

POLICY BRIEF

Conservation Plan for the Parita Bay Wetlands

Oscar López / Sociedad Audubon de Panamá

View of wetlands of Aguadulce.

Introduction

In a region of exceptional biodiversity, the wetlands of Parita Bay are a vitally important ecosystem that is home to a unique variety of terrestrial and marine species. Each year, the area's mudflats, rivers, swamps, lakes, and mangrove forests provide food and shelter to hundreds of thousands of birds. These habitats also serve as nurseries for commercially valuable fish and crustaceans, and form a natural buffer against coastal erosion and storms.

The Conservation Plan for the Parita Bay Wetlands was developed by Panama Audubon Society. The planning process identified conservation challenges and threats to the Parita Bay wetlands, and selected high-priority conservation targets. Strategies were proposed to reduce threats against these key targets and maintain healthy habitats and stable populations.

Meeting the goals of this Conservation Plan will require increased public knowledge of the ecosystem services that wetlands provide and a greater commitment to science-based conservation among all parties. *By embracing these strategies, Panama can ensure the long-term resilience of this vital resource, and the prosperity of the communities that depend on it.*

Methodology

The study area extends south from Antón to the La Villa River. The area includes approximately 15,000 hectares of intertidal mudflats and adjacent coastal areas. It includes six rivers and three protected areas: Cenegón del Mangle Wildlife Refuge, Sarigua National Park, and Peñón de la Honda Wildlife Refuge.

The methodology used to develop this highly participatory Conservation Plan is based on the Open Standards for Conservation Practice. Planning began with 18 workshops that included 274 participants: fishermen, farmers, local authorities, institutions, private companies, salt farmers' cooperatives, and academics.

Conservation targets were chosen to represent the entire geographic scope. After analyzing threats and anthropogenic factors, goals were established for the desired future state of each target. Then, a situational



FIGURE 1. Parita Bay Important Bird Area (IBA), Parita Bay Conservation Plan.

analysis led to conservation strategies that are likely to be effective in preserving or increasing the status or viability of each target.

The objectives of each result are defined with indicators that can be used to monitor and determine whether objectives are being met — allowing the plan to be adjusted over time to capitalize on the most effective strategies.

Environmental and Economic Importance

Parita Bay is Panama's second most important site for migratory birds and is identified as an important bird area (IBA). The wetlands also serve as nurseries for commercially valuable fish and shrimp, and form a natural buffer against coastal erosion and storms. Rivers, swamps, lakes, and tidal pools are key to maintaining the landscape's water balance, thus supporting freshwater supply for people and agricultural activities. They also cushion the coast from floods and waves, filter pollutants, and purify wastewater. In addition, these natural landscapes sequester carbon, helping to mitigate climate change.

Effectively protecting Parita Bay's wetlands and the ecosystem services they provide is essential to the livelihoods and health of residents.

Threats to the Wetlands of Parita Bay



Climate Change

- Rising temperatures will accelerate sea-level rise, decrease river flow, and lead to the disappearance of sensitive species.
- Rising seas and tidal waves can erode beaches and damage infrastructure. Flooding and saltwater intrusion can salinize water in rivers, lakes, and drinking-water wells.
- Shore, aquatic, pelagic, and island birds face habitat loss due to sea level rise.



Pollution

- The increase in population combined with poor waste management have choked mangroves and mudflats with solid waste, posing a risk to public health and hurting the fishing industry.
- Unregulated agrochemicals are carried by rainwater to waterways, and eventually to marine-coastal ecosystems and the open sea.



Overexploitation of Fisheries

- Fishing resources and profitability are declining, due mainly to a lack of fisheries management and control. The disorder of Panama's fishing industry threatens the basic needs of those who depend on these resources to survive.



Habitat Loss and Degradation

- Lost and degraded habitats (mangroves in particular) are caused by aquaculture, timber extraction, urbanization, soil and water pollution, and natural events.



Modification of Hydrological Conditions

- Modification of water flows leads to increases in turbidity and bio-accumulation of contaminants in fish and other fauna, short-term decreases in dissolved oxygen levels, and compromised habitats and fishing resources.



Human Intrusion and Disturbance

- The advance of urban areas leads to an increase in shore-bird disturbances, reducing the birds' rest and causing flocks to relocate to lower-quality areas. These disturbances lead to a decline in populations.



Mudflats of El Retén beach.

Conservation Targets

Six conservation targets (Conservation Objects), consisting of both landscapes and species, were chosen to represent the total biodiversity of the Parita Bay wetlands. If efforts to preserve these Objects are successful, then the full range of environmental services of the Parita Bay wetlands are strengthened.

1

Salt Flats, Shrimp Farms, and Salt Farms



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Artisanal fisherman in Aguadulce.

Salt flats (*albinas*) are natural flat areas that fill with seawater at certain periods of the year. These high-salinity ecosystems are favored by invertebrate animals that are attractive to shorebirds. Salt farms and shrimp farms function as artificial wetlands that provide an ideal home for birds, fish, and flora. Unfortunately, conflicts can arise when shrimp farmers kill birds to prevent them from feeding on shrimp.

Key ecological attribute

The presence of shorebirds that use these habitats.

Indicator

The percentage of area and number of shorebirds that use these areas.

Goal

By 2032, the population density of shorebirds using shorebird-friendly salt marshes and shrimp farms is equal to or greater than that of previous years' censuses.

2

Clams and Black Conch



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Conchero (black conch fisherman) in El Retén beach.

Many residents of Parita Bay collect mollusks as a subsistence or commercial activity. Among the most-extracted species are the sand clam (*Donax spp.*) and black conch (*Anadara sp.*). High demand for the black conch has reduced its population and may lead to local extinction of the fishery. Deteriorating water quality also decreases mollusk populations.

Key ecological attribute

Capture effort per unit of harvester.

Indicator

The average amount of clams and black conch collected per person, per day, per site.

Goal

By 2032, there is an established adult collection size for clams and black conch that does not affect their reproduction in the wetlands of Parita Bay.

3

Wilson's Plover



Yenifer Díaz / Sociedad Audubon de Panamá

Wilson's Plover.

Wilson's Plover (*Charadrius wilsonia*) is a shorebird species of Least Concern (IUCN Red List). In Parita Bay, plovers are exposed to pollution, habitat loss, and disturbances. Wilson's Plovers depend on fiddler crabs and other marine organisms whose ability to adapt quickly to sea level rise is unknown. More research is needed to fill gaps in data about this species and guide future mitigation measures.

Key ecological attribute

The number of individuals using the Parita Bay wetlands during migration and residence periods.

Indicator

The percentage difference in population density compared to previous surveys in the same area.

Goal

By the year 2032, the winter population of Wilson's Plovers reflected in the Central American Waterbird Census in Parita Bay is equal to or greater than that recorded by the Panama Audubon Society in 2019.

View of Peñón de La Honda.

4

White Shrimp

John Sutherland - Courtesy of Biomuseo

White Shrimp illustration.

Overfishing has led to decreasing harvests of white shrimp (*Litopenaeus occidentalis*), an important economic resource for artisanal fishermen. By-catch is also a problem: for every ton of shrimp extracted, seven tons of other fauna are captured and usually thrown back into the sea.

Key ecological attribute

Adult population size.

Indicator

Total annual commercial catch, by weight.

Goal

By 2032, the commercial catch volume of white shrimp on the Pacific coast is maintained compared to 2005 data.

5

Croaker

John Sutherland - Courtesy of Biomuseo

Croaker illustration.

About 25 species of croaker (*Sciaenidae* family) are found in Panama's Pacific waters. Although they are among Parita Bay's most important commercial catches, there is little reliable information on sizes, catch volumes, and reproductive aspects. In recent years, decreasing catches have been observed; local fishermen say the fisheries are going through a "bad period."

Key ecological attribute

Adult population size.

Indicator

Total annual commercial catch, by weight.

Goal

By the year 2032, there is an established adult harvest size for croaker that does not affect its reproduction in the wetlands of Parita Bay.

6

Mangroves

Yenifer Diaz/ Sociedad Audubon de Panamá

Mangroves of El Retén beach.

Studies highlight the importance of mangrove forests due to the ecosystem services they provide, such as nurseries for fish, sediment stabilization, erosion control, and water purification. They also provide forest products, carbon sequestration, and windbreaks against storms. Among the most serious pressures on mangroves are human population growth, upstream pollution, timber extraction, agriculture, coastal development, unsustainable shrimp farming, and sea level rise.

Key ecological attribute

Mangrove coverage based on periodic satellite and aerial surveys produced by MiAmbiente.

Indicator

Coverage in km² or hectares and the annual frequency of incidents of mangrove loss.

Goal

By 2032, there is no loss of mangroves compared to the data that appears in the MiAmbiente forest cover map for the year 2022.

Recommended Strategies

1) Promote scientific research to inform biodiversity protection and support effective conservation management.

Effective science-based conservation actions depend on reliable data. Currently, there are few official records of fishing catches, pollution levels, and information on the sizes of fish, shrimp, and shorebird populations. Biodiversity monitoring can lead to a more comprehensive understanding of ecological processes and conservation threats. In the case of migratory species such as Wilson's Plover, monitoring and assessment must be coordinated with international conservation efforts along migratory routes. The development of a scientific advisory group would help to identify information gaps, define a roadmap for research, and seek funding sources.

2) Promote and implement good aquaculture, agriculture, livestock, and fishing practices as well as ecological restoration.

Good management practices could minimize negative impacts on the wetlands of Parita Bay. These practices typically save money and positively affect human health. For example, reducing the use of agricultural chemicals would prevent their entry into waterways and also reduce worker and public exposure to toxic chemicals. Good management practices can be implemented by working directly with stakeholders to identify effective techniques and initiate pilot projects. Ecological restoration can recover ecosystems and habitats that are degraded by human activities and/or the impacts of climate change.

3) Create multi-sector alliances to monitor high-impact projects and implement the Conservation Plan for the Parita Bay wetlands.

The implementation of these strategies requires the support of a broad base of stakeholders interested in the long-term conservation of the Parita Bay wetlands. An umbrella strategy is needed to support the formation of an alliance of actors who can support, coordinate, and implement these proposed actions.

4) Promote ecotourism, birdwatching, and rural agrotourism.

Empowering communities to develop sustainable income-generating activities — such as agrotourism, ecotourism, or honey production in mangroves — will lessen pressure to convert wetlands to farms, pastures, and other uses. Teaching rural communities how to manage seafood harvests through monitoring, self-regulation, and sustainable harvesting practices can decrease pressure on these resources. Over the long term, conservation leads to opportunities for increased income and incentivizes sustainable uses.



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Shorebird monitoring.



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El Gago port in Penonomé.

5) Implement the National Communication, Education, Awareness and Public Participation Plan (CEPA) for Panama's wetlands at all education levels, as well as in state institutions and communities.

An informed public is essential for the preservation of ecosystem services of Parita Bay wetlands. Aulas Verdes (Green Classrooms school educational program) content can be used to teach students about the ecology and utility of wetlands — and what can happen if care is not taken to keep natural processes functioning. This knowledge helps to develop co-responsibility and also allows citizens to participate in environmental management and make informed decisions. This strategy also calls for an awareness campaign supported by the National CEPA Plan. The campaign seeks to inform the public about the cultural, economic, and environmental values of wetlands, and the need to rationally use this resource.

6) Promote the development and implementation of territorial planning with ecological and site connectivity criteria.

The advancement of planning for wetland ecological requirements is the best way to ensure that economic development near Parita Bay is compatible with preserving the wetlands' ability to provide environmental services. Both the Ministry of Housing and Territorial Planning (MIVIOT) and some municipalities lead the preparation of land use plans. The Ministry of Environment is tasked with ensuring that plans are completed in accordance with rules that protect ecosystems and with management plans of protected areas.

7) Strengthen the technical, financial, and operational capacities of regional and local institutions and authorities.

Although Panama has many good laws regarding environmental protection, it is necessary to strengthen enforcement capacities for their application, as well as to develop additional measures to fill gaps in wetlands management and protection.

Conclusion

Parita Bay's wetlands directly benefit the health, economic status, and quality of life of its residents. As this plan demonstrates, solutions are available to restore the viability of these ecosystems and enhance their ability to provide essential ecosystem services for humans and biodiversity.

Working together, we can ensure the long-term resilience of this vital resource, and the prosperity of the communities that depend on it.

Parita Bay Conservation Plan (Spanish version only) can be found [HERE](#).



Shorebirds in mudflats.

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