



Project Proposals 2021-2022



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Protection of Wintering and Stop-Over sites in the Conservation Coast Birdscape, Guatemala

Partners: Fundacion para el EcoDesarrollo y La Conservacion (FUNDAECO), American Bird Conservancy (ABC)

States that have participated to date: Missouri, Tennessee, Arkansas, Iowa, Texas

Overview: The coastal Caribbean region of Guatemala lies between Belize and Honduras in the province of Izabal. This region includes several unique and isolated massifs rising from sea level up to 1,200 meters, low-land rainforest, large mangrove and natural beach systems and a Ramsar Wetland. The region is bathed in moisture-laden Caribbean trade winds and supports a unique transitional ecosystem from the shoreline to wet rainforests and pine-oak forests on south-facing rain-shadow slopes. The unique combination of topographical and climatic conditions creates important stop over and wintering habitat for at least 153 species of neotropical migrants. As such, this region is defined by ABC as a high priority BirdScape called the Conservation Coast. ABC began implementing its BirdScape Initiative to scale up habitat protection and management in key landscapes for migratory birds. FUNDAECO, ABC's Guatemalan partner, is ensuring the conservation of these sites by purchasing and managing core habitat in areas identified for national protection by the Guatemalan government, who themselves lack the funds to purchase or manage land. Southern Wings, and matching funds, have made it possible to create an extensive and robust system of protected areas with FUNDAECO. This project is focused on protecting additional forest and wetland habitat, restoring degraded lands, and improving management of agriculture systems in the buffer zones of these protected areas to benefit migratory birds.

Threats: Cattle ranching, oil palm expansion, illegal logging, and slash-and-burn and industrial agriculture, and climate change continue to threaten forest resources.

Birds: 153 neotropical migratory bird species have been identified in the Izabal region of Guatemala, including wood thrush, Kentucky warbler, worm-eating warbler, hooded warbler, black-throated green warbler, and painted bunting. past ABC-funded research identified the region's caribbean mountain tops as important spring stopover sites for the cerulean warbler—a priority watchlist bird. other watchlist species that use different FUNDAECO reserves include golden-winged warbler, Canada warbler, and olive-sided flycatchers. The coastline of Punta de Manabique has been used by buff-breasted sandpiper, sanderling, stilt sandpiper, western sandpiper, red knot, and Wilson's plover during the winter migration. other migrants in the region include Swainson's hawk, blue-winged warbler, Tennessee warbler, magnolia warbler, Louisiana waterthrush, Baltimore oriole, and indigo bunting.

Project Goal(s): Our goal is to secure the protection of core migratory bird habitat in this important wintering and stopover site through protected area creation and management, and implementation of sustainable agroforestry systems with local landowners on over 5,000 acres. Critical to the agroforestry approach of land restoration is providing hands-on training and technical expertise to landowners. ABC and FUNDAECO have started to create a series of "BioCenters," plots of land we acquire where we can implement agroforestry systems and demonstrate to landowners the methodology of planting native tree species along with black pepper, cacao, and other crops that can be grown in forest cover. BioCenters also earn money by selling the products grown in the demonstration plots. The profits can be invested back into conservation. BioCenters provide complementary conservation value to our land acquisition and protection activities. In 2020, ABC and FUNDAECO completed a 10-year BirdScape Conservation Plan. That plan included the following goals that we are continuing to work toward, and for which we seek Southern Wings funding.

- Acquire 4,000 additional ha (9,880 acres) of forest for protection.
- Reduce the deforestation rate from approximately 3,225 ha/yr (7,965.75 acres) to 900 ha/ yr (2,223 acres).
- Protect 100% of riparian forests (25 m buffer of forest on each side of river) within the BirdScape that are perennial waterways. A total of 650 km of riparian habitat.
- Ensure the protection of at least 83% of existing forest within BirdScape; approximately 115,000 ha (284,050 acres).
- Restore 5,920 ha. of forest within core zones of National Protected Areas within the BirdScape.
- Improve the conditions of degraded pasture lands through the establishment of 5,000 ha (12,350 acres) of silvipasture systems.
- Establish at least 3,000 ha (7,410 acres) of additional agroforestry systems within the BirdScape.
- Expand the extension of BioCenters by at least 366 ha (904.02 acres), for a total of 500 ha (123.5 acres) of BioCenters.

Previous Southern Wings Successes: Since 2012, Southern Wings has supported the creation and expansion of five protected areas and one BioCenter called Guaytan through land acquisition. In total, these lands account for 11,262 acres of habit for migratory birds. FUNDAECO has now established protections for core areas within all priority locations of the Conservation Coast. This includes Sierra Caral, Cerro San Gil, Punta Manabique, Rio Sarstun (Tapon Creek) and Sierra Santa Cruz. Within the Guaytan BioCenter, 16.8 ha of black pepper, 28 ha of cacao, and 31.2 ha of cinnamon have been established in agroforestry plots to restore cattle pasture. Southern Wings (along with counterpart funds) has also supported landowner engagement and agroforestry implementation at two additional Biocenters, Santa Marta and Las Jaras. ABC and FUNDAECO have also invested counterpart funds in these properties. In 2020, 17,000 trees were planted at the Santa Marta Biocenter on 15 ha (37.05 acres). At Las Jaras 24.16 ha (59.67 acres) of cardamom production have been established. This includes the planting of over 30,000 native trees.

Project Activities: FUNDAECO has identified three properties for sale, and all are of conservation interest and would help advance the established BirdScape goals. They are presented in order of priority.

1. **Rio Dulce Canyon Reserve:** The acquisition of this property would create a new reserve for FUNDAECO along the Rio Dulce River within the Rio Sarstun National Protected Area, and benefit wood thrush, Kentucky warbler, worm-eating warbler, and Louisiana waterthrush. The 90.4 ha (222.4 acre) property protects 200 meters of riparian corridor along the river, as well as parcels of tropical forest and mangrove habitat. The total cost of the property is \$259,740. FUNDAECO has made the first two of 10 payments on this property. ABC is seeking \$25,974 to make payment number three on this property.
2. **Temeja Mountain Reserve:** This 225 ha (556 acre) property would help FUNDAECO expand their holdings within the San Gil Mountain Range. The property has significant remaining forest from 306 to 955 meters above sea level, and nearby is the headwater for two important rivers. Protection of this property will help protect a key freshwater source in the region, while providing riparian and wet forest habitat for species such as wood thrush. ABC is seeking \$50,000 for the first payment.
3. **Punta de Palma:** This 44 ha (118 acre) property would protect the only freshwater pond on a peninsula within the Amatique Bay. This peninsular property is under high pressure for coastal development, which could pollute the bay and have wide-ranging effects. The freshwater pond is used by waterbirds and ducks. The price of the property is \$100,000 and \$25,000 is needed for the down payment.

In addition to acquisitions, 14 has (34.58 acres) of cardamom agroforestry plots were damaged by the Eta and Iota hurricanes at the Las Jaras BioCenter in late 2020. We are seeking \$15,000 to help restore 7 ha (17.29 acres). FUNDAECO has secured \$15,000 to restore the other 7 ha.

Budget: The total project budget is \$127,574 but smaller amounts of money can be put towards specific activities.

Matching funds: Matching funds will come from FUNDAECO and ABC investments in these properties, related management costs and other associated activities within the BirdScape.



Figure 1: Properties owned and managed by FUNDAECO within the Conservation Coast are shown in blue. The yellow circles represent the location of properties to acquire. From left to right: Rio Dulce, Temeja, Punta de Palma.

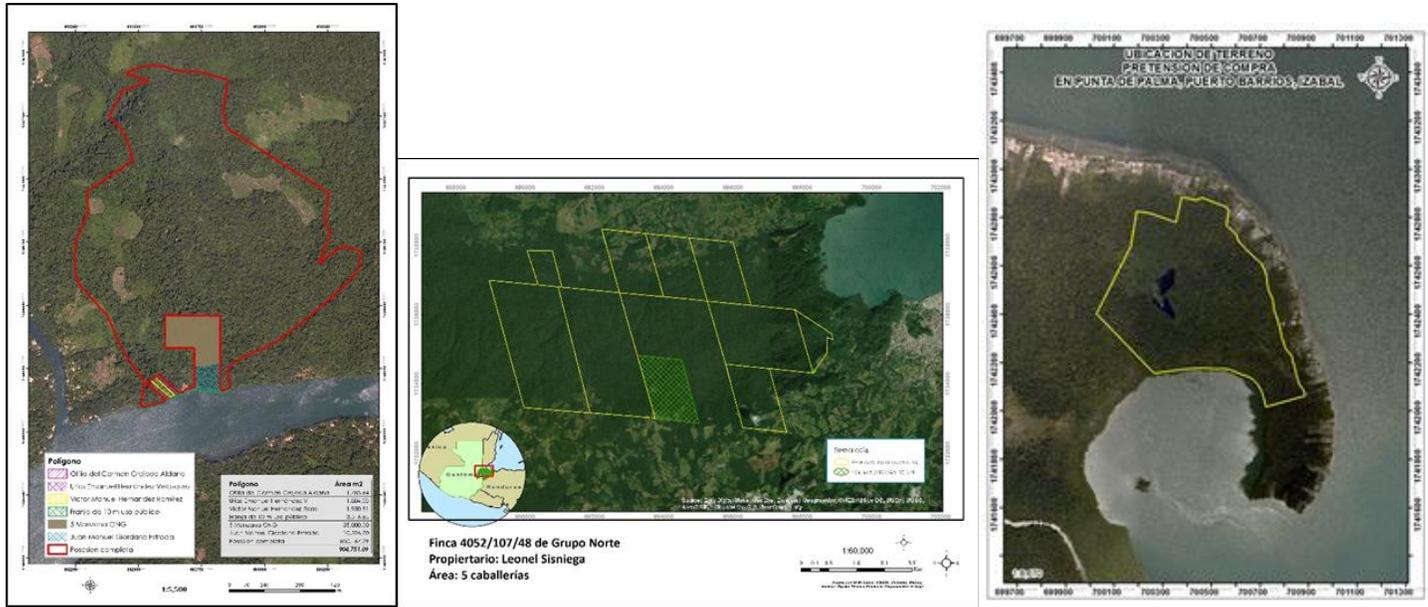


Figure 2: From Left to Right: Rio Dulce Reserve property in red, Temeja Reserve in green checker, and Rio Dulce Reserve in yellow.

Protection of Desert Grasslands Migratory Bird Habitat in the El Tokio Grassland Priority Conservation Area (in the Saltillo BirdScape)

Partners: Pronatura Noreste (PNE), Universidad Autónoma de Nuevo León (UANL), ABC

States that have participated to date: Oklahoma, South Dakota, Nebraska, Iowa, Texas, Kansas

Overview: The desert grasslands, located south of the town of Saltillo in northern Mexico, are high elevation (6,000 to 7,000 feet) grasslands important to numerous wintering migratory birds as well as threatened resident bird species and a threatened endemic mammal, the Mexican prairie dog. PNE's Chihuahuan Desert Grasslands program goal is to ensure the protection and management of 2,400,000 acres of grassland habitat. ABC is working in partnership with PNE to help them achieve this goal, and specifically for the improved protection, management, and restoration of grasslands within the El Tokio Grassland Priority Conservation Area (GPCA), which ABC has incorporated into our BirdScape program as the El Tokio BirdScape. Within this GPCA, the goal is to ensure habitat sufficient to support 30% of the global long-billed curlew (LBCU) population, 12% of the mountain plover global population, and to maintain the population of the globally endangered Worthen's sparrow

Within El Tokio, PNE and ABC have supported conservation efforts on over 140,000 acres (56,680 ha) of habitat through private reserves, ejido (community-based) reserves, and conservation agreements that restrict cattle ranching and agriculture practices; and through the installation of erosion control measures and ranching best management practices. The ejidos currently involved include: La Hediondilla, Matehuapil, Tanque Nuevo, Puerto México, El Cercado, La India, Los Arrieros, San José del Alamito, La Carbonera, La Esperanza, and Las Vegas. PNE and ABC manage two formal protected areas, Cuatro Gorriones and Loma del Gorrión, which are being managed for the conservation of migratory grassland birds and the endangered Worthen's sparrow. Additional ejidos in Nuevo León, Zacatecas, and San Luis Potosí states are being targeted for future work including San Juan del Prado and Refugio de los Ibarra.

Working with ejidos is a dynamic process and work can ebb and flow. To ensure habitat restoration is constantly moving forward, ABC would use additional funding to expand this project to new properties in the region and to conduct habitat improvement activities on properties with whom PNE already has conservation agreements. Specific activities include:

- creation of management plans and grazing recommendations,
- installation of erosion control systems to help restore grasslands,
- restoration and creation of water sources, and
- installation of water infrastructure and fencing for livestock control.

In addition, PNE and ABC have determined there is a need to identify a larger set of economic opportunities for ejidos and policy solutions to prevent and combat illegal land use and illegal well development.

Threats: One of the most significant threats is overgrazing by cattle and goats. The loss of vegetative cover, in a region with naturally arid soil, has exacerbated drought conditions and is leading to desertification of this ecosystem. Erosion and a proliferation of invasive species are side effects of overgrazing and contribute to an overall loss of grassland and declines in the populations of migratory birds that depend on this habitat. Another significant threat is the rapid conversion of the land to agriculture across the Chihuahuan Desert Grasslands. In El Tokio, potato production is on the rise and we anticipate will drive additional loss of grassland. Industrial agriculture of this kind

requires intense irrigation and the digging of new wells, which will seriously deplete the underground water supply if it is not managed adequately by the government.

Birds: More than 250 bird species are found in El Tokio. Here, high concentrations of grassland wintering birds occur, including significant numbers of LBCU (up to 2,000 individuals have been seen in a single flock). This region is also one of the most important wintering areas for mountain plovers and Sprague's pipit. Other species of conservation concern include loggerhead shrike, lark bunting, Brewer's and Baird's sparrow and ferruginous hawk. Also wintering in the area are grasshopper, lark, and vesper sparrows. passage migrants include the upland sandpiper and Swainson's hawk. The endemic Worthen's sparrow is IUCN Endangered and considered an Alliance for Zero Extinction species, as it is restricted to this region.

Project goals: With ABC's BirdScape approach, we are looking to scale up implementation of sustainable land use practices for grassland birds throughout the 2.5 million-acre El Tokio BirdScape. Our long-term goal is to directly impact at least 370,000 acres of grasslands through improved grassland management and erosion control. A key part of achieving this goal is to create a habitat corridor that would connect approximately 15 ejidos and ensure that each has at least some percentage of ejido land dedicated to conservation. We also have the goal of setting legal precedence by harnessing the power of constitution laws of the Mexican government and ensuring the enforcement of existing laws to protect the environment, something that has not been done much in Mexico.

Previous Southern Wings Successes: With Southern Wings funding, ABC and PNE have helped restore grasslands on nearly a dozen properties in El Tokio. This includes the protection and management of two reserves owned and managed by PNE: Loma del Gorrión and Cuatro Gorriones. Here support has gone to maintaining a guard for the two reserves, which has been crucial for deterring illegal activity and carrying out management tasks such as monitoring and repairing the fence that prevents the ingress of goats from neighboring properties. In addition, we have installed erosion control devices, reforested with native junipers, removed invasive species, developing sustainable cattle grazing plans with ejidos, trained local ranchers on best cattle ranching practices, and conducted prescribed burns to help restore habitat.

More recently we have worked with the La Hediondilla, Tanque Nuevo, Matehuapil, San José del Alamito, Puerto México, La Carbonera, El Cercado, and La Esperanza ejidos. ABC has provided match funding for working in other ejidos like La India. PNE works to develop conservation agreements on these properties and implement management activities that help protect and restore portions of these ejidos. Four livestock management plans were developed for La Carbonera, Puerto México, La Esperanza, and San José del Alamito ejidos which will lead to reduce the number of livestock grazing in the ejido and improve the grazing practices. Monitoring has been conducted across multiple ejidos to better understand the distribution of migratory birds and their presence and abundance on different properties.

Project Activities: The project will continue to work with ejidos already in the program, as well as engage additional ejidos (E.g., Refugio de los Ibarra and San Juan del Prado) and ejidos in San Luis Potosí and Zacatecas.

The communities of San José del Alamito and La Esperanza now have a conservation and livestock management plan to guide sustainable grazing practices. We will provide technical support for their implementation. Some immediate actions have been identified that we will work on this coming year, including the removal of more invasive species and installing erosion control measures that have been successful in the past. For the community of La Esperanza there is the potential to convert the agreement into a formal protected area; under the Mexican law it would be considered an "area voluntarily destined for conservation." This conservation mechanism allows communities to access public funding to implement a conservation plan; the designation can last from 20 to 99 years. To complete the process will require some funding for the application and working with the appropriate government agency.

Now that La Carbonera has a livestock management plans, it is important to review it with the community to make sure they will commit to the grazing plan and work on the infrastructure enhancements (e.g., water and fencing). Visits to the community will be necessary to guide the installation of new infrastructure.

People from the communities of Refugio de los Ibarra and San Juan del Prado have shown interest in working with us. PNE has conducted preliminary assessments and has identified clear opportunity areas for preventing loss of grassland habitat. Ideally, we can move forward with developing an action plan for these communities and raise funds to start implementing the plans.

While we work to develop new conservation opportunities, it is extremely important that we maintain contact with ejidos that have already signed agreements and have received support. We have identified a need to help National Commission of Protected Areas (CONANP), and the local authorities, manage and enforce the rules of the Llano de Soledad Protected Area, which is made up of multiple ejido reserves with whom PNE has conservation agreements. We continue our effort to help PNE raise funds to support a Protected Area Administrator, to ensure regular, onsite supervision of these areas and to deter land speculation and illegal activities.

Budget: The total project budget is \$53,570 but smaller amounts of money can be put towards specific activities.

Matching Funds: ABC and PNE have secured funding from Neotropical Migratory Bird Conservation Act (NMBCA), the Rio Grande Joint Venture, and the Mexican forestry agency, Comisión Nacional Forestal (CONAFOR). Organizations like the University of Nuevo León are providing in-kind match for things like monitoring. Ejidos are contributing in-kind match for installation of infrastructure.

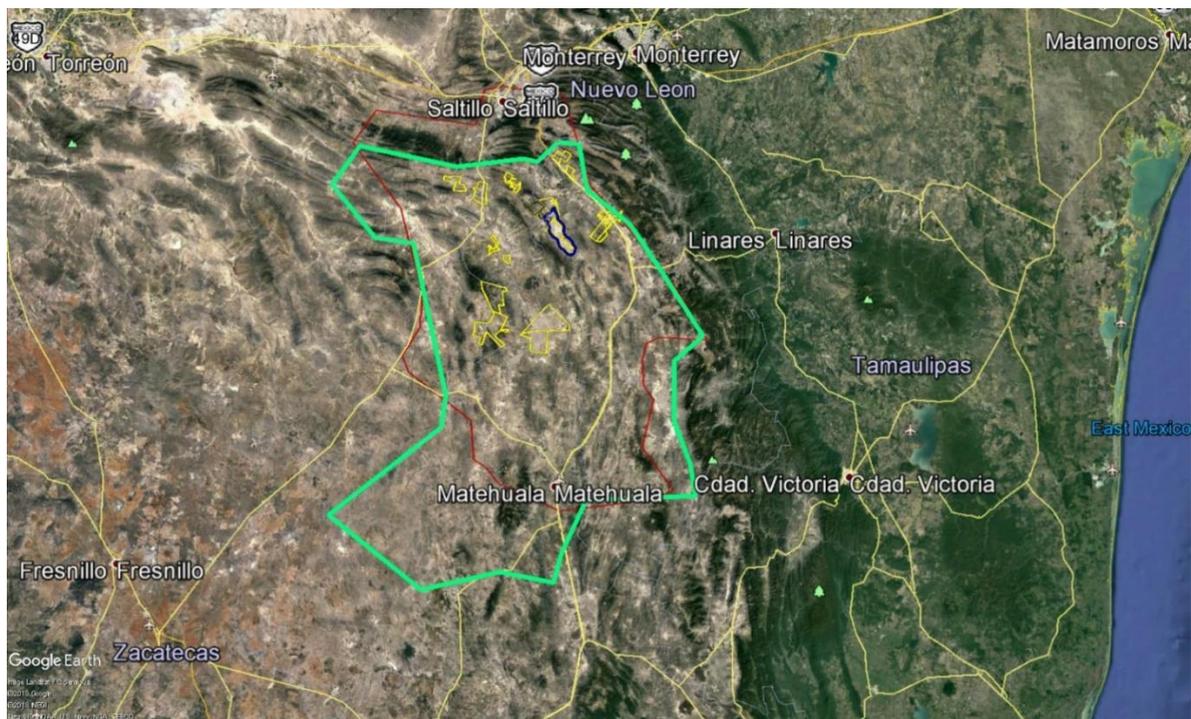


Figure 3: El Tokio BirdScape (green), El Tokio GPCA (red) and location of properties PNE is involved with (yellow), and Llano de Soledad Protected Area (blue)

A Sustainable Grazing Network to Protect and Restore Grasslands on Private and Communal Lands in Mexico's Chihuahuan Desert

Partners:



States that have participated to date: Arizona, Colorado, Montana, New Mexico, Pacific Flyway Council

States with strong biological connections: Seven to 28 Species of Greatest Conservation Need (SGCN) in each Western Association of Fish and Wildlife Agencies (WAFWA) state have a biological connection to the species in the Chihuahuan Desert.

Overview: Grassland birds that overwinter in the Chihuahuan Desert are declining twice as fast as other North American grassland birds, having lost 70% of their global populations since 1970. The Chihuahuan Desert, more than two-thirds of which lies in Mexico, is a continentally-important wintering area for grassland birds. It supports 90% of migratory species breeding in the western Great Plains, including 27 species recognized as high priorities for conservation, such as Baird's sparrow and chestnut-collared longspur, which winter nowhere else. These birds are sentinels for unsustainable practices that are

degrading grasslands and aquifers across the continent, especially in Mexico. Conservation and restoration of winter habitat in northern Mexico is needed to stabilize and recover grassland bird populations and prevent the additional listings under the Endangered Species Act. Our collaborative, non-regulatory approach to conserving grassland birds addresses the root cause of habitat loss in northern Mexico – desertification due to unsustainable grazing practices. Using scientific guidance from our peer-reviewed research, we collaborate with landowners to foster planned grazing and grassland restoration to protect and improve habitat for grassland birds while at the same time making each ranch more productive, resilient and resistant to land use change. Less farming conserves aquifers that are being depleted, jeopardizing pastoral economies, rural communities, a shared cultural heritage and way of life spanning generations and nations.

Birds: chestnut-collared longspur, vesper sparrow, Brewer’s sparrow, savannah sparrow, horned lark, grasshopper sparrow, lark bunting, chipping sparrow, mourning dove, clay-colored sparrow, Baird’s sparrow, eastern meadowlark, scaled quail, Cassin’s sparrow, Sprague’s pipit, loggerhead shrike, Say’s phoebe, short-eared owl, northern harrier, Chihuahuan raven, western meadowlark, red-tailed hawk, American kestrel, mountain bluebird, burrowing owl, long-billed curlew, Aplomado falcon, white-tailed kite, ferruginous hawk, prairie falcon and golden eagle.

Threats: Intensive cropland agriculture is rapidly expanding in Janos and the Valles Centrales, threatening to eliminate remaining native valley-bottom grasslands by 2025. Between 2006 and 2011, croplands in Valles Centrales expanded by 34%, destroying 170,000 acres of grasslands and displacing 355,000 grassland birds, including 133,000 wintering chestnut-collared longspurs. Land use change has continued since then, and croplands now occupy more than 63% of former low-slope grasslands in the Valles Centrales. Long-term unsustainable grazing along with increased aridity/drought have reduced rangeland productivity and increased financial strain on ranchers, driving many to sell their land for farming. This phenomenon is also happening across the desert grasslands of northern Mexico.

Success to Date: Since 2013, Bird Conservancy of the Rockies (BCR) has enrolled 28 ranches encompassing over 504,000 acres into the Sustainable Grazing Network (SGN) and have identified additional properties we plan to enroll in the coming years, along with hundreds of thousands of additional acres of ranchlands with a high value and potential for enrollment. The SGN currently includes 21 co-managed ranches, where we develop an integrated wildlife and grazing management plan with each landowner and provide technical and cost-share assistance for implementing the plan (including range and habitat improvement projects) as well as 7 reference ranches that provide models of excellence for range management, and opportunities for outreach, habitat capacity, restoration, and bird monitoring. We have improved over 160,000 acres of grasslands through these actions, and we are monitoring the response of birds and vegetation annually to assess progress and inform next steps. For example, since 2014, Sprague’s pipits have increased 15% annually across our co-managed SGN ranches. This collaborative, win-win, science-based approach has significant proof-of-concept and is ready to be scaled up.

Goals:

1. Enroll an additional 10,000 acres in the Chihuahuan Desert into the SGN in 2021.
2. Improve range management on at least 25,000 acres of desert grasslands in 2021.
3. Restore at least 200 acres of degraded Chihuahuan Desert grassland in 2021
4. Increase abundance and survival of priority grassland bird species on SGN lands, including Sprague’s pipit, Baird’s sparrow and chestnut-collared longspur, through habitat restoration.
5. Host a meeting and celebration in 2022 of private ranchers and conservation groups working together in the Chihuahuan Desert to build a sense of community, pride and understanding of their

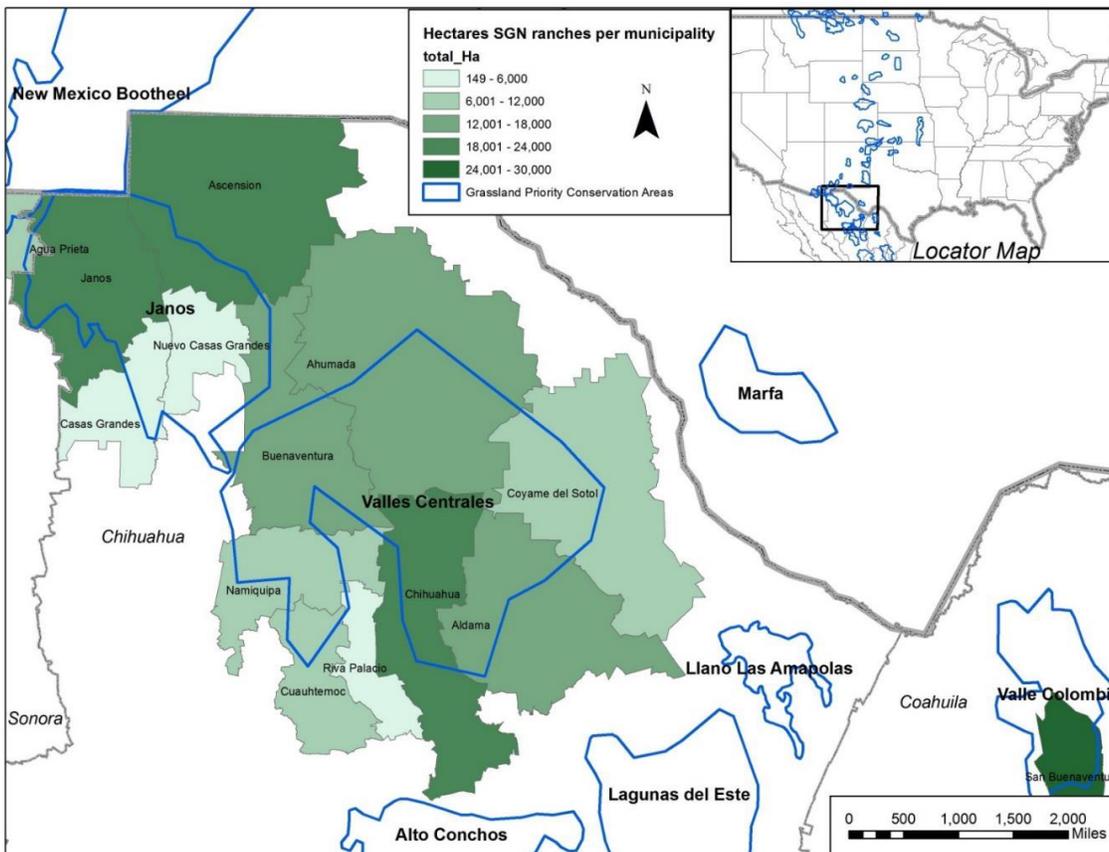
role in continental grassland conservation efforts.

Project Activities: Keeping ranchers on the land by helping them improve their management, profitability and carrying capacity for birds and other wildlife is the most immediate and cost-effective way to slow and begin to reverse the decline in grassland birds. BCR collaborates closely with IMC-Vida Silvestre, A.C., and other Chihuahua-based non-profit organizations with expertise in landowner outreach, grazing management and grassland birds. Thanks to support from our many partners, we currently support four full-time private lands wildlife biologists (PLWBs) at IMC-Vida Silvestre who operate all aspects of the SGN from outreach and landowner relations, to development and implementation of management plans and habitat restoration, to bird monitoring and evaluation.

Budget: Funding is needed to help acquire infrastructure (i.e., fencing, water distribution lines, water storage tanks and troughs, etc.) needed to facilitate rest-rotational grazing plans and improve grassland conditions, as well as pay for diesel and machinery rental for shrub removal (\$125/acre) and sub-soil aeration (\$75/acre). Funding is also needed to construct water tank escape ladders (2 m tall, \$60/each) and support PLWB capacity, training and landowner outreach events.

Matching Funds: This project leverages significant investment from Mexican landowners, private foundations, the Canadian Wildlife Service, NMBCA, Bureau of Land Management, the U.S. Forest Service International Program (USFSIP), U.S. states, and municipal governments in Colorado. Every dollar invested leverages at least one additional dollar from other sources.

Figure 4: Distribution of SGN lands by municipality in 2021



Protecting stopover and wintering habitat for key priority species of shorebirds and waterbirds in Laguna Madre, Mexico

Partners: PNE, CONANP, Rio Grande Joint Venture

States that have participated to date: Texas

Overview: Shorebird and waterbird species are experiencing serious population declines. For some we understand the biggest threats, but for many others we are still identifying important stopover and wintering sites, and developing conservation strategies. Examples include the International Reddish Egret Working Group, which recently concluded the process of updating the rangewide conservation action plan for this species, as well as the development of a conservation business plan for the U.S. Implementation of priority, on-the-ground conservation actions is now one of the key next steps. ABC, our partner PNE, and the Río Grande Joint Venture led the development of a Reddish Egret Conservation Plan for Mexico that identified five priority regions for that country, including Laguna Madre in the state of Tamaulipas in northeast Mexico.

The Laguna Madre is formed by a barrier island, enclosing a lagoon more than 100 miles long and as wide as 15 miles in some places, although on average it is much narrower. There are many bays, inlets, and sand islands; overall the water is hypersaline, with some bays at times reaching salinity levels that are 150% greater than sea water. Large numbers of shorebirds, ducks and waterfowl winter in the lagoon and on its shores and the barrier island, including hundreds of thousands of Redheads—more than two-thirds of its global population. The lagoon and its islands also serve as important breeding, stopover, and wintering areas for priority bird species including piping plover, American oystercatcher, red knot, LBCU, reddish egret, snowy and Wilson’s plovers, gull-billed tern, and black skimmer. Conservation of Laguna Madre habitats has been identified as a priority in the Rio Grande Joint Venture implementation plan, and also supports priorities identified in the United States Shorebird Conservation Plan (Brown et al, 2001) and The North American Waterbird Conservation Plan, Version 1 (Kushlan et al, 2002). Our focus in the Laguna Madre has been on habitat restoration, biological monitoring, community engagement, and land protection.

Threats: The principal threats include shoreline and wetland modification, aquaculture, poor water management policies and enforcement, habitat disturbance from recreation activities and predators, invasive species, development, and climate change. Frequently, sites experience many or all these threats. In Laguna Madre drought is a serious issue and is reducing wetland habitat. The loss of mangroves in this ecosystem has led to increased erosion of barrier islands and is decreasing available resting and roosting habitat for migratory water birds. Furthermore, fishers frequent barrier islands and leave dogs there that disturb and prey on birds.

Birds: The focal species for this project include reddish egret, along with Wilson’s and snowy plover, red knot, LBCU, and piping plover. Secondary focal species include: American oystercatcher, sanderling, least tern, black skimmer, western sandpiper, and semipalmated sandpiper, and redheads.

Project goals: Conservation planning with our partners have identified the following objectives for reddish egrets in Mexico.

- Improve management and conservation of existing habitats
- Cultivate and empower conservation constituencies
- Engage commercial industries impacting natural resources
- Strengthen compliance and enforcement of local laws

- Develop and or improve environmental, water and wildlife policies
- Improve knowledge of current habitat use and threat status
- Increase partner and stakeholder capacity

Specific conservation objectives in the Laguna Madre focused on reddish egret that also provide benefits to the other bird species listed above include:

- Conservation and stabilization of the current populations
- Mapping and better understanding of breeding populations
- Determination of breeding and foraging habitat use
- Better understanding of the hydrological regimes in breeding and foraging areas

Previous Southern Wings Successes: In 2013 and 2017, Southern Wings funded mangrove reforestation that resulted in the planting of nearly 21,000 mangrove saplings over 75.6 acres. Previously, with funding from the National Fish and Wildlife Foundation (NFWF), ABC and PNE created two new conservation agreements on private lands totaling over 10,000 acres, began a program to control feral animals on islands, improved fencing to reduce cattle and other agricultural animals from entering sensitive areas of Laguna Madre, conducted focal species monitoring, began mangrove restoration, and protected key nesting and wintering sites. In 2018, Southern Wings funding went to advancing the development of range-wide conservation plan for the Reddish Egret and the development of a Mexico specific conservation plan. These goals have been successfully accomplished.

Project Activities: In the 240,000-ha Laguna Madre, our conservation priorities include:

- Mangrove reforestation on key breeding islands
- Coastal dune reforestation on key barrier islands
- Construction and installation of containment barriers
- Breeding season monitoring
- Community outreach and education –fishers, school children, etc

Budget: The total project budget is \$40,500 but smaller amounts of money can be put towards specific activities.

Matching Funds – In-kind support from ABC and PNE.

Migratory Bird Wintering Grounds Conservation in Nicaragua and Honduras

Current, Past and Potential Partners:

Nicaragua: El Jaguar Private Wildlife Refuge, ABC, Red de las Reservas Silvestres Privadas de Nicaragua (RSP), Indiana University of Pennsylvania (IUP), Audubon North Carolina, North Carolina Museum of Natural Sciences, El Centro de Entendimiento con la Naturaleza (CEN), Cornell Lab of Ornithology, MARENA, URACCAN, SELVA, Wildlife Conservation Society (WCS), Paso Pacifico

Honduras: American ABC, WCS, La Asociación de Investigación para el Desarrollo Ecológico y Socio Económico (ASIDE), Mesoamerican Development Institute (MDI); USFSIP; UMASS - Lowell; Universidad Nacional de Agricultura de Honduras (UNA); Instituto Nacional de Conservación y Desarrollo Forestal, Instituto Conservación Forestal Áreas Protegidas y Vida Silvestre (ICF), CATIE, Mi Ambiente, Smart Consulting Enterprises.

States that have participated to date: Missouri, Indiana, Pennsylvania

Overview: In 2016, the golden-winged warbler (GWWA) Non-breeding Ground Conservation Plan was published. This document helped identify focal areas throughout the wintering range of this species. It also identified priority focal areas and identified specific objectives and actions for each. In Honduras the highest priority focal areas are La Muralla National Park, Sierra de Agalta National Park and El Boqueron and Rio Platano Biosphere Reserve: Southern Zone Focal Areas. In Nicaragua, the top four priority focal areas are Yali-El Jaguar Corridor, Macizo de Peñas Blancas, Cerro Datanli El Diablo, and Cerro Arenal—all occurring within American Bird Conservancy’s Northern Nicaragua Highlands BirdScape. Cerro Saslaya was of second priority. Similarly, there have been multiple studies published, including by Rushing, Stanley, Skutchbury and La Sorte showing connectivity and importance of Honduras and Nicaragua (among other countries in Central America) for wood thrush conservation. La Sorte further showed the importance of these countries for 21 migratory bird species. Since 2016, ABC and other partners have developed and implemented conservation actions in the GWWA focal areas of these two countries. ABC has established the Agalta – Lost City BirdScape in Honduras, and the Bosawas BirdScape and the Northern Highlands BirdScape in Nicaragua to organize and advance conservation action for GWWA, wood thrush and other migratory bird species.

Threats: The GWWA Regional Threat Analysis Report states “unsustainable land use(s)... have resulted in the following major threats to the habitat and birds of the focal areas: habitat degradation, loss of forest cover, and watershed contamination caused by fertilizer and/or other chemicals.” In the Bosawas BirdScape in particular there is a growing issue of migration to the region from other parts of the country, and even the rest of Central America, leading to encroachment on indigenous lands. The lack of understanding regarding land tenure in the region and indigenous communities amplifies the loss of habitat and habitat degradation. In the Northern Highlands BirdScape, the Sierra de Agalta and La Murralla National Park experience habitat loss due to conversion to cattle production and agriculture. The same situation applies to the Tawahka and Rio Platano Biosphere Reserves in the Agalta-Lost City BirdScape.

Birds: There is considerable overlap in species between the projects in Honduras and Nicaragua. These include: wood thrush, GWWA, golden-cheeked warbler (GCWA), magnolia warbler, blue-winged warbler, Kentucky warbler, worm-eating warbler, Louisiana waterthrush, black-and-white warbler, black-throated green warbler, chestnut-sided warbler, Wilson’s warbler, eastern wood-pewee, yellow-bellied flycatcher yellow-throated vireo and white-eyed vireo. more than 15 other species also use this area as a stop-over on their annual migratory cycle including Canada warbler, bay-breasted warbler, and yellow-billed cuckoo.

Project Goal(s): Our long-term goal is to slow the rate of deforestation in Honduras and Nicaragua. We aim to do

this by working with landowners and communities to adopt land use practices that are compatible with forest preservation. We are helping indigenous communities learn how to conduct safe and effective law enforcement patrols of their lands, which is helping them organize and better protect their land from migrants to the area.

Our goals are aligned with those defined in the GWWA Non-breeding Conservation Plan for Nicaragua and Honduras. Those include the following:

Nicaragua:

1. Improve GWWA habitat quality on 10% of all coffee farms in focal areas.
2. Restore 10% of all pastures in focal areas to useable habitat by GWWA.
3. Protect 10% of remaining forest in focal areas.
4. Decrease deforestation rate by 4% (50% of current rate).

Honduras:

1. Achieve compliance with best management practices in 50% of the farms found within the focal areas.
2. Achieve a 10% increase in forest coverage on 50% of the farms.
3. In La Murralla, produce and plant 30,000 native trees.

Southern Wings Successes to Date:

In Honduras, with Southern Wings funding as well as matching funds, ABC and partners have facilitated habitat restoration in the Agalta – Lost City BirdScape. This includes the improvement of 89.18 ha of coffee plantations by the planting of disease-resistant shade varieties of coffee and 1,500 native trees, and establishing 37.37 ha of cacao agroforestry production through the planting of 5,299 cacao plants, 1917 native trees, and 577 fruit trees. Additionally, nine communities signed conservation agreements that secured commitments to protect 1,734 ha of land within the buffer zone of Sierra de Agalta. In the Tawahka and Rio Platano Biosphere Reserves, we have established conservation agreements with 59 landowners who are now actively reducing the impact of their cattle ranching through implementation of silvipasture techniques, tree planting, and the creation of feed banks and rotational grazing systems. Rotational grazing helps reduce the amount of land needed for cattle and allows natural regeneration to occur where cows previously fed.

ABC's partner, WCS, has been dedicated to conducting SMART patrol training workshops. In 2020, they conducted a SMART workshop in Catacamas with ICF and municipal staff that manage Sierra de Agalta National Park. The workshop included two classroom days and two field days practicing the use of the SMART protocol and associated "CyberTrack" application which allows for uploading of information from the field. This is the fourth SMART training in Honduras; the trainings are already resulting in improved patrol methodologies for the Tawahka and Rio Platano Biosphere Reserves and Sierra de Agalta National Park.

In Nicaragua ABC's work has resulted in the planting of over 100,000 trees since 2011. This includes reforestation and agroforestry plantings in and around El Jaguar, the Peñas Blancas Focal Area and in the Bosawas BirdScape. With matching funds, 43 silvipasture systems covering 90 ha were implemented resulting in 5000 ha being left for natural regeneration. Additionally, 25 producers committed to conservation agreements across 419 ha in the buffer zone of Saslaya National Park. WCS also led four major SMART patrol operations in the Bosawas BirdScape, including two within Saslaya National Park. These patrols conducted with national and local authorities were successful in stopping illegal settlements within the National Park.

Project Activities:

HONDURAS

Agalta-Lost City BirdScape:

In this BirdScape ABC and our partners will continue to focus on improving land production practices—primarily

agriculture and ranching—to benefit migratory birds. Funds are needed to ensure the survival of the 12,000 trees planted on the six demonstration farms we established with our partner CATIE in 2020. We also want to invest in the maintenance of the local tree nurseries, to have additional trees available for project expansion. CATIE is in the process of obtaining funds from the German government for a large silvipasture project, but until that support is in place, our current investments are vulnerable. Similarly, we are seeking funding for at least one more year of monitoring on farms where agroforestry and silvipasture actions are being implemented.

In the Tawahka and Río Platano Biosphere Reserves, we will continue to explore the possibility of creating an agroforestry corridor along the Patuca River. There is an existing market and cacao supply chain from this region that we would like to strengthen and expand. With WCS we will be working to identify existing cacao producers in the local indigenous communities (known as BAKINASTA) and understand their production practices and volumes. We then need to analyze the cacao supply chain in the region and determine what steps we should take to ensure cacao remains a valuable production system so communities do not revert to cattle production.

To aid in this, we are exploring new partnerships with entities such as Smart Consulting Enterprises, who have experience with small cacao producers in Honduras and the local Cacao Association called APROSACAO. With their experience and expertise in developing well-functioning organic and Fair-Trade certified cacao harvests, we are seeking funds to provide a technical assistance package to more landowners to involve them in cacao production or complementary agroforestry production such as fruit and timber. The package will include training, provision of plants and trees, maintenance of trees, and certification guidance and oversight. Our goal over the next four years is to secure the engagement of at least five producers each year in agroforestry production. Cacao is a sensitive plant, and it requires significant long-term investment in maintenance to become certified and produce the amounts that make cacao production economically viable for the producer. Smart Consulting has demonstrated their expertise in helping non-cacao producers transform into organic, Fair Trade certified cacao producers and implementers of functioning agroforestry systems.

In La Muralla National Park, a GWWA and GCWA Focal Area, ABC has identified multiple needs and opportunities around this important area co-managed by ABC's partner, ASIDE. La Muralla National Park is home to important stands of pine-oak forest; important habitat for wintering GCWA. However, pine beetles and fires have decimated these forests. ABC is seeking funding to support ASIDE and the government in the management of La Muralla National Park. This includes the construction of a second guardhouse, housing and training more guards for fire control, and conducting pine reforestation efforts. La Muralla National Park has also been identified as a GWWA Focal Area in the non-breeding conservation plan and is used by other migratory bird species, including Wood Thrush.

NICARAGUA

Bosawas BirdScape: Our focus in Nicaragua has been on implementation of agroforestry and silvipasture systems, with a focus on cacao, in the Bosawas Biosphere Reserve and around Saslaya National Park. In 2020, 25 landowners participated in workshops and trainings on cacao management and production of native trees. Additionally, we established two model farms to use as training grounds for local producers. To maintain our effort and continue monitoring of these farms to ensure their continued engagement and maintenance of established agroforestry and silvipasture systems, a program coordinator must be maintained. Many producers in the region were negatively affected by Hurricane Iota and Eta. Many lost trees, and crops. Reforesting impacted areas will be a key to recover forests damaged by the high winds. As such ABC is seeking funding for a program coordinator and nursery production. A reconnaissance effort will be required to identify and prioritize landowners with whom to work.

Northern Highlands BirdScape: In the Northern Highlands we also plan to develop a BirdScape conservation strategy like what was done in the Conservation Coast BirdScape of Guatemala. The process will help bring together actors to discuss needs and opportunities moving forward, and to establish clear goals and objectives for the BirdScape. A

land use analysis must be conducted from which goals and objectives can be established. ABC is seeking funding for GIS analysis and a local BirdScape coordinator to facilitate communication locally in Nicaragua. We hope to be able to continue to deploy more nanotags on migratory birds in Nicaragua that can be read by Motus stations. This will help us continue to learn more about the birds that overwinter in Nicaragua and better understand their migratory pathways and population linkages.

Budget: The total project budget for Honduras is \$117,400. The total budget for Nicaragua is \$32,500. Smaller amounts of money can be put towards specific activities.

Matching Funds: Matching funds will come from ABC and partner investments.

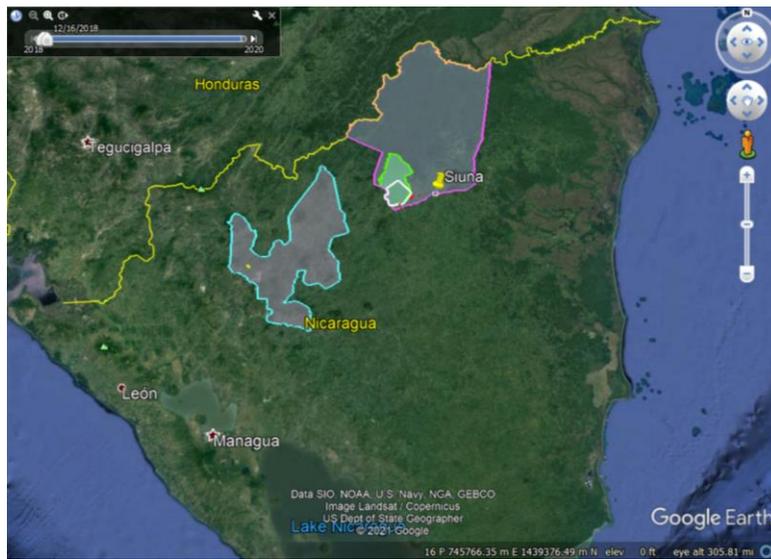


Figure 6: BirdScapes within Nicaragua. Northern Highlands in blue. El Jaguar in yellow within BirdScape. Bosawas BirdScape in pink. Saslaya National Park in Green, with white representing core zone of national park.



Figure 7: Project areas in Honduras. Agalta-Lost City BirdScape in purple. Rio Platano Biosphere in yellow. Tawahka Biosphere Reserve in red. Sierra de Agalta National park in teal. Project area of CATIE in black. La Murralla National Park in green.

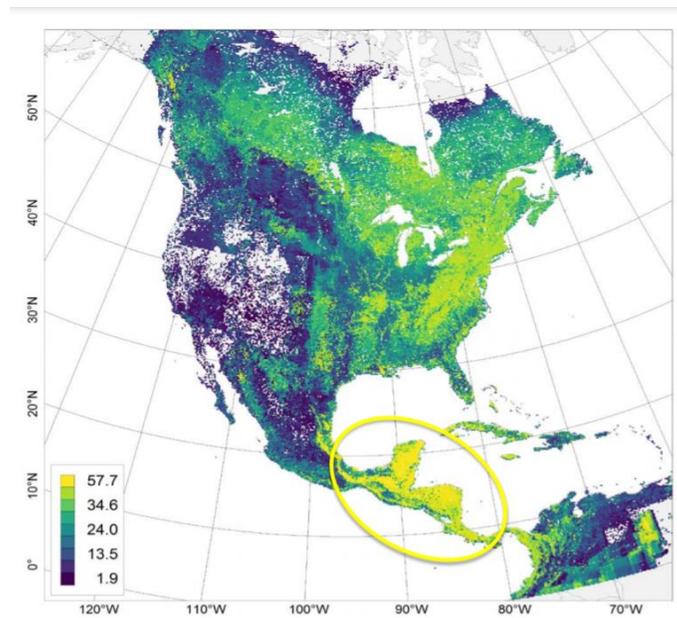


Figure 8. Full-year distributions of 21 focal species of Neotropical migrants that breed in Eastern North America. The results illustrate the importance of Mexico and Central America for the 21 species evaluated. La Sorte et al. 2017. *Global Change Biology* (adapted from Fig. 1)

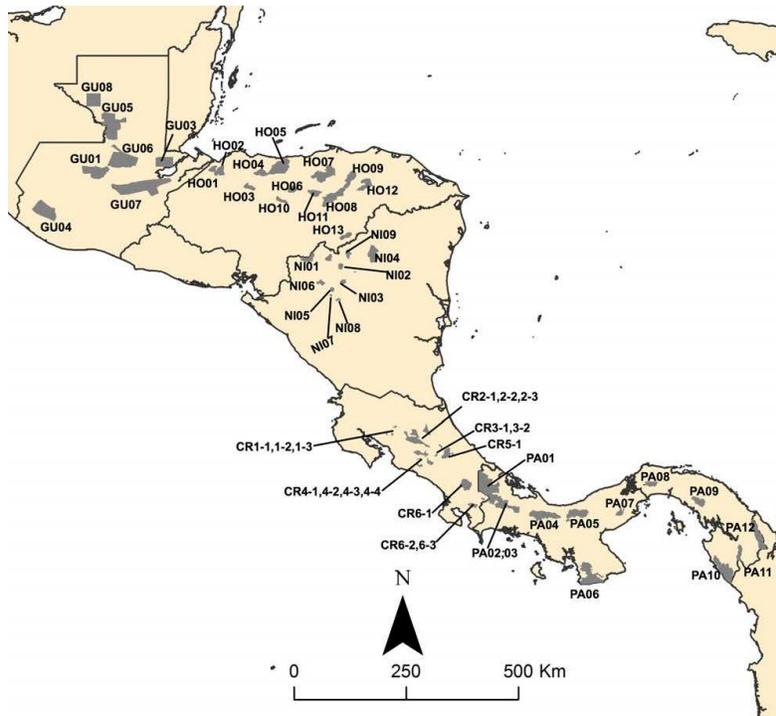


Figure 9: Location of GWWA Focal Areas in Central America as identified in the GWWA Non-breeding Grounds Conservation Plan

Conserving Critical Piping Plover and other Shorebirds Wintering Sites in the Bahamas

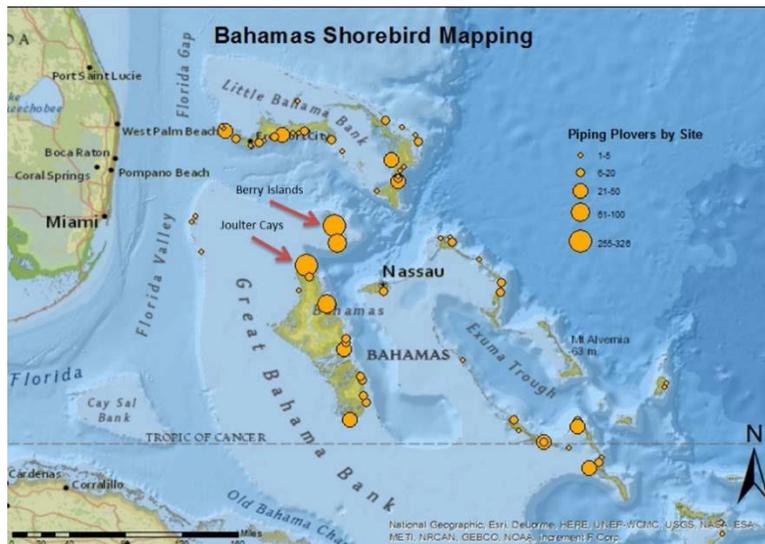
Partners: National Audubon Society (Audubon), Bahamas National Trust (BNT), Virginia Tech, Environment and Climate Change Canada, Foundations, Private Donors

States that have participated to date: NEAFWA, Virginia, North Carolina

States with strong biological connections: CT, DE, MD, ME, MA, NH, NY, NC, RI, VT, GA, SC and VA

Overview: More than thirty-three species of shorebirds that breed along the Atlantic coast of the U.S., Canada and the Arctic complete a perilous migratory journey each fall to reach remote islands of the Bahamas where they spend up to ten months each year. These include around half of the Atlantic population of the endangered piping plover. Audubon, in partnership with BNT, is working to protect critical coastal habitats that wintering plovers and other declining shorebird species depend on. Shorebirds worldwide are in precipitous decline. The piping plover, with an estimated global population of only 8,024 individuals, is the most endangered shorebird breeding in the U.S. and Canada. Concern about the species has triggered widespread, intensive conservation action throughout its breeding range, but protecting its wintering grounds —where it can spend up to ten months of the year—has received little attention until recently.

The importance of The Bahamas for wintering piping plovers and other declining shorebirds was first understood in 2006, when Audubon scientists discovered high numbers of the Atlantic breeding population spending the



winter months in remote parts of the archipelago. Now, Audubon, The BNT and other partners are taking ambitious steps to conserve and protect several of the highest priority sites across the Bahamas archipelago that are necessary to ensure the survival of these wintering shorebirds. By protecting these habitats, we are also helping other vulnerable species, including the red knot (*rufa*) the semipalmated sandpiper, reddish egret—and supporting important commercial and sport fish nurseries, coral reefs, eel grass beds and mangroves necessary for sustainable fisheries and traditional economic opportunities for local communities.

Audubon and BNT are close to achieving our 2020 goal that Bahamian Protected Areas support at least 20% of the Atlantic piping plover population. Further, significant capacity has been developed and many of the islands are aware of and take actions to support piping plover conservation. Over the next five years, we will consolidate our efforts and double down on a few critical sites, strengthening community support for conservation.

Project Goal(s): Each goal is an essential step toward durable, seamless protection and conservation for piping plovers and other shorebirds along the Atlantic Flyway, from their summer nesting sites on the beaches of the U.S. and Canada to their wintering grounds in the Caribbean and South America.

1. Long term protection of Bahamas wintering habitats that support at least 20% of the Atlantic breeding population of piping plover, 32 other important shorebird species and local marine and terrestrial wildlife. By 2025, effective management established at new MPAs that are critical for piping plover survival.
2. Communities actively engaged in conserving important migratory and endemic bird species on all major islands of the Bahamas. By 2025, community conservation and protection efforts solidified at critical sites that are not formally protected.
3. Local conservation capacity is improved when Audubon shares our science, policy and organizational expertise with BNT and other organizations.
4. By 2024, update Key Biodiversity Area (KBA)/ Important Bird & Biodiversity Area (IBA) portfolio for coastal habitats associated with piping plover and shorebird habitat across The Bahamas.

Project Activities: Over the next 12 months to advance our understanding, which will lead to future land protection and on-the-ground community habitat management actions, we will leverage investments to:

- Complete the 2020-21 International Plover Census. (\$5,000) We will engage Bahamian researchers and community scientists, and volunteer biologists and community scientists from the U.S. and Canada, to complete the Census and generate information that can be used to update KBA/IBA designations across The Bahamas.
- At critical sites (> 1% Atlantic piping plover population) that are not protected, we will work with local stakeholders to develop community conservation initiatives including nomination of sites as Western Hemisphere Shorebird Network Reserves, creating signage, community education, community science efforts and building local government support to reduce threats. (\$8,000)
- Work with management agencies to support development of management plans for priority protected areas and continued capacity development.



From Discovery to Protection

2006: Audubon discovers over 400 piping plovers wintering on several islands.

2010: 57 plovers are banded on three islands in The Bahamas.

2011: 41 banded plovers are found along the Atlantic coast, from North Carolina to Nova Scotia.

2011: 1,066 piping plovers are found on 14 Bahamas islands by 31 researchers from 10 organizations

2012: Audubon focuses efforts and discovers 708 birds or 20% of the Atlantic piping plovers wintering on just 3 islands Andros, the Joulter Cays and The Barry Islands.

2013: Audubon and BNT submit a proposal to the Bahamian government for establishment of a 92,000 acre National Park on the Joulter Cays.

2015: The Bahamian Government declared the 92,000 acre Joulter Cays a National Park protecting winter habitat for over 10% of the Atlantic breeding population of piping plover.

2016: International Plover Census records 1404 piping plovers in the Bahamas and adds important sites in Turks and Caicos.

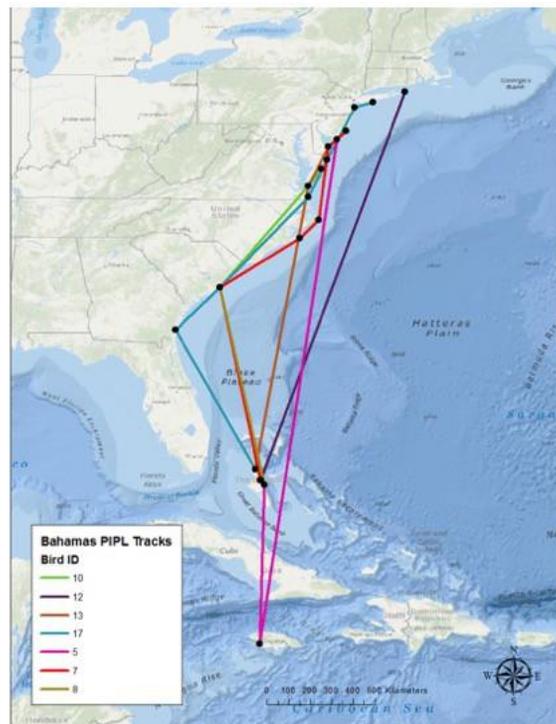
2017: First Motus Tracking efforts from the Bahamas maps initial migration pathways.

2018: Critical shorebird and seabird sites included in recommendations to Bahamian Government for new protections, including Berry Islands IBA (7% PIPL pop) and Long Island.

Budget: The total project budget is \$14,950 but smaller amounts of money can be put towards specific activities.

Match: Disney Conservation Fund (\$15,000)

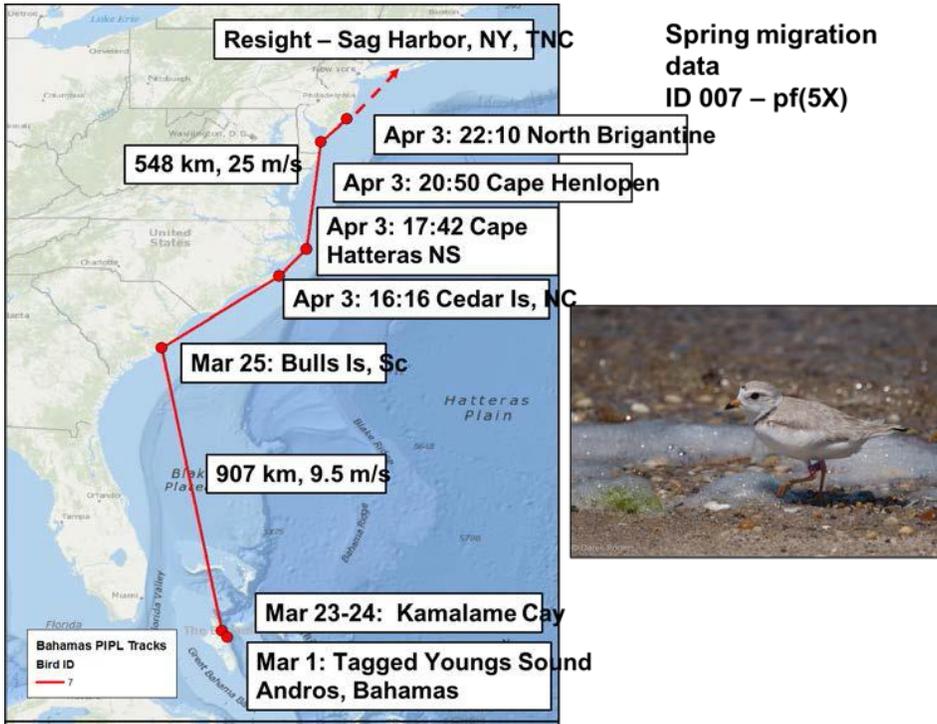
Figure 10: Motus Wildlife Tracking of Northern Migration Piping Plovers



Spring migration data

- 10 tags deployed in Bahamas
- 7 tags w/spring migration data
- Duration (days):
 - Mean 40 (SD 40; 19-21)
- Distance (km, Euclidean):
 - Mean 1862 (SD 649, 932-3087)

Figure 11: Spring Migration Data



Conservation and Management of Neotropical Migratory Birds and Thick-billed Parrots in old-growth forests of the Sierra Madre Occidental, Mexico

Partners: Organización Vida Silvestre A.C (OVIS), Ejidos, CONANP, CONAFOR, Arizona Game and Fish Department (AGFD), Unidad Forestal Galván, Asociación de Silvicultores de Guadalupe y Calvo, San Diego Zoo Wildlife Alliance, U.S. Fish and Wildlife Service (USFWS), NMBCA, Universidad Autónoma de Nuevo León.

Overview: Mexico's national forest management policy, which now considers the management of biodiversity, presents an opportunity to work at reducing significant threats (e.g., destructive fires, over-harvesting of timber) to maintain or restore populations of birds in remaining forests of the Sierra Madre Occidental (SMO). Timber harvesting for the past 70 years has been implemented through Forest Management Units. These units cover vast territories where various timber harvesting treatments have been applied. Through new partnerships, forest managers are adopting and implementing practices that promote sustainable forest production and productivity and explicitly integrate biodiversity conservation objectives and indicators.

This project focuses on establishing and maintaining a network of forests under conservation schemes and integrating best management into forest management plans. The project area encompasses the high elevation forests found in the mountainous regions of Chihuahua and Durango (1,000,000 ha) where threats are severe and ongoing. Continued loss of old-growth forests will inevitably lead to loss and/or significant population declines of species associated with these old-growth forests. One of the most dramatic examples is the almost complete loss of remnant old-growth forests in northern Durango and Cerro Mohinora in southern Chihuahua and with it the loss of locally-nesting populations of thick-billed parrots (TBPA) (an endemic species) and Neotropical migrant populations dependent on old-growth forests. The project implements strategies outlined in the Partners in Flight (PIF) *an Integrated Conservation Strategy for Western Temperate, Mexican Pine-Oak, and Tropical Cloud Forest Birds: North America to Central America*. Furthermore, the project addresses threats identified in the species recovery plan for the TBPA.

Threats: The birds of the SMO are seriously threatened from the loss and degradation of habitat as a result of poor forest management policies over more than a hundred years, as well as from fire suppression and a higher incidence of catastrophic fires. Large scale timber harvest has been practiced for many decades without considering the need to manage for biodiversity. The main threats have caused the Imperial woodpecker to be considered extinct and for two other endemic species to be critically endangered (Sierra Madre sparrow and the TBPA). Forest exploitation has eliminated old-growth forests (it's estimated that less than 1% remains of their original distribution) affecting whole groups of birds that depend on mature forests to provide cavities for nesting and shelter, such as trogons, woodpeckers, and owls.

There is an urgency to advance the conservation of the TBPA, a species listed as endangered by both the U.S. and Mexico. This parrot historically occurred in Arizona but is now only found in the mountain ranges of the SMO. TBPA are threatened from the loss and degradation of habitat as a result of poor forest management policies, as well as from fire suppression and a higher incidence of catastrophic fires. Actions addressing these and other threats to the species will significantly contribute to its overall management and conservation.

Birds: The rugged Sierra Madre harbors a system of canyons dominated by temperate forests in the higher areas and jungles in the lower areas. As a result, the footprint of the project can be felt over an extensive area of critical habitat for more than 300 bird species, 45% of which are NMBs. At least 19 species in the region are considered species of common concern (USFWS 2008) and more than 30 species are listed as high priority by PIF, including band-tailed pigeon, Bell's vireo, calliope and rufous hummingbird, elegant trogon, flammulated

and short-eared owl, Grace's, hermit, and Lucy's warbler, loggerhead shrike, purple martin, and yellow-billed cuckoo. Other species include dusky and Hammond's flycatcher, and painted bunting. Resident species of high conservation priority also benefit, such as eared quetzal, Mexican spotted owl and Apache northern goshawk

Project Goals: The project focuses on conserving habitat and implementing sustainable forest management practices that benefit the SMO. This will be accomplished by integrating habitat needs of (Neotropical Migratory Birds (NMBs) (Table 1) and the TBPAs into forest management plans using the national forest management policy framework. The policy incorporates biodiversity management and environmental education to preserve wildlife populations and habitats. Also, in partnership with AGFD, the project will implement management of breeding populations of TBPAs in the protected natural areas of Tutuaca, Papigochi, Campo Verde, Mesa de Guacamayas and Madera (Figure 5). The project will also use new information on TBPA wintering areas (obtained from new satellite tracking of migrating TBPAs) to begin conservation planning of wintering habitats for TBPAS and NMBs.

Southern Wings Successes 2020: In coordination with CONANP, CONAFOR, Forestry Units and Ejidos of the Sierra Tarahumara in 2020, the following achievements were accomplished.

Implement habitat conservation measures to protect, restore and manage mixed coniferous forests.

- Trained forestry technicians in Durango to implement best practices.
- Establishment of a corridor by identifying and excluding the use of Areas with High Conservation Value (69,491 ha) in Chihuahua mountains.
- Best practices implemented in 152,170 ha in the mountains of Chihuahua.
- Had a workshop to update the Janos Biosphere Reserve (RB Janos) Conservation and Management Plan.

Manage breeding populations of TBPAs

- 24 field visits were made to five breeding areas, 71 potential breeding pairs were found, of which only 53 pairs nested: RB Janos (1 nest), La Gloria/APFF Campo Verde (2), RPC Madera (24), APFF Tutuaca (20) and APFF Papigochic (6).
- Two new nesting sites were located, adjacent to the traditional nesting areas.
 - Mesa Prieta (Ejido 5 de Mayo), RB Janos a neighboring Mesa de Guacamayas. This finding is important, because this TBPA nesting population is the most northern and located just 80 km from the border with the USA.
 - Yahuirachi, APFF Tutuaca. OVIS staff and 4 community promoters inspected the site, finding 27 cavities with signs of TBPA use, but only 11 nests were recorded in an aspen stand, in an area of 30 ha. This finding is important because it would be the second area (after Madera), where TBPAs are concentrated to nest in aspen forests.
- 30 artificial nests were maintained, so that they were in the best conditions to be used
- 20 anti-predation systems were installed (laminates around the trees used for nesting).
- Of the 53 active nests, 18 accessible nests were monitored, in which a total of 35 eggs were recorded, with a total productivity of 1.78 ± 0.43 fledglings per nest.
- Adult mortality occurred in a nest in Madera where an adult was predated by a bobcat. Chick mortality occurred in three nests, one in Tutuaca and two in Papigochi. Bed bugs were recorded in the nests.

Research migratory patterns of TBPAs (deployment of satellite radio transmitters)

- A total of 20 transmitters have been installed in 5 TBPA breeding populations: 10 transmitters in 2019 and 11 in 2020. All transmitters provided by the San Diego Zoo. (Table 2, Figure 14).
- Through the information collected from 6 radio transmitters from 4 breeding populations installed in 2019, we were able to obtain a more precise knowledge of the phenology of the life cycle of the TBPA. With the information provided by the 10 transmitters installed in 2019 and 2020, the TBPA nesting phenology will be refined.

- The 4 breeding populations traveled south on very similar migratory routes, although the 4 populations did not travel together if they were found on mountain peaks. During their migratory journey, they traveled between 60 and 150 kilometers per week and traveled to the mountainous region of central Nayarit. The maximum distance of its migration to the south was 648 km from Tutuaca, although on average it was a distance of 612 km and ± 49.8 km, locating its southernmost range of displacement in the limits of Nayarit. Most of the time in its wintering range occurred in the State of Durango (Figure 4).

Verification and characterization of wintering areas used by TBPA and NMBs

- With the information of the movements registered by the transmitters, we identified 14 priority sites with habitats characterized from mix-conifer forests, secondary forests, and younger forests stands, depending on location:
 - Six priority sites located adjacent to the reproductive areas (mix –conifer forest): **Las Pomas**, municipality of Madera and Casas Grandes, a surface area of 5,389 ha, it is a site adjacent to the APFF Campo Verde. **Madera**: municipality of Madera, an area of importance of 19,497 ha. **La Chinaca**, Ejido el Largo, municipality of Madera, an area of 8,780 ha. **Ciénega del Oso** (16,613 has) municipalities of Temósachic and Madera. **Chachamuri** (14,905 ha) on the limits of the Ejidos of Tutuaca and Conoachi, municipality of Temósachic and **Heredia** (25,169 ha located in the municipality of Guerrero), located the APFF Papigochic.
 - Four priority sites located on the migratory route: **Samachique** (14,197 ha) in three ejidos of the municipality of Guachochi. **Buenavista** (9,695 ha), municipality of Guadalupe y Calvo. **Las Tijeras** (18,340 ha) municipality of Guadalupe y Calvo and **Mesa de Guadalupe** (23,368 ha) municipalities of Canelas, Santiago Papasquiario and Tamazula in the state of Durango,
 - Four winter sites were located in the State of Durango (mix-conifer forests and transition areas): **Espadañal de San Jerónimo** (67,966 ha) municipalities of San Dimas and Tamazula in the state of Durango and in San Ignacio, Sinaloa. **Santa Rita** (36,503 ha) municipality of San Dimas. **Neveros** (17,239 ha) municipality of San Dimas and **La Ventana** (33,004 ha) municipality of San Dimas. This site being the only one in the wintering area of the TBPA with an official protection scheme.
- During the month of January, the field team conducted assessment visits in TBPA winter sites in the state of Durango, the localities that were visited are: Neveros, Las Cebollas, Revolcaderos, San Miguel de Cruces, Granizo and Las Veredas. No parrots were observed and very little food availability was noted.

Project Activities: OVIS and partners will implement the following conservation actions.

Implement habitat conservation measures to protect, restore and manage mixed coniferous forests (Chihuahua y Durango).

- Work with foresters and other partners to continue implementing Best Forest Management Practices for more sustainable forests that maintain biodiversity values. The work will focus on new nesting areas located in 2020 (Mesa Prieta in RB Janos and Yahuirachi in APFF Tutuaca). Including 4 priority wintering areas for conservation in the State of Durango: Espadañal de San Jerónimo (68,000 ha) municipalities of San Dimas and Tamazula, Santa Rita (37,000 ha). Neveros (17,000 ha) and La Ventana (33,000), the three areas in the municipalities of San Dimas. And where it is considered most appropriate, considering the interests of the partners and where opportunities for collaboration occur.

Monitor populations of NMBs and TBPA.

- Conduct point counts to monitor migrant and resident species.
- Survey TBPA populations and monitor breeding colonies.

Manage breeding populations of TBPA

- Monitor and manage accessible nests to increase reproductive success.
- Continue research to identify potential predators and develop approaches to mitigating threat.
- Reduce the mortality of pairs and chicks to increase recruitment and the size of the breeding population, by installing as many anti-predation systems as possible (lamine around the nest trees and in some cases, neighboring trees, where predators may climb up into the nest tree).
- Maintain existing or install new artificial nests at Cerro Mohinora and Mesa de Guacamayas.
- Maintain natural water sources by appropriate conditioning of drinking sites.
- Protect food banks (nectar, seeds etc.) to enhance foraging habitat.
- Field work to verify the presence of TBPA in historical and potential nesting sites in Chihuahua (San Juanito, Cerro Rumurachic and Sierra del Nido) and Durango (Cocono, Vacas, San Camellones and Nevado).

Verification and characterization of wintering areas used by TBPAs and NMBs

- Update breeding habitat and newly discovered migration routes and wintering habitats.
- Integrate new distribution information (obtained from satellite telemetry work) into a conservation plan that encapsulates the network of newly discovered migration/wintering areas and provide this to CONANP to inform conservation planning and management.
- Disseminate information on migration and wintering areas to key decision makers and conservationists through workshop(s) and other communication means.

Research migratory patterns of TBPAs (deployment of satellite radio transmitters)

- Continue research at understanding migratory patterns of TBPA populations through use of satellite transmitters. Activities involve updating scientific collecting permit, accessing nesting sites, conduct intensive nest searches, and monitor active nests.
- Transmitters will be provided by the San Diego Zoo and deployed by OVIS, with the goal of deploying them on birds from across the 5 main breeding populations. Ideally, two radio transmitters per TBPA family will be installed (one adult and one fledgling).

Evaluate habitat use and movements of the long-eared quetzal

- Field work to locate eared quetzal nests and install GPS transmitters in 2022 to record local movements and thus be able to identify specific resting, feeding and nesting sites.

Budget: The total project budget is \$99,380. The total funding needed from Southern Wings (in addition to the AGFD \$8,000) is \$30,380. Smaller amounts of money can be put towards specific activities.

Match: Partners match funds \$36,000 (San Diego Zoo \$36,000).

Table 1: SGCN (*Neotropical Migrants as defined by the NMBCA) in the project area, listed by state.

<i>Species</i>	AK	AZ	CA	CO	ID	MT	NV	NM	OR	UT	WA	WY
<i>Sharp-shinned Hawk</i>	X		X									
<i>Spotted Sandpiper</i>	X											
<i>White-throated Swift</i>		X										
<i>Violet-crowned Hummingbird</i>		X						X				
<i>Golden Eagle</i>		X		X	X		X			X	X	
<i>Great Egret</i>		X										
<i>Short-eared Owl</i>	X		X	X	X		X		X		X	X
<i>Lesser Scaup</i>	X											X
<i>Red-tailed Hawk</i>	X											
<i>Swainson's Hawk</i>			X	X					X			X
<i>Common Black-Hawk</i>								X				
<i>Lark Bunting</i>												X
<i>Wilson's Warbler</i>	X											
<i>Red-faced Warbler</i>		X										
<i>Killdeer</i>	X											
<i>Common Nighthawk</i>							X	X	X			
<i>Northern Harrier</i>	X		X	X								
<i>Yellow-billed Cuckoo</i>		X	X	X	X		X	X		X	X	X
<i>Western Wood-Pewee</i>	X											
<i>Broad-billed Hummingbird</i>		X						X				
<i>Black Swift</i>				X	X	X		X		X		
<i>Gray Flycatcher</i>		X										
<i>Pacific-slope Flycatcher</i>	X											
<i>Cordilleran Flycatcher</i>		X										
<i>Magnificent Hummingbird</i>		X										
<i>Merlin</i>												X
<i>Peregrine Falcon</i>	X	X		X			X	X	X	X	X	X
<i>American Kestrel</i>	X											
<i>Common Yellowthroat</i>	X		x									
<i>Barn Swallow</i>	X											
<i>Yellow-breasted Chat</i>		X										
<i>Bullock's Oriole</i>		X										
<i>Hooded Oriole</i>		X										
<i>Scott's Oriole</i>		X	x				X					

<i>Species</i>	AK	AZ	CA	CO	ID	MT	NV	NM	OR	UT	WA	WY
<i>Dark-eyed Junco</i>			x									
<i>Blue-throated Hummingbird</i>		X										
<i>Loggerhead Shrike</i>				X					X			
<i>Belted Kingfisher</i>	X											
<i>Lincoln's Sparrow</i>	X	X										
<i>Elf Owl</i>		X	x					X				
<i>Ash-throated Flycatcher</i>												X
<i>Brown-crested Flycatcher</i>			x									
<i>Painted Redstart</i>								X				
<i>Sulphur-bellied Flycatcher</i>		X										
<i>Black-crowned Night-Heron</i>												X
<i>Rose-throated Becard</i>		X										
<i>Osprey</i>		X										
<i>Savannah Sparrow</i>	X	X	x									
<i>Varied Bunting</i>		X						X				
<i>Band-tailed Pigeon</i>				X						X	X	
<i>Spotted Towhee</i>			x									
<i>Summer Tanager</i>		X	x									
<i>Blue-gray Gnatcatcher</i>						X						
<i>Vesper Sparrow</i>								X	X		X	
<i>Purple Martin</i>				X							X	
<i>Vermilion Flycatcher</i>			x									
<i>Ruby-crowned Kinglet</i>	X											
<i>Rufous Hummingbird</i>	X			X			X					
<i>Grace's Warbler</i>		x		X				X				
<i>Black-throated Gray Warbler</i>								X				
<i>Yellow Warbler</i>	X	x	x									
<i>Townsend's Warbler</i>	X											
<i>Mountain Bluebird</i>		x						X				
<i>Western Bluebird</i>								X			X	
<i>Eastern Bluebird</i>		x										
<i>Red-naped Sapsucker</i>		x										
<i>Williamson's Sapsucker</i>		x						X				
<i>Chipping Sparrow</i>	X								X			
<i>Tree Swallow</i>	X											
<i>Elegant Trogon</i>		X						X				
<i>Thick-billed Kingbird</i>								X				
<i>Bell's Vireo</i>		X	X				X	X				
<i>White-crowned Sparrow</i>	X	X										
Total	24	33	16	12	4	2	8	19	7	5	8	9

Figure 12: Manual of best forestry practices for the conservation of biodiversity in the Sierra Madre Occidental, which includes Neotropical migratory habitat values.



Figure 13: Location of project activities: 1) Protecting critical habitat for Neotropical migratory species and TBPA through a mix of legal mechanisms like forest segregation, and integration of best management practices into forest management plans.

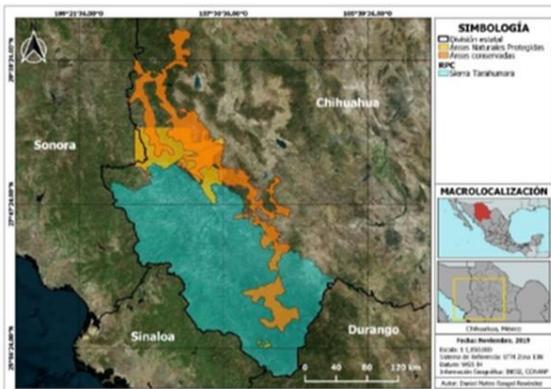


Figura 1. Corredor biológico (69,491 ha) protegido mediante el Segregamiento Forestal, Sierra Tarahumara

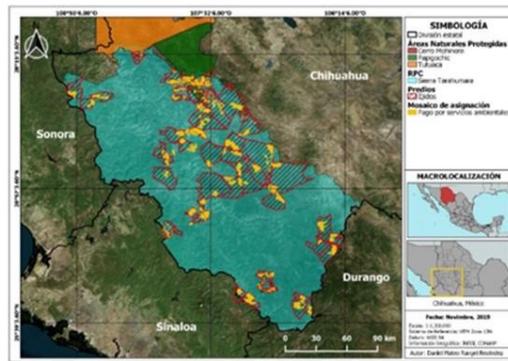


Figura 4. Distribución de predios y áreas segregadas del aprovechamiento forestal en la Sierra Tarahumara
En la RPC Sierra Tarahumara, cuya extensión aproximada es de 4 millones de ha, se seleccionaron un total de 56 predios, sumando un área de 1,060,900 ha. Dentro de dichas áreas se localizaron 69 AAVC Segregados del Aprovechamiento Forestal en una superficie de 152,170 ha (Figura 4, Tabla 3)

Table 2: Deployment of satellite transmitters in 2019 and 2020 on TBPA individuals from several key breeding site localities.

2019		2020	
ID Radio	Ubicación	ID Radio	Ubicación
178327	Madera	203315	RB Janos
178328	Madera	203311	Madera
178329	APFF Tutuaca	203312	Madera
178330	APFF Papigochic	178334	APFF Tutuaca
178331	APFF Papigochic	203314	APFF Tutuaca
178332	Madera	203313	APFF Tutuaca
178333	APFF Papigochic	197885	APFF Tutuaca
178334	APFF Campo	203317	APFF Papigochic

	Verde		
178335	APFF Tutuaca	203316	APFF Papigochic
178336	APFF Papigochic	197886	APFF Papigochic



Figure 13: Deploying transmitters on an adult (left) and a juvenile (right) TBPA.

Figure 14: TBPA migration patterns based on the movements of parrots with radio transmitters installed in 2019 (n = 6)

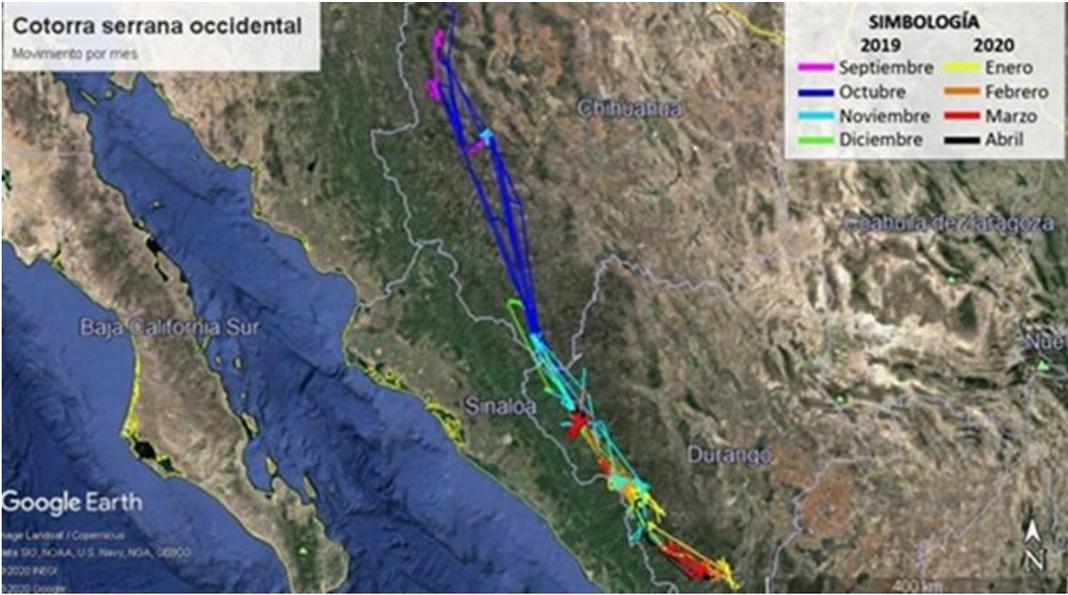


Figure 15: Designated Natural Protected Areas (high elevation mix-conifer forest habitats) in the Mexican state of Chihuahua, within the Sierra Madre Occidental. Breeding localities of Thick-billed Parrots include: (1) Mesa de las Guacamayas at Ejido 5 de Mayo in the Janos Biosphere Reserve (2) At the Ejido El Largo Maderal and Socorro Rivera in RPC Madera, (3) Ejidos Tutuaca and Conoachi in APFF Tutuaca. (4) Ejidos Heredia, Rojo Gómez, El Ranchito and Cerro Rumúrachic in APFF Papigochi and (5) Ejido Las Pomas and Heroínas in APFF Campo Verde. (6) RPC Cerro Mohinora where parrot nests were registered until 2011 (Cruz 1998 and Cruz et al. 2014). Potential locations of Thick Billed Parrots in the winter range: Durango, Zacatecas, Jalisco and Michoacán (all south of Chihuahua).

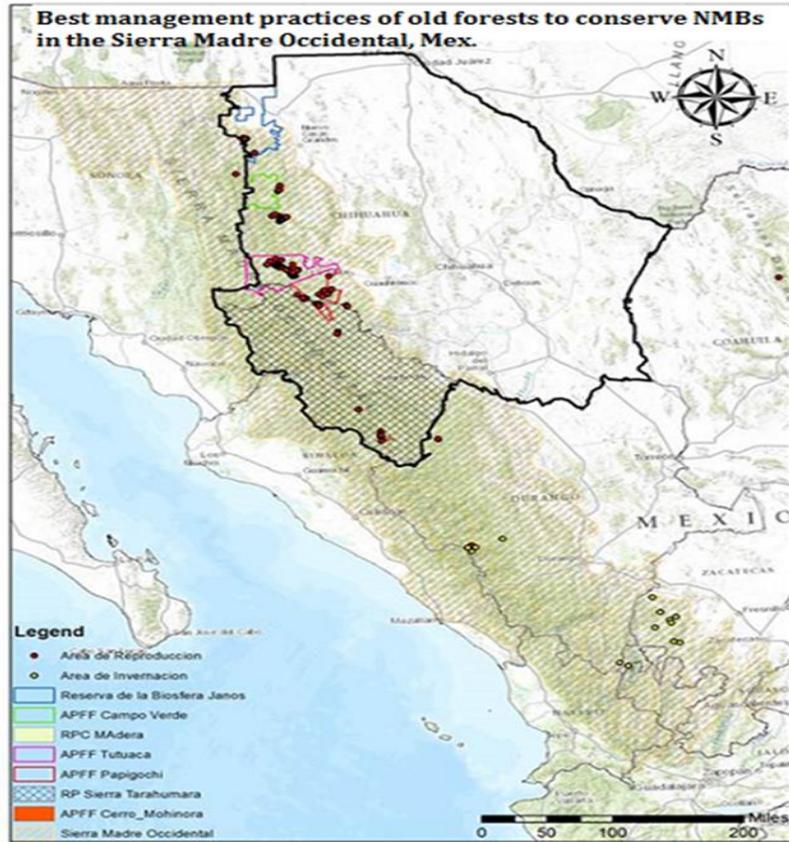


Table 3: Annual reproductive phenology of TBPA.

Evento	M				J				J				A				S				O				N				December-april							
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Arrival at nesting area	■	■	■																																	
Inspection and selection of nesting cavities			■	■	■	■	■	■																												
Asynchronous laying of eggs									■	■	■																									
Incubation									■	■	■	■	■	■	■																					
Hatching of eggs													■	■	■	■																				
Chick development													■	■	■	■	■	■	■	■																
Successful fledgling of chicks																					■	■	■	■												
Parental care for fledged juvs.																					■	■	■	■	■	■	■	■								
Flock migration	■	■																							■	■	■	■	■	■	■	■	■	■	■	■

Neotropical Flyway Project: 2021-2022 Season

Partners: SELVA: Investigación para la Conservación en el Neotropico, Colombia; Cornell Lab of Ornithology; Environment and Climate Change Canada; Bird Studies Canada; Parques Naturales Nacionales de Colombia; ADOPTA: Panama Rainforest, Panama; Canopy Family, Panama, Costa Rica Bird Observatories; Proyecto Cerulea-CR; Las Brisas Nature Reserve; Reserva El Jaguar, Nicaragua; Quetzalii, Nicaragua.

States that have participated to date: Missouri, Wisconsin

States with a biological connection: All states in eastern U.S. have a significant biological connection through migratory species that use northern Colombia and Central America for critical stopovers; many western states also have connections through long-distance migrants such as olive-sided flycatcher. See attached list of species highlighted in this project, with specific ties to key states.

Overview: Close to 300 species of landbirds, whose combined populations represent billions of birds, migrate between the Neotropics and North America. For many species, migration is the greatest source of mortality during their annual cycle, such that even successive delayed arrivals or degradation at a single major stopover site can lead to significant declines, threatening the viability of populations across the Western Hemisphere.

To successfully migrate between their breeding and wintering grounds, Nearctic-Neotropical migrants typically depend on a series of (stopover) sites along the length of their migratory route, which provide critical resources such as the fuel for migratory flights, safe roosting sites, and refuges where birds can make emergency stops.

Outside of North America, the funnel-shaped geography of Central America and the biogeography of northern Colombia, act as bottlenecks, concentrating millions of migratory landbirds into a tiny area (relative to their breeding grounds), magnifying the importance of Neotropical stopover sites. Further, birds migrating through this region face major barriers in the form of both the Caribbean Sea and the Gulf of Mexico, and it is likely that vital stopover regions exist where birds attain sufficient fuel to cross these barriers safely. Recent work on thrushes, vireos, and warblers on stopover in northern Colombia has shown that the energy reserves acquired there, may enable birds to not only cross the Caribbean sea but also cover up to 40% of their total migration distance – highlighting an urgent need to identify major Neotropical stopover regions and assess the needs of birds within them.

To address this urgent need, the **Neotropical Flyways Project** (NFP) has been operating since 2016 with the goals of (1) rapidly discover and map new stopovers sites; (2) determine habitat quality and stopover behavior at these sites; (3) develop conservation strategies at key stopover sites; and (4) train and build capacity among in-country biologists and managers to protect sites and continue long-term monitoring.

Threats: Research to date indicates that the majority of birds stopping over in northern South and Central America rely on native forests, especially pre-montane forests on Caribbean-facing slopes as well as lowland tropical wet and dry forests. These tropical forests are under severe threat from expanding agriculture, agroforestry, and development. Although some agroforestry systems, such as shade coffee, provide habitat for overwintering migrants, preliminary results from this study indicate that these habitats may not support adequate fueling conditions for several species on migration. The almost complete lack of knowledge of

migratory stopovers in this region constitutes a threat, hampering full life-cycle bird conservation.

NFP: AT A GLANCE

- Over **one billion migratory landbirds** migrate to the Neotropics from N. America.
- Despite this massive movement of birds, the routes and strategies that migratory landbirds adopt in the Neotropics are almost completely unknown.
- The Caribbean Sea represents a major **ecological barrier** to many species and quality of stopover sites on either side can influence the success of migration.
- Only by identifying **stopover sites and habitats** where birds lay down the energy reserves for migration can we identify the needs of migratory birds at all stages of their life cycle.
- The **NFP** is discovering critical stopover regions and habitats across five Central American countries and northern Colombia.
- **Intensive surveys** are used to identify previously **unknown** stopover sites.
- Constant effort **mist-netting stations**, combined with cutting-edge **radio-tracking** technology, determine how birds use stopover regions and to what degree a site contributes to the migration of each species.
- **Regional capacity for avian research** is enhanced by training biologists and students from six countries in research techniques for studying and monitoring migratory birds.
- The combined results will be used to develop a **conservation business plan** for stopover sites along the western Caribbean flyway.
- **Major discoveries to date:** (1) Sierra Nevada de Santa Marta, N. Colombia critical for Gray-cheeked Thrush and other migrants in spring; (2) N. Colombian dry forests critical for Yellow-billed Cuckoo in spring, and Blackpoll Warblers arriving after trans-oceanic crossing in fall; (3) major fall stopover by Cerulean Warblers in Caribbean foothills of Costa Rica; (4) global populations of most aerial insectivore species funnel through the Darien in spring and fall. (5) The highlands of Nicaragua provide stopover habitat for Canada Warblers, Cerulean Warblers and Golden-winged Warblers, and for the latter during the winter.

Project Goal(s): The NFP has been designed to tackle enormous gaps in our knowledge of stopover regions in Central America and northern South America. This information will feed into a wealth of conservation plans that currently lack actions addressing the needs of species such as the cerulean and Canada warbler during their lengthy migrations through Neotropical regions. The goal is to prioritize and protect key habitats and sites through a conservation business plan for migration stopover sites in Central America and northern South America. This plan will guide actions aimed at ensuring that not only major stopover regions for currently threatened are safeguarded, but also for the millions of individuals that belong to common yet declining species that are essential to ecosystem functionality across the Americas.

Specific objectives are to:

1. identify previously unknown stopover/staging sites (“Delaware Bays for songbirds”);
2. determine habitat quality and needs for key species within stopover sites;
3. determine migratory connectivity and migration strategies with tracking technologies;

4. engage and train local biologists, conservationists, and communities;
5. incorporate migration-stopover needs into full life-cycle bird conservation plans; and
6. develop and implement conservation strategies at newly discovered stopovers through local partners.

Birds: More than 50 species of landbirds regularly migrate through northern Colombia and Central America on their way to and from South American wintering grounds, and many more both winter and use Central America for stopovers. These are primarily species from eastern and boreal forests of the U.S. and Canada, including species of high conservation concern, such as Canada warbler, cerulean, and golden-winged warbler, as well as common species central to ecosystem function, such as red-eyed vireo, scarlet tanager, and Swainson’s thrush. All eastern states have connections to this project due to the migration routes of many species. See Table 4 for specific species connected to representative states. A few western migrants, such as western wood-pewee, olive-sided flycatcher, and yellow-billed cuckoo, which may be of interest to western states.

Table 4: Species targeted by the NFP, and their SGCN List status in selected states. These species migrate to South American wintering grounds and use sites within northern Colombia for stopover or as migration corridors. PIF continental status: **XX** = Red Watch List, **XX** = Yellow Watch List, **XX** = Common Bird in Steep Decline (2016 PIF Landbird Plan).

PIF	Species	NY	MO	LA	NC	GA	VA	TN	KY
XX	golden-winged warbler	X			X	X	X	X	X
XX	common nighthawk	X	X		X				
XX	black-billed cuckoo	X	X		X				
XX	olive-sided flycatcher	X						X	
	Tennessee warbler	X							
	bay-breasted warbler	X							
XX	cerulean warbler	X	X		X	X	X	X	X
	dickcissel	X	X	X	X			X	X
	Louisiana waterthrush	X	X	X			X	X	X
XX	Canada warbler	X			X		X		X
	scarlet tanager	X	X				X		
XX	prothonotary warbler	X	X	X			X	X	X
XX	yellow-billed cuckoo		X	X	X		X	X	
XX	chimney swift		X		X		X		
	eastern wood-pewee		X		X		X	X	
	rose-breasted grosbeak		X		X		X		X
	Mississippi kite		X		X			X	X
	eastern kingbird		X		X		X		
	black-and-white warbler		X				X		
	yellow warbler		X				X		
	yellow-throated vireo		X				X	X	
XX	bank swallow		X				X		X
	Acadian flycatcher		X					X	
	blackburnian warbler								X

Previous Successes and history: During the initial phases of the NFP in 2016-2018, with funding from Cornell Lab of Ornithology, Environment and Climate Change Canada, and SELVA, more than 10,000 transect surveys were conducted along 450 transects at 32 sites across northern Colombia, Panama, and Costa Rica. The surveys have produced over 150,000 records during passive transects and migration counts, recording a total of over 3 million birds. Surveys were designed to cover a range of elevations, climatic conditions and habitats, thereby facilitating the development of spatial predictions of stopover use at the regional level (see Figure 16). Analysis of spring data, for example, revealed the previously unknown importance of dry forest stopover sites for species such as yellow-billed cuckoo and barn swallow, while also highlighting the importance of pre-montane forests for species like Blackburnian warbler and scarlet tanager.

During Fall 2017 and 2018, we studied the use of tropical thorn scrub on the Guajira Peninsula, NE Colombia, by blackpoll warblers arriving after trans-oceanic crossings from North America. Our results revealed the critical importance of this habitat for blackpolls to recover body fat and refuel for the remaining 1,000 km+ journey to wintering grounds in the Orinoco and Amazon basins. During Fall 2019 and 2020, a mist-netting station was established in the Caribbean foothills of Costa Rica in order to understand the stopover of cerulean warblers and has revealed this region to provide important fuel reserves for a range of species including cerulean, Blackburnian and bay-breasted warblers.

In 2020, surveys were expanded to Nicaragua and spring and fall surveys revealed important concentrations of Canada warblers in the highlands, as well as high wintering densities of Golden-winged Warblers and both fall and spring records of cerulean warbler. Surveys also provided novel information on wintering GCWA, with up to 20 individuals recorded in the Cerros de Yali.

Working with local partners in each country we have trained 12 Colombian, 6 Panamanian, 5 Costa Rican and 7 Nicaraguan biologists; worked alongside the National Parks authority in three national parks and carried out education activities in local schools. Other outreach activities included the organization of a migration stopover symposium and presentation of results at PIF VI in Costa Rica (Nov 2017), the publication of a review of major stopover regions in the Neotropics ([PDF](#)), at least five additional peer-reviewed publications, presentation of results to three Colombian National Parks, the Colombian Ornithology Congress (Nov 2016), American Ornithological Society (April 2018), and International Ornithological Congress (August, 2018), and NAOC (2020).

Results from occupancy surveys in the form of spatial maps have updated regularly on the project website: <https://www.neotropicalflyways.com>

Proposed Activities/Actions for 2021-2022: The broader NFP will focus on understanding migrant strategies and stopover use in six countries over a period of six years: Colombia, Panama, Costa Rica, Nicaragua, Honduras and Belize. In the current proposal, we are seeking funding for planned actions during 2021/2022 that will build on the activities carried out during 2016-2020. These include:

January-December 2021 – Carry out occupancy analyses using fall migration data from Panama, Costa Rica and Colombia to *identify major stopover regions* (ongoing).

March-May 2021 – Establish a constant-effort mist netting station in the highlands of *Nicaragua* focused on the migration ecology of *GWWA* and *Canada warbler*.

March-May 2021 – Carry out occupancy surveys in southern *Ecuador* across nine sites, with a special focus on identifying spring stopover habitats for *black-billed cuckoos*.

August-September 2021 - Carry out a *training workshop* for NFP researchers from Panama, Costa Rica and Nicaragua, at Las Brisas Reserve in Costa Rica covering banding techniques, canopy netting, the installation of radio transmitters and the use of Motus automated telemetry stations to track migratory birds. Radio transmitters will be installed on *cerulean warblers*, to generate information on stopover duration and area use and onward migration strategies.

August-December 2021 - Carry out the planning phase for occupancy surveys across Honduras, Guatemala and Belize, involving the identification of local partners and survey sites.

October 2021 – Detailed study of *blackpoll warbler* habitat use and relation to precipitation at critical recovery/stopover sites in NE Colombia, where birds arrive following trans-oceanic flights >2500 km. This dry region of Colombia may be highly susceptible to climate change. It is important to understand how this might impact the declining blackpoll warbler and other species using this region (e.g. yellow-billed cuckoo).

March-May 2022 - Carry out occupancy surveys for migratory landbirds during spring migration across Honduras, Guatemala, and Belize.

Budget (Spring and fall 2021 and Spring 2022): The total project budget is \$57,000. Note: because the project is built on modular activities in each country and region, with new modules being phased in through time, smaller amounts of funding can go towards specific components in each season. There is an immediate need for funding for Fall 2021 workshops, planning and analyses, and Spring migration 2022 occupancy surveys.

Matching funds: a 1 to 1 match is required. Funding has been provided by Cornell Lab of Ornithology -- \$10,000 for 2018, \$15,000 for 2019 and \$10,000 for 2020. The Canadian Wildlife Service has provided \$33,000 for 2018/2019 and a private donor (\$10K). Smaller contributions from SELVA, Acadia University, Guelph University and Saskatchewan University total \$10,000. Equipment, namely 50 radio transmitters, represent a further \$10,000. In 2019/2020 Environment Canada provided \$25,000 towards conservation activities in key stopover regions identified in Colombia and are providing a further \$20,000 for 2020/2021.

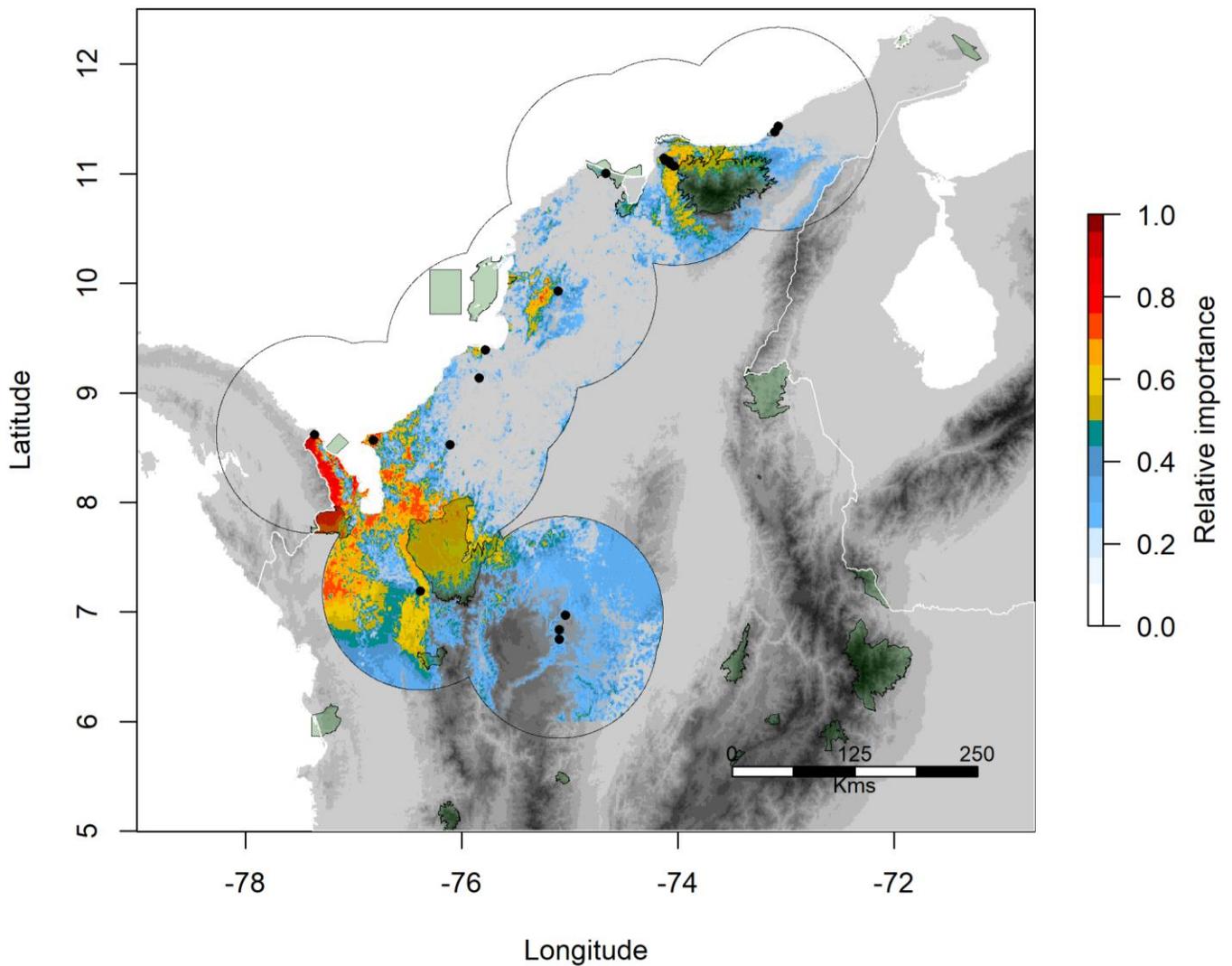


Figure 16: Priority spring stopover areas in northern Colombia based on the results of occupancy surveys and a subsequent modeling exercise for 20 species of migratory landbirds. Priority areas are limited to areas where natural forest remains and the presence of protected areas is indicated by transparent green shapes. The area outlined by a thin black line, is the area within which spatial predictions from occupancy models can be assumed to be appropriate, while black symbols represent survey sites. Critical stopover habitat in need of protection remains in north-west Colombia in the Darien and Uraba regions and on the northern and western flanks for the Santa Marta mountains in the north east.

The Pacific Flyway Shorebird Survey: Identifying Threats and Conservation Hotspots in Northwest Mexico

Partners: Terra Peninsular, Centro de Investigación Científica y de Educación Superior de Ensenada (CICESE), Centro de Investigación en Alimentación y Desarrollo, A.C. (CIAD Guaymas, Sonora), Point Blue Conservation Science, Universidad Nacional Autónoma de México (UNAM), Centro de Investigaciones Biológicas del Noroeste (CIBNOR), Universidad Autónoma de Baja California Sur (UABCS), USFSIP, Grupo Aves del Noroeste De México (GANO)

States that have participated to date: Arizona, California (new for 2019), Pacific Flyway Council.

Overview: Nearctic-neotropical migratory shorebirds (Order: Charadriiformes; Families: Charadriidae, Recurvirostridae, Scolopacidae) are highly mobile animals that traverse thousands of kilometers across the Western Hemisphere bi-annually and are reliant upon a network of coastal and interior wetland ecosystems. The Pacific Coast of the Americas (Figure 17) supports entire populations of neotropical migratory shorebird species during winter (November-February). Wetlands stretching from western Alaska to southern Chile are critical for the survival of these birds; including 13 Western Hemisphere Shorebird Reserve Network (WHSRN) sites in NW Mexico.

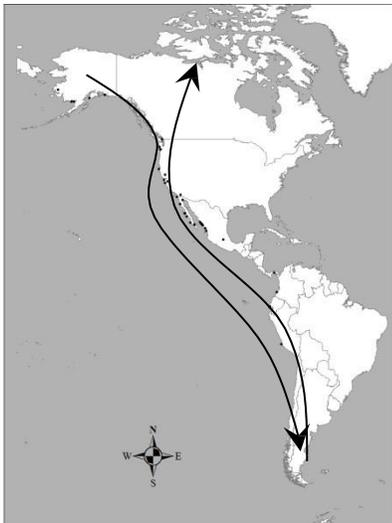


Figure 17: The Western Hemisphere with stylized migration route of shorebirds along the Pacific Coast of the Americas and important wetland sites (black dots) as designated by the WHSRN.

The health of these sites is critical to supporting shorebird populations during their annual migrations. Current research indicates populations of shorebirds are declining (Andres et al. 2012) but the causes of these changes are not well understood (Butler et al. 2004).

The lack of broad-scale coordinated monitoring for Pacific Flyway shorebirds has limited our ability to effectively manage their populations particularly in light of the predictions of climate change, which will likely alter habitat conditions (e.g. sea-level rise, reduced wetlands due to drought). In 2011, in collaboration with the Copper River International Migratory Bird Initiative and >100 individual and organizational partners throughout the Pacific Flyway, we initiated the Pacific Flyway Shorebird Survey (PFSS) and then the Migratory Shorebird Project (MSP) to fill gaps in Pacific Flyway population status and trends and then to assess hypothesized threats to shorebirds and identify priority conservation locations, respectively. Specifically, the objectives of the PFSS and then the MSP are to: (1) quantify spatial and temporal trends in distribution and abundance of shorebirds and other waterbirds both at the individual site level and across their wintering ranges; (2) provide science-based guidance for managers to inform actions and measure the response; (3) develop an “iterative learning” analytical framework to critically evaluate specific hypotheses about the factors influencing population changes and to

identify priority wetlands; and (4) educate individuals, communities, and governments about the importance of their wetland resources and their connectivity with people, via shorebirds, throughout the Americas. These programs now collect standardized bird and habitat condition data

on over 2.5 million non-breeding waterbirds from 14 countries annually.

Threats: The primary threats to shorebirds in the Pacific Flyway include 1) changes in habitat availability; 2) exposure to contaminants and pollutants; 3) human disturbance; 4) climate change; and 5) increasing predator populations. Human disturbance is thought to particularly be a problem in beach habitats (important for populations of threatened or endangered species such as the snowy plover and red knot), which get a lot of use by humans compared to intertidal mudflats and rocky areas commonly used by other shorebird species.

Birds: Shorebirds (Families: Charadriidae, Haematopodidae, Recurvirostridae, Scolopacidae); waterfowl (Pacific brant and ducks); raptors; and waterbirds (terns, egrets, etc.). See Table 5 for a complete list of species. The wetland habitats and sites used by shorebirds during the non-breeding season and monitored as part of this program are important for other migratory waterbirds. For example; all 13 sites of importance for wintering pacific brant in northwest Mexico are surveyed each year, and brant as well as other waterfowl are counted as part of the MSP (Table 4).

Project Goal(s): The overall goal is to improve the efficiency of conservation and management for coastal wetlands, shorebirds, waterbirds and waterfowl in Mexico through the integration of data and prioritization in decision- making. This will be achieved by conducting the following actions.

1. Complete annual non-breeding bird surveys at 21 sites across Mexico (Figure 17) and compile these survey data in to the PFSS node of the Avian Knowledge Network (AKN). Data collected includes the number of birds (shorebirds, waterbirds and waterfowl), measures of bird disturbance, and assessment of habitat condition. The number of avian predators (raptors) of shorebirds and other waterbirds are also recorded.
2. Expand survey efforts on sandy beaches to improve sampling for snowy plover, red knot, willet, and sanderling, and improve our understanding of human impacts which primarily occur on beaches.
3. Integrate survey data from new and existing sites, along with spatial data on the distribution of shorebird habitat across Mexico, into models to determine drivers of shorebird distribution and abundance, and the prevalence of different threats. Distribution models developed with these data for Pacific Flyway State Wildlife Action Plan focal species will be used to highlight priority areas for non-breeding shorebird conservation.

Southern Wings Successes in 2020: Funds have helped to conduct midwinter Pacific brant surveys in all major wintering sites in northwest Mexico, nonbreeding shorebird and waterfowl surveys as part of the MSP, breeding shorebird surveys at coastal wetlands and sandy beaches (targeting breeding snowy plover, Wilson's plover and American oystercatchers), identify key wintering sites and develop conservation strategies (as data becomes available and analyzed). Also, these funds have strengthened conservation and management of specific sites, disseminated information to land managers, and conducted education/outreach to the general public. Achievements of the project to date include:

Nonbreeding Surveys

- **Nonbreeding Shorebirds Monitoring:** During January-February of 2020 we completed the annual non-breeding midwinter shorebird surveys at 21 sites across northwest Mexico (Figure 17). These sites included 250 sampling units that are surveyed by about 50 volunteers in northwest Mexico.

- Pacific Brant Surveys: We provided a summary report on the 2020 mid-winter Pacific brant surveys in Mexico to the Pacific Flyway Council for their annual meeting.
- Snowy Plover Nonbreeding Surveys: During January 2020 we coordinated with the snowy plover midwinter window survey along the Pacific coast of U.S. to conduct nonbreeding snowy plovers surveys in five sites in northwest Mexico (Estero de Punta Banda, Bahía San Quintin, Laguna Atotonilco, Marismas Nacionales and Bahía Ceuta).
- Nonbreeding American Oystercatcher Monitoring: During January 2020 we completed winter surveys of roosting aggregations of American oystercatchers during high tides at 15 priority sites across northwest Mexico.

Breeding Surveys

- Snowy Plover Monitoring: From April through June of 2020 breeding Western snowy plovers were monitored in Estero de Punta Banda, Baja California; Laguna Atotonilco, Jalisco; and Bahía Ceuta, Sinaloa. In collaboration with partners during May-June, 2020 we monitored 22 nests and banded 29 snowy plovers with color bands in Ensenada, BC.
- California Least Tern Monitoring: During June we conducted surveys and sightings of color alpha-numeric bands of the endangered California least tern colony in the Estero de Punta Banda, Baja California, in La Paz, and Los Cabos, Baja California Sur. In Estero de Punta Banda, among 112 adults, we re-sighted seven individuals originally banded in California.
- American Oystercatcher Monitoring: During April through June we conducted repeated counts of American oystercatchers breeding pairs in Natural Protected Areas of Northwest Mexico, including Marismas Nacionales, (Nayarit); Bahías Santa María, Ceuta and Navachiste, (Sinaloa); El Tóbari, Bahía Kino, and Puerto Peñasco, (Sonora); Laguna Ojo de Liebre, Bahía Magdalena, Bahía de La Paz, Bahía de Loreto, and Isla San Marcos, (Baja California Sur).

Education/Outreach/Training

- Public Outreach: To celebrate the Migratory Bird Day, we gave a [talk on bird watching](#) at home and the importance of waterbirds of Bahía Todos Santos (Ensenada).
- Public Outreach: A story on [Snowy Plovers in times of COVID-19](#)
- Public Outreach: On June 4th, we did a facebook live event about the [Snowy Plover conservation project in Bahía Todos Santos](#) in collaboration with the Secretary of Sustainable Economy and Tourism of the State of Baja California, reaching a live audience of over 1000 viewers, and total accumulated views of more than 7800.
- Scientific Publication: Palacios, E. et al. Submitted to Journal of Field Ornithology. *Impact of human disturbance on the abundance of nonbreeding shorebirds in a subtropical wetland*. In review.

Data Entry

- Database: We entered all 2020 mid-winter shorebird survey data into the project's online data entry portal hosted by CADC (California Avian Data Center), which is a node of the AKN. Data includes the number of shorebirds, waterbirds and waterfowl, measures of human disturbance and raptors, and assessment of habitat condition.

Conservation Planning/Management

- Management and Monitoring of local Hunting Area: Collaborated with the local hunting organization of San Quintín "Los Volcanes" to monitor wintering Pacific brant in Bahia San Quintin and protect their wetland habitat (protection of loafing and gritting sites), conduct patrols to reduce illegal hunting and human disturbance, and adjust hunting rules to make harvest more sustainable.
- Application of shorebird data: Technical report, Palacios, E. and M. Reiter. 2020. *Landscape assessment of shorebird disturbance hotspots for Mexico to Chile, 2016 – 2019*. Unpubl. Summary Report to Point Blue Conservation Science. La Paz, Baja California Sur. 17 pp. We also compiled and

analyzed disturbance data from all 21 sites of northwest Mexico to identify spatial and temporal patterns of disturbance. As well as hot spots of disturbance and “refuge” sites for shorebirds.

- **Application of shorebird data:** Mentored graduate students on data analysis and interpretation for use in conservation and management. Daniela Valdez started her M.Sc. thesis at UABCS by using Wilson’s plover data collected in the MSP for the site Ensenada de La Paz. Jennifer Hernandez, continues working on her M.Sc. thesis at UABCS by using shorebird data from Ensenada de La Paz collected by this project (MSP). Jonathan Vargas, a fellow of the Coastal Solutions Fellows program continues focusing his project on reducing human disturbance on the western snowy plovers in Baja California. In addition, Estefanía Muñoz is making progress on her M.Sc. thesis at CICESE on the abundance and distribution patterns of three large shorebirds in California and northwest Mexico in relation to weather, also using the data from MSP.
- **Protection of Habitat:** In order to protect the nests of snowy plovers and California least tern in early April 2020 we installed predator excluders and a temporary fence on the nesting beach of Estero de Punta Banda, northwest Baja California ([see online note](#) in Spanish). This action also includes monitoring of the Least Tern breeding season. The fence will remain installed until August.
- **Protection of Habitat:** To protect the public beach of the City of Ensenada, that is nesting ground for the Snowy Plover, Terra Peninsular is applying to the Federal Government to get a land use designation called Acuerdo de Destino in favor of the Municipal stewardship. The technical study to support this designation was completed. The municipal authorities will have the legal background to control disturbance and promote best management practices in this beach.
- **Protection of Habitat:** Terra Peninsular along with partners achieved to pass a municipal law to designate the beaches of Ensenada as tobacco smoke free.
- **Management in the Reserves:** As part of the signage project within the Terra Peninsular reserves, a signage manual was generated. The manual lays the foundations for the design and elaboration of the different types of signs that are necessary within the reserves, as well as the distinctive emblems of each one. In addition, due to COVID-19, signs were installed to promote responsible recreation in outdoor areas. These signs were placed at different points in the Punta Mazo and Monte Ceniza Natural Reserves in order to raise awareness and invite visitors to enjoy the area responsibly, maintaining preventive measures. These Reserves provide important habitat for a suite of migrants including thousands of Pacific brant, surf scoter, western sandpiper, marbled godwit, willet, and dozens of LBCU, snowy plover, and sanderling.

Specific Activities planned for 2021: Terra Peninsular and partners will implement the following conservation actions.

- Conduct standardized annual non-breeding bird surveys of 21 wetland sites across NW Mexico (Fig. 2), and compile these survey data into the AKN node. Data collected in the field includes the number of birds (shorebirds, waterbirds and waterfowl), measures of bird disturbance, and assessment of habitat condition. The number of avian predators (raptors) of shorebirds and other waterbirds are also recorded.
- In collaboration with local hunting organizations we will strengthen conservation and management of designated wildlife conservation units (UMAs) in San Quintín, Baja California and El Tóbari, Sonora, including:
 - Monitor wintering population of Pacific Brant and work to maintain/enhance habitat.
 - Assist in the voluntary designation of hunting and non-hunting units within the UMA.
 - Improve capture of harvest information (sex and age) for hunted Pacific brant.
 - Conduct outreach and a workshop on sustainable and responsible hunting practices.
 - Promote birding and wildlife photography tours.
 - Implement a beach cleanup campaign.

- Work with an irrigation district (Yaqui River watershed, Sonora) to implement management practices that allow for vegetation to be maintained on one side of each canal to serve as loafing and foraging areas for waterfowl. Irrigation districts in Sonora traditionally work to keep canals free of any vegetation, but these vegetated areas provide important habitat for wintering populations of waterfowl as well as breeding Mexican duck and other species.
 - Organize workshops (and meetings) with the irrigation district to adopt the management of vegetation and dredged sediment.
 - Design and supervise the removal of vegetation in a channel slope or drainage ditch (water conveyance network).
 - Monitor the response of birds to the management of the vegetation of the water conveyance network.
- Initiate a monitoring program of breeding secretive marsh birds in southern Sonora and Baja California Sur, specifically focused on the threatened Ridgway's rail, including the two subspecies (Yuma and Belding's rail) using mangrove habitats.
 - Conduct monitoring of breeding snowy plover at six sites across NW México (Estero de Punta Banda and Bahía San Quintin, Baja California; Ensenada de La Paz, Baja California Sur; Laguna Atotonilco, Jalisco; Bahía Ceuta, Sinaloa; and Marismas Nacionales, Nayarit). Breeding Least Tern colonies will also be monitored at three of these sites (Ensenada de La Paz, Punta Banda and San Quintin). Protect nesting habitat (through perimeter fencing) and implement public outreach/education activities at three sites (Guerrero Negro, Bahía San Quintin and Estero de Punta Banda) to mitigate the effects of human disturbance on breeding snowy plover and least tern.
 - Implement or support education/outreach and training activities such as 1) outreach campaign "Share the Beach" focused on nesting Snowy Plover and Least Tern, 2) other activities that disseminate conservation information to land managers, new professionals, and the general public.
- Build interpretive trail "La Dudleya" in the Punta Mazo nature reserve. Trail will have a length of 6.2 kilometers. This interpretive trail will allow us to share with visitors the importance of mud flats, dune systems, sandy beaches, and rocky cliffs as critical habitats for migratory birds. This work will be carried out closely with neighboring communities and under the guidance of experts in trail design. The Terra Peninsular team will be in charge of the educational contents using the methodology for nature and culture interpretation of the National Association for Interpretation.

Budget: The total project budget is \$25,000 but smaller amounts of money can be put towards specific activities. Contributions of \$5,000 to \$10,000 each will significantly advance implementation of these shorebird/waterbirds/waterfowl conservation actions. It's anticipated that AGFD will provide \$7,500 to support completion of some of the project's objectives. Previously Pacific Flyway Council contributed \$5,000 to this project.

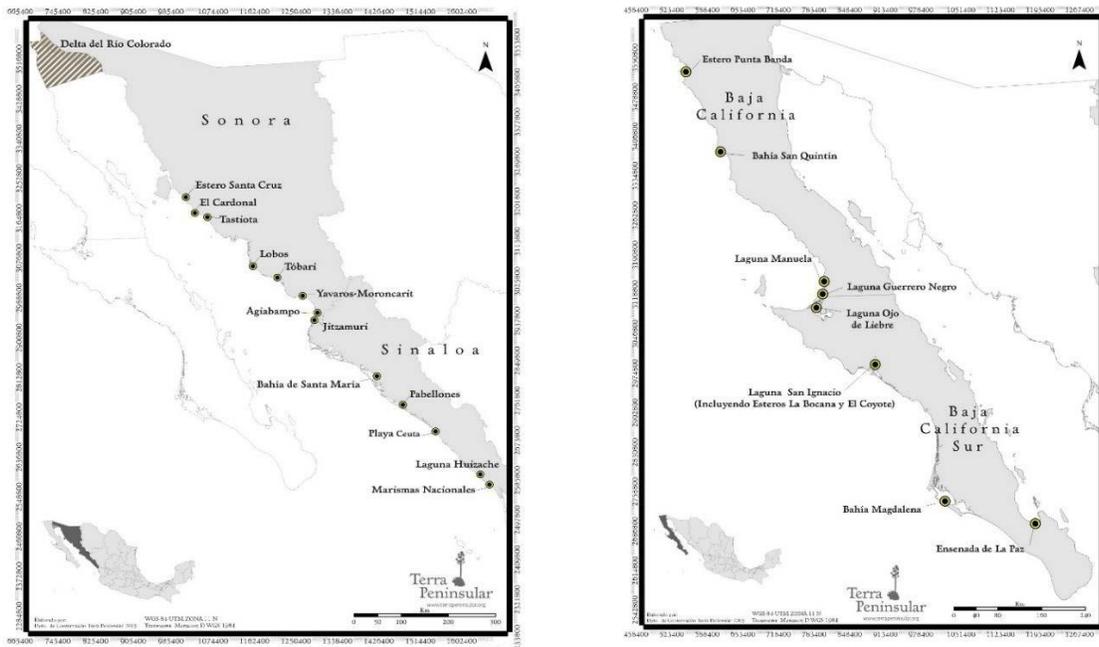


Figure 17: Location of 21 coastal wetland sites which are part of the PFSS in NW Mexico.

Table 4: Waterfowl abundance and distribution documented in the sampling units of the MSP sites in NW Mexico.

Common Name	Abundance	Percent of sites	Number of sites
northern shoveler	35606	29	7
green-winged teal	28380	38	9
brant	5378	50	12
redhead	4932	17	4
ruddy duck	4032	29	7
northern pintail	3457	58	14
American wigeon	2872	25	6
gadwall	2568	13	3
blue-winged teal	889	33	8
lesser scaup	858	33	8
cinnamon teal	689	25	6
surf scoter	557	17	4
black-bellied whistling-duck	259	8	2
red-breasted merganser	193	46	11
bufflehead	116	29	7
mallard	34	4	1
fulvous whistling-duck	10	8	2
greater white-fronted goose	5	4	1
white-winged scoter	3	4	1

Table 5: SGCN in the project area, listed by state.

Species (SGCN)	AK	AZ	CA	CO	ID	MT	NV	NM	OR	UT	WA	WY
spotted sandpiper	X											
western grebe		X			X						X	
northern pintail							X					X
cinnamon teal											X	
greater white-fronted goose	X											
great egret		X										
ruddy turnstone			X									
black turnstone	X		X									
lesser scaup	X											X
brant goose			X								X	
Pacific black brant	X								X			
sanderling	X		X									
red knot			X								X	
western sandpiper	X						X					
semipalmated sandpiper	X											
mountain plover		X	X	X		X		X				X
snowy plover			X					X		X	X	
western snowy plover		X		X			X		X			
killdeer	X											
black tern			X	X	X		X					X
black-bellied whistling duck		X										
fulvous whistling duck			X									
snowy egret		X							X			X
common loon			X		X		X				X	X
gull-billed tern			X									
black oystercatcher	X		X						X			
black-necked stilt									X			
Caspian tern					X	X			X	X		X
loggerhead shrike			X	X			X	X	X		X	
California gull					X							
ring-billed gull					X							
short-billed dowitcher	X											
long-billed dowitcher	X						X					
marbled godwit												
belted kingfisher	X											
surf scoter											X	
wood stork			X									
long-billed curlew				X	X		X	X	X			X
whimbrel	X											
black-crowned night heron												X
American white pelican			X	X	X		X		X	X	X	
brown pelican (California)			X						X		X	

neotropic cormorant								X				
Species (SGCN)	AK	AZ	CA	CO	ID	MT	NV	NM	OR	UT	WA	WY
Brandt's cormorant			X									
red phalarope	X											
red-necked phalarope							X					
Wilson's phalarope							X					
white-faced ibis				X	X		X			X		X
black-bellied plover	X											
eared grebe								X				
American avocet							X					
black skimmer			X									
Forster's tern												X
least tern				X		X		X				
California least tern		X	X									
elegant tern			X									
royal tern			X									
lesser yellowlegs	X											
Total species	18	7	21	8	9	3	13	7	10	4	10	11

Restoration of Migratory Bird Habitat in Ecuador

Partners: Fundación Jocotoco (Jocotoco) and ABC

States that have participated to date: Missouri

Overview: Ecuador provides wintering habitat to 105 species of neotropical migratory birds, many of them included in the U.S. Fish and Wildlife Service Species of Conservation Concern List. Ecuador has the highest deforestation rate in South America over the last 50 years. Annual loss of forests ranges from 148,000 to 495,000 acres because of expanding human development. Forest loss is highest in the Andes and the Chocó Rainforest, prompting our partner, Jocotoco, to establish bird reserves in these regions and elsewhere throughout the country where habitat protection is needed the most.

In FY 2022, ABC will be focusing our work with Jocotoco in the Ecuadorian Chocó, located in northwest Ecuador, which is one of the last remnants of the Tumbes-Chocó-Magdalena Global Biodiversity Hotspot. The Chocó is characterized by high species endemism and accelerated habitat loss; only 2% of the original forest in the area remains. The Chocó rainforest is important to numerous wintering migratory birds including olive-sided flycatcher, cerulean warbler, Acadian flycatcher, western wood-pewee, and Swainson's thrush. The area is also important for threatened resident bird species such as the great green macaw and the banded-ground cuckoo. In this region, ABC has established the Chocó-Canandé BirdScape, which encompasses the 13,000-acre Canandé Reserve and the Tesoro Escondido Reserve with 4,560 acres, owned and managed by Jocotoco.

The Chocó-Canandé BirdScape includes a matrix of different land uses such as cacao plantations, oil palm and balsa plantations, monocultures (e.g., rice, pepper, plantain, cassava, etc.), pastures, fallow land, and patches of primary forest. Most people living in the area arrived nearly 40 years ago, migrating from other provinces. Their agricultural practices and grazing techniques poorly match the local conditions, and their activities are creating access to highly impactful industries such as Palm Oil. Poverty is an enabling condition for environmental degradation in the Esmeraldas province, where the Ecuadorian Chocó is located. It is one of the poorest provinces in the country.

Our goal in this BirdScape is transform existing monocultures, pastures, and fallow lands into silvopastures and agroforestry systems in eight communities. By introducing trees in pastures, farmers will provide shade and diet supplements to the cattle while protecting the soil from erosion and providing additional habitat and corridors to neotropical migratory birds. By adding trees to their existing monocultures, farmers will generate extra revenues, which have the potential to prevent further deforestation. In addition, by restoring abandoned lands that were previously deforested, the communities will be able to secure a clean source of water year-round. Building the communities' capacity to manage nurseries, diversify their income sources, and value wildlife will be key to the long-term success of our conservation efforts. Our goal is to target communities around remaining forests to limit their impact on these important forests that remain.

Threats: Forests in Ecuador, especially in the Chocó, are rapidly disappearing due to local timber extraction and agricultural expansion (mostly oil palm, and more recently balsa plantations). Land use change is an on-going process accelerated by poverty and the lack of alternative income opportunities for the communities. From 2001 to 2017, the Chocó lost 883,352 acres of forests. Deforestation is likely to keep increasing given the construction of new roads and bridges to cross rivers that historically were only

crossed by boat. In addition, industrial development, particularly from oil palm production, is polluting the waterways and after many years of deforestation water sources are drying up.

Birds: Species that will benefit include Canada warbler, olive-sided flycatcher, blackburnian warbler, cerulean warbler, black-and-white warbler, Swainson's thrush, summer tanager, western wood-pewee, southern rough-winged swallow, Acadian flycatcher, and broad-winged hawk.

Previous Southern Wings Successes:

With Southern Wings funding in FY 2020, ABC and Jocotoco worked with eight communities in and around the Chocó-Canandé BirdScape. Funds helped Jocotoco build six nurseries in five communities, each one with capacity to produce 5,000 seedlings. A total of 20,000 seedlings were planted in 75 acres (30 has) of cacao monocultures, pastures, and fallow lands. Staff of Jocotoco's Tesoro Escondido Reserve gave a series of workshops about tree nurseries, seed collection, bird identification, and wildlife conservation.

Project goal(s): The goal of this project is to slow the rate of deforestation and work with landowners to improve land use practices and create better habitat connectivity in the buffer zones of existing protected areas in the Chocó-Canandé BirdScape. Our short-term goal is to restore 150 acres through agroforestry and 741 acres through assisted reforestation. In FY 2022 our objective is to build more nurseries, produce 35,000 seedlings, and start restoring 150 acres of degraded lands. In addition, we will start to identify and engage additional communities.

Project Activities:

In the Chocó-Canandé BirdScape, we will:

- continue working with the eight communities engaged during FY 2020 to maintain the existing nurseries and engage new community members,
- identify at least three new areas for reforestation in and around the Canandé and Tesoro Escondido Reserves,
- conduct four community workshops to strengthen the knowledge gained through the first round of workshops, this includes writing and printing bird guides and brochures in the indigenous language of some of our focal communities in,
- build six new nurseries, with a total production capacity of 5,000 seedlings each, and
- plant 37,500 seedlings across at least 150 acres to enhance monocultures and pastures and restore fallow and degraded lands.

Budget: The total project budget is \$49,800 but smaller amounts of money can be put towards specific activities.

Matching Funds: ABC and Jocotoco have secured funds for work in Canandé from Synchronicity Earth, the Canadian Wildlife Service, and private donors. Fundación Jocotoco and the local farmers will provide in-kind investment into this project including providing the tools, land, expertise, and workforce to plant tree seedlings.

Figure 18: Location of Chocó-Canandé BirdScape and project area in NW Ecuador, Esmeraldas Province.



Improving Migratory Bird Habitat in Colombia

Partners: Coffee Producers Ecological Foundation (FEC), Vivo Cuenca, SELVA, and ABC, El Silencio

States that have participated to date: Missouri, Indiana, Tennessee, Virginia

Overview: The country of Colombia is an integral part of the lifecycle of more than 170 migratory species. ABC has been working in Colombia for more than 15 years to support the creation and management of bird reserves and ecological easements; develop and promote bird tourism opportunities; restore degraded lands; and promote bird-friendly agriculture. As part of ABC's Migratory Bird Program, we have begun to identify large landscapes, or BirdScapes, to target conservation action for migratory birds of conservation concern. In Colombia, we have identified seven landscapes that we would like to develop into BirdScapes with active conservation projects being implemented. One of these BirdScapes, the Central Andes BirdScape, encompasses much of the Caldas and Tolima Departments and is one of the highest coffee producing regions in the country.

In 2019, ABC began to take action in the Central Andes BirdScape by engaging with the multiple agencies and groups already working successfully in the region to restore watersheds, implement best management practices for coffee growing and processing, and conduct outreach to involve the communities in conservation. Workshops and meetings with these stakeholders helped prioritize where to work first, and also led to our dividing the BirdScape into two sections, east and west. In the western section we are working with a partner named Vivo Cuenca and have prioritized the Río Chinchiná watershed and the micro-watershed of one of its tributaries, the Río Claro, in the Caldas Department. In the eastern portion, we are working with SELVA in the Tolima Department. Tolima supports a variety of habitats and high bird diversity in small concentrations; more than 500 bird species have been recorded in just under 1,500 km², including multiple threatened species and migratory species of concern such as the golden-winged and cerulean warblers. Here native vegetation is being replaced with agriculture and pasture lands. In 2019 we started working with our partner SELVA to develop alliances with stakeholders, conduct outreach activities and promote best management practices that will restore, connect and improve habitat for the native and migratory species with the community of Libano. This work is now underway.

A second BirdScape we have begun to develop is in the Magdalena River Valley where in 2020, ABC assisted Fundación Biodiversa with the acquisition of 3,869 acres to expand and nearly double their El Silencio Reserve. The acquisition connects two significant forest patches, protecting the largest contiguous forest in the Magdalena Valley. ABC is keen to build off the success of this acquisition and support restoration that is needed in degraded areas, as well as develop agroforestry plots that can produce revenue to support reserve management. Establishing a new BirdScape in the Magdalena Valley is critical, as approximately 85-90% of original forest has disappeared from the region due to livestock, agriculture, mining, and oil development. The result is that this region is one of the most threatened and least protected areas of Colombia. Furthermore, recent geolocator data on prothonotary warblers (Tonra et. al., 2019) identifies the area as a potential important wintering area for this species. Birds tagged in Arkansas, Louisiana, South Carolina, Virginia, Wisconsin and Ohio also show levels of connectivity with this region of Colombia.

Threats: The Colombian Andes have some of the highest rates of deforestation in Latin America; a significant amount of this loss is due to agriculture. In Colombia, it is estimated that 87% of NMBs occur in

agroecosystems and more than 70 species have been registered in coffee systems. It is imperative that we target these kinds of landscapes in our migratory bird conservation strategy in Colombia.

Furthermore, in the Magdalena River Valley remote sensing information reveals that the deforestation rate in the area of Barbacoas is nearly 5.7%, or 874 ha per year. Most of this is for unsustainable cattle farming. Alternative economic models are needed for the region, along with protection and restoration. Otherwise, it is estimated that all forest habitat could be gone in less than a decade.

Birds: In the Central Andes BirdScape, 74 migrant bird species have been registered, including golden-winged, cerulean, Canada, black-and-white, Tennessee, blackburnian, yellow and blackpoll warblers; broad-winged hawk; yellow-billed cuckoo; Acadian and olive-sided flycatchers; eastern wood-pewee; summer tanager; rose-breasted grosbeak; northern waterthrush; spotted sandpiper; red-eyed vireo; and Swainson's thrush. data from 2020, confirmed the majority of these species, but also identified clay-colored thrush, and American redstart.

In the Magdalena Valley, where we are developing the Middle Magdalena BirdScape, priority NMBs include a mix of passerines and shorebirds that use riparian and flood plain habitat. These include prothonotary warbler, buff-breasted sandpiper, bay-breasted warbler, yellow-billed cuckoo, American golden-plover, upland sandpiper, solitary sandpiper, lesser yellowlegs, and willow flycatcher.

Project goals: Our goal for both of these BirdScapes is to protect existing forest and improve habitat quality and connectivity through restoration for migratory birds in the coffee-growing area of the Caldas and Tolima departments, and in the Barbacoas region of the Magdalena River Valley. Specific objectives include:

- planting at least 100,000 native trees in the Central Andes BirdScape,
- engaging 250 coffee producers in conservation activities in the Central Andes BirdScape, and
- restoring 200 ha of degraded lands within the Middle Magdalena BirdScape.

Previous Southern Wings Success: With past Southern Wings funding, ABC worked in the Eastern Andes, specifically the Cerulean Warbler Corridor. Here ABC and ProAves engaged cacao and coffee producers in the buffer zones of two ProAves reserves, the Cerulean Warbler Reserve and the Pauxi Reserve. Southern Wings funds contributed to the creation of this habitat corridor through the planting of more than 500,000 saplings on 2,835 acres across 200 private farms. A total of 18 ecological easements were also established by ProAves, as a measure to reduce deforestation. More than 5,000 people throughout the corridor received information about birds and biodiversity through radio programs, International Migratory Bird Day events and activities, training workshops on reforestation and sustainable coffee, and through the distribution of educational materials.

Most recently funding through Southern Wings has supported engagement with coffee producers in the Central Andes BirdScapes, facilitating over 50 agreements with landowners and the planting of over 12,000 trees. Additionally, funds have been provided to install fencing to protect patches of remaining forest habitat. In 2020, 1.2 Km of fencing was installed to protect 2.2 ha.

States participating in Southern Wings have also provided funding for GWWA Surveys in Colombia and neighboring Venezuela. We are currently working with SELVA to conduct a third year of surveys in Colombia, including in the Central Andes BirdScape.

New Project Activities:

Central Andes BirdScape:

Within the Río Chinchiná watershed we will continue to plant native trees within coffee farms to increase connectivity between forest patches. Our goal is to plant at least 50,000 trees this year, and provide maintenance to the trees planted thus far. This will require maintenance of the tree nurseries that have not been able to be sufficiently maintained due to COVID, as well as the establishment of additional nurseries.

We will also continue to conduct outreach to farmers in the watershed, to facilitate new planting agreements with landowners and facilitate implementation of sustainable practices. Additional funds are needed for another Forestry Technician to help conduct outreach and meet the demand created by the project, as well as ensure precise management of data associated with each tree; where it was planted, when it needs to be maintained, etc.

We are also interested in expanding our efforts beyond the Río Chinchiná watershed but still within the BirdScape. In particular there are opportunities to implement silvipasture systems and create habitat connectivity along an altitudinal gradient from 800m to 3000m (the cut off elevation for the BirdScape). We would do this by engaging communities and landowners (50 would be our initial goal) and securing tree-planting agreements. Our goal in 2021/2022 would be to plant 12,000 trees within silvipasture systems, and install 5 Km of fencing to protect existing forest patches and allow for regeneration or reforestation efforts below 1000 m elevation.

ABC and Vivo Cuenca have identified a property for purchase that would be of conservation benefit for migratory birds. This 238.4 ha property is an inholding within the Río Blanco Forest Reserve. While technically within a designated protected area, it is not protected under private ownership. This property would be managed by Vivo Cuenca in association with the local municipality and water department. These entities also have interest in the protection of this property and its forest for the hydrological value it holds. At the moment, we are not including funding for this acquisition in the project budget.

Middle Magdalena BirdScape:

At the El Silencio Reserve there are current needs and opportunities for reforestation, agroforestry system development for reserve income generation, and related avian studies of response to management action. To initiate reforestation at the reserve, Fundación Biodiversa first needs to identify key "parent" trees on the property that can provide seed source for reproduction in nurseries. Seeds then need to be collected, nurseries constructed and maintained, and trees planted. Monitoring transects would be established, and park guards trained to conduct a monitoring protocol that would be replicated over time. Initial goals for the project include:

- installation of 4.2 km of fencing for forest protection,
- reforestation of 5.3 ha (planting 840 trees /ha or 4453 total trees),
- planting of important tree species to 181.5 ha of ongoing natural regeneration as enrichment planting,
- initiate 5 ha of sustainable timber production, and
- initiate 5 ha of sustainable agroforestry production focusing on organic production of the Sacha Inchi nut (a specialty nut, also known as a super food). Biodiversa has established a relationship with Don Juan Organics that provides technical assistance for growing this product and guarantees purchase for its producers.

We would also work with Fundación Biodiversa to validate our BirdScape polygon with additional regional actors and socialize the concept of the BirdScape. A series of workshops or meetings (likely virtual) would be held to establish initial BirdScape goals for protection, restoration and management.

Budget: The total project budget for the Central Andes BirdScape is \$83,698. The total budget for the Middle Magdalena BirdScape is \$84,232. Smaller amounts of money can be put towards specific activities.

Matching Funds: ABC has funding support from Canadian Wildlife Service, Blue Ridge Audubon Society, Amos Butler Audubon Society and USFWS via the NMBCA program for this project. In addition, Vivo Cuenca, FEC and Fundación Biodiversa have significant matching funds available for related activities.

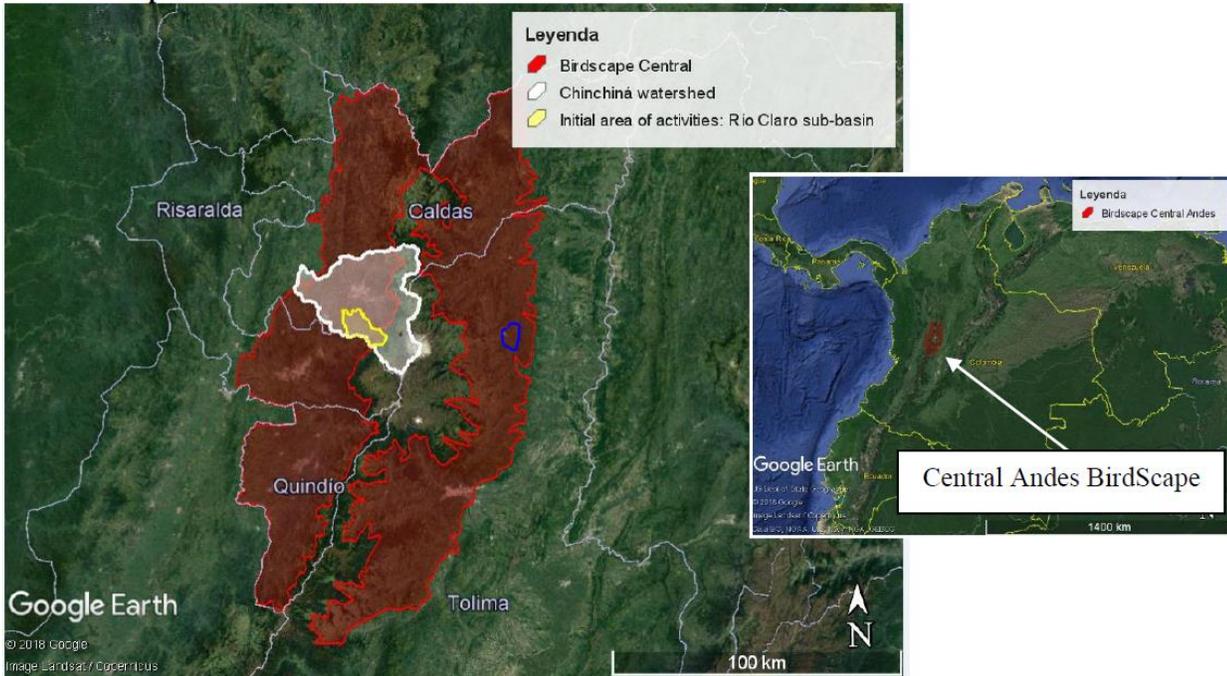


Figure 19: Central Andes BirdScape (in red), The Rio Claro watershed (white polygon) in the Caldas Department and the Libano area in Tolima (in blue).



Figure 20: The location of the proposed Middle Magdalena BirdScape.

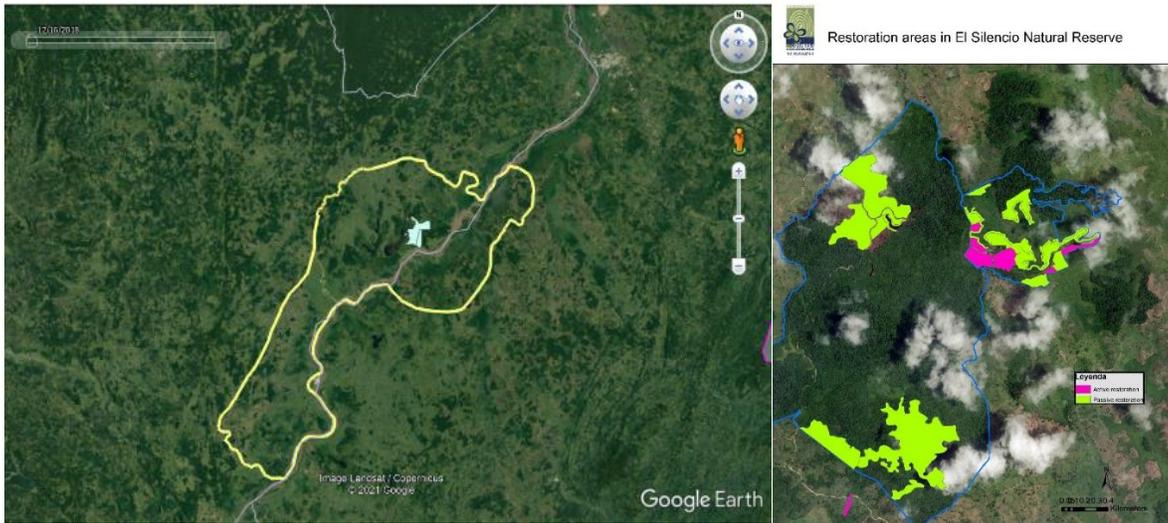


Figure 21: Location of El Silencio Reserve within Middle Magdalena BirdScape (left). Locations of restoration areas within the El Silencio Reserve (right).

Conservation of Neotropical Migratory Birds in the Dry Tropical Forests of El Salvador: Assessing and Addressing Threats to Overwintering Habitat and Bird Populations

Partners: Paso Pacífico, Zoological Foundation of El Salvador (FUNZEL), Fundación Enrique Figueroa Lemus, Ministerio de Medio Ambiente y Recursos Naturales (MARN), AGFD, Sociedad Salvaje, Asociación de Desarrollo Turístico de la Costa Oriental De El Salvador (ADETCO), *Compañía Azucarera Salvadoreña (CASSA)*

State(s) Participating: Arizona

Overview: Continued declines in populations of NMBs have demonstrated the need to take a full life-cycle approach to NMB conservation. Actions taken only within the U.S. may not be adequate for the long-term conservation of migratory birds that spend much of their life south of the U.S. Paso Pacifico proposes to work with U.S. states, Federal agencies and in-country partners to protect overwintering and stopover habitat areas in Central America, specifically El Salvador.

Numerous NMBs from throughout the pacific flyway use Central America’s Pacific coast during stopover migration and overwintering. Most of this geography was once dominated by seasonally dry tropical forests (Figure 22). However, large scale conversion to agriculture and pasture has made the dry tropical forest one of the world’s most endangered ecosystems, with less than 2% of the original forest intact. Only 5% of remaining dry forest in Mexico and Central America receive some degree of protection.



Figure 22. Map of El Salvador showing the distribution of dry tropical forests (yellow).

Threats: The primary threats to NMBs overwintering birds in lowland El Salvador are: 1) habitat conversion from forest to intensive agriculture, 2) habitat degradation through timber and firewood extraction and wildfires, and 3) direct mortality from unregulated hunting (e.g., sling shots). Intensive agriculture is perhaps the largest threat in the tropical dry forest lowlands, and export crops such as melons and sugar cane continue to replace dry tropical forest with monoculture crops every year. Meanwhile more traditional farming (maize, beans) operate in a landscape matrix that often includes small patches of dry tropical forests and thus can provide some habitat to western migratory birds.

Birds: El Salvador hosts high avian biodiversity with 585 species, despite its relatively small size. For example, in the lowlands portion of the dry tropical forest 364 bird species have been recorded, including 38 species that are considered SGCN from across 12 western states. Some SGCN species using these dry tropical forests include southwestern willow flycatcher, yellow-billed cuckoo, Mississippi kite, peregrine falcon, Swainson’s hawk, brown-crested flycatcher, Macgillivray’s warbler, summer tanager, and bell’s vireo, among others (Table 6).

The project aims to protect overwintering birds and their dry tropical forest habitats in the eastern region of El Salvador (Figure 23). The eastern region has high conservation potential for birds due to its relatively low human population density and high cover of tropical forest and also because it is located near the coast and the border of the Gulf of Fonseca, a recognized passageway for migratory birds. The challenge in the eastern region is that it is poorly studied due to its history of the civil war and more recent insecurity concerns. The security situation has greatly improved, and so it is urgent that conservation efforts begin here before commercial agriculture and threats displace forests.

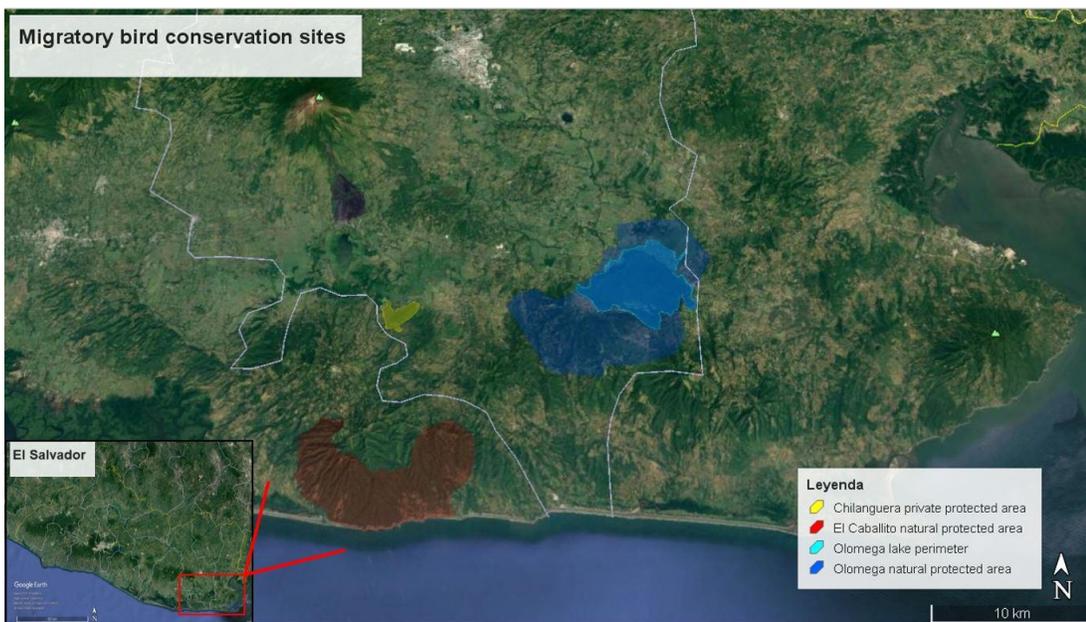


Figure 22. General project area in eastern El Salvador with specific sites of importance to overwintering birds noted (consisting of dry tropical forest habitats and adjacent wetland areas).

Two priority species in this region are the Southwestern willow flycatcher and yellow-billed cuckoo, both federally listed species that have experienced substantial population declines across their U.S. ranges. These trends are mirrored in data from capture stations in North and Central America; an overall view of demographic trends of survival and recruitment strongly infer that factors acting on migrating and overwintering populations play an important role in these declines. Willow flycatcher and yellow-billed cuckoo use Central America’s Pacific coast during stopover migration and overwintering respectively. Project activities focus on sites that maintain suitable

willow flycatcher habitat (Figure 24) and their neighboring upland forests that host a diversity of migratory and resident birds. The willow flycatcher sites were verified as supporting willow flycatcher overwintering populations during a field site visit in early 2020.

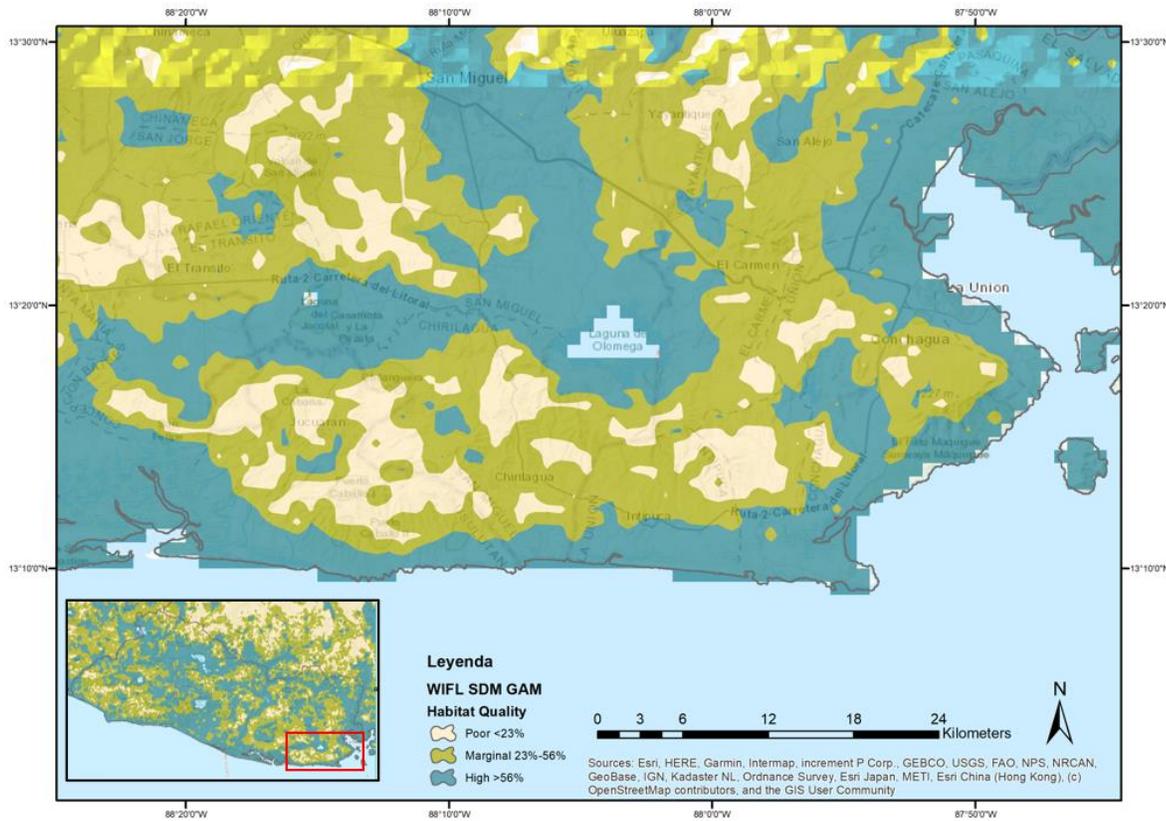


Figure 24: Distribution of suitable willow flycatcher habitat in eastern El Salvador with dark blue representing good potential habitat. Based on model by Lauren Phillips and Tom Albright, University of Nevada Reno in partnership with Paso Pacifico, 2020.

In addition to NMBs, the tropical dry forests of eastern El Salvador hosts other priority species such as the endemics white-bellied chachalaca and blue-tailed hummingbird. In addition, the endangered yellow-naped Amazon (parrot) nests in this region and the federally endangered cyanoptera macaws cross the gulf of Fonseca from Nicaragua to forage in the dry forests that border the gulf. The proposed project activities will compliment Paso Pacifico’s yellow-naped amazon and Cyanoptera Macaw Conservation Programs which operate in the same geography.

Project Goals: This project seeks to restore tropical dry forests and to protect forest-dependent migratory and resident bird populations in El Salvador, and in particular for the willow flycatcher and yellow-billed cuckoo. To reach this goal, the project will use a three-pronged strategy: 1) restore and protect dry tropical forest habitat, 3) carry out targeted monitoring and research of species of special concern, and 4) build capacity amongst local people, private sector partners, and governments for improved habitat management and awareness of migratory birds.

Southern Wings Successes 2020:

1. Conserve dry tropical forest habitats

- We met with the Ministry of the Environment at national and local levels to discuss strategies to improve protection at dry tropical forest reserves, including i) Taquillo National Park, ii) El Caballito protected area, and iii) Olomega Reserve. The corresponding strategies identified for each were: i. trail improvement and signage to reduce damage to forest, ii) land purchase to expand reserve area as outlined in proposal prepared by Paso Pacifico and submitted to World Land Trust, and iii) community rangers authorized by the ministry of the environment and placement of signage to deter poaching.

- We met with corporate leaders at CASSA and the tourism association ADETCO to discuss partnerships to protect the tropical dry forest and to develop birding trails for tourism. The CASSA sugar cane company manages the Chilanguera natural protected area of 375 ha. We then carried out a site visit to this reserve to identify the best locations for birding trails and interpretive signage. (Photo: Tropical dry forest landscape view from the Chilanguera Reserve).



- We held a meeting with the municipal government of San Salvador which is charged with the management of the Bicentario Park to discuss future management of this urban reserve. These talks were delayed due to the covid-19 pandemic.
- During limited travel of the pandemic and with matching support, we worked throughout urban San Salvador to locate and track three groups of endangered yellow-naped Amazon parrots documenting their roosts, foraging areas, and identifying three separate groups making up a population of over 80 individuals, the largest known in El Salvador (work funded by other sources).
- With matching funding for primate conservation, two community rangers hired by Paso Pacifico carried out twice weekly patrols to protect the mature forest on the Olomega Hills covering up to 2184 Ha of tropical dry forest. During these patrols they worked to prevent poaching and wildfires. This protection work continues to this day and will be strengthened by new signage under construction.

2. Promote bird monitoring as a tool to inform management

- We met with Ministry of the Environment director of wildlife management to discuss support for and participation in the development of a national program for migratory birds. We identified the need for a national strategy and also to support growing birding tourism through a guide to best practices. We will help to meet this need by contracting specialists in these areas, to develop two national documents: Guide to best practices in birding tourism, and National Program for Migratory Birds. These documents will be completed in 2021.
- We supported permitting and logistics for site visits and surveys of willow flycatchers in eastern and northern El Salvador in February 2020, with participation from 2 scientists from the Southern Sierra Research Station (SSRS) in California and in support of the Bird Genoscape project on willow flycatchers.

These surveys enabled us to identify long-term monitoring sites for WIFLs and their habitats near Laguna Olomega and potential habitat conservation opportunities.

- Partners from SSRS sampled willow flycatcher feathers near the wetlands of Laguna Olomega and visited four sites at protected areas near Jocotal Reserve, Olomega, Caballito, and Chilanguera to locate WIFLs for future monitoring in collaboration with Paso Pacifico.
- We set up an introductory meeting between university professors of ornithology in Arizona and El Salvador. The professors plan to develop joint efforts to monitor migratory birds and to build the scientific capacity of students.
- We organized a half-day workshop in February 2020 focused on the WIFL at the University of Francisco Gavidia in El Salvador. Talks were led by scientists from SSRS and Arizona Game and Fish Dept. and focused on the habitat needs of overwintering birds, and opportunities for monitoring and recording their presence through eBird, Motus, etc.

3. Build local awareness and appreciation for birds and their habitats

- In order to increase data on birds in unstudied regions and in collaboration with national Global Big Day coordinator Julio Acosta, we helped to promote eBird through a raffle of 8 binoculars and 15 bird guides to participants in the October 2020 Global Big Day. The event had record participation of 131 people and 218 checklists on eBird. Discounted binoculars were made possible through matching support from Optics for the Tropics and Environment for the Americas.
- We also donated supplies to strengthen tourism and education, including one pair of binoculars and 4 guide books to leading birders in birding tourism who do not presently have the tools but who are dedicated to promoting bird tourism and conservation. In eastern El Salvador we provided guide books and one binocular pair to the environmental education non-profit Sociedad Salvaje and also to our two community rangers at Olomega reserve.
- Throughout the pandemic year we responded to numerous citizen requests to help protect birds. Two noteworthy examples are when northern rough-winged swallows were roosting at a new shopping mall in San Salvador and the mall owners put out glue traps killing dozens of birds. We reached out to the Ministry of Environment and also to the public via social media and the mall responded positively by removing the glue traps. We used this unfortunate event to raise awareness about migratory birds and also the behavior and incredible migrations of swallows. Another example, is when large trees were being removed by the municipal government and we were able to make the ministry of environment aware of the situation and they responded by using their regulatory authority to halt the activity and establish mitigation actions (planting of replacement trees). As one of few international conservation organizations working in the country, we have the opportunity to use our expertise and our established network to impact the conservation of birds in the short and long term.



New Project Activities: Paso Pacifico and local partners including CASSA, ADETCO, Sociedad Salvaje, and MARN will implement the following activities in 2021:

1. Conserve dry tropical forest habitats

- Host workshops with small-scale farmers near wetlands and lowland area with suitable willow flycatcher habitats to discuss how farming practices can be modified to allow time for willow flycatcher to remain in the area before their northward migration. There will be 2 workshops at 3 village locations (6 workshops targeting 50 farmers and 500 acres).
- Present to the Corporate Social Responsibility section of CASSA corporation about the conservation need of the willow flycatcher and to explain their habitat use, proposing we partner to protect riparian habitats near their sugarcane plantations.
- Ranger trainings at the Chilanguera and Olomega reserves in partnership with the Ministry of the Environment, focus habitat management, fire prevention, bird observation opportunities.
- Apply for funding to purchase land along the Jucuaran dry forest areas, under high threat of tourism and road development.

2. Promote bird monitoring as a tool to inform management

- Paso Pacifico aims to establish 2 or 3 Motus towers in winter 2021-2022. During the coming months, with support from Southern Wings, we will work with landowner and government partners to plan for this implementation.
- Install signage (3 signs) for birding tourism along the “Wild Coast” tourism circuit in partnership with ADETCO.
- Finalize and print the Best Practices for birding tourism in partnership with the Ministry of the Environment.
- Provide technical and logistical support for Salvadoran college students doing thesis projects on western migratory birds in Eastern El Salvador.

3. Build local awareness and appreciation for birds and their habitats

- Update the national bird checklist for El Salvador, for use by ornithologists and the public in general. The last update was over 10 years ago.
- Support the Ministry of Environment in developing a national migratory bird program.
- Support Global Big Day and International Migratory Bird Day by supporting participation of partners in the eastern region through transportation and technical assistance. Our goal is to have the total participation of 100 local youth at Jucuaran and Olomega.

Budget: Arizona will provide up to \$USD 10,000.00 for FY2021 to support completion of some of the project’s objectives and activities. Individual contributions of \$5,000 would support implementation of project objectives.

Table 6. SGCN (considered Neotropical Migrants*) in the project area, listed by western state.

Species	AK	AZ	CA	CO	ID	MT	NV	NM	OR	UT	WA	WY
Grasshopper Sparrow			X	X	X							X
Swainson's Hawk		X	X	X					X			X
Northern Beardless-Tyrannulet								X				
Swainson's Thrush	X	X										
Vaux's Swift			X									
Yellow-billed Cuckoo		X	X	X	X		X	X		X	X	X
Olive-sided Flycatcher	X	X	X	X	X		X	X	X	X		
Western Wood-Pewee	X											
Black Swift			X	X	X	X		X		X		
Alder Flycatcher	X											
Willow Flycatcher			X						X			X
Merlin												X
Peregrine Falcon	X						X	X		X	X	X
American Kestrel	X											
MacGillivray's Warbler	X	X										
Common Yellowthroat	X											
Barn Swallow	X											
Yellow-breasted Chat		X	X									
Mississippi Kite		X										
Belted Kingfisher	X											
Acorn Woodpecker		X							X			
Dusky-capped Flycatcher		X										
Brown-crested Flycatcher		X	X									
Sulphur-bellied Flycatcher		X										
Rose-throated Becard		X										
Harris' Hawk		X										
Savannah Sparrow	X	X										
Band-tailed Pigeon		X		X						X	X	
Summer Tanager		X	X									
Blue-gray Gnatcatcher						X						
American Redstart	X											
Townsend's Warbler	X											
Dickcissel												X
Chipping Sparrow	X								X			
Eastern Meadowlark		X										
Tree Swallow	X											
Elegant Trogon		X						X				
Bell's Vireo							X	X				
Total	15	18	10	6	4	2	4	7	5	5	3	7

*SGCN Neotropical Migrants as defined by the Neotropical Migratory Bird Conservation Act Program.