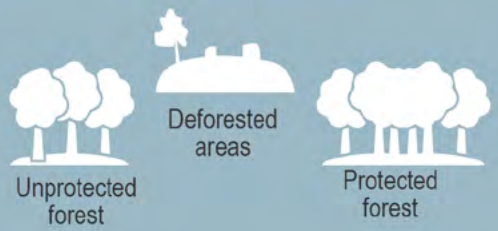
11 Species in Central America

PRELIMINARY FOCAL GEOGRAPHIES

With the goal of identifying and proposing places where conservation actions might be most effective, a priority setting exercise was carried out as part of the planning process in consultation with workshop participants. *See Figure 6*

1. Distribution mapping. (eBird)
2. Distributions overlapped and pixels with high probability of occurrence selected.
3. Overlap of resulting pixels with forest cover and protected area layers.

> *"The resulting map identifies a series of focal geographies throughout the area of interest of the plan where implementing conservation actions will benefit two or more of the target species"*



SITUATION AND THREATS

Situation

Deforestation rates over the last two decades (2000-2019) in Central and South America →

- 13% Guatemala & Honduras
- 7% Nicaragua
- 3% Costa Rica, Colombia & Perú
- <2% Panamá & Ecuador

> "Working with the agents of deforestation to tackle underlying causes is key to mitigating the threats and direct causes of deforestation"

Threats

Direct causes of habitat loss related to human activities.

- Advance of the agricultural frontier
- Advance of the cattle ranching frontier
- Transformation of shade-grown coffee to sun-grown coffee or other land uses

Underlying causes
Demographic
Economic
Technological
Political
Cultural

GOALS AND OBJECTIVES

General goal

Decrease the loss of forested habitats, increase the availability of habitat in degraded areas, maintain and/or increase the area covered by agroforestry systems within the Plan's area of action in Central America and northern South America, and halt the population decline of the three Target species – 2033

Conservation targets

Mid-elevation forests

Objective. Include 50% of their current extent in conservation areas by 2033

Objective. Increase tree cover in 37,200 ha in South America and in 9,800 ha in Central America - 2033

Plantations of shade-grown coffee, cacao and cardamon

Objective. Maintain and increase the current extent of shade-grown plantations

Target Migratory Birds

Objective. Increase the population of the three Target species by 5% - 2033

IMPLEMENTATION: STRATEGIC AREAS FOR ACTION

Strategic Areas for Action





1	2	3	4	5
Conservation Areas	Indigenous and afro-descendent lands	Best Agricultural & Livestock Practices, Incentives & Ecological Restoration	Marketing Biodiversity Friendly Coffee	Land use Planning & Environmental Regulation

Strategies and Action Steps

Threat Reduction

1	2	3	4	5
Expansion of the agricultural and livestock frontiers halted	Expansion of the agricultural and livestock frontiers halted Grazing in forests and the use of fire to renovate pastures reduced or eliminated Forest fires caused by the use of fire for agriculture and cattle ranching reduced or eliminated		Conversion of shade-grown coffee to sun-grown coffee or other crops reduced	Expansion of tourist, energy and transport infrastructure better regulated

FINANCING

Implementation of Plan

The implementation of the Plan in the first 10 years has an estimated cost of

$71,359,475 USD

1	2	3	4	5
				
$10,334,500	$6,498,250	$48,188,800	$3,942,675	$2,395,250

1

CONSERVATION NEEDS

1.1
Why a conservation investment strategy?

Conservation Investment Plans are a mechanism to evaluate the status of habitats and target species, establish priority conservation strategies and actions, establish performance indicators, determine the resources needed to achieve desired results, and guide conservation decision-making. This Plan is focused on forests and agroforestry systems located at mid-elevations in Central America and northern South America, which are recognized as critical habitats for Neotropical migratory birds, particularly migratory species of conservation concern such as the Canada Warbler (Cardellina canadensis), Cerulean Warbler (Setophaga cerulea) and Golden-winged Warbler (Vermivora chrysoptera). The loss and degradation of these mid-elevation habitats has been identified as a primary driver of population declines in these species (Gonzalez et al., 2017; Kramer et al., 2018; Wilson et al., 2018).

Although Conservation Plans exist for each of the species listed above, the objective of this Plan is to strengthen previously identified conservation strategies and actions, focusing efforts in areas where mid-elevation habitats critical to the conservation of multiple species are located. Conservation efforts for these habitats will result in the conservation of declining Neotropical migratory species, as well as providing an important opportunity to safeguard other groups of interest such as resident birds, amphibians, reptiles and mammals (Wilson et al., 2021). Mid-elevations in the countries covered by the Plan also support high rural population densities, providing a unique opportunity to formulate and implement strategies that simultaneously favor biodiversity and the well-being of local communities.

Creating a plan that effectively contributes to the recovery of migratory and resident bird populations, necessitates a planning process that ultimately results in the broad-scale collaborative implementation of strategic conservation actions, with participation of community and institutional actors from North, South and Central America. This Plan has been designed to facilitate collaboration among multiple organizations, maximize the scale at which conservation actions can be implemented, and measure the success of conservation outcomes.

VISION

To conserve, sustainably manage and restore forests and agroforestry systems at mid-elevations in Central and northern South America in order to maintain and increase the non-breeding habitat of the Cerulean Warbler, Golden-winged Warbler and Canada Warbler, thus contributing to their conservation, and to the wellbeing of the communities that are an integral part of these regions.

PLANNING AND DEVELOPMENT PROCESS

1.2 Background

This Conservation Plan continues and builds on the work of a group of international partners to conserve birds at risk in the Americas.

Partners in Flight (PIF), a partnership of bird conservation entities, organized two international conferences in 2013 and 2017 that brought together scientists and conservationists from across the Western Hemisphere concerned about the declines experienced by Neotropical migratory birds. These conferences aimed to facilitate the development and implementation of strategic plans that address the threats faced by these birds. They also aimed to establish international collaborations among partners from the breeding and non-breeding areas of Neotropical migratory birds of high conservation concern.

Following the 2013 congress, a draft Business Plan for the Conservation of the Central and South American Highlands was generated. The congress and business plan were the precursors to this Plan and focus on the same target species, habitats and geographies. An initial assessment of high priority threats and strategies to address those threats was presented at the congress. However, the business plan was never finalized, in part because it was recognized that there was insufficient international participation and, therefore, the plan did not include the wealth of knowledge that existed in Latin America about the threats and conservation processes in the region.

The approach used in the development of this Plan was based, in part, on these earlier events and experiences. In particular, the new approach emphasized the involvement of a broad and diverse set of partners from all countries hosting mid-elevation forests in Central and South America and ensured that the planning process was led by an experienced team of Latin American professionals. It also positioned mid-elevation forests as the main focus of the Plan to increase the Plan's audience, and adopted the Open Standards for the Practice of Conservation methodology to strengthen the planning process. The collective knowledge, experience and interests of this broad set of partners provided a solid foundation for this Plan and will be fundamental to its implementation.

1.3
Building partnerships for conservation implementation

The success of any conservation plan is directly linked to the rate of appropriation and implementation by a representative group of stakeholders. With this in mind, workshops and meetings for the Plan's development were designed to maximize stakeholder participation through the use of virtual platforms and by designating Spanish as the primary language. To further facilitate the participation of the desired breadth of stakeholders, a list of potential stakeholders from across eleven Latin American countries was drawn up and over 140 individuals/organizations/institutions were contacted prior to the initiation of planning workshops. In South America, one-on-one virtual meetings were held with 21 potential stakeholders to explain the planning process and discuss the value of each stakeholder's contribution – this personalized process was key to ensuring the participation of public institutions in Colombia, for example.

As a result, workshops were attended by a total of 217 individuals representing 79 entities from twelve countries, with representation from national protected area authorities, regional environment authorities, environment ministries, local and international NGOs, ornithological groups, academic institutions, birdwatching tourism businesses, coffee grower's associations and coffee federations **(Appendix 1).** The diverse and committed community that arose out of the planning process represents a crucial resource for the implementation of this Plan and a community that we hope will grow with the Plan's publication and implementation. Nonetheless, there was limited engagement with individuals representing Indigenous and Afro-descendant communities in the process, and engaging communities within the geographic scope of the Plan should be prioritized in the early stages of implementation.

1.4 Methodology

The development of this Investment Strategy was carried out in four phases implemented between January and May 2021 **(Appendix 2). Phase 1** was a planning phase and included a review of the conservation strategies and actions proposed in existing conservation plans for the three target species (see below) to avoid duplicating efforts. **Phases 2 and 3** were developed through a series of workshops using the Conservation Standards methodology. In **Phase 2**, conservation targets were defined and an analysis of threats was carried out independently for Central and South America, prior to formulating conservation objectives and strategies and integrating the results from the two regions in a single conceptual diagram. In **Phase 3**, the process for implementing the Plan was established, which is composed of five Strategic Areas for Action, each with an overall Goal and Threat Reduction Objectives and respective indicators. For each Strategic Area of Action, a set of conservation strategies and key activities or action steps were designed, and a series of intermediate results, objectives and indicators were defined **(Fig. 1)**. In Phase 4, a technical report summarizing the previous three phases was prepared, which was the basis for this document.

Figure 1. Components and organization of each of the five Strategic Areas for Action. The number of strategies or activities, for example, varies by Strategic Area for Action.

2

CONSERVATION TARGETS

Highland or montane forests and associated agroforestry systems throughout Central and South America have increasingly been recognized as vital non-breeding habitat for a diverse community of long-distance Nearctic-Neotropical migratory birds (Cespedes et al. 2021) as well as numerous endemic and threatened resident vertebrates (Wilson et al. 2021).

Taking into account the above and following an extensive literature review and a workshop with strategic actors, two habitats (Section 2.1) and three species (Section 2.2) were selected as **conservation targets** for this Plan.

1. Mid-elevation forests in Central America (between 750 and 2000 m) and South America (between 1000 and 2250 m)
2. Agroforestry systems including coffee, cocoa and cardamon (in the same elevation range defined above for forests).
3. The Canada Warbler *(Cardellina canadensis)*, Cerulean Warbler *(Setophaga cerulea)* and Golden-winged Warbler *(Vermivora chrysoptera)*.

From October to April each year (i.e., during the stationary non-breeding period of the target species), the two target habitats hold the majority of individuals of the target bird species and the loss of these two habitats has been recognized as one of the main drivers of population declines (Colorado et al. 2012; Wilson et al. 2018). In Central America, in particular, these habitats double as stopover habitat for Cerulean and Canada Warblers during both pre- and post-breeding migration periods, providing a vital link between North American breeding grounds and South American non-breeding grounds.

In addition to the target habitats and species targets described above, **human wellbeing in the communities and populations** within the area of influence of the plan is a target. Specifically, three of the dimensions of human wellbeing laid out in the Millennium Ecosystem Assessment *(https://www.millenniumassessment.org)* were selected: material wellbeing, health and security. This target encompasses rights such as the right to live in a healthy environment, to have secure and stable access to natural resources (e.g., clean water) and to have a sustainable livelihood that ensures access to housing and food security.

2.1 Target Habitats

2.1.1 Mid-elevation forests

The conservation target encapsulated in the term mid-elevation forest can take a variety of names depending on elevation, latitude and annual precipitation.

For example, the Holdridge life zones system (Holdridge, 1947), which uses gradients of temperature and precipitation relative to elevation to define plant communities or associations across different regions, defines forest types across the tropical Andes as follows: Tropical forests (<1000 m asl), Premontane forest (1000-2000 m asl), Lower Montane forest (2000-3000 m asl), and Montane forest (3000-4000 m asl). Variable precipitation within each elevation belt results in further classification of forests as follows: Dry (1000-2000 mm/year), Moist (2000-4000 mm/year), Wet (4000-8000 mm/year), and Rainforest (>8000 mm/year). Given the above, the term mid-elevation forest refers specifically to ***premontane and lower montane forests, which may be either Moist, Wet or occasionally Rainforest.***

In Central America, however, the ranges of precipitation and elevation that define life zones differ, with transitions from one classification to another occurring at lower values of annual precipitation and elevation. Nonetheless, the same zones defined above for mid-elevation forest still apply, although it should be kept in mind that “premontane” is occasionally used interchangeably with the term “subtropical”. Importantly, in Honduras and Nicaragua mid-elevation forests may take the form of tropical pine-oak forests. To date, the evidence suggests that pine-oak forests are used by Golden-winged Warblers (Bennett 2012) but rarely by Cerulean or Canada Warblers (eBird data 2022). Further, Central American pine-oak forests are the subject of a separate conservation plan (see Alliance for the Conservation of Mesoamerican Pine-Oak Forests 2007) and were therefore not selected as a Conservation Target for this Plan.

2.1.2
Agroforestry systems (coffee, cocoa and cardamon)

Shade-grown plantations or agroforestry systems have been universally recognized as important reservoirs of tropical diversity (Perfecto et al., 1996; Waldron et al., 2012) and as habitat for a diverse community of Neotropical migratory landbirds (Cespedes et al., 2021; Gonzalez-Prieto, 2018; Komar, 2006). The retention of native trees in these systems serves an important role in the provision of habitat for migratory birds, regardless of the crop grown in the understory. For example, the richness and abundance of birds (including migratory birds) is positively related to the structural and floristic characteristics of the retained native vegetation, including canopy height and cover, the presence of epiphytes (Bakermans et al., 2012), and the diversity of shade trees (Calvo and Blake, 1998). In the specific case of the Canada Warbler, its abundance is positively related to canopy height in shade-grown coffee plantations (Céspedes and Bayly, 2018). The presence of certain tree species can also benefit migratory birds, for example, the presence of species such as Inga sp., Albizia sp., Cordia alliodora, Ficus sp., and Erythrina sp. have all been associated with higher foraging and use rates by insectivorous migratory birds (Bakermans et al., 2012; Narango et al., 2019).

Shade-grown coffee is one of the main tropical agroforestry systems in the area of influence of this Plan (Gonzalez-Prieto, 2018). The conversion of shade-grown coffee to sun-grown coffee and other agricultural uses is considered to be one of the factors driving population declines in the Target species. For the purposes of the Plan, shade-grown coffee refers to plantations where: 1) canopy cover is greater than 30%; 2) shade trees belong to three or more native species; and 3) the predominant tree species are native species.

2.2
Target species and linked geographies

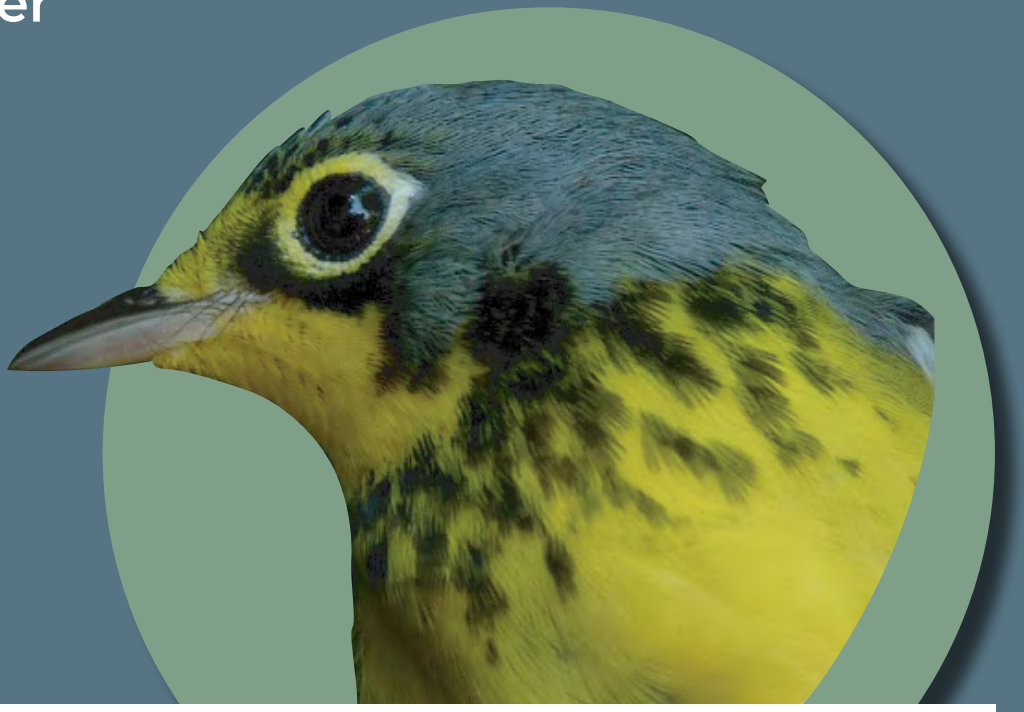
The three Target species are all steeply declining Nearctic-Neotropical migratory landbirds, whose populations have decreased by over 60% since 1970 (Rosenberg et al. 2016).

Breeding across eastern North America, these species connect the Appalachian Mountains, the Great Lakes and the Boreal Forest with mid-elevation forests and agroforestry systems in Central and South America. The conservation of these species and their habitats is a shared responsibility between the breeding and non-breeding areas. In particular, the responsibility of three North American Bird Conservation regions (BCRs; https://nabci-us.org): BCR 12 (Boreal Hardwood Transition), BCR 13 (Lower Great Lakes/St. Lawrence Plain) and BCR 28 (Appalachian Mountains) is high, given that they hold significant populations of two or more of this Plan's Target species. Meanwhile, BCRs 6 (Boreal Taiga Plains), 14 (Atlantic Northern Forests) and 24 (Central Hardwoods) share populations of one Target species with mid-elevation forests in Central and northern South America.

In the following species accounts we summarize each species' non-breeding distribution and ecology, the main findings from the scientific literature relevant to their conservation, and the linkages between distinct breeding populations and non-breeding areas (migratory connectivity).

2.2.1

Canada Warbler *(Cardellina canadensis)*



CORE BREEDING RANGE:

BCRs 6, 12, 13, 14, 28.

CORE NON-BREEDING RANGE:

Tropical Andes of Colombia, Ecuador and Peru

MIGRATORY STOPOVERS:

Not well described but likely occur throughout Central American highlands and mid-elevation forests in southern Mexico.

ESTIMATED POPULATION SIZE:

2.6 million (Partners in Flight, 2021)

ESTIMATED POPULATION DECLINE:

63% since 1970

Non-breeding distribution and habitat use

The core non-breeding distribution of the Canada Warbler lies within the tropical Andes of Colombia, Ecuador and Peru, where it occupies pre-montane and lower montane forests between 1000 and 2250 m **(Fig. 2)**. Small populations are also found in Venezuela, Bolivia, Panama and Costa Rica. Non-breeding habitats include secondary and mature forests, shade-grown coffee plantations and fragments of natural vegetation in working landscapes, such as riparian strips and "guaduales" (bamboo forests common in Andean landscapes). Birds are absent from open vegetation types with few or no trees, such as silvopasture or sun-grown coffee plantations, but may use either when forested habitat is present nearby (Cespedes et al., 2021; Céspedes and Bayly, 2018; Mcdermott and Rodewald, 2012).

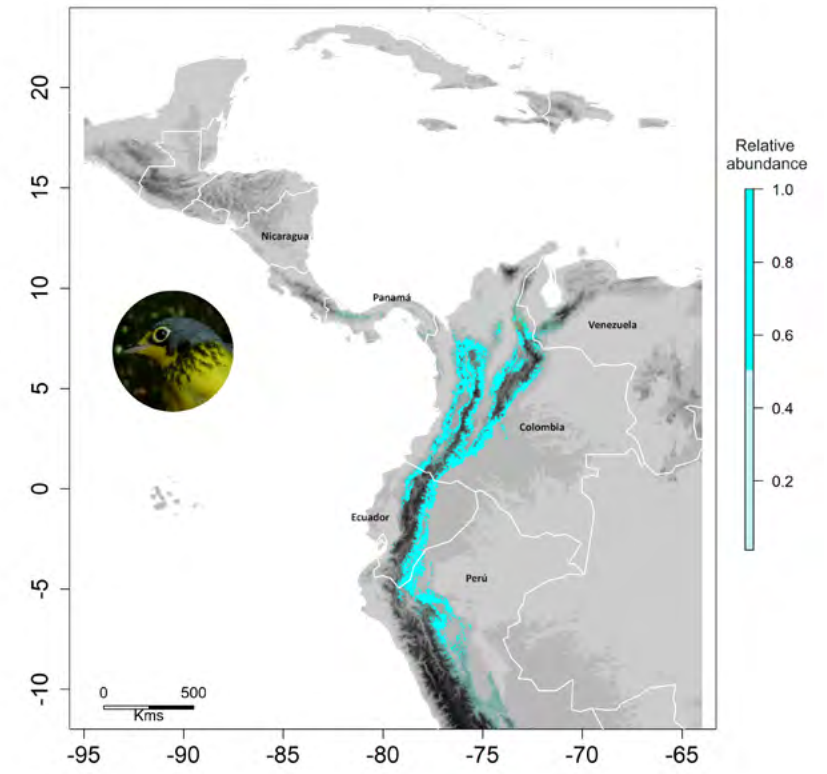


Figure 2. Abundance surface for the non-breeding distribution of the Canada Warbler (adapted from the eBird Status and Trends data products; Fink et al. 2021)

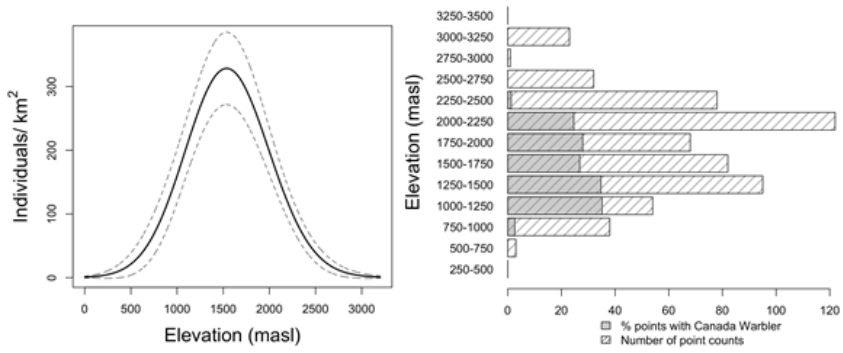


Figure 3. Variation in the density of Canada Warblers by elevation in the Andes of Colombia, indicating a mid-elevation peak in abundance (adapted from Céspedes and Bayly 2018).

Non-breeding ecology

An intensive study of the species' ecology in the Colombian Andes found birds wintering between 750 and 2300 m, however, most birds occurred between 1000 and 2250m and modelling of abundance by elevation revealed a mid-elevation peak around 1500 m (Fig. 3; Céspedes and Bayly 2018). Abundance was also found to vary by habitat, with higher abundance in mature taller forests, followed by secondary forests and shade-coffee plantations.

Abundance was positively correlated with canopy height, implying that the presence of mature trees increases densities in both forest and shade coffee. The same study found that density increased with cloud cover across the Andes, indicating that moister habitats may be of higher quality. In parallel with this finding, Gonzalez et al. (2020) found that the body condition of birds in both forest and shade-coffee decreased with the progression of the dry season in the Eastern Andes of Colombia and was lowest in an El Niño year with below average annual precipitation.

To date, no clear evidence for differential use of habitats by males or females or by elevation has been found (Céspedes and Bayly, 2018), however, there is a tendency for males to occur with greater frequency in native forest, especially in years of low precipitation (González et al., 2020). In an evaluation of habitat quality, Gonzalez et al. (2020) used body condition and survival as indicators, finding no clear difference between shade-grown coffee and forest for population maintenance. However, it should be noted that Cespedes et al. (2018, 2021) found lower densities in shade coffee compared to adjacent forests, implying a lower carrying capacity in shade coffee. In conservation terms, **this means that a greater area of shade-grown coffee is required to maintain a comparable population of Canada Warblers relative to forest.**

Migratory connectivity and limiting factors

Population trends vary across the length of the breeding range of the Canada Warbler, with those in the western extent of their breeding distribution faring better than those in the east and in the Appalachian Mountains (Sauer et al., 2014). Defining migratory connectivity is therefore key to directing conservation actions to regions used by declining populations. An analysis of stable isotopes in feathers collected in the three Andean ranges of Colombia, revealed longitudinal connectivity between populations, with **declining populations largely linked to the eastern slope of the Eastern Andes** (González-Prieto et al., 2017), implying that actions there could counteract declines. Through the application of a full life cycle model, Wilson et al. (2019) reached the same conclusion, finding that **the most likely driver of population declines in the Canada Warbler was the loss of mid-elevation forest on the eastern slope of the Andes** in Colombia and Ecuador.

Conservation recommendation

Recovery of Canada Warbler populations depends, in part, on the protection and restoration of mid-elevation forests and the maintenance/increase of agroforestry systems in the Eastern Andes, primarily along the eastern slope, in Colombia and Ecuador. **Conserving tall mature forest, given the relationship between density and canopy height, should be central to any conservation strategy, in order to ensure quality habitat for remaining populations. Elsewhere in the Andes, avoiding further deforestation or loss of shade coffee plantations, is necessary to avoid declines in currently stable breeding populations.** Density estimates in mature forest vary from 300 individuals/km² (Céspedes and Bayly, 2018) to 400 individuals/km² (Cespedes et al., 2021), and are in good agreement with a home range estimate of 0.2 hectares using radio-telemetry (Gonzalez, A. unpublished data). **Based on the assumption that a population recovery of 5% (130,000 individuals) could be achieved by creating new habitat on the non-breeding grounds and current density estimates (350 ind./km²), the reforestation or restoration of approximately 371 km² or 37,143 ha of mid-elevation forest between 1,000 and 2,250 m is required** (more if efforts include a mix of forest and agroforestry systems).

2.2.2

Cerulean Warbler *(Setophaga cerulea)*

CORE BREEDING RANGE:

BCRs 24, 28

CORE NON-BREEDING RANGE:

Tropical Andes of Venezuela, Colombia, Ecuador and Peru.

MIGRATORY STOPOVERS:

Not well described but likely occur primarily along the Caribbean slope of Honduras, Nicaragua and Costa Rica.

ESTIMATED POPULATION SIZE:

530,000 (Partners in Flight, 2021)

ESTIMATED POPULATION DECLINE:

73% since 1970

Non-breeding distribution and habitat use

Cerulean Warblers are found throughout the tropical Andes of Venezuela, Colombia, Ecuador and Peru during the non-breeding season, with isolated populations in massifs such as the Sierra Nevada de Santa Marta of northern Colombia **(Fig. 4)**. An earlier study emphasized the importance of sites in Colombia and Venezuela relative to those in Ecuador and Peru (Colorado et al., 2012). This finding is partially supported by eBird Status and Trends models, which predict higher occurrence rates on the more northerly slopes of both the Cauca and Magdalena valleys in Colombia, and along the length of the eastern slope of the Eastern Andes in Colombia and Ecuador (Fink et al., 2020). The species occupies a range of forested habitats, including mature forest, advanced secondary growth, shade-grown coffee and shade-grown cacao (Bakermans et al., 2009; Colorado et al., 2012).

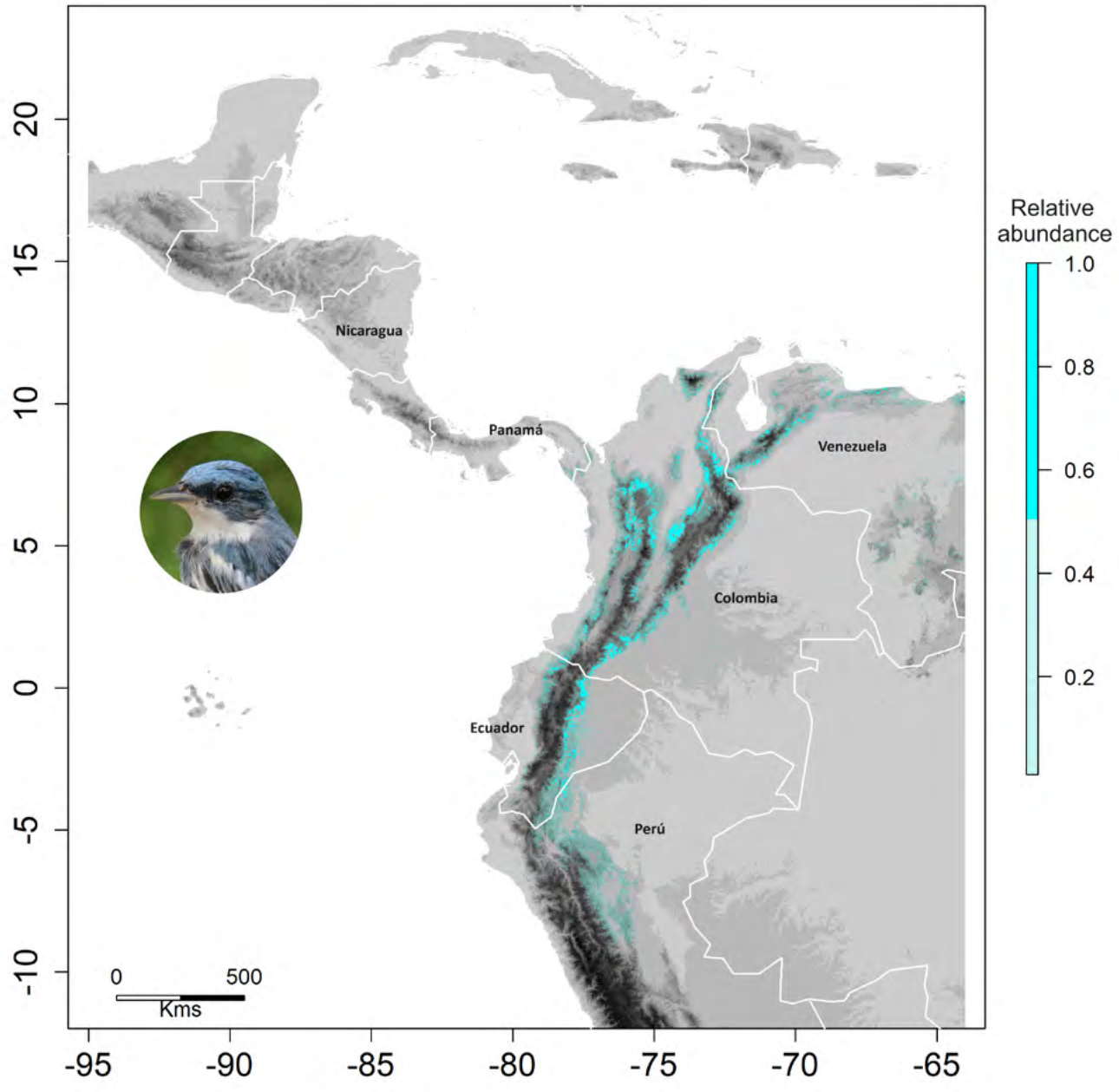


Figure 4. Abundance surface for the non-breeding distribution of the Cerulean Warbler (adapted from the eBird Status and Trends data products; Fink et al., 2021).

Non-breeding ecology

In a study in the tropical Andes, Cerulean Warblers were found at elevations between 900 and 2600 m, with most records occurring between 1000 and 1800 m (Colorado et al. 2012). A similar result was found for Colombia's coffee growing region, where most records occurred between 1250-2250 m (Céspedes et al., 2020). How density varies by habitat is unclear, with a comparison of forest and shade-grown cacao plantations in Colombia revealing similar abundances (Céspedes et al. in prep), while a comparison of shade-grown coffee and mature forest in Venezuela found higher densities in the former (Bakermans et al., 2009). Most authors agree that reduced tree cover or a lack of forest in the landscape, results in lower densities or probability of occurrence (Colorado et al., 2012; Jones et al., 2000).

An important aspect of non-breeding ecology is the species' strong association with mixed-species flocks (Muñoz and Colorado, 2021). Most observations, both in forest and agroforestry systems, relate to birds in mixed flocks, where two or more individuals may be present (Bakermans et al. 2009). Dependence on mixed-species flocks may be a key limiting factor for the species in heavily transformed landscapes where mixed flocks are either small or absent (Mcdermott and Rodewald, 2014).

Migratory connectivity and limiting factors

A stable isotope analysis of feathers grown during the non-breeding period, collected from birds captured in distinct breeding regions, found evidence for a "parallel" migration system. More westerly breeding birds were connected to the south-western extent of the non-breeding range in Ecuador and Peru, while eastern populations were connected to the northern extent of the non-breeding range in Colombia and Venezuela (Jones et al., 2008). The deployment of geolocators across multiple breeding populations found a similar pattern, with western birds breeding in Missouri and Arkansas largely migrating to Peru, Appalachian breeders migrating to Colombia, and north-eastern populations to Venezuela (Raybuck et al. 2022). Both results point to moderate connectivity between the most steeply declining populations and non-breeding areas in Colombia and Venezuela (Jones et al., 2008), which appear to be located primarily in the Eastern Andes. Similar to the conclusions for the Canada Warbler, this suggests that **habitat loss along the eastern slope of the Andes, especially in Colombia, may be a driver of declines.**

Conservation recommendation

Given the current information on connectivity between declining populations and non-breeding areas, recovery of Cerulean Warbler populations likely depends on the protection and restoration of mid-elevation forests and the maintenance/increase of agroforestry systems in the Andes of Colombia and Venezuela. Elsewhere in the Andes of Ecuador and Peru, avoiding further deforestation or loss of shade-grown coffee plantations, is necessary to avoid declines in currently stable breeding populations. Density estimates for Cerulean Warblers in distinct non-breeding areas vary from 0.17 birds/ha to 2.7 birds/ha (Bakermans et al., 2009; Jones et al., 2000). A radiotelemetry study in secondary forest in Colombia found marked variation in home range size, with adult males using around 4.3 ha and immature males 14.3 ha, as well as overlapping ranges in three or more birds (Raybuck unpublished data). The same study estimated that 132 individuals were present in 1 km², which is equivalent to 1.32 individuals/ha. **Based on the assumption that a population recovery of 5% (26,500 individuals) could be achieved by creating new habitat on the non-breeding grounds and current density estimates (1.32 ind./ha), the reforestation or creation of agroforestry systems covering approximately 200 km² or 20,075 ha between 1000 and 1800 m is required.**

2.2.3

Golden-winged Warbler *(Vermivora chrysoptera)*

CORE BREEDING RANGE:

BCRs 12, 13, 28

CORE NON-BREEDING RANGE:

Highlands of Honduras, Nicaragua, Costa Rica and Panama, low density occurrence in Guatemala, Belize, southern Mexico and Colombia.

MIGRATORY STOPOVERS:

Not well described but likely occur in Central America highlands, Yucatan Peninsula and parts of southern Mexico e.g., Chiapas

ESTIMATED POPULATION SIZE:

390,000 (Partners in Flight, 2021)

ESTIMATED POPULATION DECLINE:

61% since 1970

Non-breeding distribution and habitat use

Golden-winged Warblers occur throughout Central America from southern Mexico to Panama and in the Andes of Venezuela and Colombia (rarely Ecuador). High occurrence rates are limited to mountainous areas of Honduras, Nicaragua, Costa Rica and Panama (Bennett et al., 2018; Fink et al., 2020) **(Fig. 5).** Surveys between 2018 and 2022 across Colombia and Venezuela found very low densities of birds and detection rates were around four times lower than in Central America (Bayly et al., 2021). The species occurs in a variety of habitats including montane forest, mid-elevation forest, pine-oak forest, semi-deciduous forests, riparian strips, and shaded agroforestry systems (Bennett et al., 2018).

Several authors have reported associations with microhabitat features such as hanging dead leaves and epiphytes, which appear to provide a specialized foraging niche for the species (Chandler et al., 2016; Chandler and King, 2011). To date, differences in density between habitats have not been well described, however, high abundance is associated with intermediate canopy heights, suggesting an association with secondary forests and disturbance features (Bennett et al., 2018; Chandler and King, 2011). Use of agroforestry systems such as shade-grown coffee appears to be limited, however, a systematic study of shade-grown coffee versus forest use is lacking.

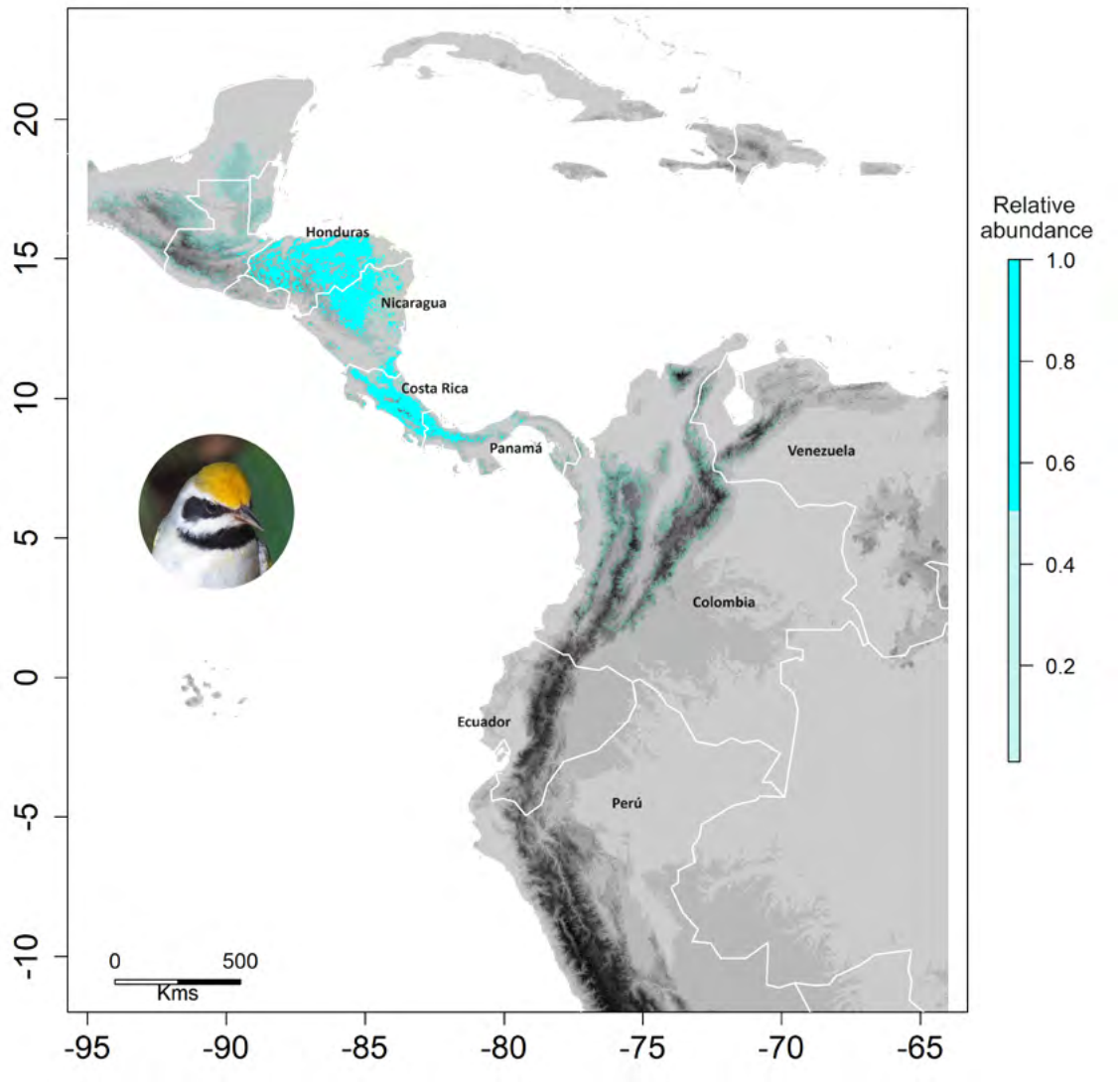


Figure 5. Abundance Surface for the non-breeding distribution of the Golden-winged Warbler (adapted from the eBird Status and Trends data products; Fink et al. 2021).

Non-breeding ecology

Golden-winged Warblers occupy elevations between 300 and 1800 m in Central America (Bennett et al., 2019a) and have been found between 600 and 2400 m in Colombia, with a peak in records between 1400 and 2200 m (Bayly et al., 2021) – implying that birds occur at higher elevations in the Andes. Importantly, Bennett et al. (2019) found marked differences in elevation use between male and female warblers, with female occupancy peaking at lower elevations (peak 750 m; range 300-1300 m) and males at higher elevations (peak 1400 m; range 800-1800 m). Similar to the Cerulean Warbler, Golden-winged Warblers are often associated with mixed-species flocks during the non-breeding season, however, the prevalence of this behavior is unclear given the male-bias in published studies (Chandler et al., 2016). Foraging studies have highlighted the dominance of probing and gleaning maneuvers, especially those directed towards dead hanging leaves but also other substrates such as bromeliads, rolled leaves, loose bark, etc., highlighting the importance of these micro-habitat features. Precipitation appears to play an important role in determining where habitats with appropriate micro-habitat features occur, with high occupancy rates associated with areas receiving between 1500 and 2500 mm per year (Bennett et al., 2019a; Chandler and King, 2011).

Migratory connectivity and limiting factors

Survival in non-breeding areas has been found to be higher than during other periods of the annual cycle, however, survival is lower in immature versus adult birds (Ritterson et al., 2021). Survival was found to increase with canopy height and where intermediate levels of vine-tangles and dead hanging leaves occur, suggesting that winter habitat may be limiting in younger forests and where key micro-habitat features are absent (Ritterson et al., 2021). Bennett et al. (2019) found that forest loss in areas occupied by females in Central America was twice as high as that for males in the same region, implying that reduced female survival could be driving declines. Information on migratory connectivity, however, suggests that limiting factors may not be acting on the non-breeding grounds. For example, steeply declining populations from the Appalachian mountains are linked to non-breeding areas in Colombia and Venezuela (Hobson et al., 2016; Kramer et al., 2017), where low occurrence rates in appropriate habitat imply that habitat availability is not limiting (Bayly et al., 2021). Stable or increasing populations in the western Great Lakes show strong connectivity with Central American populations (Bennett et al., 2019b; Kramer et al., 2017; Larkin et al., 2017), where occupancy rates are markedly higher than in South America.

Conservation recommendation

Given the current information on migratory connectivity and occupancy of non-breeding habitats, it is unclear whether the recovery of Golden-winged Warbler populations depends on the protection and restoration of non-breeding areas. Nonetheless, the strong association between declining Appalachian populations and mid-elevations in the Andes of Colombia and Venezuela implies that maintaining and increasing core habitats in this region will likely assist in the recovery of these populations. Given that most of the World population spends the non-breeding season in Central America, the species' future persistence is also highly dependent on avoiding further habitat loss there, especially at elevations between 600 and 1800 m on the Caribbean slope of Honduras and Nicaragua, and along both slopes in Costa Rica and Panama (note that protecting mid-elevation forests in Central America will also safeguard stopover regions for Canada and Cerulean Warblers).

Density estimates for Golden-winged Warblers are lacking but home ranges have between estimated at 8.77 ± 0.92 ha in Costa Rica and at 4.09 ± 1.30 ha in Nicaragua (Chandler et al., 2016)- larger than those of many migratory landbirds in the Neotropics. However, two or more birds may use overlapping ranges, suggesting that core use areas might be more appropriate for estimating space use needs – Chandler et al. 2016 estimated core use areas at 0.98 ha and 1.99 ha in Nicaragua and Costa Rica respectively. **Based on the assumption that a population recovery of 5% (19,500 individuals) could be achieved by creating new habitat on the non-breeding grounds and a density of 1.99 individuals/ha based on core use areas in Costa Rica, the reforestation or restoration of approximately 98 km² or 9,799 ha of forest between 600 and 1800 m is required.**

3

PRELIMINARY FOCAL GEOGRAPHIES

Despite the narrow elevation belt occupied by each of the target species and their habitat preferences, as described above, their combined distributions still cover a vast area of the highlands of Central and South America (see Figs. 2, 4 & 5).

With a view to guiding where conservation action may be most effective, a prioritization analysis was carried out as part of the planning process and in consultation with workshop participants. The analysis involved three steps: 1. Mapping high probability of occurrence pixels (top 25%) for each target species using eBird Status and Trends data during the non-breeding and migration periods (Fink et al., 2021); 2. Overlapping the resulting pixels and selecting those pixels where at least two of the three species had a high probability of occurrence; 3. Overlapping the resulting pixels with forest cover and protected area layers, to differentiate between three classes of pixels: A) deforested areas, B) forested but unprotected areas and C) forested protected areas. The resulting map identifies a series of focal areas throughout the geographical scope of this Plan, where conservation action is likely to benefit two or more of the focal species **(see Fig. 6).**

The areas in **Figure 6** represent a preliminary analysis and it is important to emphasize that while actions carried out in the resulting focal areas will likely generate the greatest return for any given investment, we must not rule out other areas within the non-breeding distribution of the target species that may prove important as our knowledge evolves. Many conservation strategies focus on the most vulnerable populations and for that reason we describe known connectivity to declining populations for the target species in **Table 1** below. Finally, it is important to emphasize that within each focal area, actions should be restricted to the focal elevations and target habitats defined at the start of Section 2: **mid-elevation forests and agroforestry systems between 750 and 2000 m in Central America and 1000 and 2250 m in South America.**

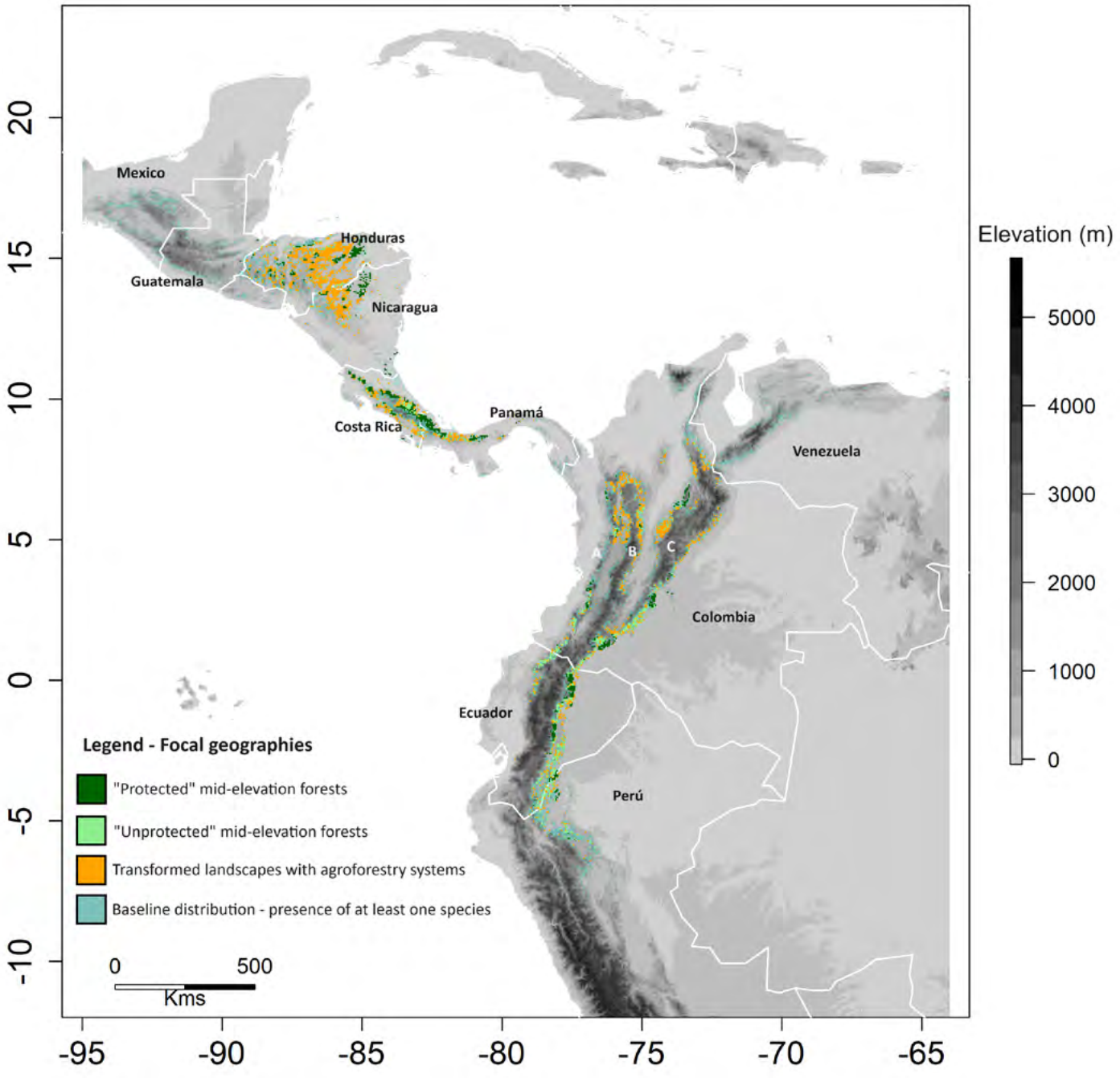


Figure 6. Preliminary focal geographies for the implementation of conservation actions for mid-elevation forests and agroforestry systems in Central and South America. Focal regions are colored in orange, light green and dark green, while high presence pixels for at least one species (baseline distribution) are in turquoise. A – Western Andes; B – Central Andes; C- Eastern Andes.

Description of preliminary focal geographies

In Table 1 we describe the focal geographies identified, their location in each country, the Target species present, the rate of forest loss, vegetation cover and suggest Strategic Areas for Action that may be most effective. Many of these regions overlap or contain priority geographies defined through other planning processes, such as Important Bird Areas (IBAs) or Key Biodiversity Areas (KBAs), and it is important to identify potential synergies with these processes during the implementation of this Plan.

Table 1. Focal geographies by country for Canada (CAWA), Cerulean (CERW) and Golden-winged Warblers (GWWA) at mid-elevations in Central and South America. The rate of forest loss and forest cover, as well as potentially successful strategies are listed for each region. Focal species for each region are color coded, where **red** implies a documented link to declining breeding populations and **black** indicates presence only during the migration periods.

Country	Region (Political units)	Target species present	Rate of forest loss	Forest Cover	Strategic areas for action
Peru	NE slope of the Andes (Cajamarca, Amazonas, San Martín)	CAWA, CERW	Medium	High	Conservation Areas Indigenous Lands
Ecuador	SE slope of Andes (Morona Santiago, Zamora Chinchipe)	CAWA, CERW	Medium	Medium	Conservation Areas Restoration Indigenous Lands
Ecuador	NE and NW slope of Andes (Sucumbíos, Napo, Carchi, Imbabura, Esmeraldas, Pichincha)	CAWA, CERW	Low	High	Conservation Areas
Colombia	SE slope of Eastern Andes (Putumayo, Caquetá, Meta)	CERW, CAWA	Medium	High	Conservation Areas Indigenous Lands
Colombia	NE slope of Eastern Andes (Meta, Cundinamarca, Boyacá, Casanare, Arauca)	CERW, CAWA	Medium	Low	Restoration & Best Practices Conservation Areas Territorial Planning
Colombia	Slopes of Magdalena Valley (Antioquia, Boyacá, Cundinamarca, Huila, Santander, Tolima)	CERW, CAWA, GWWA	Medium	Low	Restoration & Best Practices Shade-grown Coffee Conservation Areas (Antioquia)

Country	Region (Political units)	Target species present	Rate of forest loss	Forest Cover	Strategic areas for action
Colombia	Northern Central & Western Andes (Antioquia, Caldas, Quindío, Risaralda)	CERW, CAWA, GWWA	Medium	Low	Restoration & Best Practices Territorial Planning
Colombia	Western Andes - south (Cauca, Valle de Cauca, Nariño)	CERW, CAWA, GWWA	Low	High	Conservation Areas Indigenous Lands
Panamá	Talamanca mountains (Bocas del Toro, Ngabe Buglé, Veraguas, Chiriqui)	GWWA, CAWA, CERW	Low	High	Conservation Areas Indigenous Lands
Costa Rica	Caribbean Slope (Limón, Cartago, Heredia, Alajuela, Guanacaste)	GWWA, CERW, CAWA	Medium	Medium	Conservation Areas Restoration & Best Practices Shade-grown Coffee
Costa Rica	Pacific Slope (Puntarenas, San José, Guanacaste)	GWWA, CERW, CAWA	Medium	Low	Conservation Areas Restoration & Best Practices
Nicaragua	C. Highlands & Caribbean slope (Jinotega, Matagalpa, Nueva Segovia, Atlántico Norte)	GWWA, CERW, CAWA	Medium	Medium	Shade-grown Coffee Conservation Areas Restoration & Best Practices
Honduras	Central/Western Highlands (El Paraíso, Francisco Morazán, Comayagua, La Paz, Intibucá, Santa Bárbara, Cortés)	GWWA, CERW, CAWA	High	Low	Shade-grown Coffee Conservation Areas Restoration & Best Practices
Honduras	Caribbean slope (Olancho, Atlántida, Yoro, Colón)	GWWA, CERW, CAWA	High	Medium	Shade-grown Coffee Conservation Areas Restoration & Best Practices
Guatemala y México	Caribbean and Pacific slopes	CERW, CAWA	Medium	Low	(Research on stopover use)

This preliminary presentation of focal areas, should be taken exactly as that, and **should be updated on a regular basis as our knowledge of distributions, limiting factors and migratory connectivity increases.** Ongoing tracking studies and the development of a full life-cycle model for the Golden-winged Warbler, for example, will no doubt identify additional limiting factors on the non-breeding grounds.

4

ENDEMIC AND/OR THREATENED BIRDS WITHIN THE FOCAL GEOGRAPHIES

The distribution of the target species described above **(Figs. 2, 4 & 5)** and the location of the preliminary focal geographies **(Fig. 6)** overlap with regions supporting high rates of endemism for resident Neotropical birds and other vertebrates (e.g., amphibians, reptiles and mammals).

Many of these endemic residents are globally threatened and, as a consequence, actions aimed at protecting and recovering mid-elevation forests will contribute directly to national and international objectives for biodiversity conservation (Wilson et al. 2021).

To assist in identifying where the strategies outlined in this Plan may be mutually beneficial for both migratory and resident birds, we developed a database of threatened and endemic birds whose distribution and habitat use overlaps with the focal geographies identified in this Plan. To minimize the inclusion of resident species whose populations may receive little or no benefit from actions directed towards mid-elevation forests, we defined two criteria for inclusion: (1) the elevation range occupied by a species must overlap by 50% or more with the elevation ranges defined for the Target habitats **(see section 3.1)** and (2) the species must occupy an area greater than 1,500 km².

As a result, a total of 38 endemic and/or threatened species were selected, 27 species from the tropical Andes of South America and 11 from the Central American highlands **(Appendix 3 & 4),** of which 6 are classified as Endangered (EN), 24 as Vulnerable (VU) and 6 as Near-threatened (NT). Notable concentrations of threatened resident birds occur in focal geographies on the western slope of the Andes in Colombia and Ecuador, on the slopes of the inter-Andean valleys (Cauca and Magdalena valley) in Colombia, and in the Talamanca range in Costa Rica and Panama.

Top: A Bare-necked Umbrellabird (*Cephalopterus glabricollis*), an endangered species (EN) from Central America. Bottom: A Black Inca (*Coeligena prunellei*), a vulnerable (VU) Colombian endemic.

5

SITUATION AND THREATS

5.1 Situation

Mid-elevation forests throughout Central and northern South America have undergone a dramatic transformation, beginning in earnest in the mid-1800s with the introduction of cattle and the establishment of coffee plantations in the region and continuing today (Etter et al., 2008; Wassenaar et al., 2007).

For example, in the Andes of Colombia, total loss of Andean forest is estimated at 70% (Etter et al., 2006), while at mid-elevations, 40% of the area within the priority elevations defined in this Plan now has little or no tree cover (Hansen et al., 2013). Rates of forest loss over the last two decades (2000-2019) in Central and South America vary between regions. An analysis of forest loss conducted for this plan found high rates of loss in Guatemala and Honduras (13-14%, equivalent to 250,000 ha in Honduras), moderate rates in Nicaragua (6.9%) and lower rates in Costa Rica, Panama and the Andean nations (1-3.4%; see **Table 2**). Despite an apparently slowing rate of forest loss in the Andes, the area of habitat lost is greater due to a larger area of original habitat when compared to Central America, such that Colombia (181,545 ha) was second to Honduras in terms of total forest loss between 2000 and 2019.

Table 2. Area with moderate to high tree cover within priority elevations for Canada, Cerulean and Golden-winged Warblers by country and the rate of gain and loss between 2000 and 2019. Note that due to the difficulties of differentiating between shade-grown plantations and forests in different stages of succession, these figures represent the area with at least 40% tree cover, which may or not represent forest.

Country	Tree cover year 2000 (km²)	Gain 2000-2012	Loss 2000-2019	Tree cover 2019 (km²)	% loss 2000-2019
Guatemala	2,524	15.6	360.1	2,179	13.65%
Honduras	18,232	56.2	2,563.3	15,725	13.75%
Nicaragua	4,074	30.9	312.2	3,793	6.90%
Costa Rica	9,035	23.8	290.1	8,768	2.95%
Panamá	5,678	NA	90.8	5,586	1.60%
Venezuela	1.516	NA	18.1	1,497	1.19%
Colombia	50,638	103.8	1,815.5	48,926	3.38%
Ecuador	16,964	23.9	350.8	16,637	1.93%
Peru	15,073	6.1	501.5	14,577	3.29%
Total	123,733	260	6,302.2	117,691	

A temporal analysis of rates of forest loss, revealed relatively constant annual rates across countries. However, there were two exceptions: Honduras, where a marked peak in deforestation occurred between 2015 and 2017 in association with the strong El Niño event that occurred in this period; and Colombia, where a peak in forest loss in 2017 appears to have followed the signing of the peace agreement with the Revolutionary Armed Forces of Colombia (FARC) in 2016. Maps of tree cover loss reflect the patterns described above, with deforestation hotspots evident in the highlands of Honduras and Nicaragua in Central America **(Fig. 7)**, and at the northern extent of the Central and Western Andes in Colombia **(Appendix 5).**

An important percentage of remaining mid-elevation forests within the distribution of the Target species can be found across four countries: Colombia (41.5%), Ecuador (14.1%), Honduras (13.4%) and Peru (12.4%). Much of the remaining forest also lies within protected areas, especially in the case of Costa Rica, Panama and Ecuador, where representation in protected areas is high. In Peru and Colombia, representation in protected areas is moderate, while in Nicaragua and Honduras much of the remaining tree cover remains outside of protected areas **(Fig. 8).**

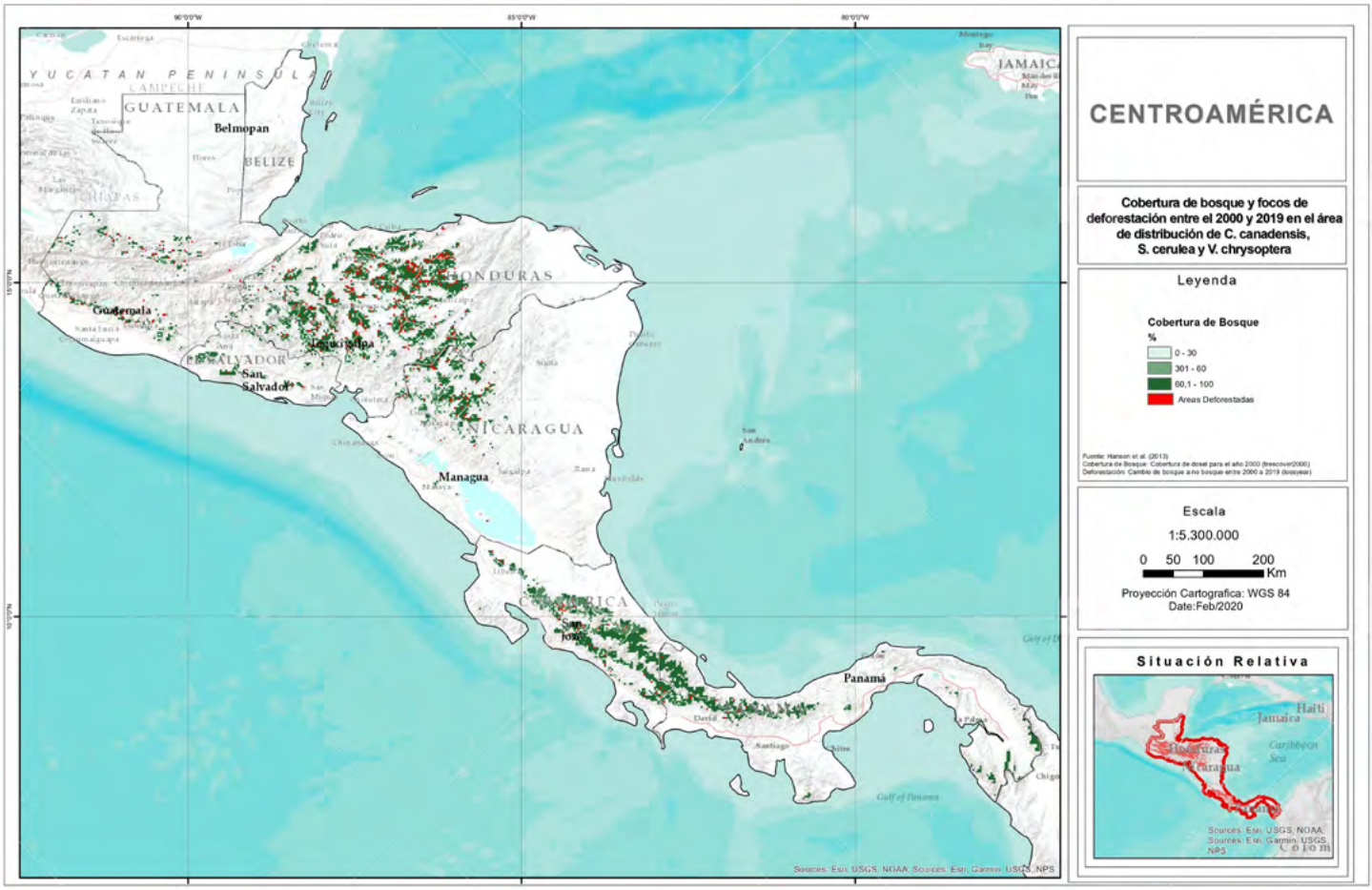


Figure 7. Remaining tree cover (green shades) within the Plan's focal elevations in Central America and areas that were deforested (red) between 2000 and 2019.

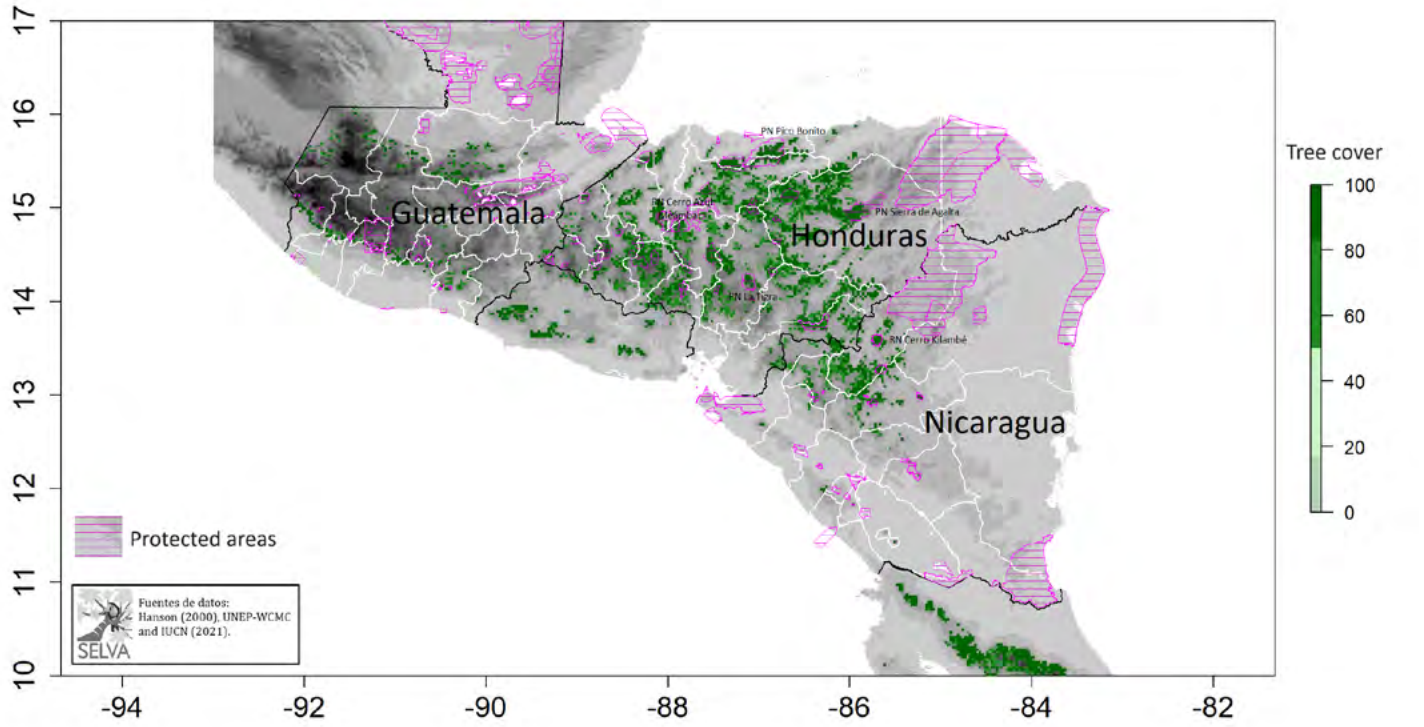


Figure 8. Distribution of remaining mid-elevation forests and protected areas in northern Central America.

Unlike forest cover, few studies have attempted to quantify the conversion of shade-grown coffee plantations to sun-grown coffee. Workshop participants identified this process as a considerable threat in Colombia but it was not considered as a major driver of habitat loss in Central America (an exception being in the Central Valley of Costa Rica). In Colombia, technological advances in the 1970s, the emergence of coffee rust and a drive for greater productivity, led to high rates of conversion of shade-grown coffee to sun-grown coffee (Jha et al., 2014). Conversion or loss of shade-trees is ongoing and in a recent study, Escobar (2013) found that between 1997 and 2013 sun-grown coffee plantations increased by 20% in Colombia, while shade-grown coffee plantations decreased by 13%, with the steepest decline occurring between 2007 and 2013. Today, around 10% of coffee in Colombia is shade-grown (~81,000 ha), with important areas of cultivation in the departments of Santander, Cundinamarca and Huila. In Central America, extensive areas of shade-grown coffee cultivation can still be found in Honduras (~200,000 ha) and Nicaragua (~127,000 ha).

5.2 Threats

For the threat analysis, the direct and underlying causes of habitat loss were established following the model presented for Colombia in González et al. (2018) and González et al. (2011).

Threats to the Target habitats were defined as the direct causes of habitat loss related to human activities. These threats or direct causes of deforestation have previously been identified for tropical regions (Geist and Lambin, 2002, 2001) and are described in detail for montane regions in the conservation plans for the three species under consideration (Bennett et al. 2016; Calidris 2020; Fundación ProAves et al. 2010). Among these causes are the expansion of livestock and agriculture, the expansion of infrastructure (i.e., roads, urbanization, public services, mining) and the extraction of wood (for sale and personal-use). The underlying causes of deforestation such as demographic (population density, distribution and migration), economic, technological (intensification of agriculture), political (economic development, land tenure) and cultural (perception of the forest) factors interact and influence the decision of deforestation agents (people, social groups or public or private institutions) to transform the forest. **Working with deforestation agents to address underlying causes is key to mitigating threats or direct causes of deforestation.**

Six of the seven threats considered during the development of the Plan are presented below. Mining was not considered in the analysis but its impact on the Conservation Targets and the Plan's area of action is presented in **Appendix 6.**

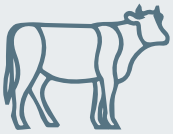
5.2.1
Expansion of the agricultural frontier

The main agents of deforestation are associated with subsistence agricultural (small farmers and settlers), industrial agriculture, and illegal activities. In deforestation hotspots, agents generally perceive forests as sources of ecosystem goods and services, and as a land use that competes with productive activities. At mid-elevations, the majority of the rural population is represented by small agricultural producers and their families, and production is generally for self-consumption or sale for subsistence. The negative impact of agriculture on forests is derived from the cumulative effect of these small productive units (González et al., 2018). Among the most common crops are corn, beans, sun and shade-grown coffee, and fruits such as naranjilla/lulo, passion fruit, blackberry, pitaya and tree tomato. The industrial agents of deforestation are associated with the conventional production of coffee and with avocado crops, which are becoming a social and environmental problem in some areas of the Colombian Andes and in Guatemala. Although illicit crops in countries like Colombia are a direct cause of deforestation, they are generally grown below 1000 masl, although some regions could be affected e.g., PNN Paramillo and the Serranía de San Lucas.

Among the underlying causes of the expansion of the agricultural frontier identified to date are poverty, limited access to agricultural technology, unsustainable traditional practices, limited state presence, high demand for agricultural products in the national market, unemployment, and the absence of a fiscal policy that promotes efficient land use in rural areas (Geist and Lambin, 2002; González et al., 2018).

5.2.2
Loss of structural and floral complexity in shade-grown coffee plantations, and the transformation to sun-grown coffee and other land uses

Optimal regions for coffee production in Latin America are typically found at elevations between 1000 and 1800 meters above sea level. Historically, coffee was grown under the shade of the forest or in traditional polyculture systems, where some of the native trees were replaced by fruit trees or trees of economic interest to coffee growers (Moguel and Toledo, 1999). These agroforestry systems have been widely recognized as important habitats for migratory birds and for biodiversity in general (Céspedes et al., 2021, González, 2018). However, several processes including the technification of crops, fluctuations in the international price of coffee and the cost of land, have caused severe modifications to the traditional coffee landscape over the last 50 years. The modernization and intensification of crops have led to the reduction or loss of the structure and floristic complexity of the plantations through the reduction or elimination of the shade, and to the loss of forest through the establishment of new sun-grown plantations. The variable profitability of coffee and an increase in land prices have led to two processes generating the loss of habitat for migratory species: (1) plantations have been replaced by other crops or by pastures for livestock and (2) the increase in the cost of land associated with urbanization has led producers to abandon or sell their properties as has been documented in Costa Rica, Guatemala and Ecuador (reviewed by Jha et al., 2014).



5.2.3
Expansion of the cattle ranching frontier

Compared to other agricultural activities, livestock rearing requires a large amount of land to produce a relatively small amount of food. Being both extensive and of low-productivity makes this one of the main drivers of deforestation (Boucher, 2011). The impact of the expansion of the cattle ranching frontier in the mountains of Latin America varies spatially and temporally. While the establishment of grasslands is the main cause of montane forest loss in South America (Tejedor-Garavito et al., 2012), forest loss in Central America is mainly caused by agriculture (Armenteras and Rodríguez, 2014). For example, Andean landscapes in Colombia are dominated by introduced grasses and forests are highly fragmented as a consequence of the persistent expansion of grasslands during the last 300 years (Etter et al., 2008). In some regions, during the establishment of grasslands the forest is cut down and burned, which increases the price of the land making the activity profitable, although subsequent productivity is low. In some cases, forests go through an intermediate stage of exploitation for several years before being converted to pasture.

5.2.4
Forest fires

The uncontrolled use of fire for agricultural and livestock purposes was recognized as a threat to forests mainly in Central America. In this region, fire has been used for centuries as a technique for the establishment of new areas for cultivation, the elimination of residual vegetation cover from previous crops, fertilization or pest control (Martínez Domínguez and Rodríguez Trejo, 2008). Fire is also a key component of deforestation for grassland establishment and is used on a regular basis as an effective method to stimulate grass growth during the dry season. However, continuous burning over the years decreases the productivity of pastures and these lands are eventually abandoned to make way for new pastures in forested areas (Boucher, 2011).

In addition to the effects on vegetation in areas designated for agriculture or livestock, the uncontrolled use of fire represents a threat in nearby wooded areas by increasing the probability of wildfires. Depending on their frequency and severity, fires can also have negative effects on the quality and structure of the soil, affecting its productivity, the regeneration of species, which in turn influence management and restoration decisions in affected areas (Minervini et al., 2018).

5.2.5
Inadequate planning of urban and tourism developments

This threat was identified mainly for Colombia and Costa Rica, where areas of high population density and urban and tourist development overlap with the Plan's focal geographies. For example, the Central Valley of Costa Rica and the Andes of Colombia are inhabited by more than 50% of the population of each country. Deficiencies in planning for the establishment of recreational houses/gated communities in rural areas close to major urban centers is a frequent cause of forest remnant and natural vegetation loss at mid-elevations.

5.2.6
Inadequate planning and expansion of infrastructure

The expansion of transportation infrastructure, including public roads and highways for the extraction of minerals, oil and wood, is recognized as a frequent cause of deforestation and fragmentation in Latin America. The establishment of public service infrastructure including power grids (Geist and Lambin, 2001), communications infrastructure and the opening of roads for wind power projects are also associated with deforestation, although their impact is less frequent. In addition to deforestation and fragmentation, the opening, expansion and maintenance of roads is associated with erosion processes due to the lack of compliance with environmental regulations and environmental impact mitigation in some countries. The actual effect of opening roads varies between countries according to the degree of accessibility to forests. For example, in western Honduras the government has promoted coffee production through incentive programs such as road improvement or construction, which has increased deforestation in mountainous regions where access was limited (Nagendra et al., 2003). In contrast, regions such as the Andes of Colombia are in an advanced state of colonization and road or electrical infrastructure projects at mid-elevations generally comply with environmental regulations and do not pose an immediate threat to forest remnants.

6

GOALS AND OBJECTIVES

Table 3 presents the overall goal of the Plan and the objectives established for each Conservation Target over a 10-year period (2023-2033).

The goals and objectives were established following the Conservation Standards methodology, where goals are defined as formal statements about the desired conservation status of the Conservation Target and objectives are formal statements of the desired outcome of the strategies. Goals and objectives should be specific (i.e., linked to the Conservation Target), measurable (i.e., defined in relation to some standard scale), achievable within the constraints of the project (i.e., financial, time, ethical, etc.), results-oriented, and framed within a specific time period.

Table 3. Overall goal of the Plan and objectives for each Conservation Target

GOAL:

Decrease the loss of forested habitats, increase the availability of habitat in degraded areas, maintain and/or increase the area covered by agroforestry systems within the Plan's area of action in Central America and northern South America [1], and halt the population decline of the three Target species – 2033.

Conservation targets

1. Mid-elevation forests

Objectives:

- Include 50% of the current forest cover at mid-elevations within Conservation Areas and reduce deforestation to less than 1% of the current forest cover in Central and northern South America[2]- 2033.
- Increase current tree cover by 37,200 ha in South America[3] and 9,800 ha in Central America[3] in productive landscapes through the protection of forest remnants and ecological restoration- 2033.

2. Shade-grown coffee, cocoa and cardamon plantations

Objective:

- Maintain or increase (outside of forested areas) the current cover of “biodiversity friendly” shade-grown plantations in Central and South America.

3. Priority migratory birds

Objective:

- Increase the population of the three Target migratory birds by 5% based on the population estimates for 2021 (Partners in Flight, 2021).

[1] In 2019 the extent of this area was 162,570 ha between 750 and 2,000 m in Central America and 730,000 ha between 1,000 and 2,250 m in northern South America.
[2] In 2019, the extent of this area was 36,053 km² between 750 and 2,000 m in Central America and 81,600 km² ha between 1,000 and 2,250 m in northern South America.
[3] Area obtained from estimates of density and the area needed to generate habitat for a 5% increase in the population of Canada and Cerulean Warblers in South America and for Golden-winged Warblers in Central America.

7

IMPLEMENTATION: STRATEGIC AREAS FOR ACTION

Through the Conservation Standards process, five Strategic Areas for Action were defined, which address the threats to the Target habitats and provide a roadmap to achieve the Plan's goal and objectives presented in **Table 3.**

1 Conservation areas

2 Indigenous, Afro-descendant and community lands

3 Agricultural and Livestock Best Practices, Incentives and Ecological Restoration

4 Marketing of Bird Friendly Coffees

5 Territorial planning and Environmental Regulation

In the following sections, we present each Strategic Area for Action, together with its goal, threat reduction objectives and indicators in a diagram. In the subsequent text, we follow the structure presented in **Figure 1,** presenting strategies, action steps, intermediate results, objectives and indicators.

7.1 Conservation Areas

Increasing the coverage of conservation areas and strengthening existing protected areas is central to reducing deforestation and halting the advance of the agricultural and cattle ranching frontiers. This approach has proven effective in Central America and the tropical Andes to date, with large tracts of mid-elevation forests protected within national parks such as the PN Sumaco-Galeras, Ecuador; PNN Paramillo and PNN Serranía de los Churumbelos, Colombia; Parque Internacional la Amistad, Panama and Costa Rica; and PN La Murulla, Honduras **(Appendix 5).**

The term Conservation Area (CA) covers a broad range of legal instruments that allow for the management of a territory, as well as a number of designations that can be used to protect mid-elevation forest remnants, including municipal and regional reserves, private protected areas, integrated management districts, and other effective area-based conservation measures (OECMs), among others.

To ensure the success of the actions described below, it is imperative to invest in participatory processes that directly engage and support the leadership of the communities that live and work within potential/ existing CAs and their buffer zones..

The 10-year goal of the Strategic Area for Action is to reduce deforestation in existing CAs and their buffer zones, as well as to detain the expansion of the agricultural and livestock frontiers in unprotected forest remnants. Fulfilment of this goal is expected to result in an enhanced supply of ecosystem services in the CAs, with an associated improvement in the quality of life for the communities in the Plan's area of influence. The threats addressed by this Strategic Area for Action are presented in **Figure 9**, along with the threat reduction objectives and indicators. In **Figure 10** the strategies, action steps, and intermediate results are presented in a flow diagram; accompanying descriptions of the objectives, indicators, action steps and expected intermediate results can be found in **Table 4.**

THREAT	OBJECTIVE	INDICATOR
Expansion of the agricultural and cattle ranching frontiers.	Increase the area of mid-elevation forests within conservation areas to 30%[1] of the current extent (35,000 km² of 117,000 km²) – 2033.	Number of hectares/ km² under a figure of protection.
		% reduction in the number of hectares deforested.
	Reduce the expansion of the agricultural and livestock frontiers within existing CAs, such that the rate of deforestation between 2023-2033 equals <1% of the remaining forest in 2019.	

Figure 9. Threats addressed by the "Conservation Areas" Strategic Area for Action, objectives for each threat and indicators.

[1]This goal encompasses the establishment of four conservation areas in focal regions for migratory birds in Honduras, covering 143,175 ha- 2033

7.1.1

Strategies and actions steps

Strategy 1.

Establish and declare new conservation areas (CAs) and/or expand existing areas

The identification, prioritization and subsequent declaration of new CAs at multiple levels (e.g., national, regional, private etc.) is essential to reduce deforestation rates in remaining mid-elevation forests. Conservation areas may take many forms under each country's legislation, including national parks, regional forest reserves, municipal reserves, areas for watershed protection, special management areas, private protected areas, other effective area-based conservation measures (OECMs), among others. In addition, they may or may not require land acquisition. Several countries have specific legislation for the establishment of CAs on private properties, providing a viable mechanism for conserving forest fragments on private lands. Currently, several national and international efforts to create new CAs in Latin America are underway (e.g., Bezos Earth Fund, Conserva Aves) and a diverse set of conservation portfolios have already been developed, therefore, it is imperative to integrate the actions described below into these processes.

Action steps

Identify and prioritize new areas for conservation

AC1	Consolidate maps of current forest cover at mid-elevations and overlap with distribution layers for the target species, protected areas of different categories, portfolios of existing conservation opportunities and other conservation measures or strategies (e.g., OECMs), and identify forest remnants to conserve within the focal geography in each country.
AC2	Identify additional conservation targets within the prioritized forest remnants (using secondary information where it exists and/or field surveys in its absence).
AC3	Prioritize new areas for conservation through a participatory process employing rigorous technical and social criteria, and community consultation.
AC4	Identify ongoing national and international initiatives for the declaration/expansion of CAs within focal geographies, and integrate efforts where possible.

Establish or expand conservation areas

AC5	Generate maps and land tenure databases for the areas prioritized in steps AC1 through AC4.
AC6	Identify and analyze key stakeholders and evaluate governance structures in prioritized areas.
AC7	Verify the presence of conservation targets and other key species, habitats, and processes in prioritized areas.
AC8	Implement an awareness campaign in local communities and with private landowners, and involve community stakeholders in decision-making processes.
AC9	Develop the necessary technical criteria (declaration route) and submit the necessary documentation for the declaration of new CAs or land purchase for each prioritized area.

Conservation Areas

E — Establish and declare new conservation areas (CAs) and/or expand existing areas

Intermediate result
Maps of conservation gaps/opportunities for mid-elevation forests

AC1 Consolidate maps of current forest cover at mid-elevations and overlap with distribution layers for target species, protected areas of different categories, portfolios of existing conservation opportunities and other conservation measures or strategies (e.g., OECMs), and identify forest remnants to conserve within the focal geography in each country.

AC2 Identify additional conservation targets within prioritized forest remnants (using secondary information where it exists and/or field surveys in its absence).

AC3 Prioritize new areas for conservation through a participatory process employing rigorous technical and social criteria, and community consultation.

Intermediate result
Areas prioritized under this Plan socialized and integrated with ongoing declaration initiatives and the action plans of entities responsible for conservation areas in each country.

AC4 Identify ongoing national and international initiatives for the declaration/expansion of CAs within focal geographies, and integrate efforts where possible.

Technical studies for the creation/expansion of new conservation areas completed

Intermediate result
Presence of target species, other conservation targets, and habitat verified.

Intermediate result
Local communities in prioritized areas understand the role of the proposed conservation area and its benefits

Intermediate result
Analysis of land tenure, stakeholders and governance structures conducted, and land cover and land ownership maps created.

Intermediate result
Local communities were involved in decision making and agree with the declaration process

Intermediate result
Technical studies and community consultations required for the desired category of area completed

AC6 Identify and analyze key stakeholders and evaluate governance structures in prioritized areas.

AC7 Verify the presence of conservation targets and other key species, habitats, and processes in priority areas.

AC8 Implement an awareness campaign in local communities and with private landowners, and involve community stakeholders in decision-making processes.

Intermediate result
Documentation required for the declaration submitted to the appropriate authority

Intermediate result
Conservation areas established

AC9 Develop the necessary technical criteria (declaration route) and submit the necessary documentation for the declaration of new CAs or land purchase for each prioritized area.

E — Strengthen management of existing conservation areas

Intermediate result
Review of management plans and analyses of management effectiveness completed for each CA and an analysis of deforestation rates completed.

AC10 Identify CAs, or management zones within CAs, where deforestation/invasion is active and ongoing, by consulting spatial analyses of deforestation and/or management plans.

AC11 Undertake a simple analysis of the management effectiveness of CAs in terms of their protection of mid-elevation forests and prioritize them for action based on the urgency of halting deforestation.

AC12 Identify gaps in the physical, technical and financial capacity of CAs, including their capacity to conduct planning processes or monitoring programs.

Increase the operational capacity of 25% of prioritized CAs through co-management agreements, inter-institutional agreements, implementation funds or technical assistance

Intermediate result
Inter-institutional and co-management agreements signed and/or implementation funds increased or established

Intermediate result
Staff in prioritized CAs have received training in topics such as forest fire management, community relations and environmental education, and monitoring

AC13 Use existing mechanisms or establish new ones to address the deficiencies identified in AC12, such as inter-institutional agreements, co-management agreements, implementation funds, increasing the category of protection, or providing technical assistance in areas such as monitoring of target species.

Decrease pressures imposed by surrounding communities on conservation targets in 25% of CAs through increased community well-being and access to sustainable and profitable livelihoods

Intermediate result
Alternative livelihood programs designed through a participatory process with communities in and around CAs

Intermediate result
Technical assistance provided on subjects like best agricultural practices, quality control, and organizational skills

Intermediate result
Conservation agreements signed

AC14 Implement participatory programs or processes (e.g., alternative livelihoods, conservation agreements) aimed at reducing pressures on target habitats in conservation areas and fostering a positive relationship with local communities.

Threat Reduction
Expansion of the agricultural and cattle ranching frontiers detained

Conservation Targets

Mid-elevation forests (between 750 - 2000 m in Central America and 1000 - 2250 m in South America) → Ecosystems services and livelihoods → Human wellbeing in local communities

Priority Bird Species

Figure 10. Strategies, action steps and intermediate results describing the workflow for the Strategic Area for Action "Conservation Areas" based on the Miradi diagram resulting from the Conservation Standards process.

Table 4. Objectives, indicators, action steps (AC1, AC2…) and intermediate results associated with the Conservation Areas (CAs) strategic area for action.

Objectives and indicators	Actions steps and intermediate results
OBJECTIVE: Identify and prioritize conservation gaps/opportunities for mid-elevation forests – 2025 **INDICATOR:** % of area of interest evaluated	**AC1, AC2, AC3** Maps of conservation gaps/opportunities for mid-elevation forests
OBJECTIVE: Integrate priority areas lacking formal protection into ongoing declaration initiatives- 2027 **INDICATOR:** # of prioritized areas integrated into existing processes.	**AC4** Database of active declaration initiatives, along with maps of potential conservation areas. Prioritized areas under this Plan socialized and integrated with ongoing declaration initiatives and the action plans of entities responsible for conservation areas in each country.
OBJECTIVE: Characterize 50% of the prioritized areas in terms of land tenure, stakeholders present, governance structures and presence of conservation targets- 2028 **INDICATORS:** % of priority areas characterized (e.g., actors present, land tenure) % of priority areas verified in the field (e.g., species present, habitat)	**AC5, AC6, AC7** Analysis of land tenure, stakeholders and governance structures conducted, and land cover and land ownership maps created. Presence of target species, other conservation targets, and habitat verified.
OBJECTIVE: Implement an awareness campaign and a participatory consultation process for the establishment and management of conservation areas in 25% of the prioritized areas- 2030 **INDICATORS:** % of prioritized areas where participatory consultation processes and awareness campaigns are carried out % of communities participating in decision-making and in the establishment and management of conservation areas % of communities taking a leadership role in the planning and management of conservation areas	**AC8** Local communities in prioritized areas understand the role of the proposed conservation area and its benefits Local communities were involved in decision making and agree with the declaration process

OBJECTIVE:

Declare or register new conservation areas in 25% of the prioritized areas- 2033

INDICATOR:

% of prioritized areas declared as conservation areas

AC9

Technical studies and community consultations required for the desired category of area completed

Documentation required for the declaration submitted to the appropriate authority

OBJECTIVE:

Complete a participatory (e.g., protected area managers, local community, etc.) and transparent diagnosis of 100% of existing CAs within the Plan's area of influence and prioritize their strengthening based on their representation (ha) within the Plan's area of influence, their conservation status, deforestation rates, community participation, and community needs- 2027.

INDICATOR:

% of CAs in the Plan's area of influence with diagnosis

AC10, AC11

Review of management plans for each CA completed

Review of existing measures of management effectiveness completed

Analysis of deforestation rates completed

OBJECTIVE:

Increase the operational capacity of 25% of prioritized CAs through co-management agreements, inter-institutional agreements, implementation funds or technical assistance- 2033

INDICATOR:

% of prioritized CAs receiving technical or financial assistance

AC12, AC13

Inter-institutional and co-management agreements signed and/or implementation funds increased or established

Staff in prioritized CAs have received training in topics such as forest fire management, community relations and environmental education, and monitoring

OBJECTIVE:

Decrease pressures imposed by surrounding communities on conservation targets in 25% of CAs through increased community well-being and access to sustainable and profitable livelihoods- 2033

INDICATORS:

% of prioritized CAs with technical assistance programs or conservation agreements

% of communities with increased economic prosperity and improved livelihoods

AC14

Alternative livelihood programs designed through a participatory process with communities in and around CAs

Technical assistance provided on subjects like best agricultural practices, quality control, and organizational skills

Conservation agreements signed

Strategy 2.
Strengthen management of existing conservation areas

Despite their designation as protected areas, many areas within the geographical scope of this Plan lack the technical and financial capacity to eradicate deforestation within the protected area and its buffer zones. Identifying weaknesses in the management of protected areas with a significant responsibility for the protection of mid-elevation forests, is the first step to improving management efficacy. Subsequent steps involve providing the necessary technical and financial support, and the initiation of community-engagement processes to minimize the pressures that lead to forest loss within conservation areas. The actions described below focus on strengthening operational capacity through human and financial resources, without underestimating that needs may extend to equipment requirements, as well as mobility solutions.

Action Steps

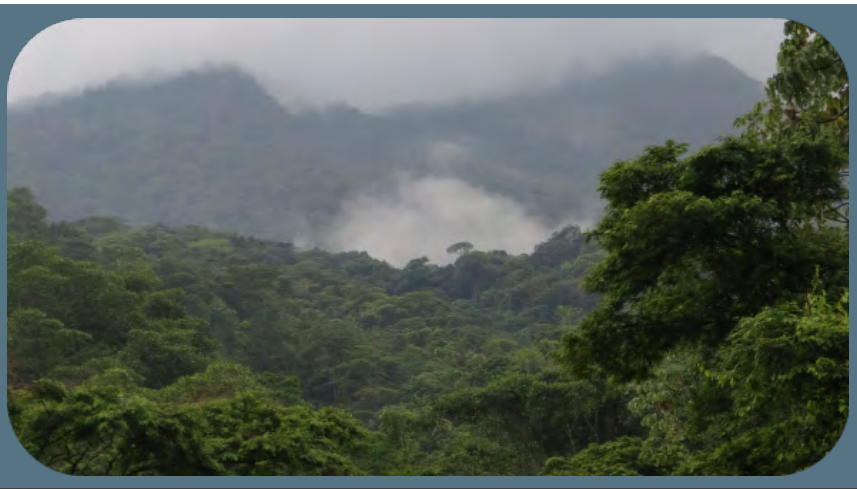
AC10 Identify CAs, or management zones within CAs, where deforestation/invasion is active and ongoing, by consulting spatial analyses of deforestation and/or management plans.

AC11 Undertake a simple analysis of the management effectiveness of CAs in terms of their protection of mid-elevation forests (e.g., calculate the extent of forest at mid-elevations within CAs and the area deforested/degraded at different time scales), and prioritize them for action based on the urgency of halting active deforestation fronts.

AC12 Identify gaps in the physical, technical and financial capacity of CAs, including their capacity to conduct planning or monitoring processes.

AC13 Use existing mechanisms or establish new ones to address the deficiencies identified in AC12, such as inter-institutional agreements, co-management agreements, implementation funds (funds exist in several countries to channel funding), increasing the category of protection (e.g., from a regional to a national protected area), or providing technical assistance in themes such as monitoring of target species.

AC14 Implement participatory programs or processes (e.g., alternative livelihoods, conservation agreements) aimed at reducing pressures on target habitats in conservation areas and fostering a positive relationship with local communities.



The Distrito regional de Manejo Integrado (DRMI) Cuchillas Negra y Guaneque protects populations of Cerulean and Canada Warblers in the Eastern Andes of Colombia.

General considerations

Strengthening existing protected areas and creating new conservation areas were considered to be highly effective strategies for mitigating the expansion of the agricultural and cattle ranching frontiers by the participants of the workshops. Nonetheless, the success of these strategies depends on a number of critical assumptions. For example, the necessary social and political conditions must exist in regions where new conservation areas are proposed. Many forested areas within the geographical scope of this plan are found on private lands and therefore require the adoption of protected area figures that can include private lands, such as special management zones (e.g., a Distrito Regional de Manejo Integrado in Colombia can include both public and private lands), or assisting landowners with the creation/declaration of private reserves. The same applies to regional or municipal protected areas, as the probability of success is strongly tied to the interests of local political leaders and the duration of their time in office. Regardless of the level of protection sort, community consultation and involvement in decision making processes from the outset is key to the future effectiveness of any conservation area.

In **Appendix 5**, the overlap of protected areas with remaining mid-elevation forests is described through a series of maps. A number of national protected areas stand out as having a significant responsibility for protecting mid-elevation forest and would benefit from activities aimed at strengthening management capacity and reducing forest loss. The same maps identify the low representation of remaining forests in protected areas in Honduras and for this reason a specific goal was established for Honduras. Seventeen new protected areas have been proposed in Honduras and the following areas currently under consideration were identified as overlapping with focal geographies for the target species of this Plan: El Cipresal, El Cajón, La Montaña de la Flor and La Sierra de Río Tinto. The integration of the objectives and actions described here with these and other ongoing processes is likely to be a very effective means of meeting the goals for the establishment of new conservation areas.

The creation of CAs can have negative effects when communities are displaced or agricultural activities move to new areas. Community consultations and subsequent implementation of alternative livelihood programs are essential to mitigate these potential effects.

In Honduras, the Guardar Recursos program has proven to be an effective mechanism for transferring funds to national protected areas, with the support of both national and international institutions and organizations; this model could be implemented in other countries such as Guatemala and Nicaragua.

7.2
Indigenous, Afro-descendant and Rural Community Lands

Biodiversity conservation cannot be conceived without the participation of local communities, particularly indigenous and Afro-descendant communities, which are key conservation actors within Latin America (Alcorn, 1993; Dawson et al., 2021).

The role these communities play in biodiversity conservation has been threatened by the adoption of a development model that promotes the expansion of the agricultural and livestock frontiers as a means of colonization, a livelihood option for marginalized populations or for the development of industrial agriculture. Addressing this problem requires strategies that strengthen the territorial processes of ancestral communities through the recognition of legal tenure and consolidation territorial, and increasing their capacity for territorial control, planning, organization and management.

In Latin America, there is considerable overlap between the geographic areas of greatest biological richness and those holding the greatest cultural diversity, and almost 80% of protected areas are home to indigenous peoples. Further, most Latin American countries have signed and ratified the Convention on Indigenous and Tribal Peoples (OTI, 2014), and have developed a legal structure that seeks to achieve higher levels of management effectiveness, increased levels of social sensitivity to ethnic issues, as well as integrate the ethics of conservation with the principles of social equity and interculturality (Barragán-Alvarado, 2008).

The two strategies defined under this Strategic Area for Action aim to reduce the advance of the agricultural and livestock frontiers within and in the areas of influence of indigenous and Afro-descendant territories, focusing on protected areas and their buffer zones. The first steps involve the development of an initial diagnosis in order to identify indigenous, Afro-descendant and rural community lands within the geographic scope of the Plan, areas where conflicts exist, and to plan/promote the recognition and/or consolidation of ethnic territories in at least one case per country (e.g., in countries where conflicts that lead to the degradation/deforestation of mid- elevation forests are identified).

The "consolidation" of territories seeks to recognize the rights of communities and halt incursions by non-ethnic settlers (in the US this can be referred to as land titling or in Canada as a comprehensive land claim agreement). This strategy will be complemented by strengthening the management capacity of ethnic territories, both inside and outside protected areas, through the application of the law and associated management and territorial planning instruments.

The goal in the next 10 years is to slow the advance of the agricultural and livestock frontiers within indigenous and Afro-descendant lands located within the area of action of this strategy. The number of hectares deforested annually for agricultural or livestock use within indigenous lands was selected as an indicator for this goal, differentiating between deforesting agents (indigenous or non-indigenous) and the subsequent vocation of the deforested land. In **Figure 11**, the threats addressed by this Strategic Area of Action are presented, along with the threat reduction objectives and indicators. In **Figure 12** the strategies, action steps and intermediate results are presented in a flow diagram, which is complemented by **Table 5** where the objectives, indicators, action steps and expected intermediate results are listed.

THREAT	OBJECTIVE	INDICATOR
Advance of the agricultural and livestock frontiers	50% reduction in the expansion of the agricultural and livestock frontiers within indigenous and Afro-descendant lands- 2033	Number of hectares deforested annually for agricultural or livestock use within indigenous lands

Figure 11. Threats addressed by the Strategic Area for Action "Indigenous, Afro-descendant and Rural Community Lands", objectives for each threat and indicators.

Figure 12 Strategies, action steps and intermediate results describing the workflow for the Strategic Area for Action "Indigenous, Afro-descendant and Rural Community Lands" based on the Miradi diagram resulting from the Conservation Standards process.

E

Legal recognition and "consolidation" of indigenous, afro-descendent and rural community lands

Intermediate Result

Gaps in the legal recognition of indigenous and Afro-descendant lands identified and territories prioritized for action based on the severity of legal deficiencies.

TI1. Identify the territories of indigenous, Afro-descendant and rural communities located within the Plan's area of action.

TI2. Analyze and identify gaps in the legal recognition and status of territories identified in TI1 in each country.

Intermediate Result

Agreements signed with ethnic authorities for participation in the design of a road map

TI3. Establish formal relations with ethnic organizations at the local and national level that exercise control over the territories identified in TI2.

Intermediate Result

Government entities participating in and committed to processes for legal recognition

TI4. Establish formal relationships with the government institutions responsible for land tenure and regulation processes.

Intermediate Result

Communities empowered and road maps for territorial consolidation defined.

TI5. Develop a roadmap to resolve the gaps in legal recognition and regulation for the areas identified in TI2 through a participatory process with the organizations and institutions involved in TI3 and TI4.

E

Strengthen the planning and management capacity of ethnic territories within and outside protected areas through the application of the law and associated territorial planning and management instruments

Intermediate Result

Gaps in the legal recognition of indigenous and Afro-descendant lands identified and territories prioritized for action based on the severity of legal deficiencies.

TI6. Identify the territories of indigenous, Afro-descendant and rural communities where there are planning and management gaps.

TI7. Undertake a diagnosis with community participation of the factors that affect the effective implementation of management plans and the application of the law in the face of land grabbing and the advance of the agricultural and livestock frontiers.

Intermediate Result

Emblematic cases prioritized for action

TI8. Identify and prioritize emblematic cases based on the context of each identified territory.

TI9. Support management and planning processes in accordance with the regulatory framework in each country (e.g., support the development of territorial management plans), especially in the areas of conservation, ecological restoration and sustainable production, in order to identify areas for conservation, restoration and/or sustainable production and define management measures that contribute to the recovery of forested areas.

TI10. Identify and develop funding opportunities for projects promoting the maintenance or enhancement of target habitats within areas destined for conservation, restoration and/or sustainable production within ethnic territories (e.g., Payments for environmental services).

TI11. Implement shared governance schemes (e.g., co-management) for the planning, control and management of environmental conflicts related to deforestation in ethnic territories inside or outside protected areas.

Planning and management capacity strengthened

Intermediate Result

Financing mechanisms defined and co-management agreements signed.

Intermediate Result

Communities strengthened in land management and planning processes.

Intermediate Result

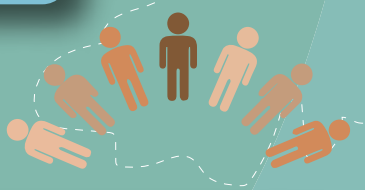
Management plans created or updated with the definition of conservation, restoration and/or sustainable production areas.

Intermediate Result

Communities manage territories for the benefit of conservation targets

Intermediate Result

Illegal and illegitimate land grabbing reduced.



Threat Reduction

Expansion of the agricultural and cattle ranching frontiers detained

Conservation Targets

Mid-elevation forests (between 750 - 2000 m in Central America and 1000 - 2250 m in South America)

Ecosystems services and livelihoods

Human wellbeing in local communities

Priority Bird Species

7.2.1 Strategies and action steps

Strategy 1.

Legal recognition and "consolidation" of indigenous, afro-descendent and rural community lands

This strategy seeks to promote the legal recognition of territories ancestrally occupied by indigenous, Afro-descendant and rural communities, through the creation of indigenous territories, community councils for the lands of afro-descendant communities, or community reserves, as established by the norms in each country in the region of interest, and where applicable, endorsed by collective titling. This process includes the design of a road map for the "consolidation" (saneamiento in Spanish) of territories, which may involve land titling, land claim agreements and/or the purchase of lands occupied by individuals who do not belong to the ethnic group for subsequent relocation outside the territory. This strategy seeks to avoid processes including the buying, selling and renting of community lands, as well as land grabbing, in addition to the conservation, restoration and/or rehabilitation of forested areas, and the maintenance or recovery of associated ecosystem services.

These activities must be adapted to the legal framework for indigenous, Afro-descendant and rural communities in each country where the strategy is to be implemented, and to the organizational structures of the corresponding ethnic and community-led organizations. For each community relevant to the development of the strategy, the legal requirement for a prior consultation process should be analyzed on a case-by-case basis. Where legal recognition of occupied territories cannot be applied for indigenous, Afro-descendant and/or rural communities, conservation agreements between communities, institutions and the beneficiaries of ecosystem services should be sought.

Action steps

TI1	Identify the territories of indigenous, Afro-descendant and rural communities located within the Plan's geographic scope.
TI2	Analyze and identify gaps in the legal recognition and status of territories identified in TI1 in each country.
TI3	Establish formal relations with ethnic organizations at the local and national level that exercise control over the territories identified in TI2.
TI4	Establish formal relationships with the government institutions responsible for land tenure and regulation processes.
TI5	Develop a roadmap to resolve the gaps in legal recognition and regulation for the areas identified in TI2 through a participatory process with the organizations and institutions involved in TI3 and TI4.

Strategy 2.

Strengthen the planning and management capacity of ethnic territories within and outside protected areas through the application of the law and associated territorial planning and management instruments

This strategy aims to strengthen the planning and management of territorial lands by ethnic groups with the support of territorial entities, based on the application of the law within the regulatory framework of indigenous and tribal peoples, with a special emphasis on protected areas. To achieve this, it is necessary to strengthen the capacity of regulatory bodies and ethnic organizations for the design and application of planning and management instruments at the necessary level (national, regional and/or local). Initially, emblematic cases, where habitat loss, protected areas and ethnic territories converge, should be identified, diagnosed and followed, and where necessary, actions should be taken to contribute to the improvement of existing legislation and management instruments, and their application. Factors affecting the application of current regulations, especially at the local level, should also be identified, and complementary actions should be defined and undertaken like, for example, the implementation of shared governance schemes, "life plans" or ethno-development plans.

For the implementation of this strategy, the following critical areas were identified in the planning workshops - Cerro Saslaya (Nicaragua) and Sierra de Agalta (Honduras) - both emblematic cases where protected areas with high biodiversity overlap with indigenous territories and colonization processes leading to an accelerated and intensive transformation of natural landcovers (Aya Rojas, 2020).

Action steps

TI6	Identify the territories of indigenous, Afro-descendant and rural communities where there are planning and management gaps.
TI7	Undertake a diagnosis with community participation of the factors that affect the effective implementation of management plans and the application of the law in the face of land grabbing and the advance of the agricultural and livestock frontiers.
TI8	Identify and prioritize emblematic cases based on the context of each identified territory.
TI9	Support management and planning processes in accordance with the regulatory framework in each country (e.g., support the development, revision and/or implementation of territorial management plans), especially in the areas of conservation, ecological restoration and sustainable production, in order to identify areas for conservation, restoration and/or sustainable production and define management measures that contribute to the recovery of forested areas.
TI10	Identify and develop funding opportunities for projects promoting the maintenance or enhancement of Target habitats within areas destined for conservation, restoration and/or sustainable production within ethnic territories (e.g., Payments for environmental services).
TI11	Implement shared governance schemes (e.g., co-management) for the planning, control and management of environmental conflicts related to deforestation in ethnic territories inside or outside protected areas.

General considerations

The success of the above strategies at the local and regional level depends on, given the context of each country, several aspects, including the following:

A legal framework that recognizes the collective titling of ancestrally occupied ethnic territories and forms of self-government in accordance with Convention 169 on Indigenous and Tribal Peoples in Dependent Countries, adopted by the 76th session of the I.T.O. General Conference, Geneva 1989.

This legal framework should include instruments and mechanisms that allow ethnic-territorial organizations to organize and administer their territories through life plans, management plans or ethno-development plans, as is the case in Colombia, where, for example, these legal instruments facilitate the establishment of conservation agreements and zones for protection, restoration and sustainable use.

Shared governance schemes should be strengthened to facilitate the co-management of protected areas with the presence of indigenous, Afro-descendant or rural communities. These schemes should be constructed together with representative ethnic organizations at the country, regional and local levels, and should take into account the lessons learned from other successful experiences in the region.

The capacity of ethnic organizations for territorial planning and management must be strengthened taking into account the different social, economic and environmental dimensions.

In this sense, ethnic organizations, should provide, or in its absence, develop with support from state and/or international cooperation agencies or other local organizations, the necessary technical assistance to evaluate, improve, or adopt best agricultural practices and/or strengthen traditional practices. For this purpose, access to equipment that allows for the implementation of best practices is essential.

Strengthening the capacity of the communities to continue and replicate their experiences.

Ethnic organizations and/or local organizations in ethnic territories should work within a framework of interinstitutional and multisectoral cooperation and coordination.

In addition, participants from the conservation standards workshops recommended verifying changes in landcover through multitemporal analyses of satellite images over periods of no less than 3-5 years in order to identify ethnic territories with active deforestation.

Table 5. Objectives, indicators, action steps (TI1, TI2, etc.) and intermediate results associated with the Strategic Area for Action "Indigenous, Afro-descendant and rural community lands".

Objectives and Indicators	Action steps and intermediate results
OBJECTIVE: Undertake a diagnosis of the gaps in the legal recognition and regulation of indigenous, Afro-descendant and rural community lands – 2027 **INDICATOR:** Gap analysis realized for each country and priority territories defined.	**TI1, TI2** Gaps in the legal recognition of indigenous and Afro-descendant lands identified. Territories prioritized for action based on the severity of legal deficiencies.
OBJECTIVE: Design a road map for the recognition and/or consolidation of indigenous, Afro-descendent and rural communities through a participatory process in 50% of the prioritized territories- 2030 **INDICATORS:** % of priority territories identified in TI1 and TI2 with a road map for their legal recognition or consolidation. % of indigenous, Afro-descendent and rural communities achieving legal recognition and/or management rights. % of governments committed to the process of legally recognizing the tenancy of individual communities.	**TI3, TI4, TI5** Agreements signed with ethnic authorities for participation in the design of a road map. Government entities participating in and committed to processes for legal recognition. Communities empowered and road maps for territorial consolidation defined. Illegal and illegitimate land grabbing reduced.
OBJECTIVE: Work with indigenous, Afro-descendent and rural communities and other representative groups to identify, map and prioritize areas for strengthening the planning and management capacity of ethnic territories within and outside of protected areas – 2027 **INDICATOR:** # of priority areas identified for the strengthening of planning and management capacities.	**TI6, TI7, TI8** Territories with conflicts mapped, and management gaps and solutions identified through participatory processes. Emblematic cases prioritized for action.
OBJECTIVE: Strengthen planning, control and management capacity in territories inside and outside of protected areas and define financing mechanisms in 50% of prioritized areas - 2030 **INDICATORS:** % of prioritized areas that have a management plan (updated) including conservation/restoration areas or co-management agreements in place. % of management plans updated taking into account the context of this Plan. # of co-management agreements or other mechanisms to support community participation and leadership. % reduction in deforestation in priority areas.	**TI9, TI10, TI11** Communities strengthened in land management and planning processes. Management plans created or updated with the definition of conservation, restoration and/or sustainable production areas. Financing mechanisms defined (e.g., Payments for Environmental Services). Co-management agreements signed.

7.3
Best agricultural and livestock practices, incentives and ecological restoration

Among the main land use changes with negative consequences for Neotropical migratory birds in the Plan's area of action is the conversion of shade-grown coffee and forests to pastures, and the conversion of shade-grown coffee to sun-grown coffee or other crops.

Maintaining, increasing or improving the available habitat for migratory birds depends, in part, on the implementation, continuity and monitoring of projects that involve ecological restoration or adopt agricultural and livestock practices beneficial for migratory birds. Similarly, raising awareness among producers and motivating them through education and incentive programs is key to reducing deforestation pressures and thereby maintaining or increasing vegetation cover on private lands dedicated to agriculture or cattle ranching.

Given the large expanses of mid-elevation forests that have already been lost, a critical component of this Plan is ecological restoration, in order to recreate habitat for the Target species that was lost in the past. Indeed, restoration/reforestation projects are essential if we are to reverse the negative population trends experienced over the last 50 years.

Under this Strategic Area for Action, three strategies were defined with the joint goal of maintaining and increasing habitats and elements of productive landscapes beneficial to migratory birds through: 1) Best agricultural and livestock practices, 2) Conservation incentives, and 3) Active or passive ecological restoration. For these three strategies, we recognize the need to design actions that benefit producers economically and in terms of productivity, while simultaneously increasing the resilience and sustainability of productive landscapes through practices/actions that favor migratory birds.

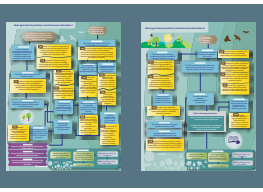
Best Agricultural Practices and Best Livestock Practices refer to practices that benefit the maintenance of habitats, or increase or improve habitats for, in this case, migratory birds. Although only agricultural and livestock practices are referred to here, best forestry practices could be applied and included in some regions.

The 10-year goal of this Strategic Area for Action is to maintain the current extent of habitat and increase habitat availability to an extent that would sustain a 5% increase in the populations of the Target species (37,200 ha in South America and 9,800 ha in Central America). In **Figure 13** the threats addressed by this Strategic Area of Action, the threat reduction objectives and associated indicators are presented. **Figure 14** presents the strategies, action steps and intermediate results, while **Table 6** presents the objectives, indicators, action steps and expected intermediate results.

THREAT	OBJECTIVE	INDICATOR
Advance of agricultural and livestock frontiers	Limit deforestation in productive landscapes to an area <1% of the remaining forest area in 2019 between 2023 and 2033.	% of standing forest in 2019 deforested by 2033. # of hectares with an increase in tree cover.
Forest fires asociated with the advance of the agricultural and livestock frontiers	Increase tree cover in at least 50% of the focal areas for ecological restoration in each country- 2033	Number of hectares affected by recurrent fires (areas burnt more than once during the last 5-10 years)
Grazing of livestock under open/fragmented forests and the use of fire to regenerate pastures	Reduce the incidence of forest fires in 50% of priority areas in Central America affected by recurrent fires e.g. less than every 5 years – 2033. Eliminate the practice of livestock grazing in open/ fragmented forests in 50% of priority areas- 2033.	# of farms and hectares implementing best livestock practices and without grazing in open or fragmented forests. % of priority areas without recurrent fires (# of ha of forest burnt per year)

Figure 13. Threats addressed by the Strategic Area for Action "Best agricultural and livestock practices, incentives and ecological restoration", objectives for each threat and indicators.

Figure 14 Strategies, action steps and intermediate results describing the workflow for the Strategic Area for Action " Best agricultural and livestock practices, incentives and ecological restoration" based on the Miradi diagram resulting from the Conservation Standards process.



Best agricultural practices, incentives and restoration I

E 1. Incentives for the adoption of best agricultural and/or livestock practices, or the implementation of active or passive ecological restoration

E 2. Promotion and adoption of best agricultural and livestock practices

Intermediate Result
Incentive programs supporting the adoption of best practices and ecological restoration compiled in a centralized database and prioritized in each country

IN1. Identify and prioritize existing incentive programs to promote best agricultural and livestock practices, and active/passive ecological restoration at local, regional, national and international levels.

IN2. Diagnose the effectiveness (e.g., cost-effectiveness analysis) of existing incentive programs in each country and their applicability to the Plan's geographic scope.

Intermediate Result
Producers in priority regions apply to incentive programs.

IN3. Implement awareness campaigns to encourage producer participation in incentive programs and provide technical assistance to communities to facilitate access to identified programs.

Intermediate Result
Producers implement best practices or restoration processes with the support of incentive programs.

Intermediate Result
Maps identifying regions suitable for the implementation of best practices

BP1. Map and prioritize areas for the promotion and implementation of best practices, active/passive restoration and incentives taking into account landscape connectivity. In Central America, areas affected by recurrent fires should be mapped and identified.

Intermediate Result
Current practices, economic rationale, and ecological impact identified and published.

Intermediate Result
Increased technical and management capacity among producers for implementing BPs

BP4. Identify and/or establish pilot projects that demonstrate the viability and profitability of best practices, optimize implementation strategies and replicate them regionally.

BP5. Develop/participate in mechanisms/platforms for the exchange of experiences and lessons learned at the local, national and international level.

BP2. Identify and characterize management practices that benefit or negatively affect the habitat of target species and compile and publish a single manual for the Plan's area of action.

BP6. Strengthen local capacity for the adoption of best practices in the areas prioritized in BP1 by providing technical assistance to producers.

BP7. Provide training in farm-level accounting to producers involved in best practices and ecological restoration programs.

Intermediate Result
Pilot projects and knowledge sharing experiences increase producers' awareness of the advantages of BPs.

Intermediate Result
Agricultural associations recognize the importance of BPs and incorporate them in their technical recommendations.

Intermediate Result
Producers benefit from the adoption of BPs (e.g. increased product quality).

Intermediate Result
Agricultural and livestock BPs adopted at landscape or regional scale

BP3. Disseminate and promote the importance of best practices, seeking their incorporation in the technical recommendations of agricultural associations/federations and their adoption by producers.

BP8. Provide technical assistance to producers involved in best practice programs with the goal of improving product quality (e.g., processing of coffee post-harvest) and increasing incomes.

BP9. Establish monitoring programs for target migratory birds before and after interventions, in order to measure the success of best practice programs.

Intermediate Result
Monitoring program for migratory birds provides information on the success of BPs and restoration processes

Threat Reduction
Expansion of the agricultural and cattle ranching frontiers detained

Threat Reduction
Grazing in forests and the use of fire to renovate pastures reduced or eliminated

Threat Reduction
Forest fires associated with the advance of the agricultural and livestock frontiers reduced or eliminated

Conservation Targets

Agroforestry systems including coffee, cacao and cardamon

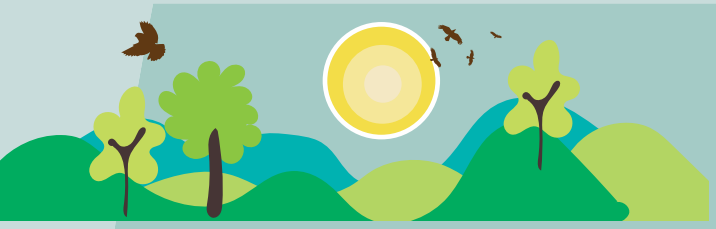
Mid-elevation forests (between 750 - 2000 m in Central America and 1000 - 2250 m in South America)

Priority Bird Species

Ecosystem services and livelihoods

Human wellbeing in local communities

Best agricultural practices, incentives and restoration II



E 3. Promote active/passive ecological restoration

Intermediate Result
Priority areas for restoration identified and mapped in each country

RE1. Prioritize areas for restoration and reforestation based on landscape fragmentation and connectivity studies.

Intermediate Result
Stakeholders in prioritized areas recognize the viability and benefits of ecological restoration processes

Intermediate Result
The Plan's priority areas and beneficial tree species are incorporated into national and regional ecological restoration programs

RE2. Identify and compile a database of locally or regionally beneficial plant species for migratory birds, evaluate and promote their availability through the establishment of nurseries.

RE3. Identify, locally or regionally, timber and fruit species of economic interest to producers and incorporate them into restoration projects.

RE4. Promote the incorporation of priority areas and beneficial plant species in national, regional or local restoration or reforestation programs.

RE5. Identify and/or establish pilot projects that demonstrate the viability (and profitability in the case of agroforestry systems) of ecological restoration/reforestation.

RE6. Disseminate the benefits and importance of pilot and/or demonstration projects as a mechanism for accelerating the implementation and expansion of restoration projects at the regional level.

Intermediate Result
Producers trained in ecological restoration implement restoration processes on their lands.

Intermediate Result
Ecological restoration programs initiated/supported in priority areas

Intermediate Result
Monitoring program for migratory birds provides information on the success of BPs and restoration processes

RE7. Strengthen local capacity by providing technical assistance to producers for the implementation of ecological restoration processes.

Effects of ecological restoration

Habitat lost due to land use changes restored in key areas for target migratory birds

Habitat lost due to conversion of shade-grown coffee to sun grown coffee compensated through ecological restoration

BP9. Establish monitoring programs for target migratory birds before and after interventions, in order to measure the success of best practice programs.

Intermediate Result
Mechanisms to stimulate and support restoration processes created

Intermediate Result
Ecological restoration programs initiated/supported in priority areas

RE8. Implement restoration projects or provide technical assistance to existing projects in order to restore 9,800 ha in Central America and 37,200 ha in South America in the areas prioritized in RE1.

Conservation targets

Agroforestry systems including coffee, cacao and cardamon

Mid-elevation forests (between 750 - 2000 m in Central America and 1000 - 2250 m in South America)

Priority Bird Species

Ecosystem services and livelihoods

Human wellbeing in local communities

7.3.1

Strategies and actions steps

Strategy 1.

Incentives for the adoption of best agricultural and/or livestock practices, or the implementation of active or passive ecological restoration

This strategy seeks to provide incentives to producers through tools such as voluntary conservation agreements or Payments for Environmental Services (PES) in order to promote the adoption of best agricultural and livestock practices and facilitate restoration initiatives. PES is a direct method for promoting conservation action, which explicitly recognizes the need to reconcile interests between private landowners and external actors through compensation processes. This strategy seeks to identify incentive programs that are aligned with the Plan's objectives, promote their adoption, and facilitate their implementation through technical support to farmers and ranchers during the application and registration process. The implementation of incentives requires regional diagnostics to determine their effectiveness. For example, the success of PESs is typically limited in areas where subsidies for agriculture exist, or where policies or institutions promote forest exploitation (Jones et al., 2017). As such, PESs are most effective when a small payment to landowners generates a desired land use, such as on properties with pastures, marginal croplands or steep hillsides with forest, and where the advance of the agricultural frontier is slow (Wunder, 2008). National restoration or reforestation programs designed to combat climate change have great potential to provide habitat for the migratory birds targeted by this Plan. Therefore, attempting to influence decision-making processes about where and how these programs are implemented could be a cost-effective strategy for achieving large-scale habitat creation goals.

Action steps

IN1	Identify and prioritize existing incentive programs to promote best agricultural and livestock practices, and active/passive ecological restoration at local, regional, national and international levels.
IN2	Diagnose the effectiveness (e.g., cost-effectiveness analysis) of existing incentive programs in each country and their applicability to the Plan's area of action.
IN3	Implement awareness campaigns to encourage producer participation in incentive programs and provide technical assistance to communities to facilitate access to identified programs.

Strategy 2.

Promotion and adoption of best agricultural and livestock practices

The identification, diffusion and adoption of best agricultural and livestock practices seeks to increase the availability and quality of habitat for migratory birds in productive landscapes. Several agricultural and livestock practices beneficial to migratory birds have already been identified in different regions of Central and South America. Since management recommendations may vary according to local or regional topographic and climatic conditions, it is essential to compile previously identified practices, evaluate their applicability and effectiveness in different regions, and modify them or develop new practices according to existing gaps. This strategy also aims to increase the income of producers by increasing productivity, reducing production costs (e.g., fencing materials, fodder banks), and diversifying production through the cultivation of fruit trees and timber species. Nine key actions were proposed for the two groups of best practices, as laid out below:

Action steps

BP1	Map and prioritize areas for the promotion and implementation of best practices, active/passive restoration and incentives taking into account landscape connectivity. In Central America, areas affected by recurrent fires should be mapped and identified.
BP2	Identify and characterize management practices that benefit or negatively affect the habitat of target species and compile and publish a single manual for the Plan's area of action.
BP3	Disseminate and promote the importance of best practices, seeking their incorporation in the technical recommendations of agricultural associations/federations and their adoption by producers.
BP4	Identify and/or establish pilot projects that demonstrate the viability and profitability of best practices, optimize implementation strategies and replicate them regionally.
BP5	Develop/participate in mechanisms/platforms for the exchange of experiences and lessons learned at the local, national and international level.
BP6	Strengthen local capacity for the adoption of best practices in the areas prioritized in BP1 by providing technical assistance to producers.
BP7	Provide training in farm-level accounting to producers involved in best practices and ecological restoration programs.
BP8	Provide technical assistance to producers involved in best practice programs with the goal of improving product quality (e.g., processing of coffee post-harvest) and increasing incomes.
BP9	Establish monitoring programs for target migratory birds before and after interventions, in order to measure the success of best practice programs.

Table 6. Objectives, indicators, action steps and intermediate results associated with the Strategic Area of Action "Incentives (IN), Best Agricultural and Livestock Practices (BP) and active/passive ecological restoration (RE)".

Strategy 1: Incentives

Objectives and indicators	Action steps/Intermediate results
OBJECTIVE: Identify and implement at least one incentive program in each country for the adoption of best practices and undertaking ecological restoration- 2025. **INDICATORS:** # of incentive programs developed, or under development, in each country. # of agreements signed with incentive programs to support the adoption of best practices and ecological restoration. # of producers participating in incentive programs. # of awareness campaigns implemented in each country	**IN1, IN2** Incentive programs supporting the adoption of best practices and ecological restoration compiled in a centralized database and prioritized in each country. **IN3** Producers in priority regions apply to incentive programs. Producers implement best practices or restoration processes with the support of incentive programs.

Strategy 2: Best agricultural and livestock practices (BPs)

Objectives and indicators	Action steps/Intermediate results
OBJECTIVE: Prioritize areas for the implementation of BPs- 2025. **INDICATORS:** % of the area of interest of the plan prioritized for best practice programs.	**BP1-BP8** Maps identifying regions suitable for the implementation of best practices
OBJECTIVE: Increase the adoption of BPs and incorporate habitat management BPs for target species within the technical guidelines of agricultural associations- 2026. **INDICATORS:** # of agricultural associations in each country incorporating BPs into their technical guidelines. # of BP pilot projects identified and/or established in each country. # of producers visiting pilot projects or participating in knowledge sharing experiences. # of producers adopting BPs.	**BP2** Current practices, economic rationale, and ecological impact identified and published. **BP3** Agricultural associations recognize the importance of BPs and incorporate them in their technical recommendations. **BP4, BP5** Pilot projects and knowledge sharing experiences increase producers' awareness of the advantages of BPs.

OBJECTIVE: Strengthen groups of producers technically and administratively for the implementation of BPs in 50% of prioritized areas- 2027. **INDICATORS:** % of prioritized area where producers have received technical and administrative support for implementing best practices	**BP6, BP7, BP8** Increased technical and management capacity among producers for implementing BPs. Producers benefit from the adoption of BPs (e.g. increased product quality).
OBJECTIVE: Implement BPs in 50% of the prioritized areas- 2033. **INDICATORS:** % of prioritized area where best practices are adopted. % increase in tree cover and/or vegetation structure over a 10-year period at BPs implementation sites.	**BP1-BP8** Agricultural and livestock BPs adopted at landscape or regional scale
OBJECTIVE: Implement monitoring programs in at least one regional project before and after the implementation of best practice or restoration programs. **INDICATORS:** # of BP projects with monitoring programs implemented.	**BP9** Monitoring program for migratory birds provides information on the success of BPs and restoration processes

Strategy 3. Restoration	
Objectives and indicators	Action steps/intermediate results
OBJECTIVE: Define areas suitable for ecological restoration in each country- 2025 **INDICATORS:** # of countries with a prioritization scheme.	**RE1, RE2** Priority areas for restoration identified and mapped in each country
OBJECTIVE: Include at least 50% of areas prioritized for restoration in national, regional or local ecological restoration programs and incorporate plant species beneficial to birds and producers in restoration processes- 2028. **INDICATORS:** # of priority areas in the Plan's area of influence considered in national restoration programs. # of tree planting programs that adopt species beneficial to birds and producers.	**RE2, RE3, RE4** The Plan's priority areas and beneficial tree species are incorporated into national and regional ecological restoration programs.

OBJECTIVE:

Support and/or establish active/passive ecological restoration projects in each country in order to restore 9,800 ha in Central America and 37,200 ha in South America- 2033.

INDICATORS:

of pilot and/or demonstration restoration projects identified and/or established in each country

# of producers trained in the implementation of ecological restoration processes

# of producers participating in restoration projects

# of hectares under restoration projects

RE5, RE6, RE7, RE8

Stakeholders in prioritized areas recognize the viability and benefits of ecological restoration processes.

Producers trained in ecological restoration implement restoration processes on their lands.

Mechanisms to stimulate and support restoration processes created.

Ecological restoration programs initiated/supported in priority areas

OBJECTIVE:

Implement monitoring programs linked to restoration projects representative of different regions and restoration schemes.

INDICATORS:

of restoration projects with monitoring programs implemented.

RE9

Monitoring program for migratory birds provides information on the success of BPs and restoration processes

Native tree nursery for ecological restoration processes in a coffee-growing landscape. The saplings of Erythrina poeppigiana in the foreground are attractive to Cerulean Warblers, as well as being a nitrogen fixing tree.

Strategy 3.

Promote active/passive ecological restoration

This strategy seeks to promote passive/active ecological restoration in degraded areas and/or areas suitable and unsuitable for agricultural production in order to increase tree cover. Restoring strategic ecosystems and increasing canopy cover in agroecosystems and silvopasture systems through reforestation processes is key to improving habitat quality for migratory birds. These actions are also expected to enhance beneficial ecosystem services and increase the resilience of producers to climate change. Ideally these initiatives will be aligned with national, regional or local restoration strategies, such as watershed restoration or the design and implementation of biological corridors involving protected areas and private properties.

Action steps

RE1	Prioritize areas for restoration and reforestation based on landscape fragmentation and connectivity studies.
RE2	Identify and compile a database of locally or regionally beneficial plant species for migratory birds, evaluate and promote their availability through the establishment of nurseries.
RE3	Identify, locally or regionally, timber and fruit species of economic interest to producers and incorporate them into restoration projects.
RE4	Promote the incorporation of priority areas and beneficial plant species in national, regional or local restoration or reforestation programs.
RE5	Identify and/or establish pilot projects that demonstrate the viability (and profitability in the case of agroforestry systems) of ecological restoration/reforestation.
RE6	Disseminate the benefits and importance of pilot and/or demonstration projects as a mechanism for accelerating the implementation and expansion of restoration projects at the regional level.
RE7	Strengthen local capacity by providing technical assistance to producers for the implementation of ecological restoration processes.
RE8	Implement restoration projects or provide technical assistance to existing projects in order to restore 9,800 ha in Central America and 37,200 ha in South America in the areas prioritized in RE1.
RE9	Establish monitoring programs for target migratory species before and after interventions in order to measure the success of restoration or reforestation programs.

General considerations

The implementation and success of the strategies and actions described above depends in part on: A) strong community organization; B) the provision of technical assistance that allows producers to assess the technical and economic feasibility of best practices and facilitates their adoption; C) access to equipment to enable the implementation of best practices; D) the strengthening of local capacity to enable communities to continue and replicate their experiences; E) working within a framework of inter-institutional and multi-sectoral cooperation and articulation; and F) guaranteeing that local, regional and/or national associations of farmers and ranchers, or government agencies, recognize and incorporate best practices into their technical guidelines. For this to happen, it is necessary to provide support to producers located in focal geographies by creating community organizations (if they do not already exist) and by identifying and meeting technical, administrative and financial needs in existing organizations.

The restoration of nearly 40,000 ha of mid-elevation forests and agroforestry systems in the Plan's area of action represents a major challenge. However, there is currently a unique opportunity to meet this challenge given the global focus on ecological restoration and the urgent need to sequester atmospheric carbon dioxide through tree planting and/or passive restoration as cost-effective measures to combat climate change. It is important to identify and take advantage of regions that offer opportunities for implementing restoration programs within the Plan's area of action, such as regions that overlap with regional or national restoration plans (Gonzalez et al. 2023), regions with marginal lands where land use conflicts would also be minimized (Etter et al. 2020), and degraded areas within protected areas or newly declared conservation areas. There are also significant opportunities where there is an urgent need to restore watersheds or slow erosion in order to restore the provision of key ecosystem services such as water supply and fertile soils. Active ecological restoration can cost between 800-2000 USD/ha and for the success of this strategy it is important to balance the implementation of active processes with passive processes (where appropriate), which are much more cost-effective.

Workshop explaining best agricultural practices to a group of cocoa farmers in a key region for the Cerulean Warbler.

7.4
Marketing biodiversity-friendly coffees

This Strategic Area for Action recognizes shade-grown coffee as a key habitat for the Target species and seeks to maintain or increase the area under cultivation.

Any increase in area should come from the conversion of sun-grown coffee or other crops to shade-grown coffee and not the establishment of coffee plantations in existing forests. The loss of shade-grown coffee is related to low profitability associated with variable prices in the global market, a decrease in production linked to droughts and disease epidemics, the high cost of agricultural inputs and increasing labor costs, among others. Among the actions that have led to a decrease and/or loss of native tree cover in coffee growing landscapes are the replacement of traditional arabica coffee varieties with coffee rust-resistant varieties grown under full sun, the expansion of coffee crops into forested areas, the abandonment and conversion of coffee plantations to other crops (e.g., avocado) or pastures, and the urbanization of coffee growing areas (Harvey et al., 2021).

For the implementation of this Strategic Area for Action, regional variability in the economic viability of shade-grown coffee should be taken into account. In regions with high cloud cover, rainfall and humidity, optimum shade cover is ≤ 20%; in contrast, in regions with high solar radiation and low rainfall, a lack of shade can be detrimental to production (Farfán-Valencia and Jaramillo-Robledo, 2009). It is therefore necessary to identify coffee growing landscapes where the implementation of strategies to maintain or increase the area of shade-grown coffee is viable. In regions more suited to the cultivation of sun-grown coffee, we recommend adopting the strategies described in the Strategic Area for Action "Good Agricultural and Livestock Practices, Incentives and Ecological Restoration", which focuses on maintaining and increasing the relicts of native vegetation in productive landscapes, such as sun-grown coffee plantations.

The aim of the strategies and actions described below is to increase the profitability of coffee production, which in turn is expected to incentivize producers to conserve, increase and/or adopt shade-grown coffee plantations. We invite the actors implementing the Plan to align the strategies and actions described below with national and/or international policies, thereby maximizing the resources available and the scope of the Plan. For example, several objectives in the “Strategic plan to modernize and increase the profitability of coffee production in Colombia” (CONPES, 2021) are aligned with the strategies and activities proposed here. Agroforestry systems are also a fundamental element in many climate change policies and are considered a Nationally Appropriate Mitigation Action (NAMA) according to the United Nations (United Nations, 2022).

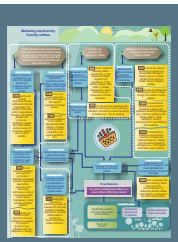
The strategies described here are not mutually exclusive. For example, a marketing or commercialization strategy can be implemented individually or hand-in-hand with strategies 1 or 2. The creation or strengthening of cooperatives and producer associations is key to the success of this Strategic Area for Action, as it can lower certification costs, guarantee the volume of coffee required for commercialization, increase the likelihood that farmers will participate in certification or quality control processes (Wollni and Zeller, 2007) and maximize the reach of marketing and commercialization programs.

The 10-year goal for this strategic area for action is to maintain 90% of the current shade-grown coffee cover and 90% of the tree cover (e.g. forest relicts, live fences, windbreaks and isolated trees) on coffee farms with and without shade in priority areas identified for the implementation of each strategy. As indicators for this goal, the percentage reduction in the area of shade-grown coffee plantations and tree cover were selected. **Figure 15** shows the threats addressed by this Strategic Area for Action, the threat reduction objectives and indicators. **Figure 16** presents the strategies, action steps and intermediate results, while **Table 7** lists the objectives, indicators, action steps and expected intermediate results.

THREAT	OBJECTIVE	INDICATOR
Advance of agricultural and livestock frontiers	Reduce/halt the transformation of agroforestry systems to other land uses in at least 10% of the current extent- 2033	Change in above-ground biomass in a period of 10-years 2023-2033.
Loss of stuctural and floristic complexity in shade-grown coffee plantations and transformation to sun-grown coffee or other land uses	Maintain the current extent of shade-grown coffee in focal geographies- 2033	Change in the extent of shade-grown coffee in a peirod of 10 years 2023-2033.

Figure 15. Threats addressed by the Strategic Area for Action "Marketing biodiversity friendly coffees", objectives for each threat and indicators.

Figure 16 . Strategies, action steps and intermediate results describing the workflow for the Strategic Area for Action "Marketing biodiversity friendly coffees" based on the Miradi diagram resulting from the Conservation Standards process.



Marketing biodiversity friendly coffees

E Position the shade trees associated with coffee plantations as a beneficial strategy for biodiversity conservation and climate change mitigation, and encourage their maintenance through certifications and other mechanisms

Intermediate Result
Regional diagnosis of certifications most likely to be adopted according to production systems and economic benefits.

Intermediate Result
Shade management optimized for productivity and for birds in coffee-growing regions where target species are present.

CA1. Carry out a spatial analysis to identify coffee regions that support populations of target species.

CA2. Provide technical assistance for the optimal management and/or adoption of shade according to local conditions in the regions identified in CA1.

CA3. Identify and promote biodiversity-friendly certifications that are more likely to be adopted at the local and/or regional level through a participatory process with producers, certification experts and coffee traders, and an analysis of production systems and economic benefits.

Intermediate Result
Coffee farms certified according to the opportunities and conditions in each region and farm.

CA4. Provide technical assistance and support to producers in certification processes (creation of grower's associations, production and processing techniques, zoning of conservation areas and/or shade management, social and administrative aspects).

CA5. Identify and contact funding sources to carry out certification processes for groups of producers (e.g., marketers such as Nespresso or Keurig).

E Creation and promotion of high-quality coffees

Intermediate Result
Focal areas for the production of biodiversity-friendly specialty coffees defined.

CA7. Identify clusters of specialty coffees according to: 1) The presence of target migratory bird populations, 2) The sensory profiles of the coffee, 3) Shade management, and 4) Connectivity and conservation of forest fragments.

Intermediate Result
Farmers produce coffee of higher quality.

CA8. Provide technical assistance and economic incentives to improve planting, cultivation, harvesting and post-harvesting processes (e.g., drying, roasting).

E Marketing and commercialization strategies for Biodiversity Friendly Coffees

Intermediate Result
Marketing and commercialization strategies formulated and implemented.

CA9. Promote the value of agroforestry systems as a conservation strategy for flagship species including migratory birds and as a climate change mitigation strategy.

CA10. Increase the demand for Biodiversity Friendly Coffees through the creation of niche markets.

CA11. Provide technical assistance and economic incentives to design and implement marketing strategies (e.g., branding, packaging and image creation, media campaigns, building connections with intermediaries and exporters).

CA12. Provide technical assistance and economic incentives to design and implement regional, national and international marketing strategies (e.g., food hygiene certificates, export permits).

Intermediate Result
Coffee growers receive a higher price for their coffee and its production is economically viable

Intermediate Result
Producers conserve their farms and the area dedicated to biodiversity-friendly coffee production remains stable.

CA6. Design and implement a monitoring program to evaluate the economic benefits of adopting certifications, and their effectiveness in maintaining biodiversity-friendly coffee production.

Intermediate Result
Increase in the demand for biodiversity-friendly coffees.

Intermediate Result
Coffee growers that participated in strategies 1 and 2 are highlighted and promoted through a dedicated web page

CA13. Build a web page that facilitates marketing, opens channels for the commercialization of biodiversity-friendly coffees and integrates producers in the Plan's area of action.

Threat Reduction

Conversion of shade-grown coffee to sun grown coffee or other crops reduced

Conservation Targets

Agroforestry systems including coffee, cacao and cardamon

Priority Bird Species

Ecosystems services and livelihoods

Human wellbeing of local communities

7.4.1

Strategies and actions steps

Strategy 1.

Position the shade trees associated with coffee plantations as a beneficial strategy for biodiversity conservation and climate change mitigation, and encourage their maintenance through certifications and other mechanisms

This strategy is focused on positioning shade as a beneficial tool for conservation and for mitigating the effects of climate change in coffee growing landscapes, and on increasing the participation of coffee growers in biodiversity friendly certification schemes. Among the biodiversity friendly certifications, the Smithsonian Institute's BirdFriendly® certification is recommended, given that its shade criteria are designed to maximize the diversity of birds in coffee plantations. For the purposes of this Plan, the term "Bird friendly" refers to coffees that are beneficial for biodiversity in general and not necessarily to the BirdFriendly® certification. Although biodiversity-friendly certifications are recommended, additional certifications such as organic or fair trade, for example, can increase the profitability of shade-grown crops and thus favor their long-term sustainability.

Action steps

CA1	Carry out a spatial analysis to identify coffee regions that support populations of Target species.
CA2	Provide technical assistance for the optimal management and/or adoption of shade according to local conditions in the regions identified in CA1.
CA3	Identify and promote biodiversity-friendly certifications that are more likely to be adopted at the local and/or regional level through a participatory process with producers, certification experts and coffee traders, and an analysis of production systems and economic benefits.
CA4	Provide technical assistance and support to producers in certification processes (creation of grower's associations, production and processing techniques, zoning of conservation areas and/or shade management, social and administrative aspects).
CA5	Identify and contact funding sources to carry out certification processes for groups of producers (e.g., marketers such as Nespresso or Keurig).
CA6	Design and implement a monitoring program to evaluate the economic benefits of adopting certifications, and their effectiveness in maintaining biodiversity-friendly coffee production.

Strategy 2.
Creation and promotion of high-quality coffees

This strategy is focused on the production of high-quality shade-grown coffees (specialty coffees) that command higher market prices for coffee growers than conventional coffees. By improving production and post-harvest processes, the goal is to produce high quality green beans with a superior cupping score (the cupping score is on a scale from 0 to 100, where coffees scoring >80 are classed as specialty coffees). In addition to post-harvest processes, several factors influence coffee flavor including the tree species present in the shade, the variety of coffee grown (e.g. Caturra, Geisha, Tipica or Bourbon), elevation and soil composition. This set of factors should be taken into account to identify regions with the potential to produce specialty coffees.

Action steps

CA7	Identify clusters of specialty coffees according to: 1) The presence of target migratory bird populations, 2) The sensory profiles of the coffee, 3) Shade management, and 4) Connectivity and conservation of forest fragments.
CA8	Provide technical assistance and economic incentives to improve planting, cultivation, harvesting and post-harvesting processes (e.g., drying, roasting).

Strategy 3.
Marketing and commercialization strategies for Biodiversity Friendly Coffees

This strategy seeks to develop marketing and commercialization strategies in order to increase the demand for Biodiversity Friendly Coffees and facilitate connections between coffee growers and buyers at the local, national and international levels.

Action Steps

CA9	Promote the value of agroforestry systems as a conservation strategy for flagship species including migratory birds and as a climate change mitigation strategy.
CA10	Increase the demand for Biodiversity Friendly Coffees through the creation of niche markets.
CA11	Provide technical assistance and economic incentives to design and implement marketing strategies (e.g., branding, packaging and image creation, media campaigns, building connections with intermediaries and exporters).
CA12	Provide technical assistance and economic incentives to design and implement regional, national and international marketing strategies (e.g., food hygiene certificates, export permits).
CA13	Build a web page that facilitates marketing, opens channels for the commercialization of biodiversity-friendly coffees and integrates producers in the Plan's area of action.

Table 7. Objectives, indicators, action steps and intermediate results associated with the Area for Strategic Action "Marketing biodiversity friendly coffees"

Objectives and indicators	Action steps / Intermediate results
OBJECTIVE: Increase the profitability and sustainability of coffee production in 50% of the priority area through the adoption of certifications that favor the retention of biodiversity-friendly landscape elements- 2033. **INDICATORS:** % of the prioritized area where certification processes have been initiated/completed. % increase in the number of certified farms % of certified farms that remain in the program	**CA1, CA2** Shade management optimized for productivity and for birds in coffee-growing regions where target species are present. **CA3** Regional diagnosis of certifications most likely to be adopted according to production systems and economic benefits. **CA4, CA5** Coffee farms certified according to the opportunities and conditions in each region and farm. **CA5, CA6** Producers conserve their farms and the area dedicated to biodiversity-friendly coffee production remains stable.
OBJECTIVE: Increase the profitability of coffee in priority areas through the creation and promotion of high-quality specialty coffees produced with biodiversity friendly agricultural practices- 2033. **INDICATORS:** % of area under shade-grown coffee production where programs to improve quality and create specialty coffees have been implemented. % increase in profitability of individual producers.	**CA7** Focal areas for the production of biodiversity friendly specialty coffees defined. **CA8** Farmers produce coffee of higher quality. **CA8, CA11** Coffee growers receive a higher price for their coffee and its production is economically viable.
OBJECTIVE: Increase the demand for biodiversity-friendly coffees through marketing and commercialization strategies. **INDICATORS:** % of producers in priority areas involved in marketing and/or commercialization programs. % increase in the demand for biodiversity-friendly / bird-friendly / organic coffees (e.g. increase in the market share for biodiversity-friendly coffee)	**CA10, CA11, CA12** Marketing and commercialization strategies formulated and implemented. **CA9, CA10, CA11, CA12** Increase in the demand for biodiversity-friendly coffees. **CA13** Coffee growers that participated in strategies 1 and 2 are highlighted and promoted through a dedicated web page.

7.5
Land use planning and environmental regulation

The objective of this Strategic Area for Action is **“to strengthen local administrations in order to improve their operational and technical capacities for land use planning and management”**, i.e., to formulate and update land use planning and environmental regulation tools in accordance with environmental determinants. These tools can facilitate the effective control of the urban frontier in rural lands destined for forest and biodiversity protection, prevent urban sprawl in the development of human settlements, as well as in the case of formal constructions.

The objective of this Strategic Area for Action is **"the conservation and restoration of the Plan's area of action based on the regulation and effective control of urban growth and the development of tourism, transport and energy infrastructure"**. Regulation and control should be carried out in processes of legal occupation (within the framework of approved planning instruments), as well as in incompletely developed human settlements, which generally occupy soils destined for forest protection in rural areas, many of which fall under a figure for their protection.

The 10-year goal is that the loss of forests and agroforestry systems due to **urban growth and the implementation of tourism and infrastructure projects be mitigated and/or compensated in 50% of cases.** **Figure 17** shows the threats addressed by this Strategic Area for Action, the threat reduction objectives and indicators. **Figure 18** presents the strategies, action steps and intermediate results, while **Table 8** presents the objectives, indicators, action steps and expected intermediate results.

THREAT	OBJECTIVE	INDICATOR
Inadequate planning of urban and tourism developments / Inadequate planning and expansion of infrastructure	By 2033, 50% of urban growth processes and development projects are implemented with measures designed to mantain ecological connectivity and to prevent, mitigate and compensate for environmental impacts	Percentage of urban expansion and development projects realized with environmental sustainability criteria

Figure 17. Threats addressed by the Strategic Area for Action "Land Use Planning and Environmental Regulation", objectives for each threat and indicators.

Figure 18. Strategies, action steps and intermediate results describing the workflow for the Strategic Area for Action "Land use planning and environmental regulation" based on the Miradi diagram resulting from the Conservation Standards process.

Land use planning and environmental regulation

E

Incorporate environmental considerations in territorial planning, environmental regulation and sectoral planning instruments (energy, transport and tourism infrastructure, among others).

Intermediate Result

Planning and regulation instruments reviewed in priority municipalities and prioritized according to their impact.

OT1. Identify and prioritize municipalities located in the Plan's area of action where there are urban and/or tourism expansion plans.

OT2. Identify, characterize and generate a preliminary analysis of strategic actors for the sustainability of the Plan in prioritized localities.

OT3. Socialize the Plan with the relevant actors in priority municipalities, e.g. sectors present (academia, transport, mining and energy), communities, and local and national governance structures.

OT4. Identify conservation gaps in the current planning and management instruments, as well as in the regulations issued and/or in the process of being issued, and review their articulation with international agreements governing biodiversity conservation.

Intermediate Result

Adjustments to planning and land use instruments made with the participation of scientific, community-led and sectoral organizations.

OT5. Establish at least one multisectoral committee per country to contribute to the improvement of territorial management through action plans currently being implemented or in the process of being developed.

OT6. Identify and engage in planning processes for land use and regulation in priority municipalities.

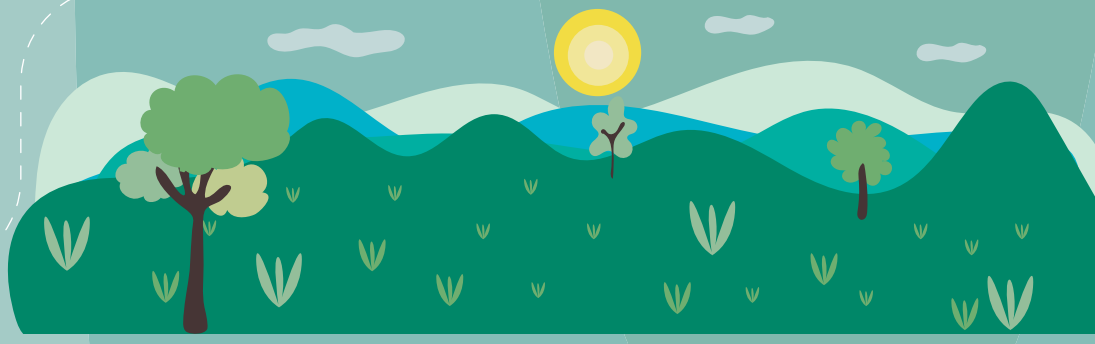
Intermediate Result

Capacity of strategic actors for decision-making, implementing regulations and conflict resolution strengthened in areas where planning instruments are deficient in themes of conservation and environmental regulation.

OT7. Train communities and local governments in environmental land management, human rights, regulations, procedures for filing complaints and conflict resolution.

Intermediate Result

Environmental regulations strengthened in favor of the Plan's conservation targets in prioritized municipalities.



Threat Reduction

Improved regulation of urban expansion and infrastructure for tourism, transport and energy sectors

Conservation Targets

Agroforestry systems including coffee, cacao and cardamon

Mid-elevation forests (between 750 - 2000 m in Central America and 1000 - 2250 m in South America)

Priority Bird Species

Ecosystems services and livelihoods

Human wellbeing in local communities

7.5.1
Strategies and action steps

Strategy 1

Incorporate environmental considerations in territorial planning, environmental regulation and sectoral planning instruments (energy, transport and tourism infrastructure, among others).

This strategy was designed to promote the incorporation of environmental considerations associated with the Plan's conservation targets in territorial planning, environmental management and sectoral planning processes and instruments, specifically in terms of the regulations, programs and projects they establish. To this end, the strategy seeks to engage both the relevant environmental authorities and related industries. Environmental considerations include both ecological (e.g., habitats, species of fauna and flora) and connectivity criteria for the protection and/or restoration of forests within the Plan's area of action. These considerations transverse other structuring systems (public services, mobility, public space, among others), favor environmental quality and human wellbeing, and should be a determining factor in decision-making regarding the viability of physical infrastructure projects. Examples of Territorial Planning Instruments for South and Central America are presented in **Appendix 7.**

Action steps

Seven key actions were proposed for this strategy. A detailed description of OT2 through OT6 is presented in **Appendix 8.**

OT1	Identify and prioritize municipalities located in the Plan's area of action where there are urban and/or tourism expansion plans.
OT2	Identify, characterize and generate a preliminary analysis of strategic actors for the sustainability of the Plan in prioritized localities.
OT3	Socialize the Plan with the relevant actors in priority municipalities, e.g. sectors present (academia, transport, mining and energy), communities, and local and national governance structures.
OT4	Identify conservation gaps in the current planning and management instruments, as well as in the regulations issued and/or in the process of being issued, and review their articulation with international agreements governing biodiversity conservation.
OT5	Establish at least one multisectoral committee per country to contribute to the improvement of territorial management through action plans currently being implemented or in the process of being developed.
OT6	Identify and engage in planning processes for land use and regulation in priority municipalities.
OT7	Train communities and local governments in environmental land management, human rights, regulations, procedures for filing complaints and conflict resolution.

Table 8. Objectives, indicators, action steps and intermediate results associated with the Strategic Area for Action "Territorial Planning and Environmental Regulation".

Objectives and Indicators	Action steps / Intermediate results
OBJECTIVE: Incorporate the Plan's conservation targets in the formulation and/or revision of planning and territorial management instruments in 70% of prioritized municipalities – 2030 **INDICATOR:** % of prioritized municipalities in which the Plan's conservation targets are incorporated into planning and management processes.	**OT1, OT2, OT4, OT6** Planning and regulation instruments reviewed in priority municipalities and prioritized according to their impact. Adjustments to planning and land use instruments made with the participation of scientific, community-led and sectoral organizations.
OBJECTIVE: Local scale- Influence environmental regulations in 50% of the prioritized municipalities through the participation of technical, sectoral and community bodies in the provision of feedback on 50% of the administrative acts on environmental matters- 2030 **INDICATORS:** # of administrative acts related to the environment in which the Plan's conservation interests are incorporated % of prioritized municipalities with trained stakeholders # of stakeholders trained, and number of planning processes in which stakeholders participate.	**OT3, OT6, OT7** Capacity of strategic actors for decision-making, implementing regulations and conflict resolution strengthened in areas where planning instruments are deficient in themes of conservation and environmental regulation. Environmental regulations strengthened in favor of the Plan's conservation targets in prioritized municipalities.
OBJECTIVE: - Include standards, instruments, programs and projects for the conservation of 50% of the Plan's area of action within national land planning regulations and instruments - 2033 **INDICATOR:** % of the Plan's area of action incorporated within planning and regulation instruments in each country.	**OT4, OT5** Strengthened environmental regulations in favor of the Plan's conservation targets at the national level.

General considerations

These considerations were crafted using Colombia as an example and we hope that they serve as a guide within the context of other countries. In Colombia, Law 152 (1994) establishes the principles of **congruence** and complementarity in public administration. Under the congruence principle, when two or more planning authorities with different powers must develop joint activities towards a common purpose, their actions must be timely and efficient, and their jurisdictional competence must be mutually respected. Under the principle of **complementarity,** the authorities should act in collaboration during the planning exercise so that planning decisions and actions are effective. However, the relevant authorities do not always apply the principles of congruence and complementarity, and conflicts of competency arise in terms of financing, project execution, and control when, for example, managing protected areas.

With respect to environmental regulations, there are also aspects that need to be improved. **In land-use planning, numerous entities or sectors tend to converge, leading to a set of regulations that are not articulated.** For example, in Colombia, land use planning is governed by Law 388 (1997), which established the terms and conditions regarding the environment, risk management, public services, roads and cultural heritage that must be included in land use plans. Regional authorities have subsequently applied these terms and conditions to their local situation, leading to an excess of individual and disjointed regulations that generate confusion and contradictions in their application. Accordingly, it is important to **create unified guidelines for implementing existing regulations** in a standardized manner, in order to avoid different interpretations between regions and sectors.

In addition, it is important that **there are no contradictions in the different planning instruments that converge in a territory** and that they allow for the protection of key areas for conservation in their zoning and regulations. For example, in the case of Colombia, there needs to be agreement between overlapping Watershed regulation and management plans - POMCAs, Territorial Management Plans, Development Plans, and Partial Plans, among others. To the contrary, the deficient control of infrastructure and tourist developments, and agricultural expansion in the Plan's area of action will be prolonged. It should be noted that several of the general considerations presented for the success of this Strategic Areas for Action go beyond the scope of the Plan and are the direct responsibility of local, regional or national governments.

7.5.2
Additional considerations for all Strategic Areas

The evaluation of the success of the strategies and actions proposed for each Strategic Area of Action depends on a continuous effort to obtain baseline information for the evaluation of indicators. For example, detailed spatial information identifying areas used for shade-grown coffee cultivation is needed, as is a characterization of the areas affected by recurrent fires, in order to establish habitat maintenance objectives and solid indicators.

It is also necessary to implement a standardized long-term monitoring program during the non-breeding season, equivalent to the Breeding Bird Surveys (BBS) in North America. Such a program would make it possible to determine population trends at stopover and non-breeding sites, and evaluate the success of the strategies and actions described in this Plan once they have been implemented. The design of additional strategies to address threats such as mining and climate change, would also strengthen the impact of the Plan.

Finally, it is important to recognize that the situation in the geographic scope of the Plan is very dynamic and pressures on target habitats can vary between governments or with fluctuations in agricultural commodity prices, as is the case for coffee. In each country there are conservation and restoration processes in progress or just beginning that were not taken into account for the construction of this Plan and it is imperative to understand the situation in potential project regions before implementing the strategies described here. For example, several remnants of mid-elevation forest in Colombia are currently part of active protected area declaration processes, which will make a significant contribution to the area of mid-elevation forest under protection in this country.

8

FUNDING NEEDS

The implementation of the Plan during the first 10 years has an estimated cost of **$71,359,475 USD**. Estimated costs for each strategic area of action and associated major action steps are presented below **(Tables 9 to 13).** The costs were estimated based on average values for salaries and materials in the geographic scope of the Plan and, therefore, may be higher or lower according to the country where the actions are implemented. To estimate the overall costs for the entire geographic scope of the Plan, each country was assigned to one of five regions that partly reflect the biogeography of the region and the distribution of the target species: R1) Honduras and northern Nicaragua; R2) Costa Rica and Panama; R3) Colombia and eastern Venezuela; R4) Ecuador and northern Peru; R5) Guatemala, Belize and Chiapas (Mexico). The estimated value for each region and for the five regions as a whole, the expected time to complete each action step and the approximate annual costs are reported. Where appropriate, related actions were grouped together to estimate costs.

Table 9. Estimated costs for the Strategic Area for Action **Conservation Areas** (see section 7.1).

Strategy 1. . Establish and declare new conservation areas (CAs) and/or expand existing areas		Cost x region	Cost x 5 regions	Duration	Average annual cost
AC1	Consolidate maps of current forest cover at mid-elevations, and overlap with distribution layers for target species and protected areas.	$8,000	$40,000	2 years	$20,000
AC2	Identify additional conservation targets in priority unprotected forests (using secondary information if it exists and/or field surveys if absent)	$37,000	$185,000	4 years	$46,250
AC3 y AC4.	Prioritize new areas for conservation through participatory processes with communities using rigorous technical and social criteria. (AC4) Identify ongoing national and international initiatives for the declaration/expansion of CAs within the focal geographic area, and integrate efforts where possible.	$53,000	$265,000	4 years	$66,250
AC5 a AC9	Undertake two declaration processes per country following the relevant criteria in each country and the category of CA to be declared.	$400,000	$2,000,000	8 years	$250,000
Strategy 2. Strengthen the management of existing conservation areas		Cost x region	Cost x 5 regions	Duration	Average annual cost
AC10 a AC12.	Identify CAs with active deforestation or invasion through a spatial analysis of deforestation and/ or management plans, and an effectivity analysis. Identify weaknesses in the physical, technical and financial capacity of CAs, including the capacity for planning processes and monitoring programs.	$46,000	$230,000	2 years	$115,000
AC13	Implement or establish mechanisms to address the weaknesses identified in AC12 such as inter-institutional agreements, co-management agreements, implementation funds or technical assistance.	$400,000	$2,000,000	8 years	$250,000
AC14	Implement participatory programs or processes (e.g., alternative livelihoods, conservation agreements) aimed at reducing pressures on focal habitats in conservation areas.	$800,000	$4,000,000	8 years	$500,000
Design and supervision of projects		$135,000	$675,000	9 years	$75,000
Indirect Costs (10%)		$187,900	$939,500	10 years	$93,950
TOTAL STRATEGIC AREA FOR ACTION			**$10,334,500**		

Table 10. Estimated costs for the Strategic Area for Action **Indigenous, Afro-descendant and Rural Community Lands** (see section 7.2).

Strategy 1. Legal recognition and "consolidation" of indigenous, afro-descendent and rural community lands		Cost x region	Cost x 5 regions	Duration	Average annual cost
TI1 y TI2	Identify territories within the Plan's area of action and analyze and identify gaps in legal recognition and integrity.	$32,500	$162,500	3 years	$54,167
TI3 y TI4	Establish formal relationships with indigenous organizations and communities at the national and local levels, and with government institutions responsible for the legalization and recognition of territories.	$50,000	$250,000	2 years	$125,000
TI5	Design roadmaps to resolve the gaps in legal recognition and the consolidation of the areas identified in TI2 through a participatory process.	$40,000	$200,000	2 years	$100,000
Strategy 2. Strengthen the planning and management capacity of ethnic territories within and outside protected areas through the application of the law and associated management and territorial planning instruments.		Cost x region	Cost x 5 regions	Duration	Average annual cost
TI6 y TI7	Identify territories with gaps in planning and management capacity, and carry out a participatory diagnosis to identify factors affecting the implementation of management plans.	$50,000	$250,000	2 years	$125,000
TI8	Support management and planning processes, especially those involving conservation, restoration ecological and sustainable production.	$50,000	$250,000	2 years	$125,000
TI9	Identify and develop funding opportunities for the implementation of plans and strategies to reduce deforestation within collective territories, including co-management of protected areas.	$824,000	$4,120,000	5 years	$824,000
Design and supervision of projects		$135,000	$675,000	9 years	$75,000
Indirect costs (10%)			$590,750	10 years	$59,075
TOTAL STRATEGIC AREA FOR ACTION			**$6,498,250**		

Table 11. Estimated costs for the Strategic Area for Action **Agricultural and Livestock Best Practices, Incentives and Ecological Restoration** (see section 7.3).

	Strategy 1. Incentives for the adoption of best agricultural and livestock practices or active/passive ecological restoration.	Cost x region	Cost x 5 regions	Duration	Average annual cost
IN1 IN2	Identify and prioritize existing incentive programs to promote best practices and active/passive ecological restoration at local, regional, national and international levels and **IN2**. Diagnose the effectiveness (e.g., cost-effectiveness analysis) of existing incentive programs in each country and their applicability to the Plan's area of action.	$10,000	$50,000	2 years	$25,000
IN3	Implement awareness campaigns to encourage producer participation in incentive programs and provide technical assistance to communities to facilitate access to identified incentive programs.	$104,000	$520,000	5 years	$104,000

	Strategy 2. Promotion and adoption of best agricultural and livestock practices	Cost x region	Cost x 5 regions	Duration	Average annual cost
BP1	Map and prioritize areas for the promotion and implementation of best practices, active/passive restoration and incentives taking into account landscape connectivity. In Central America, it's necessary to identify and map areas affected by recurrent burning.	$6,000	$30,000	2 years	$15,000
BP2	Identify and characterize management practices that affect, positively or negatively, the habitat of the target species and compile and publish a single manual for the Plan's area of action.	$5,600	$28,000	2 years	$14,000
BP3	Disseminate and promote the importance of best practices, and advocate for their incorporation in the technical recommendations of grower's associations and their adoption by producers.	$50,000	$250,000	5 years	$50,000
BP4	Identify and/or establish pilot projects that demonstrate the viability and profitability of best practices, optimize them and replicate across regions.	$72,000	$360,000	7 years	$51,429
BP5	Develop/participate in mechanisms/platforms for exchanging experiences and lessons learnt at local, national and international levels.	$30,000	$150,000	3 years	$50,000
BP6	Strengthen local capacity by providing technical assistance to producers for the adoption of best practices in the areas prioritized in BP1.	$206,000	$590,750	7 years	$147,143
BP7	Provide training in accounting to producers involved in programs for best practices and passive/active ecological restoration.	$25,000	$125,000	5 years	$25,000
BP8	Provide technical assistance to producers involved in best practice programs in order to increase product quality (e.g., post-harvest processing) and in turn their income.	$195,000	$975,000	6 years	$162,500
BP9	Establish monitoring programs for target species before and after interventions in order to measure the success of best practice programs.	$165,000	$505,000	8 years	$63,125

	Strategy 3. Promote active/passive ecological restoration	Cost x region	Cost x 5 regions	Duration	Average annual cost
RE1	Prioritize areas for restoration and reforestation based on an analysis of habitat fragmentation and connectivity.	$6,000	$30,000	2 years	$15,000
RE2 RE3	Identify and/or compile local or regional databases of plant species beneficial for migratory birds; evaluate and promote their availability through the establishment of nurseries and **RE3.** Identify timber or fruit species of economic interest to producers and incorporate them into restoration projects.	$14,000	$70,000	2 years	$35,000
RE4	Advocate for the incorporation of priority areas and beneficial plant species in national, regional or local restoration or reforestation programs.	$7,500	$37,500	3 years	$12,500
RE5	Identify and/or establish pilot projects that demonstrate the feasibility (and profitability in the case of agroforestry systems) of ecological restoration/reforestation.	$15,000	$75,000	3 years	$25,000
RE6	Disseminate the benefits and successes of pilot and/or demonstration projects to inform the implementation and scaling up of restoration projects at the regional level.	$25,000	$125,000	5 years	$25,000
RE7	Strengthen local capacity by providing technical assistance to producers for the implementation of ecological restoration processes.	$175,000	$875,000	5 years	$175,000
RE8	Implement restoration projects or provide technical assistance to existing projects to restore 9,800ha in Central America and 37,200 ha in South America in the areas prioritized in RE1.	$7,548,000	$37,740,000	8 years	$4,717,500
RE9	Establish monitoring programs for target species before and after interventions in order to measure the success of restoration or reforestation programs.	$51,500	$157,500	5 years	$31,500
	Design and supervision of projects	$135,000	$675,000	9 years	$75,000
	Indirect costs (10%)	$884,560	$4,380,800	10 years	$438,080
	TOTAL STRATEGIC AREA FOR ACTION		**$48,188,800**		

Table 12. Estimated costs for the Strategic Area for Action **Marketing of biodiversity friendly coffees** (see section 7.4).

Strategy 1. Position the shade trees associated with coffee plantations as a beneficial strategy for biodiversity conservation and climate change mitigation, and encourage their maintenance through certifications and other mechanisms.		Cost x region	Cost x 5 regions	Duration	Average annual cost
CA1	Carry out a spatial analysis to Identify coffee regions that support key populations of the target species.	$6,000	$30,000	2 years	$15,000
CA2	Provide technical assistance for the optimal management and/or adoption of shade trees according to local conditions in the regions identified in CA1.	$180,000	$900,000	4 years	$225,000
CA3, CA4 y CA5	Identify and promote biodiversity-friendly certifications, (CA4) provide technical assistance and support to producers in the certification process, and (CA5) identify and contact funding sources for certification processes.	$158,000	$790,000	5 years	$158,000
CA6	Design and implement a monitoring program to evaluate the economic benefits of certification adoption and its effectiveness in maintaining biodiversity-friendly coffee production (3 regions).	$52,500	$157,500	6 years	$26,250
Strategy 2. Creation and promotion of specialty coffees		Cost x region	Cost x 5 regions	Duration	Average annual cost
CA7	Identify clusters of specialty coffees based on 1) the presence of migratory bird populations, 2) the sensory profiles of the coffee, 3) shade management practices, and 4) connectivity and conservation of forest areas.	$10,000	$50,000	2 years	$25,000
CA8	Provide technical assistance and economic incentives to improve planting, cultivation, harvesting and post-harvest processes (e.g., drying, roasting).	$120,000	$600,000	5 years	$120,000
Strategy 3. Marketing and commercialization strategies for biodiversity friendly coffees		Cost x region	Cost x 5 regions	Duration	Average annual cost
CA9	Promote the value of agroforestry systems as a conservation strategy for flagship species, including migratory birds, and as a climate change mitigation strategy.	$10,000	$50,000	2 years	$25,000
CA10 Y CA11	Increase the demand for Biodiversity Friendly Coffees through the creation of market niches, and by (CA11) providing technical assistance and economic incentives to design and implement marketing strategies.	$44,500	$222,500	6 years	$37,083
CA12	Provide technical assistance and economic incentives to design and implement regional, national and international marketing strategies (e.g., food safety permits, export permits).	$20.250	$101,250	5 years	$20,250
CA13	Build a web page that facilitates the marketing and commercialization of biodiversity friendly coffees.	$8,000	$8,000	1 years	$8,000
Design and supervision of projects		$135,000	$675,000	9 years	$75,000
Indirect costs (10%)			$358,425	9 years	$39,825
TOTAL STRATEGIC AREA FOR ACTION			**$3,942,675**		

Table 13. Estimated costs for the Strategic Area for Action **Land Use Planning and Environmental Regulation** (see section 7.5).

Strategy 1. Incorporate environmental considerations in land-use planning, environmental regulation and sectoral planning instruments (energy, transport and tourism infrastructure, among others).		Cost x region	Cost x 5 regions	Duration	Average annual cost
OT1	Identify and prioritize municipalities located in the Plan's area of action with plans for urban expansion and/or tourism developments.	$15,000	$75,000	2 years	$37,500
OT2	Identify, characterize and generate a preliminary analysis of the strategic stakeholders for the sustainability of the Plan in prioritized municipalities.	$37,500	$187,500	2 years	$93,750
OT3	Socialize the Plan with different sectors (academia, transport, mining and energy), communities, and local and national administrations relevant to priority municipalities.	$50,000	$250,000	2 years	$125,000
OT4	Identify conservation gaps in the current planning and management instruments, as well as in regulations issued and/or in the process of being issued, and review their articulation with international agreements governing biodiversity conservation.	$18,000	$90,000	2 years	$45,000
OT5	Establish at least one multisectoral committee per country to contribute to the improvement of territorial management through action plans currently being implemented or in the process of being developed.	$45,000	$225,000	2 years	$112,500
OT6	Identify and engage in planning processes for land use and regulation in priority municipalities.	$60,000	$300,000	5 years	$60,000
OT7	Train communities and local governments in environmental land management, human rights, regulations, procedures for filing complaints and conflict resolution.	$75,000	$375,000	5 years	$75,000
Design and supervision of projects		$135,000	$675,000	9 years	$75,000
Indirect costs (10%)			$217,750	10 years	$21,775
TOTAL STRATEGIC AREA FOR ACTION			**$2,395,250**		

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