Project Proposals 2023-2024

SOUTHERN Wings

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

Partners: Fundación para el Ecodesarollo y la Conservación, American Bird Conservancy

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

Overview: The Izabal region of Caribbean Guatemala is home to over 150 species of neotropical migratory birds. American Bird Conservancy (ABC) and the Foundation for Eco-Development and Conservation (FUNDAECO) are implementing a long-term conservation strategy of preserving stopover and wintering habitats along Guatemala's Caribbean migratory funnel. ABC and FUNDAECO include this region in ABC's BirdScape initiative: the Guatemala Conservation Coast BirdScape. Our conservation goals include acquiring and managing a series of reserves that protect key habitat for priority migratory birds, such as Kentucky Warbler and Wood Thrush, and promulgating the use of bird-friendly agriculture throughout the BirdScape.

To help educate landowners on farming practices that will benefit birds, ABC and FUNDAECO have acquired properties that serve as training centers and living classrooms where we are producing shade-grown products such as black pepper, cacao, and cardamom under the shade of native timber or rubber trees. These farms are called BioCenters, and FUNDAECO has established seven of them to date. Over time, the restoration in the BioCenters creates a mechanism for sustainably financing the management needs of the reserves in the Conservation Coast. Some other priority bird species that benefit from this work include the cerulean warbler and golden-winged warbler.

Threats: Forests in the Izabal region are rapidly disappearing due to agricultural expansion (mostly cattle ranching). Land use change is an ongoing process accelerated by poverty and the lack of alternative income opportunities for the communities. Cattle ranching and illegal logging, slash-and-burn, and climate change in the area continue to threaten bird habitats.

Birds: 150 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 flycatcher. 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.

Goal: Implement habitat protection, restoration, and management based on the 10-year Conservation Coast BirdScape Conservation Plan.

a) Habitat Protection:
- Acquire an additional 9,980 acres for protection.
- Protect at least 83% of existing forest in the BirdScape (~284,000 acres).

b) Restoration:
- Restore 14,600 acres of forest within core zones of designated national protected areas.

c) Habitat Management:
- Establish 7,400 acres of additional agroforestry systems, and 12,350 acres of silvopasture systems within the BirdScape.

Previous Southern Wings Successes: Since 2012, Southern Wings has supported the creation and expansion of a network of private reserves and BioCenters through land acquisition. In total, these lands account for over 43,000 acres of habit for migratory birds. FUNDAECO has now established protections for core areas within all priority locations of the Conservation Coast. Funds from Missouri Department of Conservation have been complementary to other funds used by FUNDAECO to restore and enhance 120 acres of agroforestry farms with 20,150 native trees of five native species and 7,222 cardamom plants. In the period 2020-2021, 53 community members received training on why, when, and how to fertilize their crops by visiting demonstration sites with the facilitator. Also, the training included information on pest management and what types of supplies are required for fertilization, including types of fertilizer, and types of composting.

In FY 2023, with support from Missouri, the US Fish and Wildlife Service (USFWS), and additional funds secured by ABC, we supported the acquisition of 1,112 acres of forested habitat on two parcels known together as Tameja Mountain within the Cerro San Gil Protected Area. We were also able to help FUNDAECO pay one out of several payments to acquire 164 acres of coastal forest in a property, called Guaira-Cocolí, which is located to the northeast of the Cerro San Gil Protected Area. These land acquisitions will effectively expand the protection of the core zone of the Cerro San Gil Protected Area, creating an important corridor across the altitudinal gradients of the Protected Area between the higher altitudes (4,156 feet above sea level) and the Tameja River lower watershed and coastal forests.

Actions: In FY 2024, ABC will be focusing our work with FUNDAECO to:

- restore 50 acres of degraded lands,
- establish 42 acres of sustainable rubber plantations,
- complete final payments the Guaira-Cocolí Reserve, and
- develop and refine models and a market analysis for a large-scale (3,700 acres) restoration project with agroforestry incorporating cardamom and native trees species.

Budget: $730,000. Please contact Deb Hahn (dhahn@fishwildlife.org) for more budget information. Matching funds: FUNDAECO and ABC investments in these properties, related management costs and other associated activities.

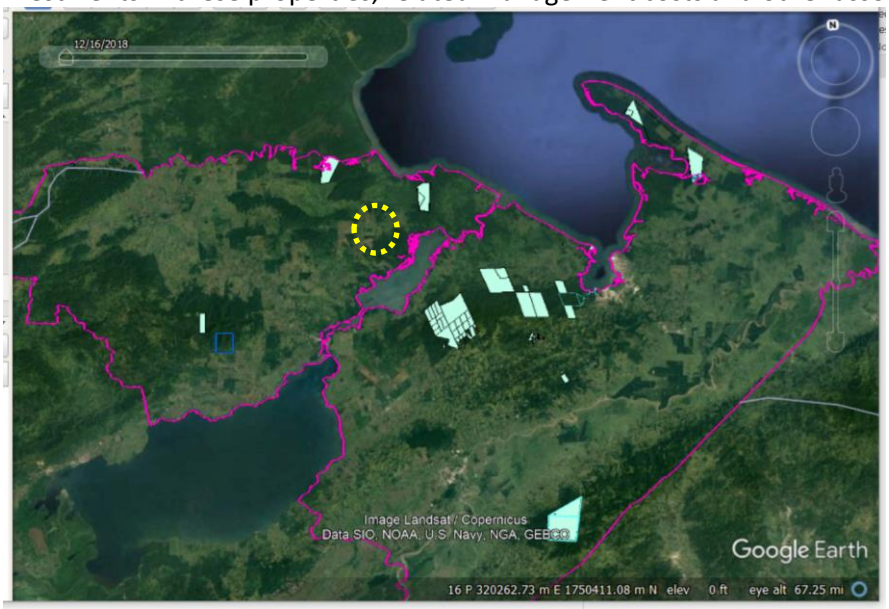


Figure 1: Properties owned and managed by FUNDAECO within the Conservation Coast are shown in blue. The yellow circle represents the location of Guaria-Cocoli Reserve.

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

Partners: Pronatura Noreste (PNE), ABC

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

Overview: The desert grasslands in El Tokio 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. ABC is working in partnership with PNE to ensure the protection and management of 325,000 acres, 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 El Tokio BirdScape initiative. Within this GPCA, the goal is to ensure habitat sufficient to support 30% of the global Long-billed Curlew population and 12% of the mountain plover global population, as well as to maintain the population of the globally endangered Worthen's sparrow.

Within El Tokio, PNE and ABC have supported conservation efforts on more than 140,000 acres of habitat through the creation of private reserves, ejido (community-owned) reserves, and conservation agreements that advance more sustainable cattle ranching and agriculture practices. We have also supported the installation of erosion control measures and ranching infrastructure, as well as implemented 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, Las Vegas, San Juan del Prado, Nuevo Gómez Farías, and San Francisco. PNE also manage two formal protected areas, Cuatro Gorriones and Loma del Gorrión, which are focused on the conservation of migratory grassland birds and the endangered resident Worthen's Sparrow.

Threats: One of the most significant threats to grassland habitat in El Tokio 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. Erosion and a proliferation of invasive plant species are also 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.

Birds: More than 250 bird species are found in El Tokio. Here, high concentrations of grassland wintering birds occur, including significant numbers of Long-billed Curlews (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 plover and Sprague's pipit. other species of conservation concern include loggerhead shrike, lark bunting, brewer's and Baird's sparrows, 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 (AZE) species, as it is restricted to this region.

Goals: 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 285,500 acres of grasslands through improved grassland management and erosion control.

Previous Southern Wings Successes: With Southern Wings funding, ABC and PNE have helped restore grasslands on 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 and allows for sustainable grazing

practices. In addition, we have installed erosion control devices, removed invasive plant species, developed sustainable cattle grazing plans with ejidos, and trained local ranchers on best cattle ranching practices.

In the last four years, four livestock management plans were developed for ejidos La Carbonera, Puerto México, La Esperanza, and San José del Alamito, which will help reduce the number of livestock grazing in some ejidos 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.

Actions: ABC and PNE would like to continue collaborating with ejidos already in the program to conduct habitat improvement activities and to expand this project to new properties in the region. Our activity goals include continue installing and restoring ranching and water infrastructure, erosion control measures, and the removal of invasive plants, engage and work with new ejidos to restore degraded grasslands and enhance their livestock grazing practices, and build ejidos' knowledge on grasslands birds and their importance.

Budget: $70,000 Please contact Deb Hahn (dhahn@fishwildlife.org) for more budget information. Matching funds**:** ABC and PNE have secured funding from NMBCA, the Rio Grande Joint Venture, and the Mexican forestry agency, CONAFOR. Ejidos are contributing in-kind match for installation of infrastructure.

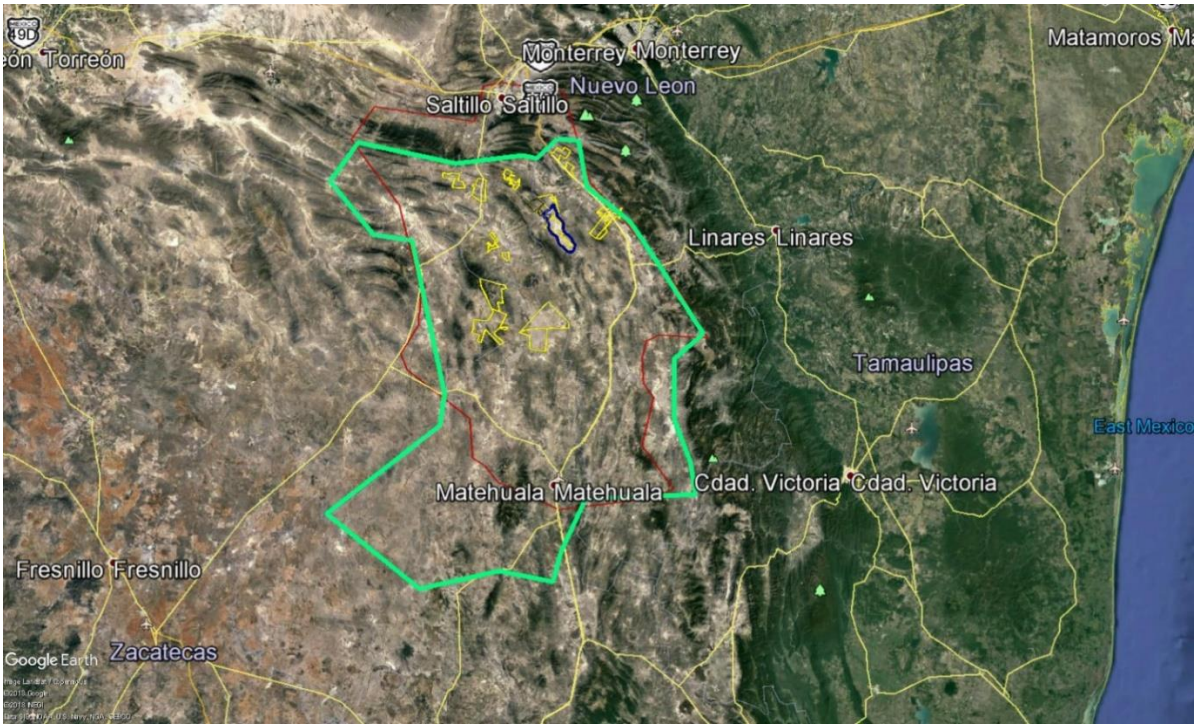


Figure 2: El Tokio BirdScape (green), El Tokio GPCA (red) and location of properties PNE is involved with (yellow), and the Llano de Soledad State Protected Area (blue)

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 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 need for 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, we have enrolled 34 ranches encompassing over 560,000 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 25 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 9 reference ranches that provide models of excellence for range management, and opportunities for outreach, habitat capacity, restoration, and bird monitoring. We have improved over 250,000 acres of grasslands through 333 range and habitat projects, 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 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 20,000+ acres with high conservation value for grassland birds in the Chihuahuan Desert into the SGN in 2023.
2. Improve range management on at least 25,000 acres of desert grasslands in 2023.
3. Restore at least 200 acres of degraded Chihuahuan Desert grassland in 2023
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. Monitor the Aplomado falcon population in Valles Centrales, conduct outreach to landowners, install stock tank escape ladders and protective nest cribs for Aplomado Falcon, plug open pipes, and improve habitat for endangered Pronghorn and other grassland species.
6. Engage Mennonite farming communities through field based environmental education utilizing our German-language Chihuahuan Desert Grassland Bird pocket guide.

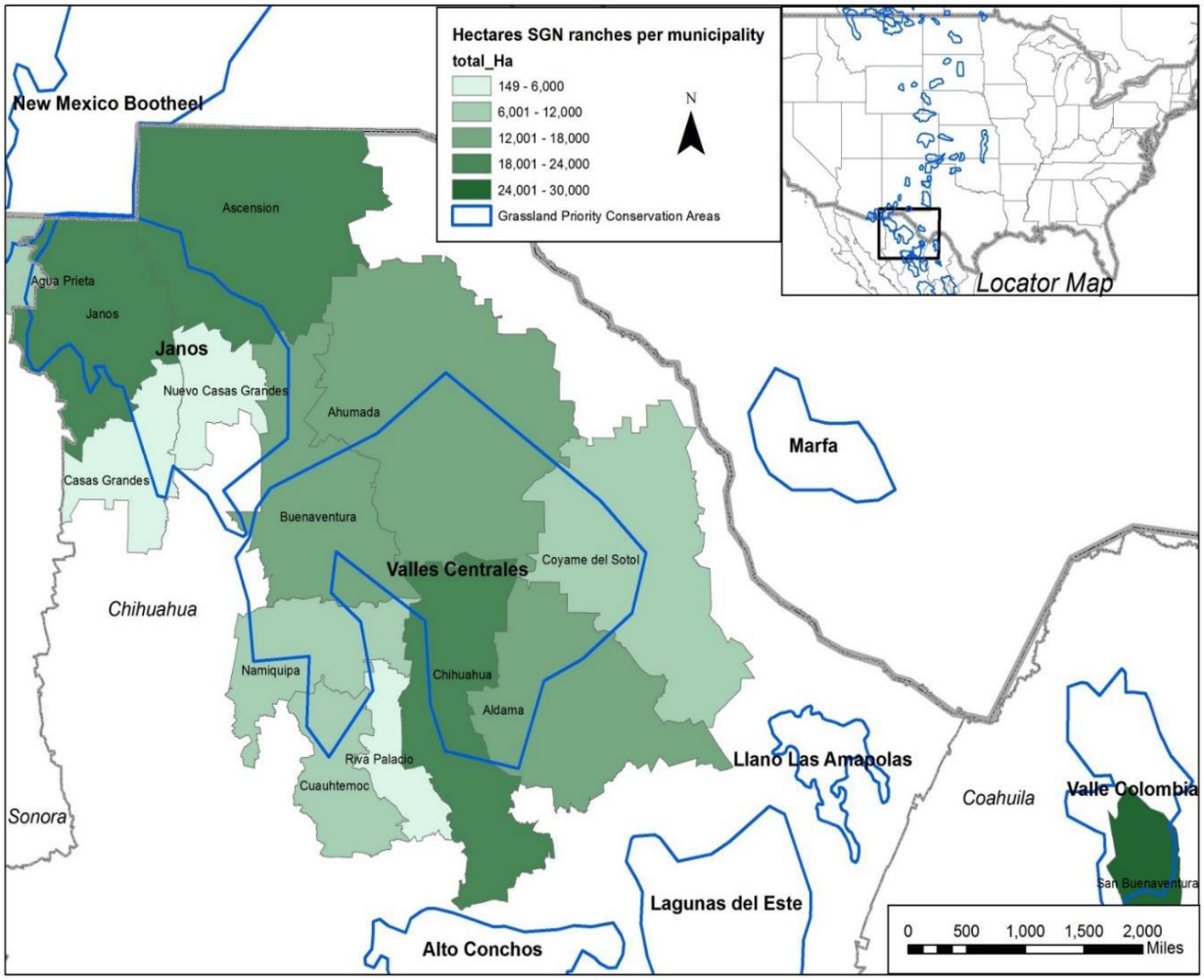
Current Capacity and Needs: Keeping ranchers on the land by helping them improve their management, profitability and carrying capacity for birds and other wildlife is the most immediate and cost-effective way to slow and begin to reverse the decline in grassland birds. BCR collaborates with Especies, Sociedad y Habitat, A.C., Evaluación Integral y Restauración de Habitat, A.C. (EIRHA), PNE, and other regional 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 in northern Mexico who operate all aspects of the SGN program from outreach and landowner relations, to development and implementation of management plans and habitat restoration, to bird monitoring and evaluation. Funding is needed to support additional boots on the ground and cost-share on

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 stock tank escape ladders ($40-$80/each, depending on size) to prevent accidental drowning of birds, Aplomado falcon nest platforms ($250/each), and support PLWB capacity, training, and landowner outreach events.

Matching Funds: This project leverages significant additional investment from Mexican landowners (typically 1:1), private foundations, the Canadian Wildlife Service, Neotropical Migratory Bird Conservation Act (NMBCA), Bureau of Land Management, the U.S. Forest Service International Program (USFS-IP), U.S. state wildlife agencies, and municipal governments in Colorado. Every dollar invested leverages at least one additional dollar from other sources.

Figure 3: Distribution of SGN lands by municipality in 2021



Conservation of Wintering Habitats in the Yoro-Pico Bonito and Agalta-Lost City Birdscapes, Honduras

Partners: Tropical Agricultural Research and Higher Education Center (CATIE), Cacao Miskito, and ABC

States that have participated to date: Missouri, Indiana

Overview: The Golden-winged Warbler Non-Breeding Ground Conservation Plan (Bennett et al., 2016) identified as priority wintering habitats the La Muralla Wildlife Refuge, the Sierra de Agalta National Park, and the Tawahka and Río Plátano Biosphere Reserve. These areas are included within two BirdScapes – the Pico Bonito-Yoro BirdScape and the Sierra de Agalta-Lost City BirdScape – as part of ABC's BirdScape Initiative.

Renewed support from Southern Wings in FY 2024 would help ABC and our partners advance the implementation of conservation strategies within the Sierra de Agalta-Lost City BirdScape in Honduras, which include creating silvopastures and agroforestry systems with cacao and coffee farmers to provide better quality habitat for neotropical migratory birds.

Threats: The most significant threat to bird habitats in the Sierra de Agalta-Lost City BirdScape is the loss of forest cover due to conversion to cattle production and monocultures. The loss of habitat is rapidly increasing due to the migration of people to the Tawahka and Río Plátano Biosphere Reserve.

Birds: Target wintering migratory species include: wood thrush, golden-winged warbler, Kentucky warbler, worm-eating warbler, and Louisiana waterthrush. 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: Our long-term goal is to slow the rate of deforestation in Honduras. We aim to do this by working with landowners and communities to adopt land use practices compatible with forest preservation. In the short term, in the Agalta-Lost City BirdScape, we will restore at least 60 acres of cacao farms with 10,000 cacao trees and 10,000 fruit and native trees to ensure they provide proper habitat for neotropical migratory birds. We will also work with Cacao Miskito to enhance 50 acres of pasturelands by planting 3,000 native trees as living fences.

Southern Wings Successes to Date: ABC and partners have facilitated habitat restoration in the Sierra de Agalta-Lost City BirdScape, including the improvement of 335 acres of cacao and coffee plantations by planting 10,617 native trees, 38,530 coffee and cacao plants, and 777 fruit trees. In addition, we worked with 17 cattle ranchers to plant 2,000 native trees as living fences and installed nearly three miles of fencing to allow ranchers to practice rotational grazing with their cattle, which helps reduce the amount of land needed for cattle and allows natural regeneration to occur where cows previously fed.

In La Muralla Wildlife Refuge in the Yoro-Pico Bonito BirdScape, ABC's partner ASIDE reforested 53 acres with 23,000 pine trees. ASIDE also worked with the Honduran Forest Service (ICF) on two training workshops for 76 park guards and community members, where they learned about the prevention and combat of wildfires, including forest fires protocols, use of firefighting equipment, use of GPS, and patrolling.

Actions: In this BirdScape, ABC and our partners will continue to focus on best land use practices—primarily agriculture and ranching—to benefit migratory birds. Funds are needed to continue working with our partner Cacao Miskito to restore and enhance 60 acres of cacao farms and plant at least 10,000 cacao trees and 10,000 native and fruit trees to ensure they provide proper habitat for neotropical migratory birds and a sustainable livelihood to 20 families, most of which are Miskito and Tawahka Indigenous People. In addition, we want to start working with cattle ranchers in the Tawahka and Río Plátano Biosphere Reserve to implement best cattle ranching practices, such as living fences and rotational grazing to enhance 50 acres of pasturelands by planting 3,000 native trees as living fences.

Budget: $61,000 Please contact Deb Hahn (dhahn@fishwildlife.org) for more budget information. Matching funds**:** ABC investments in these and complementary activities. Cacao Miskito and the local farmers will also provide in-kind investment into this project, including providing the tools, land, expertise, and workforce to plant tree seedlings.

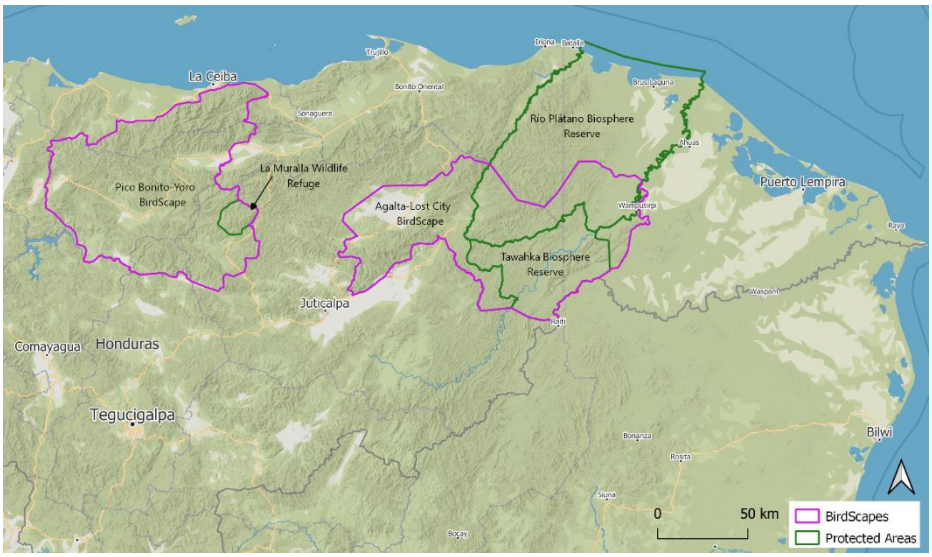


Figure 4: Location of BirdScapes and project areas in Honduras.

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

Partners: National Audubon Society (Audubon), Bahamas National Trust (BNT), Bahamas Ministry of Tourism, the Bahamas Agriculture and Marine Science Institute (BAMSI), Royal Society for the Protection of Birds (RSPB), 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 United States, Canada and the Artic 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, the Bahamas Ministry of Tourism, and BAMSI has been 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 United States 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.

Figure 5: Scott Johnson (right), science officer at Bahamas National Trust, and Shontes Hall (left), student at the University of The Bahamas, in the Blue Holes National Forest, Andros, Bahamas. Photo: Camilla Cerea/Audubon)

The importance of The Bahamas for wintering piping plovers and other declining shorebirds was first understood in 2006, when Audubon scientists and local partners discovered high numbers of the Atlantic breeding population spending the winter months in remote parts of the archipelago. Now, Audubon, 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 red knot (rufa), 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.

Alongside BNT, we were able to identify three new Key Biodiversity Areas (KBAs) to further solidify knowledge on crucial sites for piping plover across the Bahamas. With these insights, we are now shifting gears to strengthening community support for conservation by sharing our research data and training community members on the importance of birds and conservation practices.

Project goals: Each goal is an essential step toward long-term 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.

Actions: Over the next 12 months to line up future land protection and drive forward on the ground, community-led habitat management actions, we will leverage investments to:

Figure 6: Red Knot (Calidris canutus)

Research Activities:

- Compile and harmonize shorebird data collected by collaborators to publish it in Global Biodiversity Information Facility (GBIF). This will feed into IBA and KBA inventories and future nominations.
- Collaborate with Audubon's GIS analyst, provide support for updates on inventory and nominations of new IBAs/KBAs in Turks and Caicos.
- Community engagement to build local capacity and continue to elevate the importance of sites and species with local stakeholders including government agencies and private landowners.
- Spearhead a rapid Bird-based Tourism (BBT) analysis in the Bahamas that includes engaging potential BBT students through a seminar, gathering contact information from events and creating a database of stakeholders, surveying local communities to understand bird-guide training career paths (including previously trained guides), and providing information on market trends with BBT/Eco-tourism in the Bahamas.
- Create a BBT conservation strategy and plan for the Bahamas with the objective of enhancing sustainable economic opportunities and advancing impactful conservation.

Education and Outreach Activities:

- Support BAMSI in the accreditation of a Bird-guide training program, establishing it as part of the official education offerings by BAMSI and in The Bahamas
- Provide technical assistance in the adaptation of a pre-developed BBT Curriculum to BAMSI's educational guidelines.
- With technical guidance from Audubon and based on the adapted curriculum, provide technical guidance in the design of two types of Bird-Guide training courses: a merit/standards based certificate and a course [8– 14 weeks] within BAMSI's existing professional development courses with the objective of creating a robust career path for Birding Guides in the Bahamas.
    - In 2015, Audubon and BNT developed a comprehensive guide curriculum and piloted the training programs. This training has been repeated in five countries to date - Belize, Bahamas, Guatemala, Colombia and Paraguay, training over 700 guides. The Curriculum covers chapters on Biology; Diversity and Taxonomy; Conservation; Bird ID, Guiding; Group Management; Ethics and Security; Business skills; English for bird guides; Citizen Science; Tools of the Trade. We will bring this training to the Bahamas with support from

BAMSI.

- To establish long term impacts across conservation, we must inspire and train community members and local stakeholders to support the environments and species that call their region home. By developing a bird-guide training program, we will not only create jobs and increase economic activity in the Bahamas, but we will use our research-based conservation strategies as a foundation for guides to base their work. As a second phase of this work, we expect bird guides to be trained on leading effective outings that showcase our conservation work and educate tourists and locals on the value of maintaining and advancing strong conservation practices in support of local species and the economy.
- We will also promote participation of potential trained and past-trained guides in bird-related events like Caribbean Endemic Bird Festival, International Migratory Bird Day and Global Big day to exchange experiences and join the Caribbean Birding Trail network.
- With support from the Ministry of Tourism and by utilizing Audubon's communications tools, we will work to increase demand for tourists to visit the Bahamas as an eco-tourism destination to improve the income for the trained guides and build a constituency of conservation advocates.

Budget: $52,465 Please contact Deb Hahn (dhahn@fishwildlife.org) for more budget information. Matching funds: Environment and Climate Change Canada

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 (local communities), Comisión Nacional de Áreas Naturales Protegidas (CONANP), Comisión Nacional Forestal (CONAFOR), Arizona Game and Fish Department (AGFD), Foresta S.A. de C.V. Tecnicos Forestals de Ejido El largo S.A. de C.V., Unidad Forestal Galván, Asociación de Silvicultores de Guadalupe y Calvo, San Diego Zoo Wildlife Alliance (SDZWA), USFWS/NMBCA, and 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, sometimes including destructive clear-cutting and high-intensity timbering. 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 the best management into forest management plans in the Sierra Madre Occidental (Figure 7 and 8). Therefore, the project is implemented with a wide network of Forest Associations, for the generation of agreements, standardize methodologies and coordination for the conservation and monitoring of biodiversity in properties under different forest management and conservation schemes. 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), neotropical migrant populations dependent on old-growth forests.

This 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: TBPA is endemic to the pine and oak forests of the SMO, at elevations >2000 meters in northwestern Mexico. It depends on forests with an abundance of old and dead pines, a habitat highly threatened by the felling of large pines and the extraction of logs for pulp and papermaking. This type of forest has been used immoderately in the last 100 years, and currently there are some remnants in the State of Chihuahua, where this parrot nests. In the early 1900s, this parrot was hunted by humans, primarily out of curiosity. But the loss of habitat has been the main cause of the abrupt decline of their populations.

Therefore, the birds of the SMO are currently seriously threatened by habitat loss and degradation as

a result of poor forest management policies for more than a hundred years, as well as by fire suppression and an increased incidence of catastrophic fires. Large-scale logging has been practiced for many decades without considering the need to manage biodiversity. Major threats have caused the imperial woodpecker to be considered extinct and two other endemic species to be critically endangered (Sierra Madre sparrow and TBPA). Logging has eliminated primary forests (estimated less than 1% of their original range remains) affecting entire groups of birds that depend on mature forests to provide nesting and shelter cavities, 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 (in mix conifer forest habitats). TBPA are seriously threatened from the loss and degradation of habitat. Actions addressing these and other threats to the species will significantly contribute to its overall management and conservation.

Additionally, in the last two decades' various threats have been detected in TBPA and its habitat, among which prolonged droughts that cause different problems, including frequent fires, lack of food, depredations and outbreaks of ectoparasites, stand out. In 2021 and 2022, the lowest recruitment rate in 28 years of 0.63 chicks per nest occurred, and in 2022, this recruitment rate was sharply lower in 2022. Likewise, dead trees used for nesting are being lost due to natural factors. and anthropogenic.

Birds: The rugged SMO 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 Neotropical. 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 of note include dusky and Hammond's flycatcher, and painted bunting. Other resident bird 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 3). 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 2022: In coordination with CONANP, CONAFOR, Forestry Units and Ejidos of the Sierra Tarahumara, the following achievements were accomplished.

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

- We continued to support the Ejido El Largo with the annual monitoring of the population and reproductive ecology of the TBPA. This information is a requirement to continue with forest certification.

- We supported CONANP / APFF Campo Verde with a technical assessment that included TBPA information to compile the administrative record to request certification of the Madera area as a Voluntary Designated Area for Conservation (ADVC) or Sanctuary.
- APFF Campo Verde and OVIS worked on the process for the declaration of the Madera Sanctuary located in the Ejido El Largo. OVIS began compiling biological survey information to document the importance of the area for the TBPA and related species, as well as engaged the local community (consisting of communal landowners) in the process.
- We attended a meeting of the Tutuaca APFF advisory council, where we discussed opportunities to integrate new technology for early wildfire detection to aid in firefighting.

Manage breeding populations of TBPAs

- Three visits were made to each reproductive area to determine reproductive success, in which each nest tree documented was monitored, noting how many pairs with reproductive behavior were observed, how many active nests there were per area, as well as nest productivity.
- A total of 68 pairs with reproductive behavior were recorded, with a reproductive success of 1.85 ± 0.77 fledglings per nest.
- Forty-six active nests were inspected for any evidence of predation, and cat scats were collected for diet analysis.
- Evidence of predation was documented in Madera (nest 11-3-25) 16 meters from the base of the nest; the right wing, complete beak and body feathers of TBPA were found.
- We determined the presence and abundance of migratory birds in different sites of the Sierra Madre (Figure 9)
- 107 records of five feline species were documented in the Madera region (jaguar, ocelot, margay, bobcat and cougar) (Figure 10).
- Feline monitoring was conducted in the region using 28 camera traps. The cameras recorded a jaguar cub, as well as ocelot and margay, in addition to the already known puma and bobcat.
- We installed galvanized sheets in two parrot nest trees in La Gloria to prevent predation by bobcats.
- In addition, we identified 19 TBPA nest trees that need anti-predation systems (metal barriers) to be installed in order to reduce predation rates for the 2023 season.

Location of new breeding area for TBPA

- A new nesting colony was located in the Municipality of Madera, locating 4 active nests and 65 parrots, with only approximately 10% of the potential habitat explored. All nests were in Aspen (*Populus tremuloides*), and the habitat consists of Douglas Fir (*Pseudosuga menziessi*), White Fir (*Abies concolor*), Pino (*Pinus strobiformis* & *Pinus arizonica*) with an elevation of 2,577 meters above sea level.

Verification and characterization of wintering areas used by TBPAs and NMBs

- Technical reports on TBPA movements using satellite transmitters were provided to the regional offices of CONANP, CONAFOR, State government of Durango and to participating ejidos for use in management and outreach activities.
- In November, we participated in consensus workshops to update the TBPA PACE (Mexico's conservation plan for parrots). Subsequently, we provided technical information to CONANP staff to be integrated into the TBPA PACE.

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

- An annual scientific research permit was requested (and received) from SEMARNAT to continue scientific research, collection and installation of satellite transmitters.
- Ten additional satellite transmitters were deployed on TBPAs to continue the research study on identifying migration routes and wintering sites.

Evaluate habitat use and movements of the Eared Quetzal (*Euptilotis neoxenus*)

- A permit for scientific research, collection and installation of satellite transmitters was requested and obtained in January 2022.
- Five breeding pairs were located in two areas, Madera and Mesa de las Guacamayas, including a nest with chicks (Figure 11).
- Two 5-gram satellite transmitters were purchased and will be installed between July and August 2023 (Figure 12).

Actions: OVIS and partners will implement the following conservation action in the next year.

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

- Provide technical information from the transmitters research study to CONANP to inform the technical assessment for designation of a private TBPA protected area in El Ejido El Largo (450 ha) and a sustainable forest certification process (250,000 ha).
- Provide technical information from the transmitters research study to CONANP to inform the technical assessment for designation of an Area Voluntarily Destined for Conservation (+6,000 ha) in TBPA wintering habitat in the State of Durango.
- Support consultative workshops to facilitate community participation and other stakeholders to build consensus to decree an area in El Ejido El Largo Maderal (Madera, Chihuahua), as a TBPA protected area.
- Train decision makers and tourism service providers of the Municipality of Madera to reduce visitation impacts at two TBPA nesting sites. Impacts include increased fire risk, accumulation of solid waste, disturbance to nesting sites, soil erosion, opening of new roads, etc.
- Implement effective support mechanisms for community brigades to reduce the impact of destructive wildfires in priority TBPA wintering areas in 127,000 ha in the State of Durango.
- Continue training forestry service providers and technicians to implement best forest management practices in the State of Chihuahua and Durango.
- Promote other formal conservation mechanisms for priority sites, such the Wildlife Habitat Council's (WHC) certification program, Conservation Certification®, which is designed to enable businesses and corporations to advance biodiversity, sustainability, employee engagement and community relations goals.

Monitor breeding populations of TBPA, NMB and other species in the state of Chihuahua: This work will be conducted at large landscapes in coordination with Forestal S.A. de C.V and forestry technicians from Ejido El Largo, which jointly administer and manage more than 300 thousand ha of forests in the Municipality of Madera. This area constitutes one of the most important reproductive areas for the TBPA.

- Continue to monitor the reproductive ecology of TBPAs: Locate and monitor the annual productivity of the main breeding sites (Chihuahua).
- Install acoustic recorders (provided by SDZWA) to monitor TBP reproductive abundance indices at various nesting sites. Train OVIS staff and partners in the collection, organization and management of sound databases generated by acoustic recorders (with analysis to be conducted

by SDZWA staff).

- Install 5 satellite transmitters in TBPAs, provided by SDZWA and continue collecting information on home range, migratory routes and wintering areas.
- Also install camera traps to determine the presence and abundance of threatened species.
- Continue deploying anti-predation metal barriers in nest trees, as appropriate.
- Provide maintenance to 30 artificial nests, prior to the reproductive season.
- Disseminate results and management recommendations to local partners and national or international biodiversity platforms such as CONABIO and other key stakeholders.

Monitor NMB and other sensitive wildlife

- Monitor migratory and resident species, through point surveys along transects, to determine presence and abundance.
- Monitor wildlife populations through camera traps, to identify populations of TBPA predators and other sensitive species (figure 3).
- Monitor natural forest regeneration and restoration actions carried out in previous years.

Assess TBPA winter habitat use and winter flock counts.

- Carry out at least two flock counts in the wintering area to determine the population of the different passage or wintering sites.
- Train community members in monitoring wintering populations of TBPAs (State of Durango)

Evaluate habitat use and movements of the Eared Quetzal.

- Revisit and monitor previously identified Eared Quetzal nests
- Monitor diet through direct observation of food deliveries at nests.
- Document sightings with the support of community members and forestry technicians.

Budget: $67,227. Arizona will provide USD **$15,000.00** for the completion of some of project's activities. The SDZWA is providing satellite transmitters and the signal for an estimated cost of **$39,600** (in-kind), and additional funds requested from Southern Wings ($12,627). Please contact Deb Hahn (dhahn@fishwildlife.org) for more budget information.

Table 1. SGCN (considered NMBs*) in the project area, listed by state.

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

Species	AK	AZ	CA	CO	ID	MT	NV	NM	OR	UT	WA	WY
Lincoln's Sparrow	X	X										
Elf Owl		X	x					X				
Ash-throated Flycatcher												X
Brown-crested Flycatcher			x									
Painted Redstart								X				
Sulphur-bellied Flycatcher		X										
Black-crowned Night-Heron												X
Rose-throated Becard		X										
Osprey		X										
Savannah Sparrow	X	X	x									
Varied Bunting		X						X				
Band-tailed Pigeon				X						X	X	
Spotted Towhee			x									
Summer Tanager		X	x									
Blue-gray Gnatcatcher						X						
Vesper Sparrow								X	X		X	
Purple Martin				X							X	
Vermilion Flycatcher			x									
Ruby-crowned Kinglet	X											
Rufous Hummingbird	X			X			X					
Grace's Warbler		x		X				X				
Black-throated Gray Warbler								X				
Yellow Warbler	X	x	x									
Townsend's Warbler	X											
Mountain Bluebird		x						X				
Western Bluebird								X			X	
Eastern Bluebird		x										
Red-naped Sapsucker		x										
Williamson's Sapsucker		x						X				
Chipping Sparrow	X								X			
Tree Swallow	X											
Elegant Trogon		X						X				
Thick-billed Kingbird								X				
Bell's Vireo		X	X				X	X				
White-crowned Sparrow	X	X										
Total	**24**	**32**	**16**	**12**	**4**	**2**	**8**	**19**	**7**	**5**	**8**	**9**

*SGCN Neotropical Migrants as defined by the NMBCA Program.

Figure 7: Breeding sites of TBPA; (1) Mesa de Guacamayas (Reserva de la Biosfera de Janos), Áreas de Protección de Flora y Fauna (2) Tutuca, (3) Papigochic, (4) La Gloria and (5) Madera.

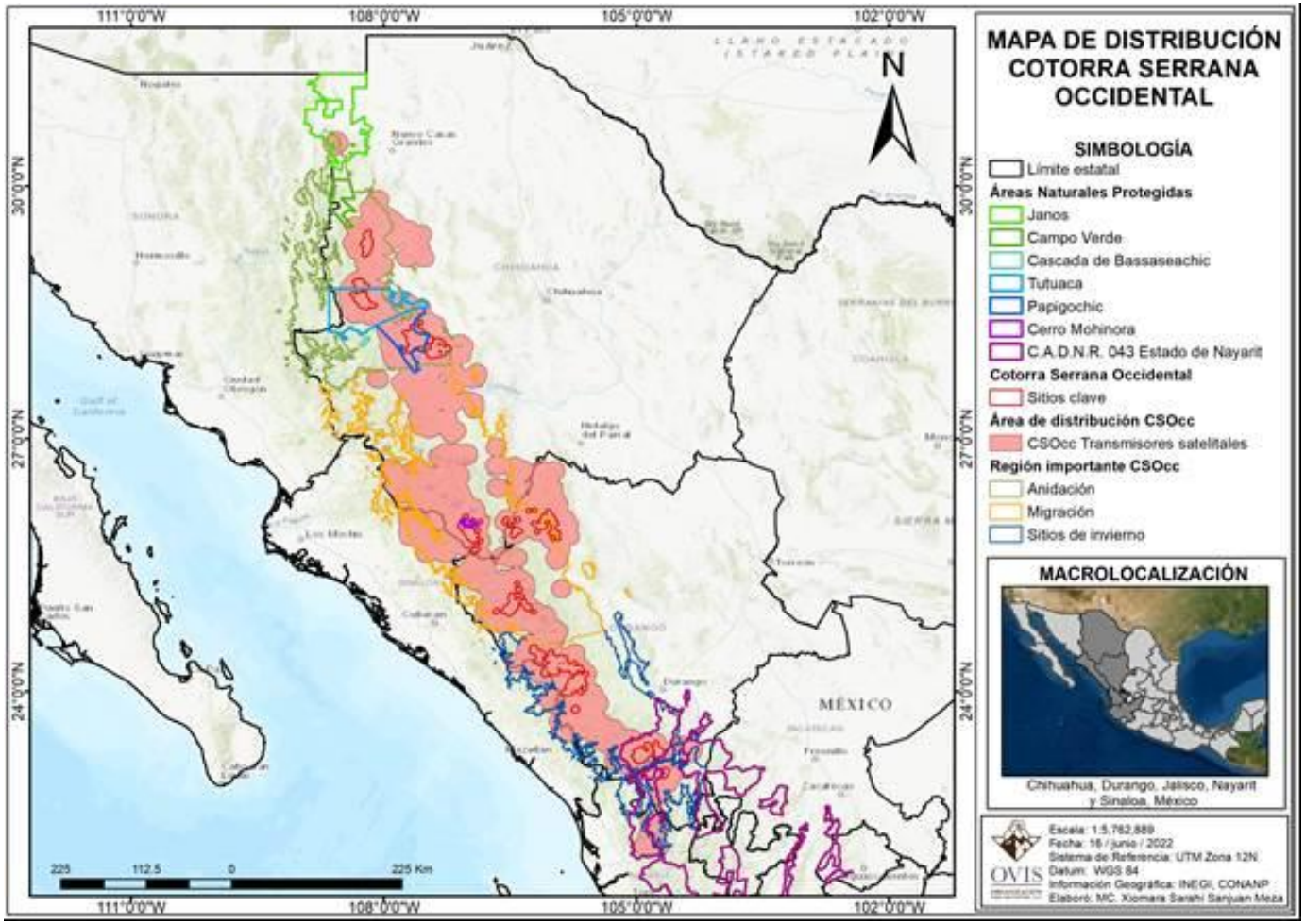


Figure 8: Map showing TBPA records in northern Durango, obtained from satellite transmitters, where conservation activities will be carried out through a combination of legal mechanisms such as forest segregation and the integration of best management practices in forest management plans.

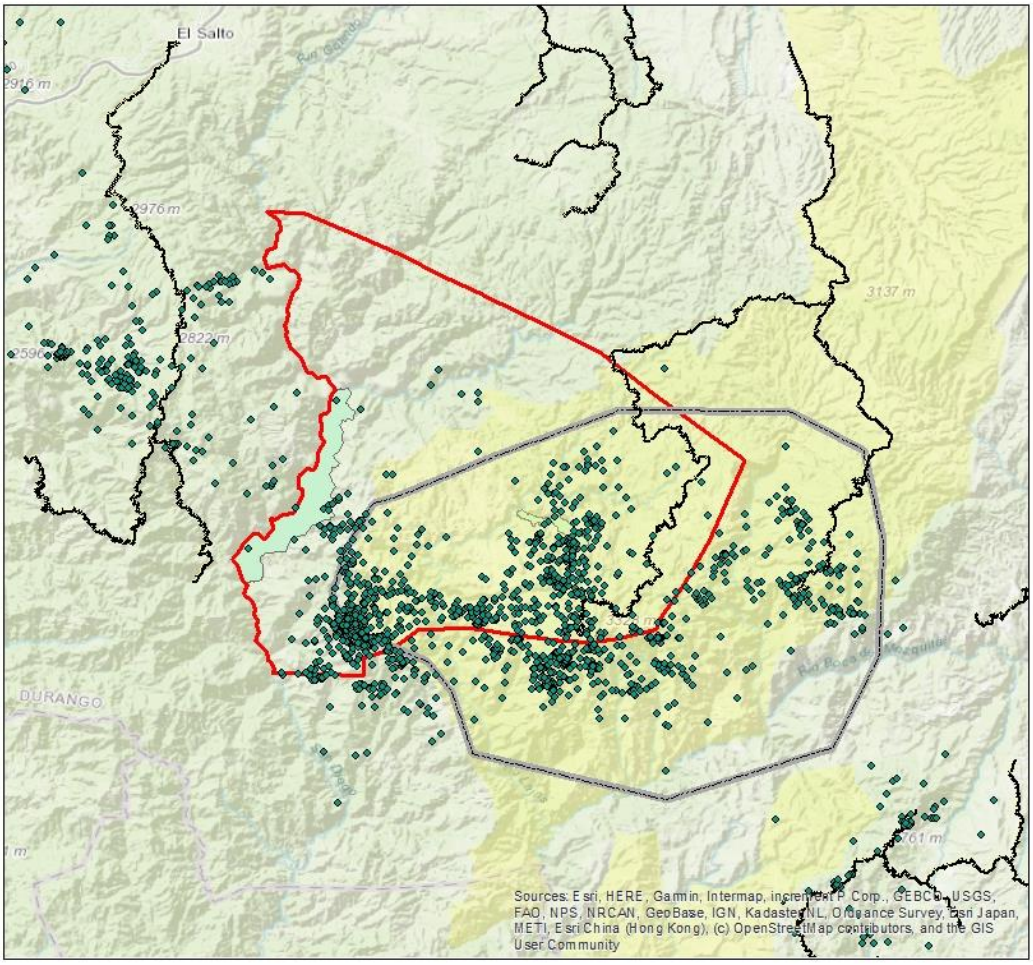


Figure 9: Photos of some bird species of the Sierra Madre Occidental.

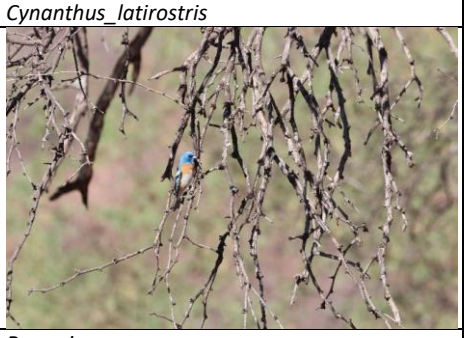
Selasphorus platycercus

Lampornis clemenciae

Eugenes fulgens

Cynanthus_latirostris

Loxia curvirostra



Passerina amoena

Rhynchopsitta pachyrhyncha

Euptilotis neuxenus

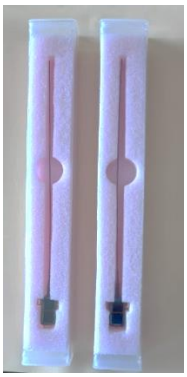
Figure 10: Photos of some felines recorded in the Sierra Madre Occidental.

Jaguar registered by camera trap on March 30, 2021

Ocelot recorded by camera trap on February 17, 2022.

Figure 11: Eared Quetzal (*Euptilotis neoxenus*) male carrying food (lizard) for chicks.

Figure 12: Satellite transmitters acquired to be installed in eared quetzal: a) Two radios acquired, b) complete radio image with antenna, c) zoom-in of radio.

a)  *b)*  *c)* 

Neotropical Flyway Project: 2023-2024 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; Fundación Julia Marquez, Colombia; Fundación Iguaraya, 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, Minnesota and the Mississippi Flyway Council

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 and western wood-pewee. 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, giving rise to vital stopover regions 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 – for example, we have lost over 600,000 hectares of pre-montane forest in this region in the last 20 years. 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.
- 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 six 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 Honduras provide stopover and winter habitat for several steeply declining migratory warblers.
- **Conservation applications:** >20,000 native trees planted to enhance stopover habitat along Colombia's Caribbean coast; the Corredor Azul initiative was launched to enhance and connect stopover habitat for cerulean warblers in Costa Rica; environmental education campaigns have reached hundreds of children in a major migratory bottleneck in NW Colombia.

Goals:

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, cerulean, blackpoll and golden-winged warblers, 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 2). Western migrants, such as western wood-pewee, olive-sided flycatcher, and yellow-billed cuckoo, connect the project to western states.

Table 2. Species targeted by the NFP and their PIF and Road to Recovery (R2R) status. These species migrate primarily to South American wintering grounds and use sites within northern Colombia and/or Central America for stopover. PIF continental status: XX = Red Watch List, XX = Yellow Watch List, XX = Common Bird in Steep Decline (2016 PIF Landbird Plan). * Conservation actions are underway to enhance or conserve stopover sites under the NFP.

Species	PIF Status	R2R	Species	PIF Status	R2R
Mississippi Kite			Yellow-throated Vireo		
Broad-winged Hawk			Red-eyed Vireo*		
Swainson's Hawk			Bobolink	XX	R2R
Black-billed Cuckoo	XX	R2R	Golden-winged Warbler	XX	R2R
Yellow-billed Cuckoo*	XX		Tennessee Warbler		
Common Nighthawk	XX		Yellow Warbler		
Chimney Swift	XX	R2R	Cerulean Warbler*	XX	R2R
Olive-sided Flycatcher*	XX	R2R	Blackburnian Warbler*		
Eastern Wood-Pewee*			Blackpoll Warbler*	XX	
Western Wood-Pewee	XX		Bay-breasted Warbler*		
Acadian Flycatcher			American Redstart*		
Willow Flycatcher			Northern Waterthrush		
Alder Flycatcher			Prothonotary Warbler	XX	
Great-crested Flycatcher			Connecticut Warbler		
Eastern Kingbird			Mourning Warbler*		R2R
Bank Swallow	XX		Canada Warbler	XX	R2R
Barn Swallow*			Summer Tanager		
Cliff Swallow			Scarlet Tanager		
Veery*			Dickcissel		
Gray-cheeked Thrush*			Rose-breasted Grosbeak		
Swainson's Thrush*					

Previous Successes: *Generating novel information* - During the initial phases of the NFP in 2016-2018, 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 Fig. 1). 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 in northern Colombia, while highlighting the importance of pre-montane forests for species like the Canada warbler.

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 and has described stopovers up to 12 days long by cerulean warblers, as well as significant fuel gains in abundant species like red-eyed vireos, Swainson's thrush and bay-breasted warbler.

In 2020 through 2022, surveys were expanded to Nicaragua, Honduras and southeastern Guatemala 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 golden-cheeked warblers, with up to 20 individuals recorded in the Cerros de Yali, Nicaragua, and >100 records from La Tigra National Park, Honduras.

Outreach - Outreach activities have included working alongside National Parks authorities in Colombia and Honduras; education activities in at least 10 schools in project areas (see photo of mural from Sapzurro, Colombia, below); 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) and five additional peer-reviewed publications; presentation of results at the Colombian Ornithology Congress (Nov 2016), American Ornithological Society (April 2018), and International Ornithological Congress (August, 2018), and NAOC (2020).

Capacity building - A major objective of the project is to build local capacity across the region and working with local partners in each country we have trained 12 Colombian, 6 Panamanian, 5 Costa Rican, 7 Nicaraguan, 8 Honduran and 4 Guatemalan biologists. In 2021, a workshop on advanced ornithological techniques was held in Costa Rica and individuals from Panama (2), Costa Rica (4) and Nicaragua (3) were trained in the use of nano-tags, manual telemetry, installation and maintenance of Motus automated telemetry stations, installation of canopy nets, ageing and sexing migratory birds, and the use of occupancy models to map stopover areas.

Translating research into action - Parallel to research activities, restoration and protection activities are underway in some of the critical stopover regions discovered to date, including the Guajira peninsula (Colombia), Caribbean dry forest (Cordoba, Colombia), and on the Caribbean slope of Costa Rica. To date >25,000 trees have been propagated in nurseries and planted through agreements with private landowners to enhance stopover habitats, with a special focus on native tree species that provide food resources to migratory landbirds (trees were identified through foraging observations of focal species).

Actions: Actions will focus on completing surveys in the final two countries earmarked in the corridor, Guatemala and Belize, and setting up a banding station in Honduras to monitor fall migration in La Tigra National Park. Parallel to these research activities, there will be an increased focus on data analysis and dissemination, and on conservation activities in Costa Rica. In the current proposal, we are seeking funding to expand data analyses and conservation actions in Colombia.

January-December 2023 – Carry out occupancy analyses to map *major stopover regions* across Colombia, Panama and Costa Rica and describe how migrants are distributed across an elevation gradient in Honduras.

March-May 2023 – Train observers in the Peten of Guatemala and southern Belize and carry out occupancy surveys during spring migration to identify regionwide concentrations of migratory birds.

August-September 2023 – Carry out occupancy surveys across the Peten of Guatemala and southern Belize during fall migration to identify regionwide concentrations of migratory birds.

March-May 2023 – Establish and run a constant-effort mist netting station/s in La Tigra National Park in Honduras to understand how this region is used by 80 different species of migratory landbirds recorded during surveys in 2022. Includes the training of local biologists in scientific banding.

January-December 2023 – Continue and expand tree planting and protected area establishment in critical stopover regions on the Guajira Peninsula of Colombia, the seasonal dry forests in Cordoba, Colombia and on the Caribbean slope of Costa Rica.

Budget: $135,000 Please contact Deb Hahn (dhahn@fishwildlife.org) for more budget information. Matching funds from in-kind and other funding sources. 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.

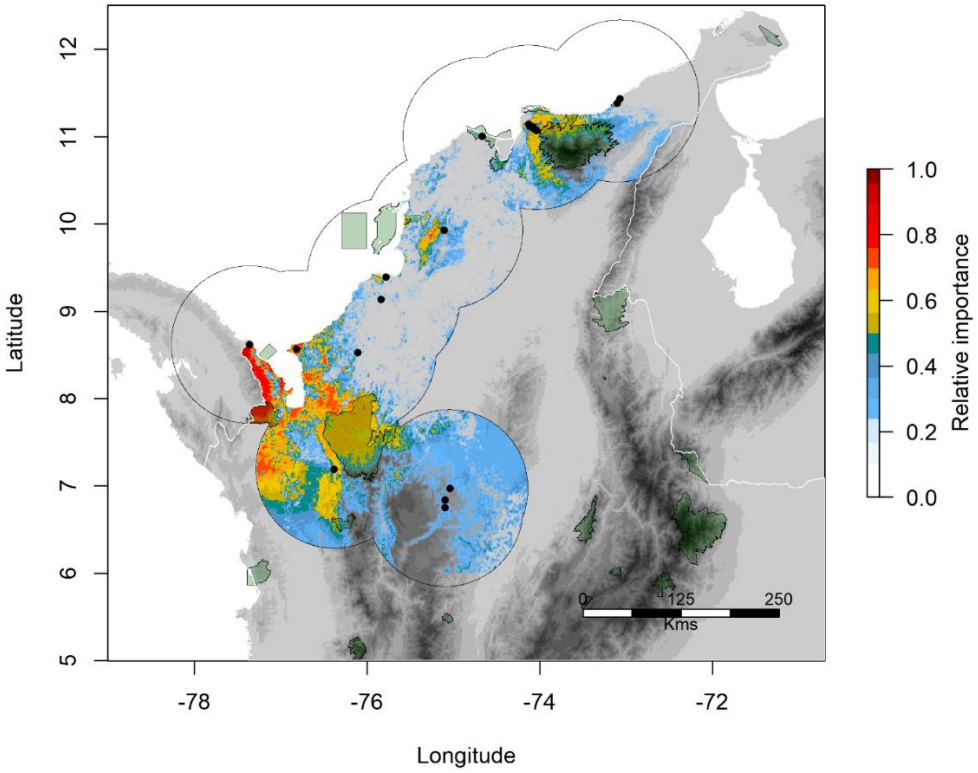


Figure 13: Priority spring stopover areas in northern Colombia based on the results of occupancy surveys and a subsequent modeling exercise for 20 species of migratory landbirds. Priority areas are limited to areas where natural forest remains and the presence of protected areas is indicated by transparent 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.

Figure 14: A mural showcasing migratory birds under construction in the village of Sapzurro, Colombia, as part of education activities focused on a major migratory bottleneck.

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), Grupo Aves del Noroeste De México (GANO), USFS-IP

States that have participated to date: Arizona, California, 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 15) 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. Mexico is particularly important because globally significant populations of shorebird species spend the winter at numerous sites along the Pacific Coast of that country. Primary species recorded during winter surveys in Mexico include: western sandpiper, dunlin, marbled godwit, willet, black-bellied plover, sanderling, greater yellowlegs, dowitcher spp., snowy plover, black-necked stilt, and American avocet. The main conservation concerns for shorebirds in the region are human disturbance and habitat loss or degradation.

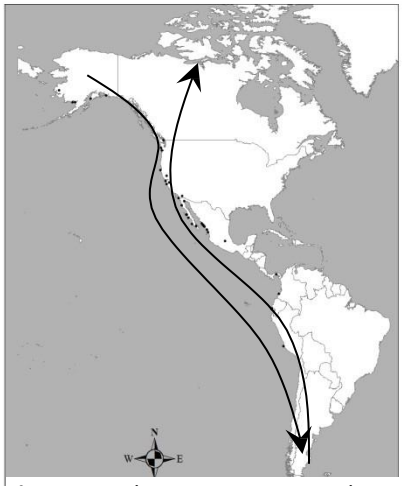


Figure 15: The Western Hemisphere with stylized migration route of shorebirds along the Pacific Coast of the Americas and important wetland sites (black dots) as designated by the WHSRN.

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 13 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 3 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. All 13 sites of importance for wintering Pacific brant in northwest Mexico are surveyed, 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 16) 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 SGCNs species will be used to highlight priority areas for non-breeding shorebird conservation.

Southern Wings Successes in 2022: Funds have helped to conduct mid-winter 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 public.

Achievements of the project to date include:

Nonbreeding Surveys

- Nonbreeding Shorebirds Monitoring: During January-February of 2022 we completed the annual non-breeding mid-winter shorebird surveys at 21 sites across northwest Mexico (Figure 16). These sites included 250 sampling units that are surveyed by about 50 volunteers in northwest Mexico.
- Pacific Brant Surveys: We conducted the 2022 mid-winter Pacific brant surveys in Mexico and provided a summary report to The Pacific Flyway Council for their annual meeting. Palacios, E. and A. Heredia. 2022. Pacific brant mid-winter ground surveys in Mexico (2022). Unpubl. Progress Report to U.S. Fish and Wildlife Service. La Paz, Baja California Sur. 12 pp.

- Collaboration with Local Hunting Organization: We collaborated with the hunting organization "Los Volcanes" to monitor wintering Pacific brant in Bahia San Quintin and conserve wetland habitat through protection of loafing and gritting sites, and surveillance to avoid illegal hunting and human disturbance.
- Snowy Plover Nonbreeding Surveys: During January 2022 we coordinated with the snowy plover mid-winter survey in the United States to conduct nonbreeding snowy plover surveys in five sites in northwest Mexico (Estero de Punta Banda, Bahía San Quintin, Laguna Atotonilco, Marismas Nacionales and Bahía Ceuta).

Breeding Surveys

- Breeding Waterbird Surveys. In 2022 we conducted three breeding waterbirds surveys at Tobari Bay (southern Sonora) and documented 12 species of waterbirds breeding on 11 dredge-spoil islands. We submitted a manuscript to *Waterbirds*. Available upon request.
- Banding and Monitoring of American Oystercatcher in Sonora: The Tobari Bay is one of the most important breeding sites for the American oystercatcher in Northwest Mexico, reaching up to 94 breeding pairs. The spoil islands in the area serve as breeding habitat. On June 14, 2022, American oystercatchers were tagged for the first time in Tobari Bay, with a total of 10 chicks. The banding effort, which will continue, will give us valuable information on the movements of individuals, survival, habitat use, etc.

Education/Outreach/Training

- Application of The MSP data: In 2022 we mentored graduate students on data analysis and interpretation for use in conservation and management. Jennifer Hernandez, finished her M.Sc. thesis at UABCS by using shorebird data from Ensenada de La Paz collected by the MSP. In addition, Estefanía Muñoz finished 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 components, also using the data from MSP. Daniela Michelle Valdez Gámez is finishing a manuscript on the ecology of Wilson's plover in Ensenada de La Paz (Baja California), by using MSP data. Jonathan Vargas, a member of the Coastal Solutions Fellows Program is working on a project to reduce human disturbance on the western snowy plovers in Baja California.
- Publications: We submitted a manuscript to *Global Ecology and Conservation* on population trends and influence of weather components on three temperate shorebirds (marbled godwit, willet, and long-billed curlew). We finished a manuscript on human disturbance and nonbreeding shorebirds in Ensenada de la Paz. We also published a paper in *Biotropica* on impact of human disturbance on the abundance of nonbreeding shorebirds in a subtropical wetland.

Data Entry

- Database: We entered all 2022 mid-winter shorebird survey data into the project's online data entry portal hosted by California Avian Data Center (CADC), a node of the AKN. Data includes the number of shorebirds, waterbirds and waterfowl, raptors, measures of human disturbance, and assessment of habitat condition.

Habitat Protection and Conservation

- Protection of Habitat: In early April 2022, we installed a temporary fence on three nesting beaches of Estero de Punta Banda, northwest Baja California, to protect the nests of snowy plovers and California least tern. The fence remained installed until August. The work also included monitoring during the breeding season.
- Protection of Habitat: We installed a fence in Guerrero Negro, Baja California Sur, to protect the nesting area for the snowy plover, California least tern, and American oystercatcher. The protected area is about 99 acres in size. Our partners for this activity include CONANP, Exportadora de Sal, Pro Esteros, CICESE, and Laura Ibarra (of the Coastal Solutions Fellows Program).
- Conservation Planning**:** In 2022 a Public Use Program in San Quintin was implemented. The identification of key stakeholders was carried out, and the concerns and opportunities were outlined. This program seeks to form and consolidate the Advisory Group and carry out a Workshop of Concerns and Opportunities.
- Protection of Habitat**:** Secondary and unused trails have been closed for dune restoration in the Punta Mazo

nature reserve. These efforts have resulted in the re-population of native plants of sand dunes, such as sand verbena (*Abronia maritima*). Signs and visitor loggers have also been installed.

- Terra Peninsular Internship Program: This program is devoted to working on conservation of habitat by developing projects in the nature reserves that we protect, including: a) waste management and handling, b) marine conservation projects, and c) environmental ethics and outdoor activities. In a period of five months we implemented the waste management plan, supported interpretive tours, and implemented fishermen surveys. Specifically, we selected three professionals for the 2022 season: 1) Brenda Marisol Núñez Bonilla, Waste Management Plan for the Punta Mazo Nature Reserve; 2) María Ramírez Rodríguez, Characterization of Fishing Activity in Bahía San Quintin and Development of a Fishing Resources Guide; and 3) Dzoara Elizabeth Rubio López, Responsible Tourism in Bahía San Quintin.
- Protection of Habitat: Terra Peninsular continued restoring hiking trails in the natural reserves by conducting soil restoration, delimitation and trail enhancement, plastic garbage cleanup, and infrastructure improvements. Local people from Ejido Chapala have been participating in restoring trails and cleanup activities in Monte Ceniza and Punta Mazo nature reserves. 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 long-billed Curlew, snowy plover, and sanderling.

Actions: Terra Peninsular and partners will implement the following conservation actions in the coming year.

- Conduct standardized annual non-breeding bird surveys of 21 wetland sites across NW Mexico (Figure 16), 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.:
    - Monitor wintering population of Pacific brant and work to maintain/enhance habitat.
    - Improve capture of harvest information (sex and age) for hunted Pacific brant.
    - 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.
- Conduct monitoring of breeding snowy plover at six sites across Northwest Mexico (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 Quintín 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.

Budget: $31,500 (Contributions of $5,000 to $10,000 each will significantly advance implementation of these shorebird/waterbirds/waterfowl conservation actions.) Please contact Deb Hahn (dhahn@fishwildlife.org) for more budget information. Matching funds are in-kind contributions and USFS-IP funds.

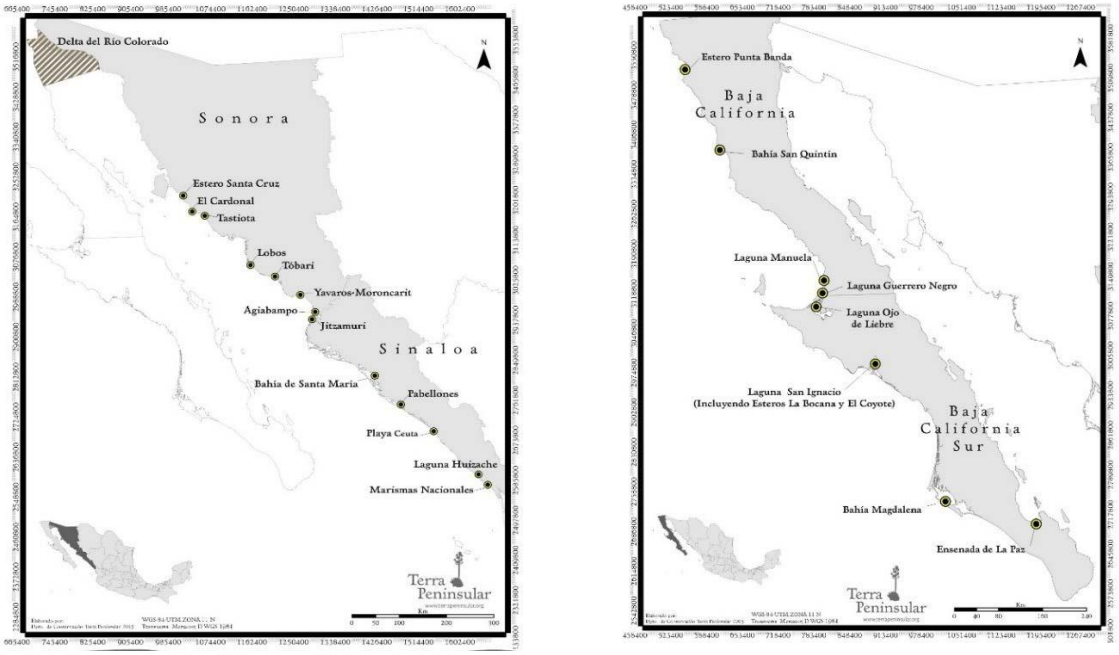


Figure 16: Location of 21 coastal wetland sites which are part of the PFSS in NW Mexico.

Table 3: 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										

Species (SGCN)	AK	AZ	CA	CO	ID	MT	NV	NM	OR	UT	WA	WY
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				
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**

Table 4: Waterfowl abundance and distribution at sampling units of 30 Migratory Shorebird Project sites in Northwest Mexico, during midwinter of 2022.

Common name	Abundance	Percent of sites (%)	Number of sites
northern shoveler	23140	30	9
green-winged teal	19654	23	7
brant	4100	30	9
redhead	3258	7	2
northern pintail	3254	33	10
gadwall	2962	7	2
blue-winged teal	2516	30	9
cinnamon teal	1177	23	7
ruddy duck	1143	13	4
American wigeon	595	13	4
surf scoter	557	13	4
red-breasted merganser	215	20	6
mallard	191	3	1
lesser scaup	113	13	4
bufflehead	71	27	8
black-bellied whistling-duck	12	3	1

Restoration of Migratory Bird Habitat in Ecuador

Partners: Fundación Aliados, Fundación Jocotoco, Fundación ReservaTesoro Escondido Reserve, 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 USFWS Species of Conservation Concern List. Ecuador has had the highest deforestation rate in South America over the last 50 years. The 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 (Chocó), prompting our partners, Fundación Jocotoco (Jocotoco) and Fundación Reserva Tesoro Escondido (Tesoro Escondido), to establish bird reserves where habitat protection is needed the most. Furthermore, Jocotoco and ABC are partnering with Fundación Aliados (Aliados), an NGO promoting agroforestry with local communities to scale up bird habitat conservation as well as sustainable and improved livelihoods. In FY 2024, ABC will be focusing our work with Aliados in the Chocó, located in northwest Ecuador.

The Ecuadorian Chocó is characterized by high species endemism and accelerated habitat loss; only 2% of the original forest in the area remains. Nevertheless, the Chocó rainforest is important to numerous wintering migratory birds, including cerulean warbler, Canada warbler, olive-sided flycatcher, 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, as part of ABC's BirdScape Initiative, ABC has established the Chocó-Canandé BirdScape, which encompasses Jocotoco's 13,000-acre Río Canandé Reserve and Tesoro Escondido's 4,560-acre reserve.

Our goal in this BirdScape is to transform existing monocultures, pastures, and fallow lands into silvopastures and agroforestry systems. By adding trees to their existing monocultures, farmers will generate extra revenues, which has the potential to prevent further deforestation. 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 for neotropical migratory birds. 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, including Indigenous Peoples, around remaining forests to limit negative impacts on these important remaining forests.

Most recently, ABC and Aliados have been working with some members of the Chachi Indigenous People to develop a business plan to expand shade-grown cacao cultivation in the Chocó. Cacao is a common crop in this part of Ecuador, but enhancements are needed to increase yields and secure a buyer willing to pay above-market prices for shade-grown cacao. By improving the cacao supply chain, we will be able to conserve at least 1,000 acres of one of the most threatened rainforest ecosystems in the world.

Threats: Forests 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 ongoing process accelerated by poverty and the lack of alternative income opportunities. 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. 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 cerulean warbler, Canada warbler, olive-sided flycatcher, blackburnian 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 Tesoro Escondido worked with eight communities in and around the Chocó-Canandé BirdScape. Funds helped Tesoro Escondido build six nurseries in five communities, each with the capacity to produce 5,000 seedlings. Twenty thousand seedlings were planted in 75 acres of cacao monocultures, pastures, and fallow lands. In addition, Tesoro Escondido's staff gave a series of workshops about tree nurseries, seed collection, bird identification, and wildlife conservation.

In addition, with funds from Environment and Climate Change Canada (Canadian Wildlife Service), we have expanded our work to another six communities (Figure 1), where we are restoring another 150 acres and organizing six bird-friendly agroforestry production workshops with these communities.

Goal: 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. In FY 2024, our objective is to restore another 100 acres of cacao monocultures and degraded lands. In addition, we will start to identify and engage other communities.

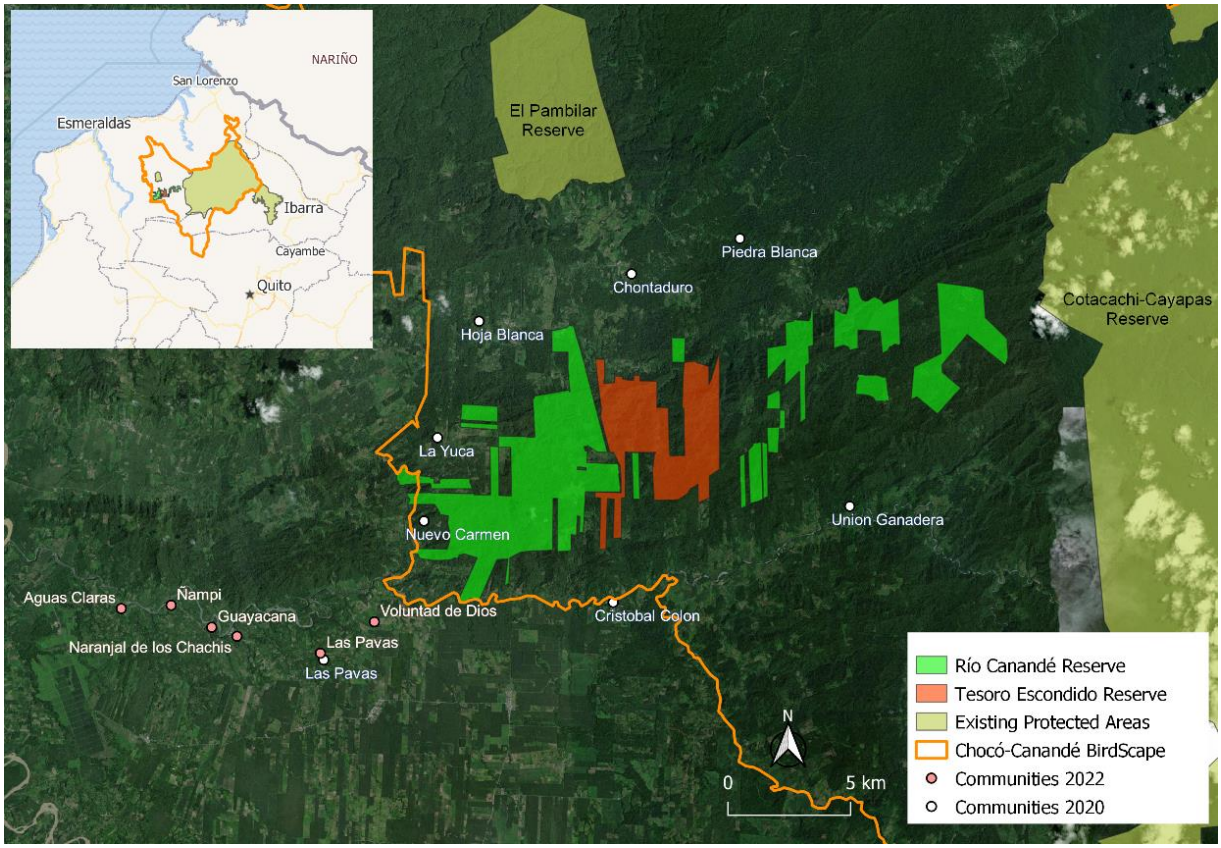
Our project in the Ecuadorian Chocó will contribute to three of the nine strategies included in the recently launched *Chocó-Conservation Investment Strategy*. These strategies include strengthening small-scale sustainable agriculture, designing and managing business models for sustainable products, influencing local people's behaviors to have a positive relationship with nature, and restoring key areas.

Actions: In the Chocó-Canandé BirdScape, we will:

- Identify and engage 40 new farmers in at least two communities.
- Conduct community workshops to strengthen local capacity, particularly around cacao production.
- Produce and plant at least 8,000 cacao plants and 3,000 native trees on 100 acres to enhance monocultures and pastures and restore fallow and degraded lands.

Budget: $53,500 Please contact Deb Hahn (dhahn@fishwildlife.org) for more budget information. Matching funds**:** American Bird Conservancy, Aliados, Jocotoco, and Tesoro Escondido have secured funds for work in Canandé from the Canadian Wildlife Service and private donors. Aliados 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 17: Location of the eight communities engaged in 2020 and the six communities engaged in 2021-2022.



Improving Migratory Bird Habitat in Colombia

Partners: VivoCuenca, Fundación Ecológica Cafetera (FEC), Comité de Cafeteros de Caldas (CCC), SELVA, and ABC

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

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. ABC has identified BirdScapes, to target conservation action for migratory birds of conservation concern. In Colombia, we have prioritized seven BirdScapes.

In 2019, ABC began to act in the Central Andes BirdScape, one of the highest coffee producing regions in the country, where native vegetation is being replaced with agriculture and pasture lands. The Central Andes provides critical habitat for golden-winged, cerulean, and Canada warblers. In partnership with VivoCuenca, we have prioritized the Río Chinchiná watershed in the Caldas Department, in the western section of the Central Andes BirdScape. We have engaged with 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. In the eastern portion, the Tolima Department supports a variety of habitats and high bird diversity in small concentrations – more than 500 bird species have been recorded in an area slightly smaller than the city of Houston, Texas. We have worked 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.

Threats: The Colombian Andes have a high rate of deforestation in Latin America; a significant amount of this loss is due to agriculture. In Colombia, it is estimated that 87% of neotropical migratory birds 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.

Birds: In the BirdScape, 74 migrant bird species have been documented, including: golden-winged, cerulean, Canada, black-and-white, Tennessee, blackburnian, yellow and blackpoll warblers; American redstart; 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.

Goals: Our goal is to protect existing forest and improve habitat quality and connectivity through restoration for migratory birds in the Caldas and Risaralda departments, which are both located in the Central Andes BirdScape. Specific objectives include:

- Planting at least 30,000 native trees.
- Engaging 80 producers in conservation activities.

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: Cerulean Warbler and Pauxi Pauxi. Southern Wings funds contributed to the creation of a 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 BirdScape, facilitating the planting of more than 145,000 trees in 290 farms over approximately 1,100 acres, and the installation of 10.5 miles of fencing to protect 378 acres of riparian forests and other forest fragments. Since 2021, the project has been expanding to lower elevations and new watersheds, maintaining our partner's staff including forestry technicians and professionals is a priority to ensure the project success.

States participating in Southern Wings have also provided funding for Golden-winged Warbler Surveys in Colombia and neighboring Venezuela. We are currently working with SELVA to conduct a fourth year of surveys.

Actions: We will plant native trees to increase habitat and connectivity between forest patches. Our goal is to plant at least 30,000 trees this year in the Caldas and Risaralda departments, and maintain the trees planted thus far. Funds are needed to maintain employment of our Forestry Technicians to meet the demand created by the project. The Forestry Technicians are the primary point of contact with landowners and provide technical assistance for the implementation and maintenance of restoration sites and nurseries. We will continue to conduct outreach and educational activities in the watershed to facilitate new planting agreements and implementation of sustainable practices. We will develop activities with the local birdwatching group. Our hope is that they can become citizen scientists and help make formal observations of migratory birds.

Budget: $85,255 Please contact Deb Hahn (dhahn@fishwildlife.org) for more budget information. Matching funds**:** ABC has funding support from Canadian Wildlife Service, Amos Butler Audubon Society, March Conservation Fund and USFWS via the NMBCA program for this project. In addition, VivoCuenca, FEC and CCC have significant matching funds available for related activities in this proposal.

Figure 18: Central Andes BirdScape (in brown) and the Chinchiná watershed (white polygon) in the Caldas Department.

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), AZGFD, Sociedad Salvaje, Asociación de Desarrollo Turístico de la Costa Oriental De *El* Salvador (ADETCO), Compañía Azucarera Salvadoreña (CASSA), Southern Sierra Research Station (SSRS), Mujeres y Naturaleza (MUNAT), Zoo Boise

State(s) Participating: Arizona, Pacific Flyway Council

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 migration and overwintering periods. Most of this geography was once dominated by seasonally dry tropical forests (Fig. 7). 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 remaining intact. Only 5% of remaining dry forest in Mexico and Central America receive some degree of protection.

Figure 19: 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 willow flycatcher (potentially the southwestern subspecies), 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 5).

The project aims to protect overwintering birds and their dry tropical forest habitats in the eastern region of El Salvador (Fig. 8). The eastern region has high conservation potential for birds due to its relatively low human population density and high cover of tropical forest and 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. Currently the security situation has significantly improved, and so it is urgent that conservation efforts accelerate here before commercial agriculture and threats displace forests.

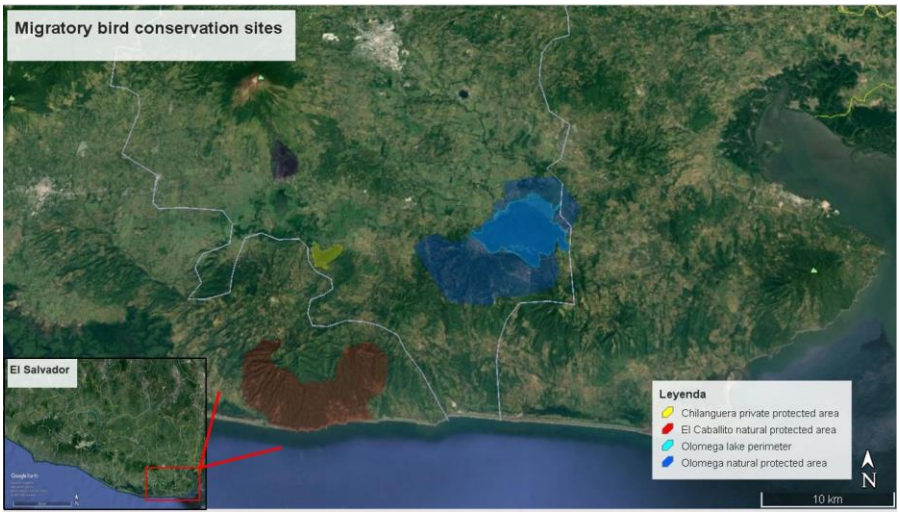


Figure 20: General project area in eastern El Salvador with specific sites of importance to overwintering birds noted (consisting of dry tropical forest habitats and adjacent wetland areas).

Two priority species in this region are the willow flycatcher (WIFL) and yellow-billed cuckoo (YBCU). Both southwestern willow flycatchers and YBCUs 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. The WIFL and YBCU use Central America's Pacific coast during stopover migration and overwintering respectively. Project activities focus on sites that maintain suitable willow flycatcher habitat (Figure 21) and their neighboring upland forests that host a diversity of migratory and resident birds.

In addition to NMBs, the tropical dry forests of eastern El Salvador host other priority species such as the endemics white-bellied chachalaca and blue-tailed hummingbird. 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 project activities will compliment Paso Pacifico's yellow-naped Amazon and Cyanoptera Macaw Conservation Programs which operate in the same geography.

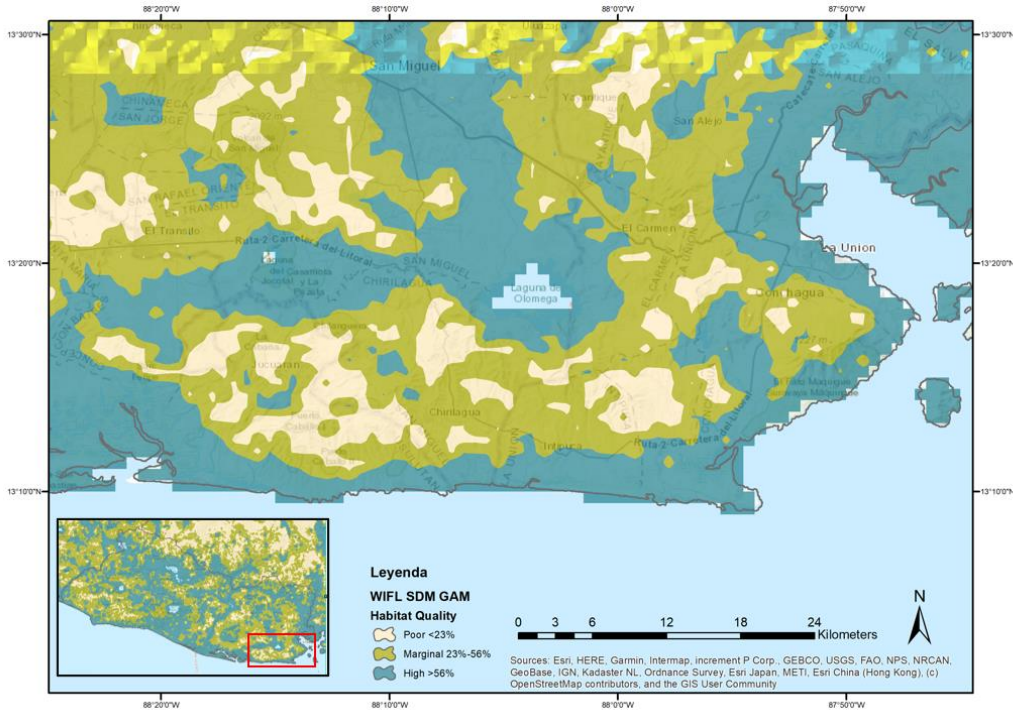


Figure 21: Distribution of potential suitable willow flycatcher (WIFL) habitat in eastern El Salvador with dark blue representing good potential habitat. Based on a model by Lauren Phillips and Tom Albright, University of Nevada Reno in partnership with Paso Pacifico, 2020.

Project Goals: This project seeks to restore tropical dry forests and to protect forest-dependent migratory and resident bird populations in El Salvador, including for the WIFL and YBCU. 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 2022:

1. Conserve dry tropical forest habitats

Figure 22: Community rangers cutting fire lines to protect dry tropical forest.

- In January 2022, we expanded our team of community rangers from two people to ten people from the communities of Chichipate, La Balastrera, and Los Riitos. These communities are adjacent to the dry tropical forests bordering the Olomega RAMSAR wetland. During the dry season, these rangers worked three days a week to create fire breaks (Fig. 10), manage fire lines, and prevent poaching. The ranger team extinguished over five significant fires, preventing the disturbance from entering the dry forest area. Other duties carried out by the community rangers included assisting the community during a tropical storm, weekly plastic pollution cleanups along the wetland, and one on one engagement with neighbors to

discuss pollution, respect for birds and other wildlife, and support for forest protection. Additional funding from Zoo Boise and private donors helped to sustain the ranger program.

- We led the creation of a community demonstration garden to promote improved agricultural practices in the communities. During twice-monthly meetings we taught about soil health and the impacts of repeated fires, shared techniques for rainwater harvest and irrigation. The rangers helped to cultivate a diversity of vegetable crops such a red peppers, green beans, and cucumbers. The rangers expanded their learnings to support gardens at two local elementary schools. The focus of the training thus far has been on economizing water, conserving soil health, organic fertilizers, and reducing the use of fire as a first step toward promoting agriculture with lower impact on bird habitats.

- We continued corresponding with the environmental office of CASSA sugar-cane processor but workshops with their staff have not been scheduled. We aim to host WIFL habitat awareness workshops with their staff in 2023.

- We made two site visits to a 103-acre forested property. There is an additional 250-acre property adjacent to the first one, which includes mature tropical dry forest. Our lead ranger researched the property and we have proposed a rapid ecological survey and an appraisal in preparation to make the purchase (with other funding). The forest on this property is threatened by expanding agriculture.

- We worked to build awareness about the importance of dry forest habitat by leading a restoration event at the Chilama River during the World Surf League Tour. This activity engaged professional surfers and 20 local children from a nearby settlement in planting native shrubs and trees (Figure 23). Ornithologists from Mujeres y Naturaleza (MUNAT) supported the event by carrying out birding at the river and leading the youth and the press during the event. National and international press covered the event and stories promoting dry tropical forest received thousands of views.

Figure 23: Local youth at Rio Chilama participated in coastal habitat restoration.

2. Promote bird monitoring as a tool to inform management and build capacity

- Although the Ministry of Environment continues to express an interest in developing a national strategy for bird conservation, the effort stalled during 2022 due to competing priorities. We will continue to engage the ministry to advance this opportunity in 2023.

- We partnered with MUNAT to design a scholarship fund to support Salvadoran college students who plan to conduct research on birds (including resident and western migratory birds). Priority topics include study of WIFL habitat management by small-holder farmers and stopover sites for yellow-billed cuckoos. The program has been launched and the first awards will be made in early 2023 (Fig. 24).

Figure 24: Invitation to apply to the bird research scholarship program.

- We made progress toward growing the Motus network in the region by supporting the attendance of two biologists (one from El Salvador and one from Jalisco, Mexico) to a Motus training workshop in northern Mexico in January 2023. The workshop was led by Bird Conservancy of the Rockies and Cuenca los Ojos. This will support establishing El Salvador's first MOTUS station (key components of the station are already on-hand) and facilitate similar work in Jalisco, Mexico where there are also large swaths of TDF habitats.

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

- We provided technical assistance and support to the citizen birding group "Observadores de Aves del Oriente", supporting logistics for them on two birding outings, the first to celebrate Global Big Day on Olomega Lagoon and the second with a birding field trip to Salvadoran islands of the Gulf of Fonseca where there has been very little research on birds. This young birding club represents the future of bird conservation in Eastern El Salvador and we were grateful to support their bird explorations in 2022 (Figure 25). Here is one of their eBird trip reports.

Figure 25: Yellow-billed cuckoo photographed by Senia Benitez of the Observadores de Aves del Oriente.

- We provided technical and financial support to our partners at MUNAT in conducting a second bird education workshop at the Riitos and Estrechura communities. The day focused on bird observations and using books and binoculars for

identification. Twenty-three participants attended the workshop that included a boat tour on the RAMSAR designated Olomega Lagoon (Figure 26).

Figure 26: Birding Olomega Lagoon with local youth.

- Two members of the ranger team patrol the forest and have begun documenting the bird life on the dry tropical forest near Olomega Lagoon, including the first king vulture and pale-billed woodpecker documented in Southeastern El Salvador since 1926. These findings highlight the importance of the dry tropical forest habitat in this geography. Other birds of conservation concern documented by the community rangers include WIFL, olive-sided flycatcher, summer tanager, and indigo bunting.

Figure 27: Pale-billed woodpeckers collected in 1926 by A.J. van Rossem and recently documented for the first time in almost 100 years in El Salvador

4. Develop science-based conservation tools for two endangered migratory birds: WIFL and YBCU

- We held planning meetings with the SSRS to learn preferred protocols for establishing permanent transects for willow flycatcher monitoring. We suspect southwestern willow flycatchers migrate or overwinter in El Salvador, as they have been documented in the Golf of Fonseca area (and elsewhere in Central Ameica). We determined three sites for the long-term transects (Lake Guija, Jocotal Lagoon, and Olomega Lagoon) based on previous WIFL captures at these sites (early 2020). Monitoring will begin in late January 2023 with technical supervision from SSRS and Paso Pacifico's ornithologist Estefania Munoz.

- We carried out meetings with staff and Salvadoran biologists with first-hand knowledge of protected areas to do preliminary planning of WIFL habitats. Our goal is to survey protected areas in Eastern El Salvador with a high percentage of WIFL habitat. We are still working to obtain the layers to the WIFL habitat suitability from researchers from the University of Nevada, Reno to layer them with protected area maps and carry out surveys in February 2023.

Actions: Paso Pacifico and local partners including CASSA, MUNAT, ADETCO, FUNZEL, and MARN will implement the following activities in 2023:

1. Conserve dry tropical forest habitats

- Sustain team of eleven community rangers and support their efforts to protect dry tropical forest from fires (3000 hectares under their protection), to promote sustainable agricultural techniques, and to discourage the use of slingshots that harm wildlife, particularly birds.

- Continue hosting educational workshops with community rangers and their villages near the wetlands and lowland area with suitable WIFL habitats to discuss how farming practices can be modified to allow time for WIFL to remain in the area before their northward migration. In 2023, our priority will be to address the topic of delayed clearing to support bird habitat up until northward migration.

- Carry out bird surveys at the dry tropical forest reserve of the CASSA sugar-cane processor. Hold meetings with the CASSA staff to discuss measures to protect vegetation corridors for WIFLs and other sensitive species neighboring sugar cane production areas.

- Submit proposal to purchase the 103-acre dry tropical forest property identified in 2022 (with other funding). This property hosts high quality dry tropical forest and could be expanded upon in the future. The property also holds high potential to host researchers wishing to study the birds in this geography.

2. Promote bird monitoring as a tool to inform management and build capacity

- Support the Ministry of Environment in developing a national strategy for bird conservation. This involves designing the process for the plan, particularly the expert and public consultation, developing the terms of reference for contractors, and providing the funding to the consultants working on the document.

- Provide financing and technical assistance to MUNAT to facilitate the scholarship program. In 2023, three awards will be given in the first quarter (this first round has already been funded), and in the final quarter of 2023 a second cohort of three recipients will be awarded scholarships.

- Follow-up with MUNAT and University of Guadalajara MOTUS workshop trainees. Launch one MOTUS station in Eastern El Salvador in the first half of 2023 and obtain permits and materials for a second station to be implemented later the same year.

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

- Continue to support birding enthusiasts in Eastern El Salvador from the Observadores de Aves del Oriente. In 2023, we aim to assist them in developing content for publications for local print newspapers educating the public about migrating birds.

- Celebrate International Migratory Bird Day at Laguna Olomega during the Fall Migration. The event will involve the Ministry of Tourism, Ministry of Environment, ADETCO, and civic partners such as the Rotary Club in the city of San Miguel.

4. Develop science-based conservation tools for two endangered migratory birds: SWIFL and YBCU

- Through ethnographic interviews, document history of harvest and consumption of the YBCU and its perceived overwintering spatial and temporal distribution in El Salvador. This research will provide conservationists with additional information on status and distribution of the species in El Salvador.

- Establish baseline for long-term monitoring of overwintering WIFLs in eastern El Salvador at three permanent transects that will be visited twice-monthly starting in late January 2023 through April and resuming in November 2023.

- Using the WIFL habitat suitability map developed by researchers from the University of Nevada Reno through a past grant from USFWS NMBCA, we will conduct winter surveys at protected areas eastern El Salvador with a predicted high-density of WIFL.

Budget: $20,500 Please contact Deb Hahn (dhahn@fishwildlife.org) for more budget information. Matching funds**:** Project funds from Paso Pacifico

Table 5. SGCN (considered Neotropical Migrants*) in the project area, listed by 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.

Restoration of Wetland Hydrology in the Marismas Nacionales of Nayarit, Mexico to benefit migratory waterfowl and shorebirds.

Partners: communal landowners (ejidos), farmers and ranchers, fisheries cooperatives, Marismas Nacionales Biopsphere Reserve, CONANP, CONAFOR, Municipality of Tecuala and OVIS.

Overview: Marismas Nacionales (Figure 28) is a complex of wetlands that form a mixture of marine waters and 11 powerful rivers, creating a very varied mosaic of features such as meanders, river deltas, marshes, freshwater lagoons, estuaries, coastal lagoons, intertidal wetlands and coastal dunes. It supports the largest mangrove area on the Pacific coast. The "Functional Diagnosis of Marismas Nacionales" document drafted in 2011 provides interdisciplinary information which is spatially explicit, enabling the systematic and integral analysis of the current state of the Marismas Nacionales wetlands. That year began the design of the first pilot projects for the restoration of wetlands in the area. Ongoing work since the initial pilot projects has provided us with extensive experience in developing and implementing effective techniques for hydrological restoration.

Threats: Marismas Nacionales is affected by the cumulative impact of multiple threats to the hydrological pattern. The hydrological pattern has been altered by the retention and excessive use of water for agricultural and livestock purposes, establishment of shrimp farms, poorly planned communications infrastructure networks and sewage systems that impede and reduce the natural hydrological flow. More recently the emergence and establishment of invasive vegetation has become a concern. All these threats have resulted in drastic mangrove mortality, higher lagoon salinity and reduced habitat for wetland-dependent bird species. Restoring the habitat depends to a great extent on the maintenance of fresh water flows from rivers, streams and springs and on a functional network of natural channels within the mangrove systems. Therefore, urgent restoration measures need to be implemented that includes cleaning and dredging (e.g., removal of dead mangroves), such as the hydrological rehabilitation of 17 miles of natural tidal channels that will restore the hydrological flow and contribute to the restoration of 4,200 acres of mangroves.

Birds: Marismas Nacionales is one of the most important energy resupply sites for waterfowl on the Mexican portion of the Pacific Flyway, providing high quality foraging and resting sites for 15 migratory species (> 250,000). The area is notable for its concentration of: northern shoveler (*Anas clypeata*) (130,000), green-winged teal (*Anas crecca*) (25,000), northern pintail (*Anas acuta*) (12,000), lesser scaup (*Ahythya affinis*) (4,450) and mallard (*Anas platyrhynchos*) (1,200). It also provides habitat for more than 427,000 wintering shorebirds of 28 species, including: American avocet (*American recurvirostra*) (137,000, which constitutes about 20% of its total population), and western sandpiper (*Calidris mauri*) (145,000). Other priority species include marbled godwit (*Limosa fedoa*) (13,000), long-billed curlew (*Numenius americanus*) (400), Wilson's plover (*Charadrius wilsonia*) and short and long-billed dowitcher (*Limnodromus* spp) (72,000) and black-necked Stilt (*Himantopus mexicanus*) (26,000). Also, notably over 1,300 red knot (*Calidris canutus roselaari*), feed in the area during their summer stay on their way to the Arctic and the area also has migratory (200) and resident populations of snowy plover (*Charadrius n. nivosus*) (93 pairs). The SGCN species occurring in the area is provided in Table 6.

General Strategies: The project focuses on restoring hydrological flows for the recovery and conservation of mangrove ecosystems, which provide foraging sites and energy resupply for thousands of waterfowl and shorebirds that migrate along the Pacific Flyway. The project includes different sites, which together benefit the Agua Brava tidal watershed (210,039 acres) and comprises 11 tidal systems (Figure 28).

Phase 1 of the project focuses on the restoration of two degraded wetland systems:
The first is the Las Garzas Lagoon of the Chagüín-Chuiga sub-tidal basin (12,429 acres), located within the Agua Brava Tidal Basin (Figure 29) This wetland was impacted and transformed by agricultural activity and hurricanes. This is observed in terms of low water volume, low water permanence (hydroperiod), hypersalinity,

and no productivity. The proposal is to rehabilitate the 8.7-mile Río Viejo (8.75 yd base by 2.19 yd height) channel, which is a branch in the delta of the Río Acaponeta. The expected outcome is to harvest surplus water from agricultural activities, pluvial and hurricanes and transport this excess water to the wetland (Las Garzas Lagoon), to recover a large part of the hydrological pattern and increase habitat for waterfowl and other wetland-dependent wildlife. The Río Viejo channel was functional until the 1980s and is currently filled with sediment and with a collapsed bridge, which does not allow water to flow into the wetland.

The second wetland is the San Cristóbal Basin (11,080 acres), which includes 5 sub-basins that make up freshwater wetlands such as La Tobara, La Chayota, Singayta, San Blas and Chacalilla, fed by streams and springs. The wetland complex is beginning to experience the establishment of several invasive species such as *Typha* sp, *Eichhornia crassipes*, *Pistia stratiotes* and *Ludwigia peploids,* leading to the reduction and loss of available habitat. Therefore, there is a need to establish an early detection and response strategy for invasive species at the basin level and implement control actions in 494 acres of Ejido La Libertad (Fig. 18).

Southern Wings Successes in 2022: Ovis in coordination with CONANP, CONAFOR, ejidos, fisheries cooperatives and other partners accomplished the following:

- Trained 100 individuals and organized community work brigades to conduct wetland restoration actions Figure 31.
- Conducted cleaning and removal of sediment and dead wood in 8.7 miles of the Rio Viejo to reconnect the Garzas Lagoon and facilitate the recovery of the hydroperiod and bird habitat (Figures 29 and 32).
- Collected and conducted assisted-dispersal of 70,000 mangrove seeds (black and white mangroves) to promote wetland restoration in the Rio Viejo (Figure 33).
- Strengthened conservation planning and management of three Wildlife Conservation Management Units (UMAs) (Antonio R. Laureles 10,255 acres, Francisco Villa 23,288 acres and Pericos 9,103 acres) by providing technical support for different management activities and also continued monitoring of bird populations (Figure 34).
- Established a new Wildlife Conservation Management Unit (3,707 acres) in Ejido La Libertad to strengthen protection of sites where restoration work is underway. Part of the process involves development of a management plan for the unit.
- Conducted water quality sampling in the Chagüín-Chuiga sub-tidal basin to track wetland health as restoration activities progress over time. Water quality measurements are taken twice annually during the dry and rainy seasons (Figures 29 and 35).
- Conducted six monthly (October 2021 to March 2022) bird surveys in the Chagüín-Chuiga sub-tidal basin (Figure 35). Sixty-six bird species (including 35 migratory) were documented, totaling 90,657 observations. The order Charadriiformes agglomerated 69% of the records, followed by the Anseriformes with 28% and the rest of the orders accumulated the remaining 3%. Accordingly, the families with the highest abundance were Scolopacidae (57%), Anatidae (28%) and Recurvirostridae (6%), while Fregatidae, Accipitridae and Ciconiidae were numerically underrepresented. High counts of species noted included northern pintail (887), green-winged teal (3,423), western sandpiper (9,300), least sandpiper (778), semipalmated plover (929), American avocet (1,089), northern shoveler (3,015), and blue-winged teal (2,400) (Table 7).
- Sampled vegetation plots in restored and reference mangrove sites. Measurements were used to obtain basal area, diameter at breast height, height and abundance of mangrove plants (Figure 35).
- Conducted quarterly fish sampling (18 survey sites) in the restoration areas, documenting 11 fish species, including five of economic importance (plus shrimp, which is serves as the economic base for the local communities).
- Disseminated project results in social media networks and to key stakeholders such as the Advisory Council of the Marismas Nacionales Biosphere Reserve.

Specific Activities planned 2023: This project focuses on the restoration of degraded wetlands, in three tidal

basins (13,810.73 acres, Figure 36) north of the Marismas Nacionales Biosphere Reserve (Estero Puerta del Río 8,572 acres, Cordones Submeridos Pericos 4,650.53 acres and Cordones Sumergidos Valle de la Urraca 588 acres). These tidal basins have been transformed by the settlement of more than 7,413 acres of shrimp farms and agricultural activity. This is seen in terms of low water volume and permanence (hydroperiod), hypersalinity, low fishing productivity, mangrove mortality, and degraded habitat for wetland-dependent birds. The proposal focuses on rehabilitating 4,201 acres through hydrological rehabilitation of 17.4 miles of natural tidal channels in three ejidos (Arenitas, Valle de la Urraca y San Cayetano del Roblito, Figure 37). Also, carry out planning workshops to manage aquaculture activities, protect these sites in the long term through different public and private schemes and establish the biological baseline to monitor trends of these restored ecosystems. OVIS and partners will implement the following conservation actions;

Objective 1. Increase habitat availability for waterfowl, shorebirds and other wetland-dependent species
Engage ejido assemblies to evaluate conservation opportunities for ejido-owned lands, asses and adopt suitable legal conservation mechanisms, sign collaborative agreements, elaborate management plans, draft and implement work plans (for defined conservation measures such as habitat protection and restoration and species monitoring).

- Establish and Strengthen UMA (Figure 37): Establish UMAs For El Ejido Valle de la Urraca and Ejido Arenitas to protect the restored and adjacent areas in good condition. In the Ejido San Cayetano del Roblito, which is already an UMA, its management plan will be updated.
- Establish Private Conservation Agreements (Figure 37): In the ejido Valle de la Urraca 4,324 acres of wetlands will be protected, including the 2,471 acres restored, with a conservation agreement for 20 years signed between the ejido and OVIS. Similarly, in Ejido Las Arenitas, 2,471 acres of wetlands will be protected, including the 1,236 acres restored, with the signing of a 20-year conservation agreement.
- Establish an Ejido Reserve: The Ejido Valle de la Urraca (Figure 37) faces strong environmental challenges, primarily due to the irregular establishment of shrimp farms whose effluent discharges into the wetlands are causing the degradation and mortality of mangroves. The planning approach resulting in the establishment of a reserve consists of 4 steps: compiling information on the physical environment (hydrology, water quality, etc.), biological (vegetation cover, ecosystems, fragility) and social (productive infrastructure) to prepare an assessment of the land uses of the ejido (5,000 ha). The assessment will be used to draft a proposal with alternative scenarios for land use zoning for consideration by the different stakeholders of the ejido. Adoption of the planning proposal would include an ejido reserve for mangroves with a minimum extension of 4,324 acres.

The result will be the protection of at least 6,795 acres, through a mixture of public (ejido) and private mechanisms for 20 years and the land use zoning of productive activities of 12,355 acres.

- Train (150 people) and organize work brigades that will participate in different de-silting and channel clearing activities for habitat restoration.
- Improve the connectivity conditions of water systems, to recover the flood pattern of deteriorated wetlands in three tidal basins. The hydrological rehabilitation activities will be carried out in 3 ejidos (Ejido Valle de la Urraca 2471 acres and 9.3 miles of natural channels. Ejido Arenitas 1,236 acres and 6.2 miles of channel, and Ejido San Cayetano del Roblito 494 acres and 1.9 miles of channels (Figure 37). Restoration activities to be conducted by work brigades will include removal of sediments and dead mangroves (which obstruct water flow) from primary and secondary natural tidal channels to reconnect degraded mangrove areas with internal lagoons and streams.

The result will be to build local capacities for restoration works (150 people), recover natural water flows in 15.5 miles of flood channels in three tidal basins (covering 13,810.79 acres). Additionally, we will have established partnerships with the different productive sectors (e.g., farmers, ranchers, fishermen) and government agencies for the restoration and maintenance of these conservation works.

Objective 2: Biological Monitoring and engagement with key stakeholders
Establish the biological baseline of the restored sites and conduct biological surveys over-time to track the rehabilitation trends of the tidal basins.

- Evaluate water quality (physicochemical parameters, hydroperiod and water column) using robust digital data loggers (hobos).
- Conduct seasonal bird surveys of wetland-dependent species to understand abundances and distributions.
- Assess the establishment of plant communities (mangroves) and fisheries, using fixed plots.
- Compile and analyze data to provide wetland management recommendations to land managers and other stakeholders.

Implement an awareness campaign directed at key audiences (fishermen, shrimp producers, farmers and ranchers) to reduce illegal activities that degrade the environment, such as the installation of shrimp farms and roads in unauthorized areas, and discharges of agrochemicals, oils and other polluting substances into wetlands.

Strengthen CONANP's regional monitoring of charismatic species with camera traps: Train and equip 60 community members to monitor a network of sites for snowy plovers and colonial birds (breeding locations), crocodiles, jaguars, among other species.

Share and disseminate key findings to federal regulatory institutions and decision makers including SEMARNAT, CONANP (Marismas Nacionales Biosphere Reserve), CONAFOR, CONAGUA, and CONABIO.

Budget: $14,500 Matching funds: NAWCA $154,344 + Mexican Partners match funds $65,478 (fishermen's &29,000+ CONANP $27,928 + OVIS $8,550) + Project funding needs requested to Southern Wings ($14,600). Please contact Deb Hahn (dhahn@fishwildlife.org) for more budget information.

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

Species	**AK**	**AZ**	**CA**	**CO**	**ID**	**MT**	**NV**	**NM**	**OR**	**UT**	**WA**	**WY**
Cinnamon Teal											X	
Northern Pintail							X					X
Eared Grebe								X				
Sora		X										
American Avocet							X					
Snowy Plover			X					X		X	X	
Whimbrel	X											
Long-billed Curlew				X	X		X	X	X			X
Marbled Godwit											X	
Ruddy Turnstone			X									
Red Knot	X		X								X	
Stilt Sandpiper												
Dunlin	X											
Western Sandpiper	X						X					
Lesser Yellowlegs	X											
Wilson's Phalarope							X					
Ring-billed Gull					X							

Species	AK	AZ	CA	CO	ID	MT	NV	NM	OR	UT	WA	WY
Least Tern				X		X		X				
Gull-billed Tern												
Caspian Tern					X	X			X	X		X
Forster's Tern												X
Wood Stork			X									
Neotropic Cormorant								X				
American White Pelican				X	X		X		X	X	X	
Brown Pelican											X	
Great Egret		X										
Snowy Egret		X							X			X
Total	**5**	**3**	**4**	**3**	**4**	**2**	**6**	**5**	**4**	**3**	**6**	**5**

*SGCN Neotropical Migrants as defined by the North American Wetlands Conservation Act Program.

Figure 28: Macrolocation of the project, Marismas Nacionales Ramsar Site and Marismas Nacionales Biosphere Reserve, Nayarit, Mexico

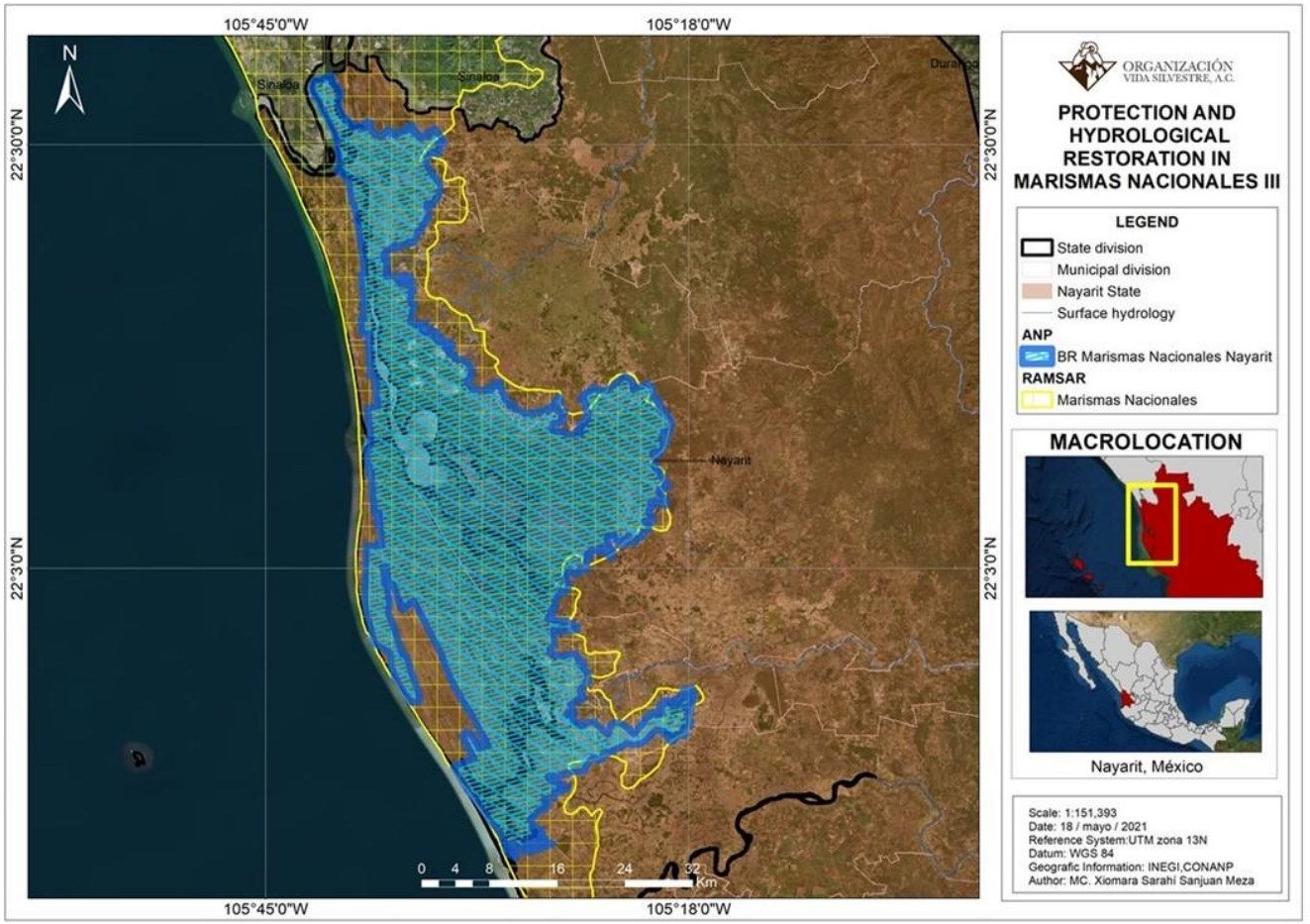


Figure 29: Location of Phase 1 of the project, the Chagüín-Chuiga sub-tidal basin (12,429 acres of estuaries) located within the Agua Brava Tidal Basin. Work involves dredging and cleaning of 8.7 miles of the Viejo River channel.

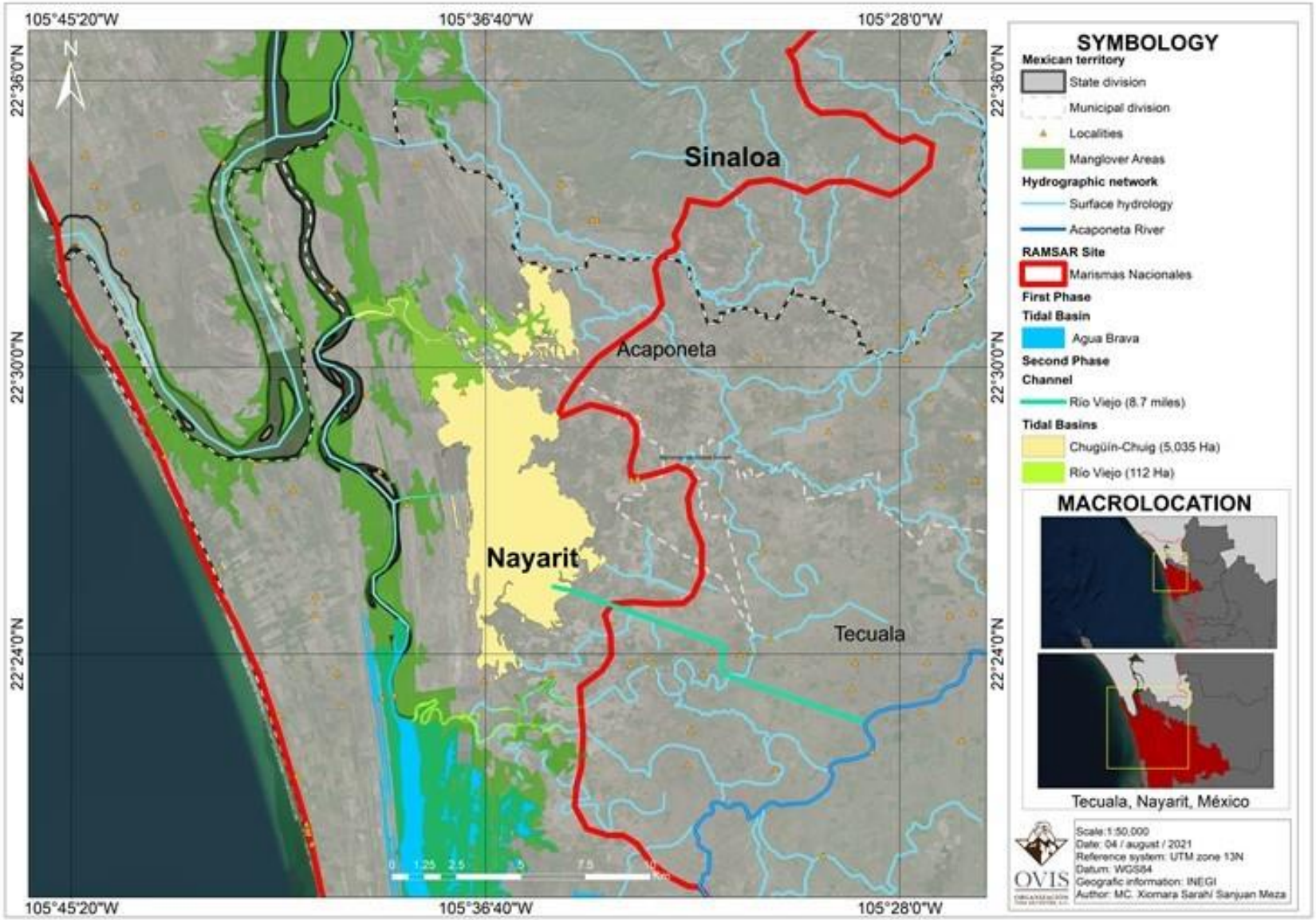


Figure 30: Location of Phase 1 of the project, the San Cristobal Basin (11,080 acres), which includes 5 sub-basins, La Tobara, La Chayota (Ejido La Libertad), Singayta, San Blas and Chacalilla. Work involves Implementing an early detection and control strategy for invasive plant species.

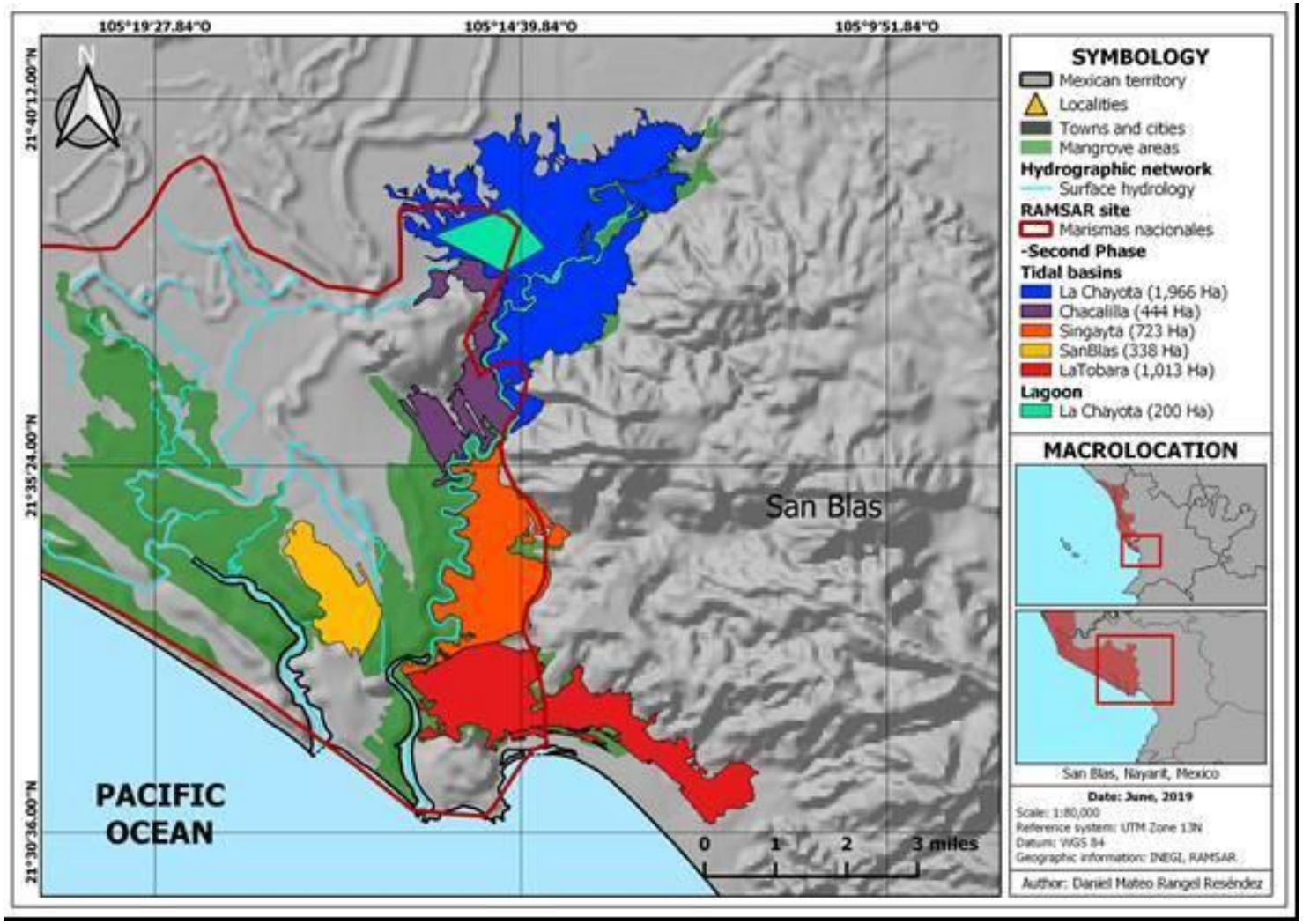


Figure 31: Photos showing activities and achievements from Phase 1 of the project: top row, workshops to inform and train communities. Bottom row, working meeting with Marismas Nacionales Biosphere Reserve staff (CONANP).

Figure 32: Photos showing the start and progress of the cleanup of 8.7 miles of the Viejo River channel.

Figure 33: Photos showing the collection and dispersal of mangrove propagules to facilitate habitat restoration.

Figure 34: Project location of Phase 1 of the project:

- Protection of 12,355 acres, Ejido Laureles/Paso Hondo
- Restoration of 1976 acres, Ejido Laureles. Restoration of 988 acres, Ejido Francisco Villa.
- Maintenance of previous restoration work 19,768 acres, ejidos Paso Hondo, Laureles and Francisco Villa.
- Evaluation and monitoring across 210,039 acres.

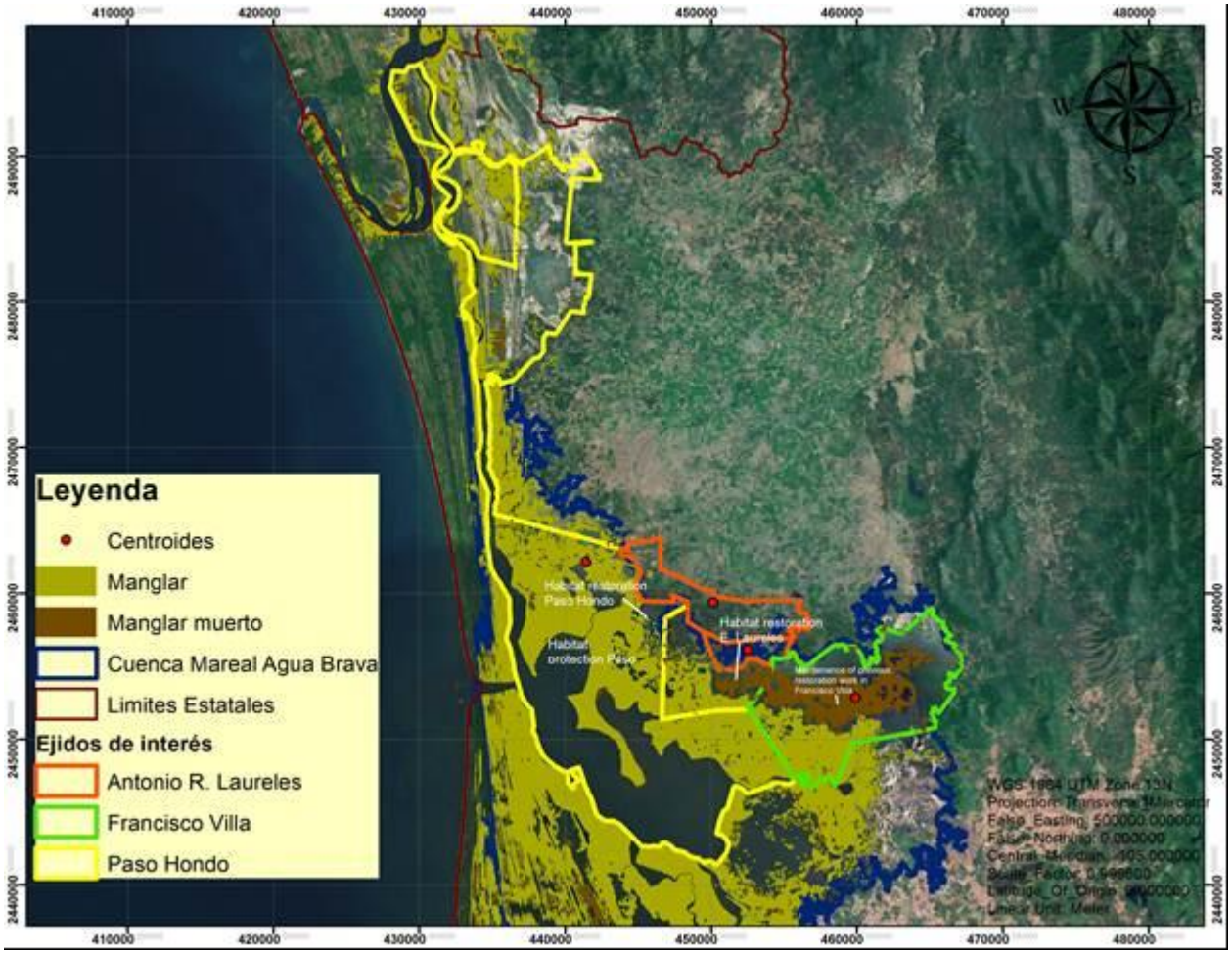


Figure 35: Photos showing surveys to establish the biological baseline in the Las Garzas-Chaguin Wetlands (mangrove plant structure, water quality, birds and fisheries).

Figure 36: Location of Phase 2 of the project, three sub-tidal basins, Estero Puerta del Río, Cordones Sumergidos de Pericos and Cordones Sumergidos de Valle de la Urraca. Work involves restoration and monitoring activities.

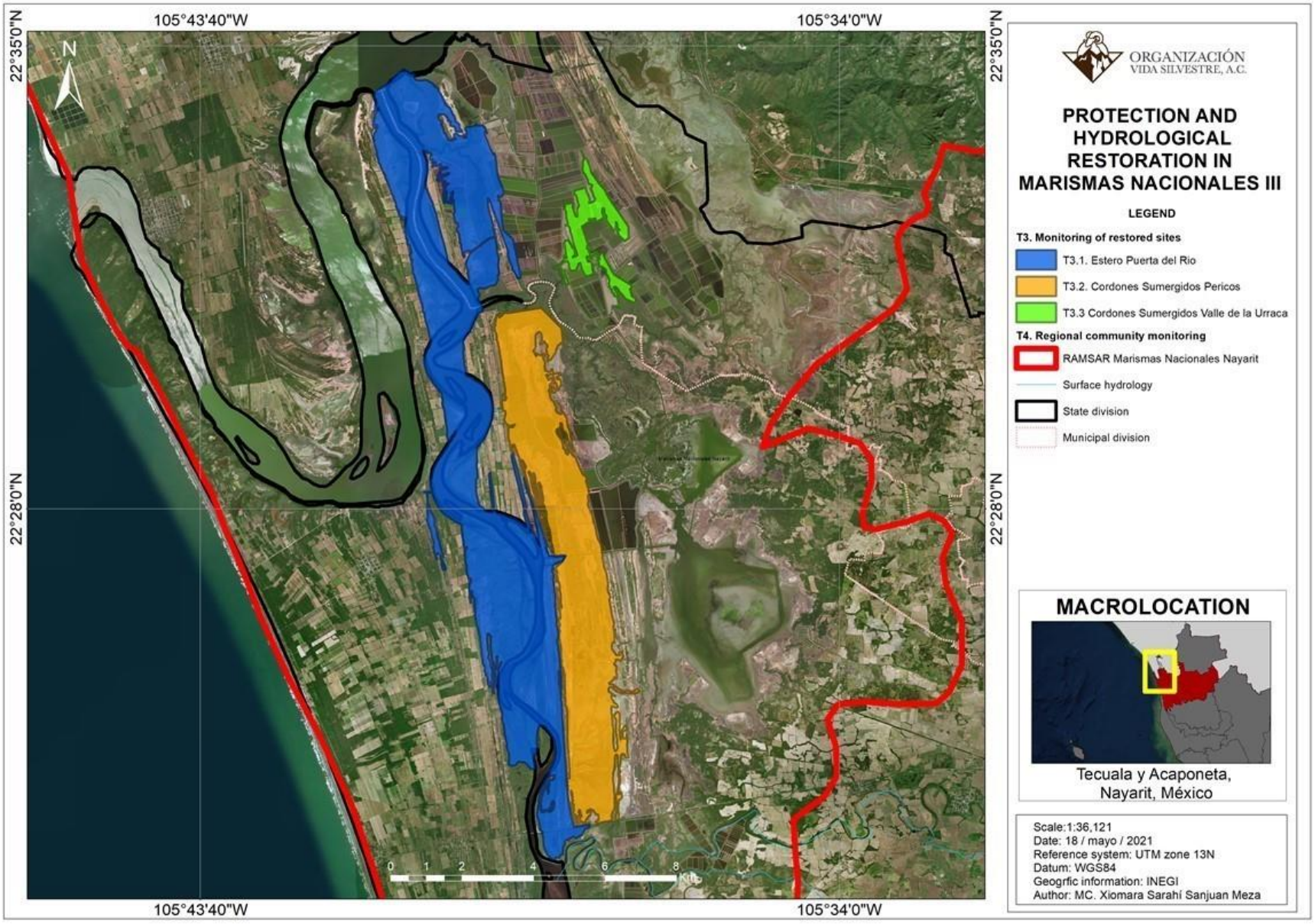


Figure 37: Location of Phase 2 of the project, protection and restoration activities in three ejidos, Valle de la Urracas, Arenitas and San Cayetano del Roblito.

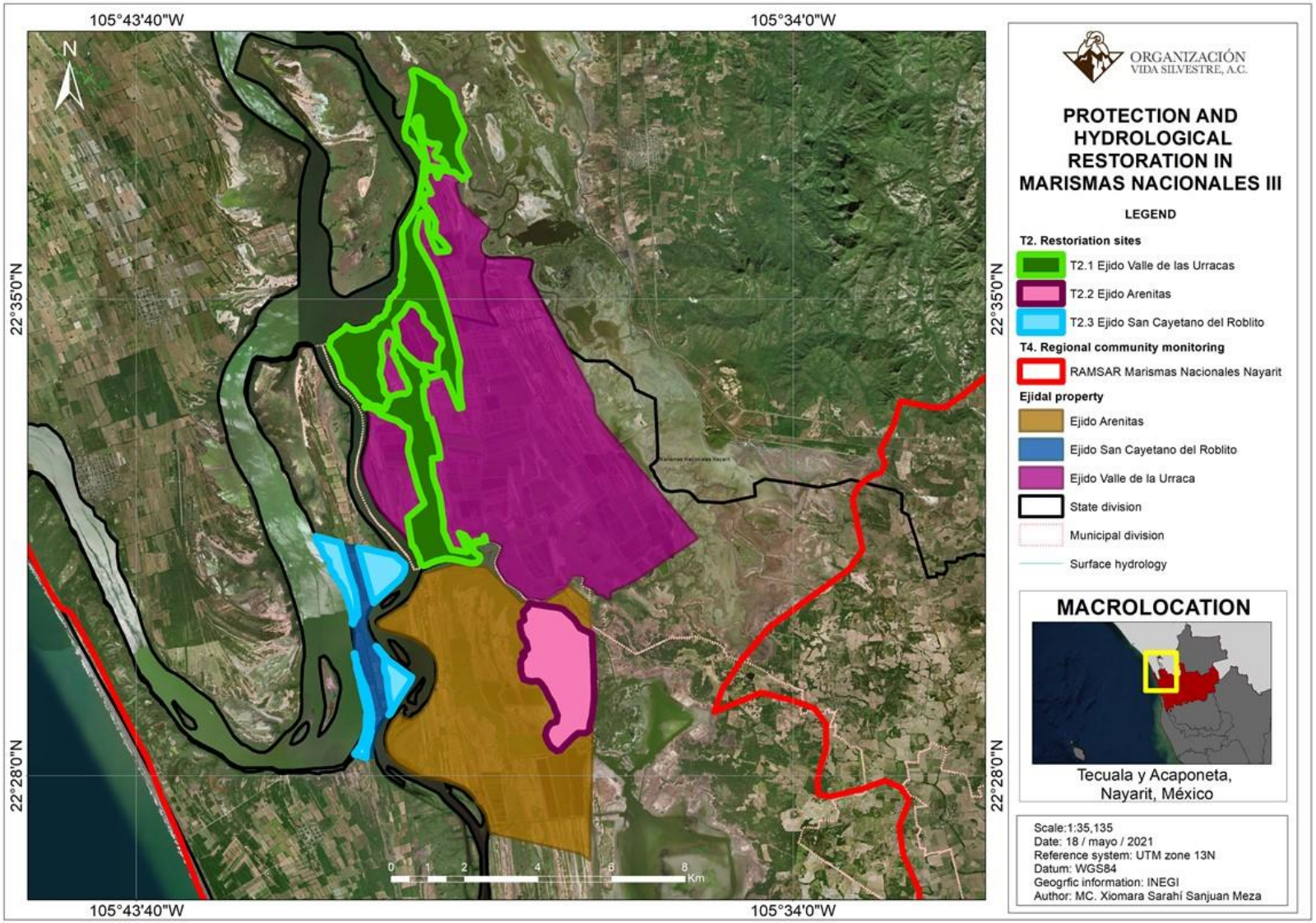


Table 7: Number of individuals recorded by species during monthly surveys (October 2021 to March 2022) in the Las Garzas Lagoon of the Chagüín-Chuiga sub-tidal basin.

Species	October	November	December	January	February	March	Total
spotted sandpiper	1	5	11	5	2	3	27
northern pintail	172	887	878	2	0	0	1,939
cinnamon teal	135	1,882	3,423	212	166	41	5,859
great egret	10	27	36	39	7	15	134
great blue heron	26	31	56	37	30	21	201
ruddy turnstone	0	1	8	0	0	0	9
lesser scaup	19	0	0	0	0	0	19
gray hawk	0	0	0	1	0	0	1
common black hawk	0	0	0	1	0	0	1
green heron	1	0	0	0	0	1	2
dunlin	2	12	35	2	0	0	51
red knot	67	20	0	0	0	0	87
stilt sandpiper	778	1,057	1,779	895	446	301	5,256
western sandpiper	1,867	6,143	8,412	9,300	2,410	1,139	29,271
least sandpiper	247	404	364	778	267	186	2,246
semipalmated sandpiper	0	0	4	0	0	0	4
crested caracara	1	0	0	0	0	0	1
turkey vulture	2	3	10	3	0	0	18
snowy plover	6	87	57	211	71	50	482
semipalmated plover	385	356	929	338	24	8	2,040
killdeer	0	45	113	57	2	0	217
Wilson plover	87	26	234	60	30	54	491
northern harrier	0	2	2	2	0	0	6
black vulture	0	1	10	0	0	0	11
black-bellied whistling duck	0	0	25	0	0	0	25
little blue heron	11	7	38	20	7	8	91
reddish egret	3	4	9	6	9	1	32
snowy egret	14	7	5	5	8	7	46
tricolored heron	5	5	6	3	11	5	35
white ibis	1	8	0	5	4	8	26
peregrine falcon	2	2	2	2	2	0	10
magnificent frigatebird	0	1	3	0	2	2	8
American coot	4	305	4	0	0	0	313
gull-billed tern	0	6	0	4	4	8	22
black-necked stilt	464	486	695	340	230	173	2,388
caspian tern	28	17	8	3	1	0	57
ring-billed gull	6	38	25	29	21	11	130
laughing gull	14	13	8	5	9	9	58
short & long-billed dowitcher	1,408	4,886	3,480	2,165	662	360	12,961
marbled godwit	315	37	367	68	11	0	798
American wigeon	27	430	0	0	0	4	461
gadwall	308	92	64	0	13	0	477
wood stork	6	0	0	0	0	0	6
neotropic cormorant	66	305	94	55	65	51	636
long-billed curlew	0	31	24	80	13	14	162

Species	October	November	December	January	February	March	Total
whimbrel	1	9	8	5	7	4	34
yellow-crowned night-heron	0	2	1	0	0	0	3
black-crowned night-heron	0	0	0	1	0	2	3
ruddy duck	94	0	0	0	0	0	94
osprey	0	0	1	4	2	2	9
American white pelican	133	142	64	84	135	15	573
brown pelican	1	0	0	1	0	0	2
roseate spoonbill	4	17	53	12	4	8	98
white-faced ibis	0	0	0	1	0	0	1
black-bellied plover	344	185	81	249	10	9	878
American avocet	219	700	1,089	717	159	12	2,896
black skimmer	424	450	223	0	0	0	1,097
northern shoveler	2,988	3,015	2,826	2,023	468	105	11,425
cinnamon teal	315	76	104	15	6	8	524
blue-winged teal	2,400	316	1,764	352	46	0	4,878
Forster's tern	17	77	32	6	5	0	137
least tern	0	0	0	0	11	20	31
royal tern	0	10	6	0	0	0	16
lesser yellowlegs	24	32	65	19	12	3	155
greater yellowlegs	15	15	57	28	12	4	131
willet	97	66	118	160	73	43	557