



Impacts on Mangroves and Swamps in Cartagena and Exploration of Alternatives for their Restoration and Protection

► 2013 - 2024

An approach from secondary sources

Elaborated by



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The Regional Center for Responsible Business and Entrepreneurship (CREER) investigates, evaluates and promotes respect for human rights and sustainable development within the framework of business activities.

En consonancia con el Instituto for In line with the Institute for Human Rights and Business (IHRB), CREER has proposed to promote a comprehensive agenda that connects governments, communities, companies and civil society organizations through:

- Collective construction of knowledge
- Trust based dialogue spaces
- Strengthening local capacities

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Presentation ↵	5
Introduction ↵	7
Contextualization ↵	8
Main types of impacts ↵	11
What actions have marked the degradation of swamps and mangroves in Cartagena during the last ten years? ↵	11
• Construction of hotel and tourist complexes ↵	12
• Water flow Disruption ↵	13
• Wetland invasion ↵	13
• Sedimentation ↵	14
• Industrial pollution ↵	14
• Household pollution ↵	14
What economic sectors have been involved in these effects? ↵	15
• Primary sector ↵	15
• Secondary sector ↵	16
• Third sector ↵	17
• Household pollution ↵	18
Initiatives for Recovery or protection ↵	19
Ciénaga de la Virgen ↵	21
Ciénaga de las Quintas ↵	24
Caño Juan Angola ↵	27
Cartagena Bay ↵	29
Conclusions ↵	33



Presentation

In 2021, the Regional Center for Responsible Companies and Entrepreneurship (CREER), in alliance with the Institute for Human Rights and Business (IHRB), began a research and action process Cartagena de Indias, Colombia, with funding from the Rafto Foundation. Its purpose was to identify opportunities in the local context to promote the Built Environments and Oceans and Human Rights agendas.

Within the framework of this general objective, CREER has been generating approaches with local actors, such as the State, academia, the private sector and communities. This work has allowed the consolidation of different products that, within the framework of the relationships built, are aimed at strengthening the knowledge and capabilities of different actors regarding the dynamics of companies and human rights in Cartagena.

After two years of work in the city, a recurring theme in the conversations was identified which concerned the protection and restoration of swamps and mangroves. This concern for strategic ecosystems led CREER to generate a collaborative alliance with the University of Cartagena, through the Institute of Regional and Government Public Policies (IPREG, for its acronym in Spanish).

The initial purpose of this alliance was the joint consolidation of this document, which aims to identify the most important effects of mangroves and swamps in Cartagena, with an emphasis on the effects that could have been related to economic activities, and to identify the actions that have been jointly developed with local actors to protect or restore these ecosystems, between 2013 and 2023.



Introduction

In the coastal heart of Cartagena de Indias, there is an invaluable ecosystem: mangroves, swamps and bodies of water that define the environmental identity of the city. They are homes to numerous species, places with great biodiversity that are increasingly at risk due to various actions, with environmental, social and economic effects.

This text has two purposes. First, to document and understand the various forms of damage that have impacted the swamps and mangroves of the city of Cartagena during the last ten years, as well as identifying the economic sectors that participate in these effects. Secondly, to identify the protection or recovery initiatives indicated in secondary sources, as well as the actors who participated in them.

To achieve these objectives, a review of secondary sources was developed, where various types of sources were considered: academic, official and press.

The document is divided into five chapters. First, this introduction. Second, a contextualization, where some of the environmental management challenges of the city regarding the swamp and mangrove ecosystems are evident. Third, a first approximation to the types of impact on these ecosystems, identifying the actions that the secondary sources indicate have marked the degradation during the last ten years and the economic sectors that have been involved. The fourth chapter identifies the initiatives that the secondary sources indicate have been developed on behalf of different actors, such as the State, the private sector, communities and civil society organizations, and academia. The last chapter points out the conclusions of the document.



Contextualization

Cartagena is a coastal city, surrounded by bodies of water, with a territorial model that seeks to consolidate it as a tourist, port and industrial center (POT, 2001). In this sense, it projects residential activities and the main economic activities towards the coastal front. Therefore, over the years the phenomenon of urbanization has been concentrating, with the accelerated appearance of high-rise buildings as the main characteristic (IHRB and CREER, 2022). At the same time, the communities that historically settled on the coasts have been displaced towards the internal side of Cartagena; that is, into freshwater bodies.

Mangroves and swamps are strategic ecosystems on which Cartagena has been built. Therefore, they have witnessed a constant increase in damage that threaten their environmental integrity. These ecosystems, crucial for a biodiversity and ecological balance, have become vulnerable points due to a complex interaction of factors of anthropogenic and natural origin.

Mangroves, with their intricate roots and dense vegetation, act as guardians of the coastline, providing shelter to a diversity of marine species and acting as natural barriers against



extreme climate events (Rodríguez, 2019). The swamps, for their part, are mirrors of fresh water that are home to a varied aquatic fauna and flora (Rodríguez, 2019). These wetlands are not only essential sources of biodiversity, but also hydrological regulators, contributing to maintaining a balance in water flow patterns (Rodríguez, 2019).

Although the territorial model in the Master Plan attempts to define a compatible development with the care of strategic ecosystems such as swamps, mangroves and wetlands, the accelerated expansion and tourism activities, as well as industrial and port growth, have generated impacts on these and other environmental areas of interest. (IHRB and CREER, 2022).

Added to this, it is challenging for the city to care for these ecosystems having an outdated Master Plan for more than ten years. Although

four attempts to update it have been made, almost all of them have failed at the same stage: environmental consultation. Only one was adopted by Agreement 033, but it was suspended due to a failure in the procedure for not having presented supporting technical documents and not having generated an instance of participation in the Open Town Hall.

The administration that has just left (2021-2023) resumed many of the inputs that were developed between the years 2011-2015-2017 and updated others to present to citizens a new effort to update this Master Plan. This effort involved the participation of citizens, which generated learned lessons from the challenges in terms of relationships, communication, information, methodology, among others. However, the update process has not been completed either.

This situation not only creates barriers to the protection of strategic ecosystems, such as swamps and mangroves in Cartagena, but also constitutes a challenge for the management of socio-environmental conflicts in the territory.

Likewise, the Office of the Inspector General for Environmental and Agrarian Affairs of Bolívar identified some of the environmental challenges faced by the municipalities in the department of Bolívar, with effects on the strategic systems of swamps and mangroves in Cartagena (Procuraduría Judicial para Asuntos Ambientales y Agrarios de Bolívar, 2023). In addition to recognizing the need for adjustments and compliance with the Master Plan, as well as other territorial planning and environmental and disaster management plans¹, it points out the need to articulate the Environmental plans with the planning of municipalities; carrying out actions to avoid deforestation and promote reforestation activities; overcoming the nonexistence or precariousness of public services such as aqueduct, sewage, solid waste collection, as well as the inadequate disposal of wastewater; the effective efforts of the authority of the Mayor's Office to prevent conduct that generates damage to the environment and affects the well-being of the population, and to stop pollution and inappropriate interventions in water sources, among others (Procuraduría Judicial para Asuntos Ambientales y Agrarios de Bolívar, 2023).

On the other hand, environmental management is also challenging in Cartagena. It is a territory with two environmental authorities with gray areas of competition and low levels of coordination in situations that merit their joint work, such as the delivery of environmental licenses and permits in places where the urban-rural division is not clear (CREER, 2024) or against the actions to protect and recover the Bay of Cartagena (Consejo de Estado, Sala de lo Contencioso Administrativo, Sección Primera, 2020).

These challenges require a multi-collaboration approach, oriented towards articulation. Why multi-stakeholder? Because of the need to address possible solutions to a social and environmental problem with multiple causes, the answer can hardly be found, developed and executed by a single actor; the complexity of the problem shows the complexity of the solution (Arango Villegas, Molina Miranda, & Botero Suárez, 2021). To achieve it, the interaction of various actors and the coordination of actions is necessary.

Therefore, it is of interest not only to know the effects on the mangroves and swamps in Cartagena, but also to identify the actors who have participated both in the effects and in actions or initiatives for their protection and recovery.

¹ As a Comprehensive Solid Waste Management Plan, the Sanitation and Dumping Management Plan and the Municipal Disaster Risk Management Plan (Procuraduría Judicial para Asuntos Ambientales y Agrarios de Bolívar, 2023).

MAIN TYPES OF IMPACTS

Cartagena de Indias is a city that has been growing constantly. This expansion of the city has generated a deterioration and progressive reduction in natural areas. This chapter explores the effects on swamps and mangroves that the secondary sources indicate, first, due to the type of actions that generate the effects and, then, recognizing the different types of actors involved.



What actions have marked the degradation of swamps and mangroves in Cartagena during the last ten years?

Below are five actions that stand out in the secondary sources as catalysts for the degradation of swamps and mangroves in Cartagena:

Construction of civil projects, such as roads, docks, ports, among others

The construction of civil projects has caused significant damage to Cartagena's water bodies. Among others, this includes the sedimentation of river and sea beds, due to erosion during construction; water pollution, due to spills of chemicals and construction materials; the alteration of aquatic habitats, and the modification of natural water flows (Tejedor, 2019).

Additionally, effects related to the obstruction of water flows are identified, with effects on the nutrition and health of people, especially in areas where clogging and obstruction of natural channels occurs

(Sánchez Páez, 2002). Likewise, the disappearance of mangroves due to the drying of floodplains and the construction of embankments has led to the disappearance of many hectares of mangroves (Sánchez Páez, 2002).

These effects also generate impact on the fauna and flora, negatively affecting the dynamic ecosystems and biodiversity of the region (Sánchez Páez, 2002).

Despite these negative consequences, some projects claim to be designed to minimize the environmental impact on water bodies and, in general, on the environment. For example, the Great Mangrove Viaduct, built on the Ciénaga de La Virgen in Cartagena, indicates that environmental aspects were prioritized, through the use of recycled materials, solar energy panels, among others, implementing elements that prioritize the components of the soil and sustainability (ACH Panels, 2020).

Construction of hotel and tourist complexes

Mainly, although not exclusively, between the Rafael Núñez Airport and the La Boquilla sector, the construction of hotel and tourist complexes intensified. In the last decade, the number of hotel establishments has doubled (Figuroa Alcázar, 2023), which has been generating the transformation of the natural landscape and pressure on local water resources, due to the increase in water demand, air pollution, soil and water, the loss of habitats and biodiversity, as well as additional pressure on existing infrastructure.

In addition to the environmental impacts in terms of infrastructure construction, pollution by the tourism sector and, particularly, hotels, is a situation that generates concern about the socio-environmental effects on the Bay of Cartagena (Sánchez Páez, 2002).



Disruption of water flows

The interruption of water flows in Cartagena is a problem that affects the city and its inhabitants. The lack of treatment of domestic and industrial wastewater contributes to pollution, which negatively impacts activities such as fishing and tourism, as well as other ecosystem services (Mogollón Vélez, 2017).

Likewise, due to sedimentation and clogging of channels, there has been a reduction in water exchange in the swamps, with effects on the biodiversity and sustainability of this fragile ecosystem and on the quality of water (Maldonado, Baldiris, & Díaz, 2011; EPA Cartagena, 2021).

Wetland invasion

The swamps and mangroves in Cartagena have been affected by the illegal construction of houses, which has generated concerns on the impact on the ecosystem (Environmental Observatory of Cartagena de Indias, 2015; Batista, 2023). Organizations such as the Bolívar Guild Council have warned about these invasions and have requested measures to protect the wetland (Caracol Radio, 2020). Local authorities, such as the Environmental Public Establishment (EPA) and the Colombian Environmental Guard, have carried out awareness-raising and environmental education activities to prevent impacts on this ecosystem (Alcaldía Mayor de Cartagena de Indias, 2023c). The situation highlights the need for effective measures to protect wetlands and guarantee their sustainable management in Cartagena de Indias (Caracol Radio, 2020; Carrasquilla, 2021).



Sedimentation

Sedimentation is a problem that affects both the ecosystem and socioeconomic activities. It reveals the influence of different factors such as the lack of treatment of domestic and industrial wastewater, with negative impacts on activities such as fishing and tourism (EPA Cartagena, 2022a).

Sedimentation has led to a decrease in oxygen and an increase in the acidity of the water in the swamps (Catorce6, 2018), which exacerbates the vulnerability to the risk of loss of biodiversity and the sustainability of the swamps and mangroves (Tinoco Devia, 2006).

As a result, there are warning signs of the possible disappearance of the bodies of water that make up the swamps and mangroves in Cartagena, as well as the need for intervention (Donado, 2022).

Industrial contamination

Industrial pollution has also seriously affected the Cartagena Bay. It has generated the concentration of high levels of mercury, lead and nickel, affecting the vitality of aquatic ecosystems, endangering fishing and water quality in the region (Mountain, Pollution of the Bay of Cartagena enters through the Canal del Dique, 2021) (Means of control for the protection of collective rights and interests, 2020).

In the face of industrial pollution, the Office of the Inspector General has pointed out the importance of the role of environmental, local and regional authorities, as well as the coordination between them, due to their lack of verification or audit, they end up contributing to exacerbating the effects (Council of State, Administrative Litigation Chamber, First Section, 2020).

Household Pollution

In Cartagena, problems of water pollution persist due to the actions of inhabitants and communities that threaten ecosystems (EPA Cartagena, 2023a). Pollution of the city's canals and marshes is alarming, with mangroves being affected by negative human actions such as landfills, debris and other materials, indiscriminate logging, and industrial, human, and agricultural discharges (Maldonado, Baldiris, & Díaz, 2011). Pollution has impacted the vitality of species inhabiting mangroves, with a observed decrease in their ability to adapt or overcome the environmental impact (Maldonado, Baldiris, & Díaz, 2011).





What economic sectors have been involved in these effects?

The effects indicated in the previous section are associated with some of the most important economic sectors in Cartagena. Below you will find the associations presented in the secondary sources.

Primary sector

The primary sector is made up by activities related to forestry, agriculture, livestock, fishing and mining. The secondary sources indicate that the forestry industry is the one that generates the greatest damage within this sector. Wood extracted from the cutting of mangroves and trees are in high request by the markets (Rodríguez, 2019; Carrasquilla, 2021; Guevara, 2018).

On the contrary, artisanal fishermen who are part of this primary sector perceive effects due to the degradation of the environment and bodies of water: the rise in the sea level greatly affects the fishermen in the coasts of Cartagena, whose process and capacity for fishing is affected. Likewise, they have seen their activity change and decrease due to the displacement of key marine species for their activity, due, among other reasons, to erosion (EAFIT University, 2021).



Secondary sector

The secondary sector, made up by the set of activities linked to the transformation of inputs for the production of final goods, such as the manufacturing industry, construction and transportation, among others, develops certain actions that generate effects on the swamps and mangroves in Cartagena. The secondary sources indicate that these actions are carried out by all types of companies, from neighborhood businesses to large operations companies (EPA Cartagena, 2023b).

Some examples are dumping from small businesses, such as car washes (Alcaldía Mayor de Cartagena de Indias, 2023d), to large companies

that have had to be accountable to the authorities, the case of Dow Química which, in 1989, caused serious environmental damage due to the spill of a compound called Lorsban, which resulted in the death of thousands of fish in the Bay of Cartagena. Due to this, in 2015, the Court ordered Dow Química to take measures to compensate for the damage to the bay (El Tiempo, 2015).

The construction sector is also part of the secondary sector. The construction of roads and the expansion of the city of Cartagena has received complaints about the poor disposal of toxic waste, the reduction in many cases of available green space in the city and the loss of strategic ecosystems such as mangroves, due to landfill actions (Council of State, Administrative Litigation Chamber, First Section, 2020; Tejedor, 2019). However, the secondary sources emphasize that, in many of these cases, responsibility does not fall solely on the private sector; On the contrary, the State in certain circumstances does not exercise the necessary regulations to protect the environment in these scenarios: the regulations imposed are not strict enough to guarantee the care of the ecosystem or are not applied systematically, granting permits lightly and without the due process and formal requirements (Tejedor, 2019).

Within the construction industry, construction companies and real estate developers are leading actors. Decisions about location, design and management can have significant impacts on the natural environment and on local communities. This situation is exacerbated because the Master Plan has not been updated in the last ten years (CREER, 2024). Real estate activities in Cartagena are related to the loss

of mangroves in some areas, as well as deforestation, coastal erosion, and urban expansion (Contreras, 2021).

The effects caused by this industry can also harm its own profitability and stability, because the communities that reside near real estate projects can experience a series of impacts, such as the loss of land and changes in the urban landscape due to sedimentation and pollution (National Environmental Licensing Authority, 2021).

This also includes actions associated with the occupation of wetlands, a phenomenon that occurs for various reasons. One of them is the validity of Law 62 of 1937 and Decree 7 of 1984 that enable the State, through Edurbe - a public-private entity - to “sell the recovered lots [on the banks of bodies of water], in the manner established by law and other regulations”.

Another reason for the occupation of wetlands is the vulnerability suffered by families who are in a situation of extreme poverty, and who cannot find other places to settle. Currently,

there are migrant families, displaced by violence, and coastal communities that have lost their territories and end up settling on the banks of bodies of water (Álvarez, 2017).

Third sector

The third sector of the economy, associated with economic activities such as the provision of services, trade, transportation and communications. Tourism is the most notable activity in this sector in Cartagena. It affects the swamps and mangroves, but it is also affected by the loss or degradation of these ecosystems.

As generators of the impact, the secondary sources point out tourism as a contributor to pollution due to waste disposal. In the most touristic areas of Cartagena, such as the historical monuments in the city center, the beaches or walks by the bay, tourists tend to carelessly deposit garbage or residue products that, after consumption, generate pollution on the city’s bodies of water (BASIC Cartagena, 2020).





At the same time, this pollution also affects the tourism industry, as it makes Cartagena a much less attractive destination (González Ortega, 2023).

Household pollution

On the other hand, some communities and homes in Cartagena also affect the swamp and mangrove ecosystems due to the poor disposal of their waste (Castellar Acosta, 2023). The lack of education regarding this, added to the lack of articulation and action by the entities in charge of garbage collection, has generated environmental impacts on bodies of water, flora and fauna (Pereira, 2020).

The communities that surround the bodies of water often point out that they have historically settled on the edge of the pipes; and those who pollute are families and businesses that are located inside the neighborhoods and that do not recognize the value of the bodies of water (Environmental Observatory of Cartagena de Indias, 2016a). They report feeling stigmatized, despite the work they carry out to try to maintain their traditional relationship with the environment (Environmental Observatory of Cartagena de Indias, 2016a).

The contamination of these ecosystems has generated environmental pollution problems, affected their biodiversity, while generating health problems to the communities that settle on this ecosystem (Torres, 2012; González, Heníquez, Peña, Castro and Forero, 2022).

RECOVERY OR PROTECTION INITIATIVES

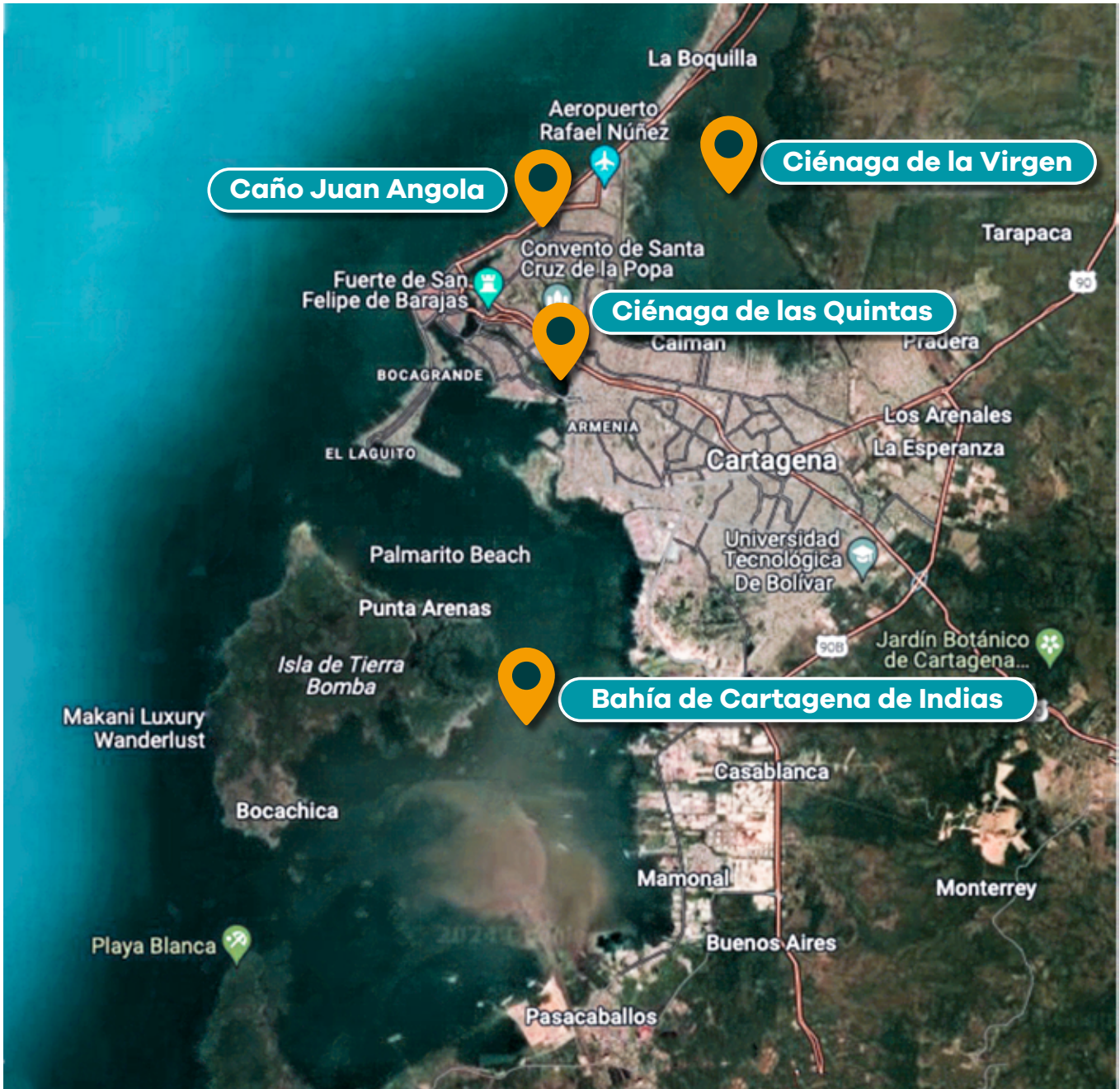
As has been stated throughout the text, the effects on swamps and mangroves in Cartagena are due to various actions and with responsibility of different sectors, with different consequences and dimensions on environment, society and economy (Procuraduría Judicial para Asuntos Ambientales y Agrarios de Bolívar, 2023). This is a multi-causal and multi-effect problem. Therefore, this chapter seeks to identify the initiatives that different actors have been developing for the recovery of these strategic ecosystems in Cartagena².

It is divided around the territories that have been prioritized for actions, that is, the places that the secondary sources indicate as focuses of impact, but also of action for recovery and protection: the Ciénaga de la Virgen, the Ciénaga de las Quintas, the Caño Juan Angola and the Bay of Cartagena.

Although this research focused on the effects on swamps and mangroves in Cartagena, at this point it was necessary to include the Bay of Cartagena as another variable, since both the effects and the initiatives for its recovery or protection, as well as the effects, generate impacts on strategic ecosystems. In other words, in order to talk about the effects on swamps and mangroves in Cartagena, as well as possible recovery actions, it is necessary to recognize the interdependence of these ecosystems with others on the coast.

² Because the initiatives are organized according to the territories where actions have taken place that seek the recovery and protection of the swamps and mangroves in Cartagena, the Ecobloque was not included as an initiative. However, it is considered important to point out that it is an inter-institutional strategy in Cartagena, which focuses on the surveillance, control and recovery of degraded areas in wetlands and bodies of water. This initiative involves several entities, such as the EPA Cartagena, Edurbe, the local Mayor's Office of La Virgen y Turística, and the Police Inspection. This strategy is part of the efforts for the environmental recovery of Cartagena and the protection of its ecosystems, including the fight against water and mangrove pollution (EPA Cartagena, 2020) (EPA Cartagena, 2022c) (EPA Cartagena, 2022b). The National Government and the Mayor's Office of Cartagena have shown interest in reactivating and strengthening the Ecobloque as part of a pact for the environmental recovery of the city (Alcaldía Mayor de Cartagena de Indias, 2022b).

Map 1. Places indicated by the secondary sources where there is greater damage to swamps and mangroves in Cartagena, as well as actions for their protection and recovery



The points indicated on the map are the places indicated in the secondary sources where the greatest impact on swamps and mangroves are, as well as protection and recovery actions. However, Cartagena’s bodies of water are

interconnected through inland pipes and lakes, made up by La Ciénaga Las Quintas, El Caño Bazarzuto, Laguna de San Lázaro, Laguna de Chambacú, Laguna del Cabrero and Caño Juan Angola. (IAVH & PUJ, 2015).

Ciénaga de la Virgen

The Ciénaga de La Virgen is a coastal lagoon located on the north side of the City of Cartagena and separated from the sea by the La Boquilla range. It is one of the priority watersheds for management and planning in the region (IAVH & PUJ, 2015); However, the lack of a conservation and surveillance policy has caused immense damage for years, with invasions, filled with debris and out of control logging that have led to the loss of connectivity between the bay, the swamp and the sea (Donado, 2022; Carrasquilla, 2021)

Below is the table of recovery or protection initiatives:

Recovery or protection initiatives for the Ciénaga de la Virgen		
Actors	Initiatives	Current status of the initiative
Communities	<p>Some communities that surround and inhabit the Ciénaga de la Virgen have developed actions for its recovery. This is the case of the Villagloria Community Council, made up of 16 women who cultivate mangroves (Montaño, 2023). Since 2018, and as compensation to the communities in the north of Cartagena, many of which make a living from fishing, the coastal concession, with the support of The Sena and Cardique, trained these women to cultivate mangroves and repopulate the swamp. (Montaño, 2023).</p>	<p>In progress. Articulated with The Sena and Cardique</p>
	<p>There are also initiatives between civil society organizations and local community companies that promote the preservation of swamps and mangroves. The Ecoprogreso Foundation was articulated with local companies that offer community tourism and ecotourism services with the aim of generating restoration actions (planting) and protection of the Ciénaga de la Virgen (Mourra & Cifuentes-Sarmiento, 2013).</p> <p>The Ecoprogreso Foundation is committed to ecotourism initiatives for the Ciénaga de la Virgen, which contribute to the preservation of mangrove ecosystems, as do community companies such as Eco-tours Boquilla, Los Arriberos EAT, La Cueva del Manglar, and the Corporación Punto Verde Aquaturistics (Mourra & Cifuentes-Sarmiento, 2013).</p>	<p>There is no information available on the continuity of the initiative.</p> <p>Articulated with local companies that offer community tourism and ecotourism</p>
State	<p>EPA has directed its actions to increase awareness among the inhabitants surrounding the Ciénaga de la Virgen about the benefits that would come from connecting to the sewage network and not generating more discharges into neighboring canals, which flow into the Ciénaga de la Virgen. This is not only to minimize environmental damage and reduce the impacts that threaten the health of these communities (EPA Cartagena, 2023a).</p>	<p>In progress. It is not constant, but it is done by sectors.</p> <p>EPA only</p>

Recovery or protection initiatives for the Ciénaga de la Virgen

Actors	Initiatives	Current status of the initiative
State	<p>The DIMAR has been promoting a reassignment of powers for the restitution of illegally occupied low-tide lands, which allows entities such as the company commands, which on behalf of Decree 5057 of 2009 exercise the functions of control and the administration of public use assets and to technically identify low-tide lands, advancing these restitution processes of public use assets to constitute these lands. This allows for more effective and coordinated actions to identify and restore low-tide lands that are part of public use assets, preventing their illegal occupation and ensuring their use in accordance with environmental regulations. This contributes to the conservation of biodiversity and the ecological value of swamp for present and future generations (Universidad Externado, 2019).</p>	<p>It is proposed to maintain surveillance so that, if any case is observed, the illegal occupation of low-tide lands can be evicted.</p> <p>DIMAR and Port Captaincy</p>
	<p>EPA has an active initiative that is part of the From time to time, project called “ Ciénaga de la Virgen Water the governance table Management System”, which involves the holds meetings with development of a governance table for the environmental Ciénaga de la Virgen, with the aim of addressing leaders belonging to environmental challenges in a comprehensive different communities manner and promote long-term sustainable surrounding the solutions, adapted to the communities that Ciénaga de la Virgen. are part of this socio-ecosystem. The ultimate purpose is to achieve environmental restoration Interinstitutional of this body of water. This governance table is made up of representatives of the mayor, Council, Local Mayors, EPA, Cardique and Planning Secretariat, Infrastructure Secretariat, Planning, Assessment, General Secretariat, Corvivienda, Participation Secretariat, and the Risk Management Office. There is also the participation of the Police, Office of the Inspector General, Public Space, Dimar, JAC and other community organizations (EPA Cartagena, 2022d).</p>	<p>From time to time, the governance table holds meetings with environmental leaders belonging to different communities surrounding the Ciénaga de la Virgen.</p> <p>Interinstitutional</p>
Private sector	<p>An important initiative to highlight the part of the private sector consisted on resuming reforestation and ecological restoration actions in the Ciénaga de la Virgen, particularly in its southern area near Olaya Herrera and Pozón neighborhoods. It was planned to plant around 40 thousand seedlings in 2023, with the support of the private sector. The initial day included the participation of organizations such as ANDI-Traso, community leaders, Fundación Bosque del Manglar and the coordination of EPA Cartagena. The main objective is the ecological restoration of the Ciénaga de la Virgen, repopulating deforested areas, revitalizing the body of water and protecting the mangrove ecosystem (Colectivo TRASO, 2019; EPA Cartagena, 2023).</p>	<p>The sources mention that it was estimated that more than 40,000 seedlings would be planted by 2023, but no further news was found to say whether this goal was met, and whether this initiative has continued in any way.</p> <p>ANDI Alliance, communities, EPA, civil society organizations.</p>
Academia	<p>Academy through an agreement signed between the Alexander Von Humboldt Biological Resources Research Institute, the Regional Autonomous Corporation of the Canal del Dique (Cardique) and the Environmental Public Establishment (EPA), in accompaniment with the Javeriana University, the Omacha Foundation and the Caribbean Hydrographic and Oceanographic Research Center (CIOH), develop a technical study was developed to delimit and understand the current state of the Ciénaga de la Virgen with the aim of recovering it (Gomez, 2014).</p>	<p>There is no further information regarding the completion or results of the study carried out.</p> <p>State (studies) and Academy.</p>



► Ciénaga de las Quintas

The Ciénaga de las Quintas is a body of water that is located along one of the main roads of the city, specifically next to the public market square, between the Jiménez Bridge and the Bazurto Bridge. There you can observe red mangrove species (*Rhizophora mangle*) and dark mangrove (*Avicennia germinans*) (Environmental Observatory of Cartagena de Indias, s.f).

Below is the table of recovery or protection initiatives:

Recovery or protection initiatives for the Ciénaga de las Quintas		
Actors	Initiatives	Current status of the initiative
► Communities	Communities participated in activities led by the State, mainly by EPA (EPA Cartagena, 2021a) and by the Public Ministry (Caracol Radio, 2021).	Finished
► State	The Municipal Ombudsman's Office of Cartagena convened actors a working group to find a solution to the contamination of the body of water of the the Ciénaga de Las Quintas, where merchants and those who use this public space participated. They committed to keeping the sector this clean and the Environmental Police also committed to generating greater controls to prevent this over time. ecosystem from continuing to be contaminated (Caracol Radio, 2021). Communities participate in actions proposed by other actors such as the Public Ministry, through the Municipal Ombudsman's Office of Cartagena.	The the above-mentioned actors showed their commitment to improvement swamp; it be seen how commitment is maintained
	In 2010, the 12th Administrative Court of Cartagena also ordered the ministries of environment and the District Administration to carry out the necessary actions to recover the health conditions of the Ciénaga de las Quintas (Molina Rodríguez, 2020). However, fourteen years later, this has not happened.	Has not started

Recovery or protection initiatives for the Ciénaga de las Quintas

Actors	Initiatives	Current status of the initiative
State ↗	<p>In 2020, the Administrative Court of Bolívar ordered to the District, during the urban renewal plan of the supply center, to carry out the necessary study to be transferred to another area of the city according to the use of the land, “so that water sources do not continue to be affected as is happening with the Ciénaga de las Quintas” (Cassiani Barrios, 2023).</p> <p>The Administration signed an inter-administrative agreement with Findeter for \$2.1 billion Colombian Pesos in June 2023, with the purpose of providing “technical assistance and resource administration to the District for the development of the technical, social, property, environmental, financial and legal structuring to prefeasibility of the Public Market System project” (Cassiani Barrios, 2023).</p> <p>These actions have been accompanied by discomfort on the part of minority associations of the Bazurto Market, which reported not being included in said studies. For this reason, they developed communication channels with the District Council so that socialization spaces could be established between Findeter and the associations of small and independent merchants (Cassiani Barrios, 2023).</p>	<p>No information</p> <p>Administrative Court orders.</p> <p>13 years later the studies begin, but the relevant actors do not feel included. In development process.</p> <p>District Alliance and Findeter socialization to selling associations.</p>
	<p>Ecobloque developed a recovery process for the areas on the banks of the Bazurto channel, Pie de La Popa sector, where the mangrove area was being invaded with illegal makeshift shelters. It did so through eviction operations in which EPA Cartagena, Public Space Management, Environmental Guard, Municipal Ombudsman’s Office and Environmental Police participated (El Universal, 2022).</p>	<p>The state, through Ecobloque and EPA Cartagena, continually carry out these types of initiatives to recover various mangroves in the city.</p> <p>Interinstitutional (eviction)</p>
	<p>EPA led the signing of a multi-stakeholder commitment to recover environmental conditions in Bazurto and the Ciénaga de las Quintas. It involved community actors, such as representatives of the communities of Martínez Martelo and Chino; associations, such as associations of sellers, merchants and fishermen, as well as the public sector, such as Public Space Management, Environmental Guard, Environmental Police, Veolia cleaning consortium, among others (EPA Cartagena, 2021a).</p> <p>The purpose of the meeting was to establish recovery actions; However, there is not enough information to show what actions are going to be developed and by which actors, in what time periods, nor indicators that can be monitored.</p>	<p>There is no information on indicators, verification groups or continuity of actions.</p> <p>Multi-stakeholder commitment recover environmental conditions in Bazurto and Ciénaga de las Quintas.</p> <p>Multi-stakeholder alliance led by EPA</p>

Recovery or protection initiatives for the Ciénaga de las Quintas

Actors	Initiatives	Current status of the initiative
<p>▶ State</p>	<p>Led by EPA, specific actions are carried out to clean up the swamp, with the help of different actors within the State, such as the General Secretariat of the Mayor's Office of Cartagena, the Office of Public Services, the Environmental Guard, the Environmental Police and the District Office, as well as companies and civil society organizations.</p>	<p>Action performed and completed.</p> <p>Interagency led by EPA</p>
<p>▶ Private sector</p>	<p>Participation in planting activities of 110 new trees for the city, donated and planted by the Public Environmental Establishment, EPA Cartagena, which also provided technical assistance to guarantee the sustainability of the <i>Sembratón</i>. The activity was attended by some artists and was supported by the Fundación Verde que te Quiero Verde, the Veolia Cleaning Consortium, the Cartagena de Indias International Film Festival, the Network of Departmental and District Film Counselors of Colombia, the Community Action Board of Barrio Chino, Caribe Plaza Shopping Center, Pie de la Popa Community Action Board, and the Popa Neighborhood Association (Caracol Radio, 2023a).</p>	<p>Action performed and completed.</p>



Caño Juan Angola

The most predominant species is the black mangrove (*Avicenia germinans*), followed by the red mangrove (*Rhizophora mangle*) (Environmental Observatory of Cartagena de Indias, s.f.).

Recovery or protection initiatives for Caño Juan Angola		
Actors	Initiatives	Current status of the initiative
<p>→ Communities</p>	<p>Communities surrounding Caño Juan Angola have been developing community tourism initiatives, with the main objective of offering tourist services, while promoting environmental conservation. Through ecological tours in wooden boats, the aim is not only to publicize the natural wealth of the area, but also to generate employment and improve the income of the local community, led by artisanal fishermen. In addition, community participation in environmental conservation is encouraged and training programs are established for youth and adults, thus contributing to the socioeconomic inclusion and sustainable development of the region (Caracol Radio, 2019).</p>	<p>This type of ecotourism plan continues to be carried out in the city, encouraging alternative tourism that in turn raises awareness among visitors.</p>
<p>→ State</p>	<p>EPA Cartagena presented the Conceptual Design of the Caño Juan Angola Comprehensive Recovery Project. A plan that contemplates actions to be developed jointly between authorities, to achieve the recovery of Caño Juan Angola. The approximate cost of the project, estimated in 2018, was \$48 billion Colombian Pesos (EPA, 2021b).</p>	<p>The actions subsequent to the Plan are not clear.</p>
	<p>The Office of the Inspector General asked the environmental authorities of Cartagena to adopt the measures required to recover and preserve the Juan Angola pipe. Likewise, to adopt an articulated environmental policy that allows, first, to rescue the mangrove as a natural barrier to combat the sedimentation of water source and, second, to implement inclusive actions that benefit the inhabitants of the surrounding neighborhoods, mainly in Marbella and Torices (Procuraduría General de la Nación, 2023).</p>	<p>It is not clear what actions took place after this request.</p>
	<p>Personnel from the Technical and Sustainable Development Sub directorate of the EPA Cartagena recommends that the community refrain from carrying out service activities that cause a negative impact on water resources, mainly on these bodies of water that are essential to the city, because they affect biodiversity and quality of water resources, and as a consequence, the well-being of the community is affected (EPA Cartagena, 2023b).</p>	<p>The instruments for measuring or evaluating the appropriation of these recommendation are not clear.</p>

Recovery or protection initiatives for Caño Juan Angola

Actors	Initiatives	Current status of the initiative
<p>Private sector</p>	<p>Esenttia, a company belonging to the Ecopetrol Group, in alliance with Actuar por Bolívar and the Planeta Azul Foundation, developed a project aimed at recycling pedagogy in the city of Cartagena, called Navigating through Cartagena, which seeks to take advantage of the city's water resource, focused on the Juan Angola channel.</p> <p>In its first phase, it began with the Multiplier Environmental Guardians: 60 young people of school age gave training in nine educational institutions to more than 5,000 people from seven neighborhoods surrounding the Caño, on topics related to the good management of solid waste.</p> <p>The second phase focused its efforts on training 15 informal recyclers from the neighborhoods in the Caño area of influence, to make the separation task more efficient on site. At this stage, the actors involved sought to design recycling entrepreneurship strategies with community participation, through the integration of recyclers, linking their services to the public solid waste management system, based on the identification of the value chain from home to the reuse of waste.</p>	<p>There is no public information on impact indicators or continuity of the project.</p> <p>Private company and civil society organizations.</p>
<p>Academy</p>	<p>The Planeta Azul Caribe Foundation (FUPAC), directed by Dr. Luis Fernando Sánchez states "The purpose of the foundation was born when we wanted to give it academic support. We worked on a doctoral thesis and it was pertinent to include the Juan Angola pipe as a pilot site to develop the project on how to get people to use the pipe in a good way, and for that they had to organize it in good condition, because it is currently in very bad environmental conditions. This study resulted in an environmental governance model that we call Triada: companies, community and professionals,". Dr. Luis Fernando Sánchez is also a marine biologist and doctor in marine sciences (Sánchez, 2019).</p> <p>The Triada model, which involves collaboration between academia or professionals, social entities or communities with empirical knowledge, and entrepreneurs with practical productive knowledge. This ensures the participation of the academy, making scientific advances accessible to communities through professional experiences. Academics and professionals play the role of transdisciplinary coordinators and help build knowledge and implement values to the collaborative project with their experience (Sánchez, 2019).</p>	<p>The foundation is still active, and constantly carries out research and recovery activities.</p> <p>Initially, the time frame for the implementation of the Triada model in Caño Juan Angola is 4 years. The period of its existence or continuity will depend on the success of its implementation and the fulfillment of its objectives.</p>

Recovery or protection initiatives for Caño Juan Angola		
Actors	Initiatives	Current status of the initiative
<p>→ Academy</p>	<p>The task of the Torices neighborhood community leaders and the Casa Mangle Foundation stands out, which donated mangroves to plant and recover an extensive edge of the Caño Juan Angola, in an initiative led by EPA Cartagena (EPA Cartagena, 2022e).</p>	<p>The Casa Mangle foundation made the donation for the Caño Juan Angola planting initiative, which, at the time, ended.</p> <p>As a foundation, it is known that they continue to carry out activities to recover the biodiversity of these habitats.</p>

► Cartagena Bay

Cartagena Bay is located in the Caribbean Sea. It is made up of the internal bay, located to the north, and the main or external bay, connected to the Caribbean Sea by the Bocachica and Bocagrande straits. The bay is influenced by continental fluvial processes (Canal del Dique) and oceanic processes (wave energy, tides from the Caribbean Sea) (Franco Arias, Restrepo López, Sanabria Ruíz and Gutiérrez, 2013).

While searching for information on the effects on the swamps and mangroves of Cartagena in the last ten years, it was possible to see that many of the previous and historical effects — such as the construction of the walls of Cartagena with the coral stone that was part of the coastline or the construction of the Canal del Dique — had already generated effects on the aforementioned ecosystems because they are interconnected bodies of water.

Therefore, within the mapping of initiatives for the swamps and mangroves of Cartagena recovery, there was an evident need to recognize the emerging category of the Bay of Cartagena. The chart below shows the initiatives that were possible to identify within the review of secondary sources.



Recovery or protection initiatives for the Bay of Cartagena

Actors	Initiatives	Current status of the initiative
→ Communities	<p>Communities participate in the BASIC project, funded by the International Development Research Centre (IDRC) of Canada and CARDIQUE. Additionally, communities engage in actions convened by environmental authorities and, in some cases, perceive the support of the Prosecutor’s Office regarding actions for the protection and recovery of Cartagena Bay.</p>	No indicators available
→ State	<p>The State Council, in 2020, ruled in a second instance ruling by deciding and resolving: ORDERING the Ministry of Environment and Sustainable Development, the Regional Autonomous Corporation of the Canal del Dique, the Public Environmental Establishment of Cartagena, the Tourist and Cultural District of Cartagena de Indias and the General Maritime Directorate, to adopt the “Master Plan for Ecological Restoration for the Bay of Cartagena”, with a short (1 to 3 years) and medium term (5 years) horizon, in accordance with their legal and regulatory constitutional powers the design and adoption of the aforementioned plan, a period of six (6) months is granted from the moment of notification of this ruling (DIMAR, 2022).</p>	Action finished
	<p>In 2022, DIMAR as coordinator of the Strategic Management Program of Maritime Interests and in coordination with the Ministry of Environment and Sustainable Development, the Regional Autonomous Corporation of the Canal del Dique, the Public Environmental Establishment of Cartagena, the Tourist District and Cultural of Cartagena de Indias and the General Maritime Directorate established the Ecological Restoration Master Plan for the Bay of Cartagena.</p>	In action
	<p>The Office of the Inspector General has taken an active position in relation to the damage suffered by the Cartagena Bay, with the aim of protecting and recovering this important marine ecosystem. “We are committed, as the Office of the Inspector General; from a legal point of view, to help resolve several issues that the Fourth Court has ruled, regarding who should lead the execution of the sentences; Likewise, we will accompany them in compliance with other rulings, for example, the right to health and education of these communities, so they are fully complied with; in addition to enforcing the “Basic” study on the pollution of the Bay, even if we have to go to court through constitutional actions” (Bossa, 2021).</p>	General accompaniment action in process.

Recovery or protection initiatives for the Bay of Cartagena

Actors	Initiatives	Current status of the initiative
→ State	The Office of the Inspector General developed a working table with the District Planning Secretariat, the Regional Autonomous Corporation (CARDIQUE) and the Environmental Public Establishment (EPA Cartagena), with the objective of serving as guarantor in the environmental coordination process of the Master Plan of Cartagena (POT Planning, 2023).	Action carried out and completed.
	The Mayor's Office of Cartagena, in its process of updating the Master Plan during the period 2021-2023, developed in its technical documents proposals to focus the development of the territory under the framework of marine-coastal criteria (Alcaldía Mayor de Cartagena de Indias, 2022b).	The Master Plan was not approved.
→ Academy	Academy The academy has developed multidisciplinary research on the Bay of Cartagena that ranges from hydrodynamic models, analysis of water quality, human safety due to environmental components, to articulation strategies, among others. (Tosic, 2018; Zárate Arias, Oliveros Avendaño and Silva Perdomo, 2015; Arrieta and Espinosa, 2019).	Research in academia is constantly being done and carried out by several universities. They are not projects in action.
	The academy, for its part, raises the importance of relating the Master of Administrative Law with the training of leaders for climate change, both as community leaders or as public officials of the District, to mitigate the effects of rising sea levels and climate change (Tejedor, 2019).	Just a proposal. Not done yet.
	The Academy has shown interest and commitment to analyzing and understanding the pollution that has affected Las Quintas Ciénaga in Cartagena, Colombia. Research such as "Postcolonial pollution of the Bay of Cartagena, Colombia" published in the Journal of Paleolimnology has sought to reconstruct the historical evolution of pollution in the body of water from colonial times to the present day (Serna, et al., 2019).	Study carried out and completed.
→ Private sector	In a protection ruling, the Court required the company DAW Químicas to issue a statement in a local newspaper in which it recognizes the human and institutional failures that led to the spill of the chemical compound and offers public apologies for the damage caused to the ecosystem of the region and its inhabitants. "The Court found a factual defect due to the improper assessment of the evidence in the file, in relation to the magnitude of the environmental damage caused and the supposed total recovery of the affected environment, the Corporation noted. Additionally, the Constitutional Court ordered the Ministry of the Environment, Cardique and the Mayor's Office of Cartagena to carry out a technical inspection of the pesticide processing factory and urged the Cartagena civil society "to take effective and real ownership of the protection of its natural environment.", aware of the inseparable link that brings together humans, animals, plants and other organisms within the same environment, beyond strictly utilitarian approaches" (Col Prensa, 2015).	The company made the payment. There is no information about actions that the company has developed outside of those ruled by the court.

Recovery or protection initiatives for the Bay of Cartagena

Actors	Initiatives	Current status of the initiative
Private sector	<p>In 2023, this company made a payment of more than 19 billion Colombian pesos to compensate for the damages. This money was incorporated into the resource fund for the execution of the master plan.</p>	<p>The company made the payment. There is no information about actions that the company has developed outside of those ruled by the court.</p>
International actors	<p>Water as Leverage (WAL) is an initiative that seeks to create sustainable solutions to the challenges of urban climate adaptation, developed by the government of the Netherlands, with international allies (Funcicar, 2023). It has a timeline from 2023 to 2025, divided into three phases.</p> <p>This program has been developed in cities such as: Chennai (India), Khulna (Bangladesh) and Semarang (Indonesia). Cartagena is the first city in the Americas in which this methodology would be developed (Funcicar, 2023).</p>	<p>Active. No public indicators.</p>
	<p>BASIC Cartagena is an applied research project that began in July 2014. It addresses the interactions between watersheds, the sea and communities in the coastal area of Cartagena. It is a multidisciplinary project, funded by the International Development Research Center (IDRC) of Canada and CARDIQUE.</p> <p>The first phase of the project was developed in 2017, under the title Reducing the risk of pollution in vulnerable coastal communities of Cartagena, Colombia: responding to climate change. The second phase of the project was developed in 2018, under the name Building resilience in Cartagena Bay.</p> <p>The general objective of this initiative is to contribute to the strengthening of the environmental governance of the Bay of Cartagena, through the provision of science-based, sustainable and climate-compatible development policy recommendations (BASIC Cartagena, 2020).</p> <p>This initiative has generated alliances with academia, such as with EAFIT University (EAFIT University, 2021) and with educational institutions in other countries such as Colab+Atlantic, from Portugal (Caicedo, 2021).</p>	<p>No indicators available</p>



Conclusions

The effects on the swamps and mangroves in Cartagena are the product of multiple causes, with the participation of various actors. Among them it was possible to identify the construction of hotel and tourist complexes, the interruption of water flows, the invasion of wetlands, sedimentation, industrial pollution and contamination of homes.

In the three sectors of the economy there are industries that contribute to the generation of effects on these ecosystems.

- In the primary sector, the forestry industry generates damages, while fishermen are affected.
- In the secondary sector, there are contributions from companies of all sizes and various unions. The construction sector stands out for the poor disposal of toxic waste, the reduction of green space available in the city and the loss of strategic ecosystems such as mangroves, due to landfill actions. The State facilitates the occupation of these spaces through Law 62 of 1937 and Decree 7 of 1984.
- On the part of the third sector of the economy, the tourism industry stands out for being a generator of damages and at the same time a recipient of its negative effects.
- Pollution from homes also contributes to generating adverse effects on these strategic ecosystems. In some cases, the communities that border the bodies of water report feeling stigmatized for being the ones who supposedly pollute the swamps, although they have historically settled there and have practices that care for the ecosystems. They report that those who pollute are the people and communities from “inner neighborhoods”, who are not aware of the protection and care of the environment.



Just as the effects on swamps and mangroves are the product of multiple causes, with the participation of various actors, there is also diversity in recovery and protection initiatives. Here, the initiatives that advocated for the recovery and protection of the Bay of Cartagena were also taken up, since many of the initiatives proposed recognized the interconnection between bodies of water from the coast and the possibility of improving the conditions of the swamps and mangroves through care:

- In the Ciénaga de la Virgen the communities develop replanting and conservation activities, in alliance with public institutions such as the Sena and Cardique, as well as with private community companies dedicated to community ecotourism; The State, through the Mayor's Office, EPA and Dimar, in alliance with other public institutions has generated awareness plans, inter-institutional strategic plans, control actions; The private sector has participated in replanting activities, and the academy has generated studies and recommendations.
- In the Ciénaga de las Quintas the communities have participated in activities developed by other actors in the territory, such as environmental authorities or the Public Ministry; The State, through the Office of the Inspector General, the judicial branch, the environmental authorities and the District Administration, developed awareness-raising actions, delivery of judicial rulings, leadership of multi-stakeholder commitment exercises, in favor of the protection and recovery of these ecosystems.
- In Caño Juan Angola, communities have developed community tourism initiatives and have

participated in scenarios convened by other actors, such as environmental authorities and the Public Ministry; The State has several positions, on the one hand, it has strategic plans for recovery, led by EPA, on the other, there is the Office of the Inspector General, who asked the environmental authorities of Cartagena to adopt the measures required to recover and preserve it, as well as adopting an articulated environmental policy; For its part, the private sector, in alliance with civil society organizations, has generated replanting and environmental education actions.

- In the Bay of Cartagena, communities participate in the BASIC project, which provides information and generates actions in favor of their recovery and protection; The State has several positions, there is the State Council that orders the adoption of the "Master Plan for Ecological Restoration for the Bay of Cartagena" and an articulated environmental policy, local and regional environmental institutions adopt the Master Plan for Ecological Restoration for the bay of Cartagena, while the Office of the Inspector General exercises actions as guarantor; The private sector contributes with replanting actions and with payments for judicial rulings for the recovery of ecosystems, and the academy generates studies and recommendations, hand in hand with international organizations.
- Although in each of these places there are actions by different actors, the review of the initiatives from secondary sources allowed the identification of the following findings:
- There is a lack of information on indicators of the initiatives or communication that account for their continuity or completion.



- Although there are recovery plans, such as those for Caño Juan Angola and those for Bahía de Cartagena, the proposed actions have not been implemented. The Office of the Inspector General has reported the disruption in several cases and ordered the articulation in others.
- The actions of the private sector are very small compared to other actors (communities, State and academia). This may be the product of a smaller number of actions or poor communication practices compared to actions to protect or recover these strategic ecosystems.
- There are initiatives with the objective of protecting and recovering the swamps and mangroves in Cartagena coming from very diverse actors that are not articulated.
- Territorial planning and environmental management regulations represent a challenge for the coordination around the protection and recovery of mangroves. Some examples of this situation are the lack of updating of the Master Plan, Law 62 of 1937 and Decree 7 of 1984.

Despite all of the above, the fact that there are diverse initiatives, coming from multiple actors, the interest in the project to protect and recover the swamps and mangroves in Cartagena is very evident.

Will the actors be open to working together?

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