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Mangroves of the Tropical Northwestern Atlantic

VU

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Abstract

Mangroves of the Tropical Northwestern Atlantic is a regional ecosystem subgroup (level 4 unit of the IUCN Global Ecosystem Typology). It includes the marine ecoregions of Bahamian, Carolinian, Eastern Caribbean, Floridian, Greater Antilles, Northern Gulf of Mexico, Southern Caribbean, Southern Gulf of Mexico, Southwestern Caribbean and Western Caribbean. The mapped extent of mangroves in 2020 was 17,408 km^2, representing 11.8% of the global mangrove area. The diverse biota of this province is characterized by seven species of true mangroves, plus many associated taxa. Six species: *Avicennia germinans, Laguncularia racemosa, Rhizophora mangle*, *Rizophora racemosa* and *Acrostichum aureum* are categorized as Least Concern (LC) and *Pelliciera rhizophorae* as Vulnerable (VU) in the IUCN Red List of threatened species.

Within the province, mangroves with lagoonal carbonate and open coast carbonate typologies prevail. Despite sediment scarcity in carbonate regions, urban mangroves unexpectedly accumulate sediments and nutrients at faster rates, potentially enhancing resilience to rising sea-levels. Threats to mangroves include deforestation due to various human activities, such as land use changes, agriculture, petroleum, tourism, and climate change-induced hurricanes. Anthropogenic impacts vary across countries. Sea-level rise (SLR) poses a multifaceted threat, from inundation and displacement of mangroves to elevated storm surge risks, necessitating comprehensive assessments and effective management for sustainability.

The net area change in the Tropical Northwestern Atlantic mangroves has been -5.4% since 1996. If this trend continues an overall change of -13.1% is projected over the next 50 years. Furthermore, under a high SLR scenario (IPCC RCP8.5) ≈-75.9% of the Tropical Northwestern Atlantic mangroves would be submerged by 2060 with a relative severity within of ≥50% and <80%. Moreover, 4% of the province's mangrove ecosystem is undergoing degradation, with the potential to increase to 12% within a 50-year period, based on a vegetation index decay analysis. Overall, the Tropical Northwestern Atlantic mangrove ecosystem is assessed as **Vulnerable (VU**).

Citation:

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Keywords:

Mangroves; Red List of ecosystems; ecosystem collapse; threats.

Ecosystem classification:
MFT1.2 Intertidal forests and shrublands
Assessment's distribution:
Tropical Northwestern Atlantic province
Summary of the assessment:

Criterion	A	B	C	D	E	Overall
Subcriterion 1	**DD**	**LC**	**DD**	**DD**	**NE**	**VU**
Subcriterion 2	**LC**	**LC**	**VU**	**LC**	**NE**	
Subcriterion 3	**DD**	**LC**	**DD**	**DD**	**NE**	

VU: Vulnerable, LC: Least Concern,
DD Data Deficient, NE: Not Evaluated

Mangroves of The Tropical Northwestern Atlantic

VU

1. Ecosystem Classification

IUCN Global Ecosystem Typology (version 2.1, Keith *et al.*, 2022):

Transitional Marine-Freshwater-Terrestrial realm

- MFT1 Brackish tidal biome
  - MFT1.2 Intertidal forests and shrublands
    - **MFT1.2_4_MP_12a** Mangroves of the Tropical Northwestern Atlantic

IUCN Habitats Classification Scheme (version 3.1, IUCN 2012):

- 1 Forest
  - 1.7 Forest – Subtropical/tropical mangrove vegetation above high tide level *below water level*[1]
- 12 Marine Intertidal
  - 12.7 Mangrove Submerged Roots

Mangrove ecosystem within the Ciénaga Grande de Santa Marta, south of Punta Tambor, Colombia (photo credit: Diana Romero D'Achiardi).

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[1] Note on the original classification scheme. This habitat should include mangrove vegetation below water level. Mangroves have spread into warm temperate regions to a limited extent and may occasionally occur in supratidal areas. However, the vast majority of the world's mangroves are found in tropical/subtropical intertidal areas.

Mangrove ecosystem of Bahía de Taco, Cuba (photo credit: Hayler María Pérez Trejo).

Mangrove ecosystem of Jaina Island in Campeche, Mexico (photo credit: Augusto Segovia).

2. Ecosystem Description

Spatial distribution

The mangroves of the Tropical Northwestern Atlantic province (Figure 1) encompass intertidal forests and shrublands of 37 territories and countries across North and Central America. This vast region stretches from the easternmost point in Barbados to the southern region of the Gulf of Urabá in Colombia, and includes various, Caribbean islands. Mangroves in the territory of Bermuda stand among the northernmost mangrove formations globally, situated at approximately 32º20’N latitude (FAO, 2007). This province´s estimated extent of mangroves was 17,057 km^2 in 2020 (Table 1), accounting for approximately 11.8% of the global mangrove area (Bunting *et al*., 2022). The most extensive mangrove cover within this ecoregion is in Mexico, accounting for 70% of the relative area of mangroves in the country, followed by Cuba with a total mangrove area representing about 20% of the countrys forest cover (Menéndez, 2013).

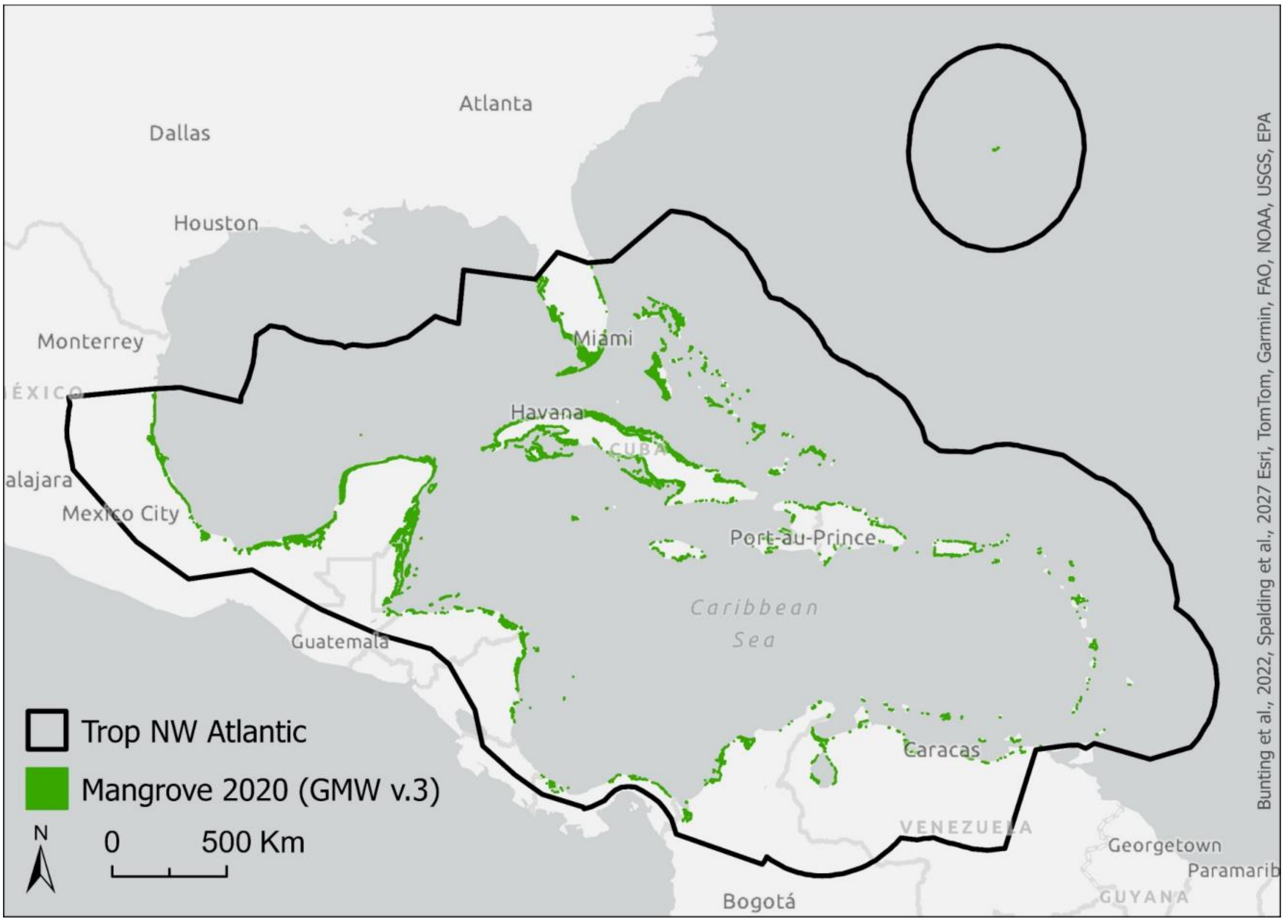


Figure 1. The mangroves of Tropical Northwestern Atlantic.

At least six countries have developed national mangrove distribution maps within the Tropical Northwestern Atlantic province. They include Mexico (Velázquez-Salazar *et al.*, 2021, Rodríguez-Zúñiga *et al*., 2022), Colombia (INVEMAR 2023), Honduras (ICF-GFA 2022), Panama (SINIA 2021), Costa Rica (CATIE, 2021) and United States of America (Bardou *et al.*, 2022). It is essential to acknowledge the discrepancies between the global estimates of mangrove distribution and the locally sourced references. In certain instances, there has been an overestimation within the global mapping, ranging from 3% (Mexico) to 8% (Colombia). In contrast, regions with mangrove distributions of less than 100 km^2 have witnessed underestimations of up to 275%, as evidenced in the case of Panama.

In countries and territories like Dominica, Sint-Maarten, Saint-Martin-Saint-Barthélemy, mangroves are restricted in extent because the coastal areas are narrow, measuring less than 1 km, and are without large bays (Slinger-Friedman. 2017).

Table 1. Mangrove area in the territories or countries of the Tropical Northwestern Atlantic Province (from Bunting *et al.*, 2022)

Territory or country	Area (km²)	Territory or country	Area (km²)
Mexico	6605.8	Guatemala	8.59
Cuba	3475.25	Virgin US Islands	2.6
United States	2199.74	Grenada	1.98
The Bahamas	1483.26	Bonaire	1.89
Colombia	853.2	Saint Lucia	1.65
Belize	519.59	Trinidad and Tobago	1.23
Venezuela	434.86	British Virgin Islands	0.98
Nicaragua	367.28	Curacao	0.46
Honduras	244.97	Aruba	0.44
Dominican Republic	189.61	Saint Kitts and Nevis	0.35
Turks and Caicos Islands	150.37	Saint Vincent and the Grenadines	0.33
Haiti	149.26	Costa Rica	0.21
Jamaica	97.51	Bermuda	0.21
Puerto Rico	81.8	Barbados	0.11
Panama	76.95	Sint Maarten	0.05
Cayman Islands	44.07	Anguilla	0.04
Guadeloupe	34.35	Dominica	0.01
Martinique	19.7	Saint-Martin-Saint-Barthélemy	0.01
Antigua and Barbuda	8.69		

The increasing recognition of the importance of mangroves within the province, in conjunction with the creation of detailed maps, is expected to lead to more accurate assessments of the state of this ecosystem (see Murillo-Sandoval *et al*., 2022), including better assessments of mangrove losses and degradation. As each nation contributes to developing up-to-date mangrove maps, it will improve the capacity to formulate effective strategies for conserving, restoring, and managing mangroves. However, to date, global references, which show regional trends, have served as a valuable initial reference point for these assessments of spatial distribution.

According to Bunting *et al*. (2022), the province has had a net area change of -5.4% since 1996. Data from the Mexican Mangrove Monitoring System (SMMM) indicates that the net area change for the Mexico region was -2.0% since the 1980s. Like many tropical countries, Puerto Rico has lost nearly half of its original mangrove area because of deforestation, conversion to agriculture, and urbanization (Figure 2). However, significant economic development events reversed the mangrove loss pattern in Puerto Rico (Martinuzzi *et al*., 2009). These events ended the agriculture-dominated economy period, leading to land abandonment and re-flooding of coastal valleys. The second event, also observed later in other countries such as Cuba, Panama, Colombia, Costa Rica and Mexico, is the establishment of conservation laws. These legal instruments have significantly reduced mangrove deforestation rates that were prevalent until well into the 2000s.

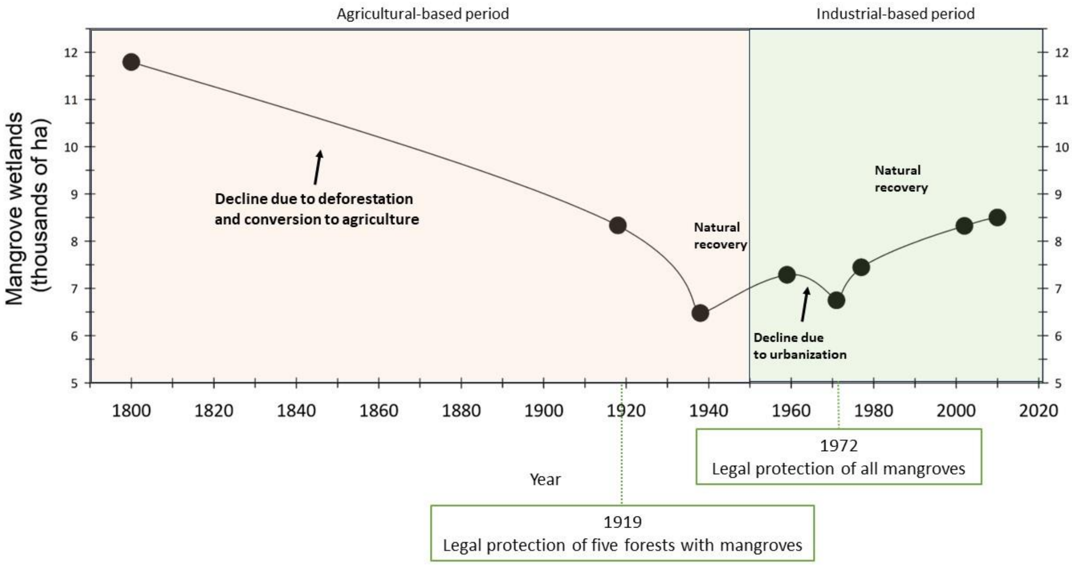


Figure 2. Timeline of changes in mangrove area in Puerto Rico. Adapted from Martinuzzi *et al.* (2009) and Yu *et al.* (2019).

Biotic components of the ecosystem (characteristic native biota)

The mangroves of the Tropical Northwestern Atlantic province are biologically diverse, with seven recorded true mangrove plant species according to IUCN (2022). The species associated with mangrove forests include *Rhizophora mangle* (red mangrove), *Rhizophora racemosa* (red mangrove), *Avicennia germinans* (black mangrove), *Avicennia schaueriana* (white mangrove), *Laguncularia racemosa* (white mangrove), *Pelliciera rhizophorae* (mangle piñuelo), *Acrostichum aureum* (golden leather fern). All of them are in the Least Concern (LC) category, except for *Pelliciera rhizophorae*, which has a Vulnerable (VU) status (Annex 1). In a recent systematic revision of the genus *Pellieciera*, another closely-related species was recognized and described as *Pelliciera benthamii*. This species is present on the Atlantic coasts of Honduras, Nicaragua, Panama, and Colombia (Duke, 2020; Blanco-Libreros and Ramírez-Ruíz, 2021). Additionally, in Panama, *Acrostichum danaeifolium* (giant leather fern) is recorded as a mangrove species in the Atlantic region (ANAM-ARAP, 2013). A species closely associated with the mangroves, *Conocarpus erectus*, is considered to be mangrove in the legislations of many of the countries within the province and, therefore, this species is also protected (e.g., in Mexico by NOM-059-SEMARNAT-2010 and NOM-022-SEMARNAT-2003).

There are at least 523 animal species within the taxa Actinopterygii, Anthozoa, Bivalvia, Chondrichthyes, Gastropoda, Holothuroidea, Insecta, Amphibia, Reptilia, Aves, and Mammalia associated with mangrove habitats in the IUCN Red List of Threatened Species (IUCN, 2022) that have natural history collection records, or observations, within the distribution of this province (GBIF, 2022) (Annex 2). Of these species, 21 are categorized as Vulnerable (VU); 20 species are Endangered (EN); and 18 are Critically Endangered (CR). Among them, there are three mammals: The Pygmy Three-Toed Sloth (*Bradypus pygmaeus*), the Pygmy Raccoon (*Procyon pygmaeus*) and the Cabrera’s Hutia (*Mesocapromys angelcabrerai*), a small rat-like rodent.

Osprey (Pandion hiliaetus) nesting on red mangrove (Rhizophora mangle) near the Sian Ka'an Biosphere Reserve, Quintana Roo, Mexico (photo credit: José Alberto Alcántara Maya).

A more extensive database, focusing on mangrove-related species for this province in Mexico (Soberón, 2022; CONABIO, 2023), documented at least 2,972 animal species, 1,761 plant species, and six fungi species included in the IUCN Red List of Threatened Species (IUCN, 2022). Out of the total registered species, 155 are classified as 'Vulnerable (VU),' 135 as 'Endangered (EN),' and 55 as 'Critically Endangered (CR).' Of these, 464 species show some level of endemism, and 570 are protected under Mexican regulations (NOM-059; SEMARNAT, 2010). Some of the endemic species in the IUCN Red List are the Cozumel Raccoon or Pigmean Racoon (*Procyon pygmaeus*), the Cuitlacoche of Cozumel (*Toxostoma guttatum*), a species of mockingbird, and the tree frog of San Martín (*Ecnomiohyla valancifer*), which are all categorized as 'Critically Endangered (CR)'.

Abiotic Components of the Ecosystem

Mangroves exhibit significant variations based on their geomorphic and sedimentary situations, the hydrological variability, which can influence the fresh-marine water balance, and the dynamics of nutrient inputs, especially of nitrogen and phosphorus. These factors determine soil density, affecting several ecosystem services, such as carbon capture and storage, primarily in soils (Rovai *et al*., 2018). Additionally, mangroves serve as a source of sediment supply, playing a crucial role in retaining sediments, which is essential for their establishment and persistence (Cinco-Castro *et al*., 2022).

The global classification of geomorphic and sedimentary settings, established by Worthington *et al*. (2020), categorizes the mangrove systems of the Tropical Northwestern Atlantic province into six main typologies. The most prevalent type is *lagoon carbonate* (41%), followed by *Open coast carbonate* (19%) and four geomorphic types (Lagoon 16%, Delta 12%, Open Coast 7%, and Estuary 5%) with *mineral sediments*.

In carbonate regions, sediment scarcity is a prevailing characteristic, and the organic substratum commonly originates from autochthonous sources (Cinco-Castro *et al*., 2023). Despite its karst (carbonate) condition, and its location in a wide variety of climates, the area presents different hydromorphic typologies, ranging from shrub mangroves of less than 1m to more than 20m in height, as seen in the geomorphic forms called *petenes* (Helmer *et al*., 2008; Allen *et al*., 2017). In many cases, nutrient deficiency and high interstitial water salinity in the province favour the extensive growth of shrub mangroves.

Reddish Egred (Egretta rufescens, NT) and Shrub mangroves (Rhizophora mangle) in a carbonate region of the province, Sian Ka´an, Mexico (photo credit: Ma. Teresa Rodríguez-Zúñiga).

The seasonal effects of tropical cyclones significantly influence mangroves in the province (Farfan *et al*., 2014; Rivera-Monroy *et al*., 2020; Lagomasino *et al*., 2021). High rainfall reduces salinity stress and increases nutrient loading from adjacent catchments. Concurrently, the effects of waves and tidal flushing, while regulating salinity, carry the risk of destabilizing and eroding mangrove substrata. As outlined by Mckee *et al*. (2011) in their research conducted in Belize, these ecosystems are vulnerable to the effects of climate change and rising sea-levels. These factors collectively mediate the local-scale dynamics in ecosystem distributions (Acuña-Piedra and Quesada-Román, 2021). Winds are another factor that affect mangroves during storms, leading to defoliation. While *Rhizophora mangle* cannot recover, species like *Avicennia germinans* and *Laguncularia racemosa* can regrow their foliage, even if the trunk is uprooted.

Key processes and interactions

The effects of human activity can convert mangrove cover to non-mangrove cover, rapidly reducing the total area of mangrove forests and increasing their fragmentation (Branoff 2017, 2018; Blanco-Libreros and Ramírez-Ruíz, 20021). However, other human activities affect mangroves without causing their loss. These insidious activities can affect all aspects of mangrove structure and function, as illustrated in the diagram from Branoff (2019) in Figure 3, which depicts key mangrove processes and interactions including the intervention of human activities. Mangroves, including urban mangroves, should be analysed ecologically, focusing on integrating human and ecological aspects. Effective management is essential to sustain the benefits provided by the mangrove ecosystem (Lugo *et al*., 2014).

The mangrove structure and functioning diagram uses Odum's energy language (1983). The solid rectangular box delimits the mangrove system from the external environment. Interactions of energy fluxes are represented by the "arrow" symbols, which typically have two interacting fluxes and a third flow, which is the product of the interaction of the two incoming fluxes. Solid lines represent the flux of energy or information. Dotted lines represent the flow of money, which flow in the opposite direction of energy. Circles are the external forces that power the mangrove and tanks represent the storage of matter (water, nutrients, money, pollutants). The "bullet-shaped" symbol denotes the mangrove trees and other photosynthetic components, while non-photosynthetic consumers are indicated by the "hexagon" symbol. Finally, humans connect mangroves to the economic market system and to the policy and regulatory system illustrated by a switch, which can be activated (or not) by people.

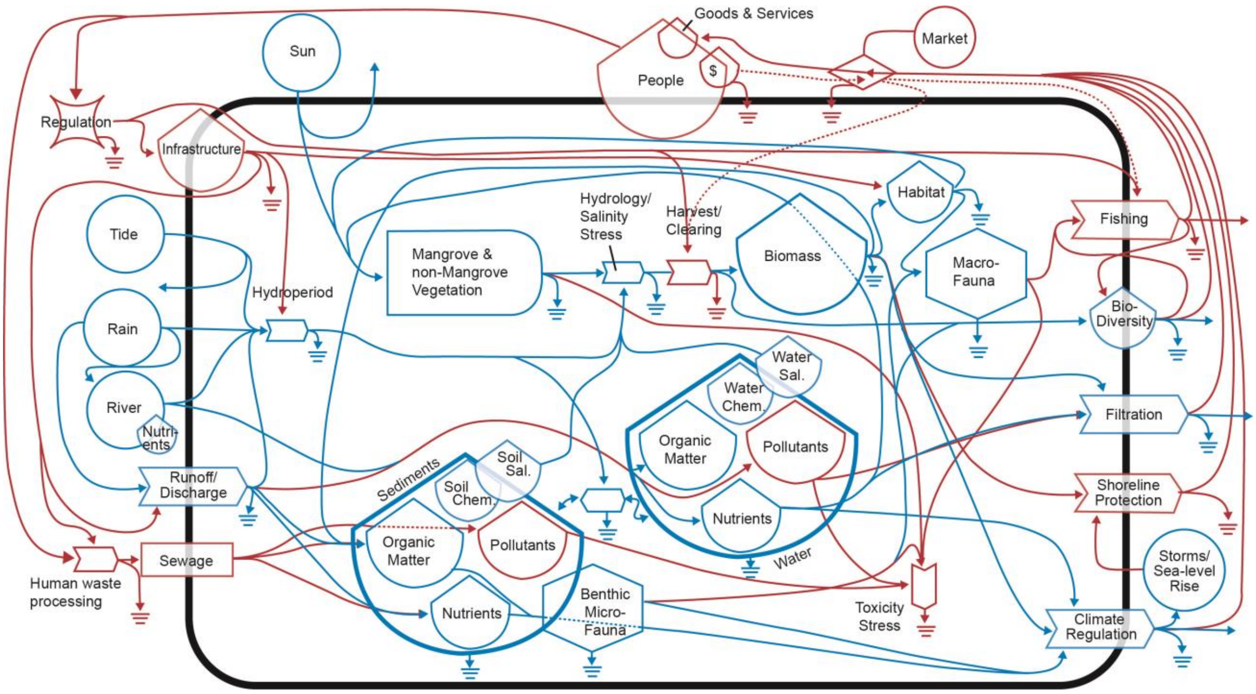


Figure 3. Depiction of the main structural parameters of mangroves (blue color) and the intervention of human activities (red color).

A surprise finding around these processes and interactions is that urban mangroves accumulate sediments, carbon, and nitrogen at faster rates than historical accumulations, resulting in increased carbon and nitrogen storage in soils. This enhanced capacity may enable them to better deal with rising sea-levels (Wigand *et al*., 2021). Additionally, as depicted in Figure 3, mangroves are situated at the land-sea interface. Consequently, the impacts of climate change are expected to affect both terrestrial ecosystems (resulting in wetter or drier conditions, and modifying their hydrology), and marine ecosystems (increasing wave energy, winds and currents). These changes can lead to defoliation, falling trees, and compromise their role in mitigating wave erosion) (Ward *et al*., 2017, Sánchez-Núñez *et al*., 2019).

However, the primary outcome of urbanization at a habitat level is a reduction in mangrove patch area and increased fragmentation at the landscape level. Utilizing the Colombian Caribbean as a study system, Blanco-Libreros and Ramírez-Ruíz (2021) found that both variables and other landscape metrics are correlated with the proximity to urban settlements. They hypothesized that a reduction in patch area could lead to increased air temperatures and reduced humidity, with subsequent affects on seedling recruitment, survival, and growth. Moreover, small patches of mangrove are more susceptible to edge effects than large patches. Therefore, urbanization and other threats affecting patch areas could result in detrimental species-specific effects on mangrove tree species, which could scale up to affect the entire ecosystem. Finally, such small patches are more prone to incursions by invasive plant and animal species than are larger patches.

3. Ecosystem Threats and vulnerabilities

Main threatening process and pathways to degradation

Mangrove deforestation in the Tropical Northwestern Atlantic province is attributed to various country-specific factors. However, among the leading causes are local wood extraction, and the land cover changes associated with agricultural expansion, the petroleum industry, tourism infrastructure, coastal urbanization, roads and dams (Osland *et al*., 2018; Hubbart *et al*., 2020; Veas-Ayala *et al*., 2023).

The threats to mangroves are not only from changes in land use due to these activities, but also from secondary effects caused by human activities. For instance, increased livestock and agricultural activity leads to higher discharges of agrochemicals and pesticides, soil compaction, and interference with sediment flow (Sonderegger and Pfister, 2021). Furthermore, establishing tourist areas in mangrove regions interferes with the hydrological and sedimentary flows of the ecosystem, as wetland areas are filled with construction materials (Brenner *et al*., 2018). The proximity of mangroves to petroleum activities is a threat due to oil spills, documented to cause defoliation, deformation, growth retardation, seedling mortality, and mortality of fauna associated with the mangrove ecosystem (Getter *et al*., 1981).

Additionally, one primary natural driver of change to mangroves is the increased frequency and intensity of hurricanes impacting the province. According to Osland *et al*. (2018), climate change is expected to increase the number and intensity of hurricanes in the Gulf of Mexico and Atlantic regions. Tropical storms can affect mangrove forests through direct defoliation and killing of trees, induce erosion, disrupt hydrological connectivity, and cause mass mortality of animal communities within the ecosystems. Despite being subject to the effects of these events, the mangroves in some regions of the province have proven to be resilient when the landscape in which they are located is in good pre-hurricane hydrological condition (Herrera-Silveira *et al*., 2022)

There are other anthropogenic threats specific to different countries in the region. In Mexico, notable threats to mangroves include those related to livestock and agriculture, tourism, and industry. Within a 5 km buffer zone around mangrove areas in Mexico, an estimated 617,850 ha of agricultural livestock coverage was recorded in 2005. This area increased by 23,036 ha by 2020 (Velázquez-Salazar *et al*., 2021). Tourism activities covered 8,572 ha in 2005, increasing 50% (circa 4,000 ha) by 2015. Industrial zones, encompassing petroleum activities, represented 10,709 ha in 2005 and 17,168 ha in 2015, an increase of 60% in ten years.

According to Menéndez *et al*. (2013), over 30% of Cuba's mangroves have been affected by human activity (22 stressful activities) and, to a lesser extent by natural phenomena (two stressful activities). Common effects include the discharge of industrial residues, damming rivers, road construction, and mangrove area filling (Hernández-Albernas *et al*., 2022; Mas-Castellanos *et al*., 2020; Faife-Cabrera *et al*., 2021).

Development of tourism infrastructure in the mangrove areas of the Riviera Maya, Mexico (photo credit: CONABIO-SEMAR/Carlos Troche).

Colombian Caribbean mangroves experienced a decline of approximately 25,000 ha from 1984 to 2020 (Murillo-Sandoval *et al*., 2022). The primary factors contributing to this decline are logging for agricultural and urban expansion, and infrastructure projects that have altered freshwater and tidal connectivity. Small-scale logging is particularly significant in the proximity of small villages and in peri-urban areas (Blanco *et al*., 2012; Blanco-Libreros and Estrada-Urrea, 2015). The red mangrove (*Rhizophora mangle*) is the focal species in many areas due to its value as poles and as pilings for construction in water-logged areas. A notable case of mangrove die-off occurred in the Ciénaga Grande de Santa Marta between 1956 and 1980 when road construction disrupted the tidal flow. This interruption affected the water exchange between the Magdalena River, flood-prone areas (mangroves and marshes) and the sea. The resulting hydraulic imbalance led to soil salinization exceeding 120ppt, causing the disappearance of over half of the mangroves, along with increased sedimentation and chemical pollution (INVEMAR 2002). Moreover, urbanization poses a significant threat near large cities like Cartagena. At the same time, the recent expansion of tourism in the Morrosquillo Gulf is responsible for converting mangroves into commercial buildings, hotels, and second homes (Blanco-Libreros and Ramírez-Ruíz, 2021).

Finally, but no less important, are the threats posed by the potential consequences of rising sea-levels, which encompasses a wide spectrum of effects, ranging from the relatively minor and controllable to the uncontrollable (Gaffin, 1997). An elevation in relative sea level can trigger diverse biogeophysical effects in coastal regions: they include the inundation and displacement of mangroves, shoreline erosion, heightened storm surge, flooding risks, and an elevation in the salinity levels of estuaries and freshwater aquifers (Nicholls,2002). According to some authors (Haites *et al*., 2002; Udika, 2009; Davis *et al*., 2010), a rise in sea level of each centimetre could result in a horizontal retreat of several meters on Caribbean islands.

There is concern about which sites will be most vulnerable to sea-level rise (SLR). Ellison's vulnerability model (Ellison, 2014), which considers exposure, sensitivity, and adaptation components, is valuable for identifying differences among sites. Harmful anthropogenic practices, which negatively affect sensitivity characteristics such as vegetation structure and conditions, , will likely have a more significant adverse effect on the vulnerability of mangrove forests in the region due to SLR (Cinco-Castro *et al*., 2020).

Definition of the collapsed state of the ecosystem

Ecosystem collapse is recognized when the tree cover of diagnostic true mangrove species declines to zero, indicating complete loss. The mangrove ecosystem exhibits remarkable dynamism, with species distributions adapting to local shifts in sediment distribution, tidal patterns, and variations in local inundation and salinity gradients. Disruptive processes can trigger shifts in this dynamism, potentially leading to ecosystem collapse. Ecosystem collapse may manifest through the following mechanisms: a) restricted recruitment and survival of diagnostic true mangroves due to adverse climatic conditions (e.g., low temperatures); b) alterations in rainfall, river inputs, waves, and tidal currents that destabilize and erode soft substrata, impeding recruitment and growth; c) shifts in rainfall patterns and tidal flushing that alter salinity rejimes and nutrient loading, thereby affecting overall survival, among other factors.

In the Tropical Northwestern Atlantic province, there is no explicit evidence of a systemic collapse within mangrove ecosystems; however, discernible negative effects are apparent at the subregional level, attributable to variances in the predominant economic activities (Velázquez-Salazar *et al*., 2019) and the influence of climate change. Disruptions in sediment and water flow, coupled with factors such as the rise in mean sea level, are among the primary causes of changes and loss of mangrove cover in the Gulf of Mexico (Torres-Rodríguez *et al*., 2010).

A notable example in this subregion is in Campeche, Mexico, specifically in an area known as Punta La Disciplina (Figure 4). From 1972 to 2020, according to data from Mexico’s Mangrove Monitoring System, 3,500 hectares of the three species of mangroves along this coastline have been lost (Valderrama-Landeros *et al*., 2019; Velázquez-Salazar *et al*., 2020).

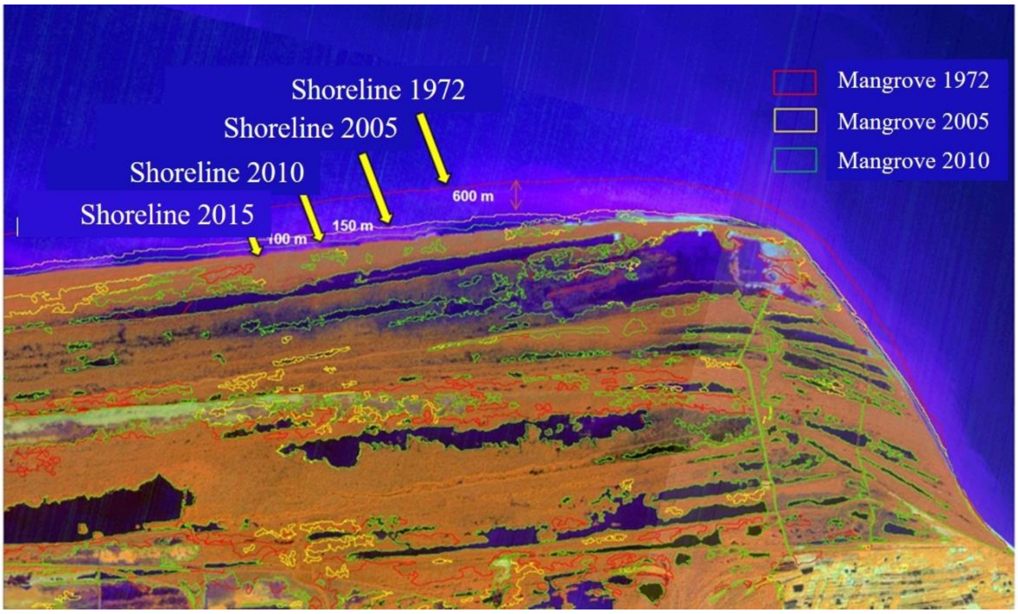
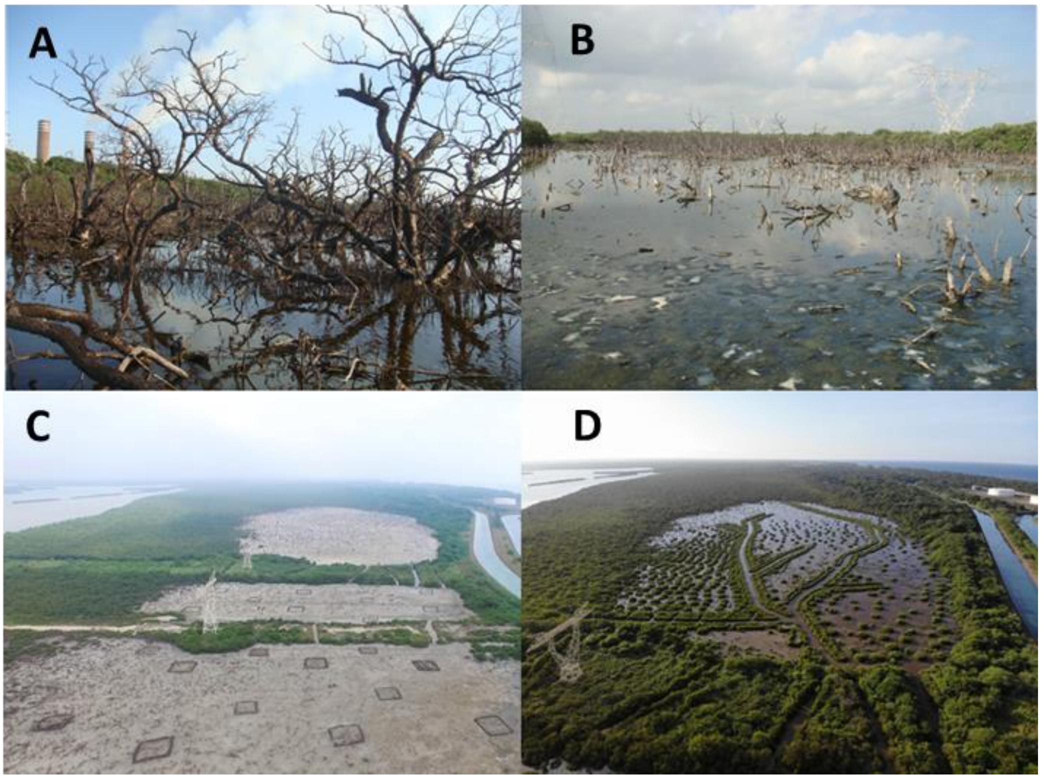


Figure 4. Mangrove loss due to coastline retreat in Punta La Disciplina, Campeche, Mexico. Spot-5 imagery (© CNES 2015, produced by SIAP under license from "SPOT IMAGINE." RGB 432).

Infrastructure development may cause massive death of trees. In the northwest limit of the province, constructing three embankments for high-voltage transmission lines obstructed water flow, causing mangrove cover degradation and loss; ongoing restoration involves channel connection to the lagoon and land elevation (López Portillo *et al*., 2022).



Loss of tree cover caused due to the restriction of water flow by embankments in Tampamachoco, Veracruz, Mexico (A, B); and views of mangrove loss (C, 2015) and gain during the on-going restoration process (D, 2023) (photo credits: A-B Jorge López-Portillo; C. Aníbal Ramírez; D. Doriel Tepach).

The following example of mangrove loss was recorded in Cuyamel, Honduras and is attributed to two natural events: rising sea level and an earthquake. Together, these events altered critical processes and functions within their ecosystem, leading to the loss of natural mangrove covers.

Mangrove cover loss and substrate erosion due to rising sea level and earthquake in the Cuyamel community, Honduras, near the Guatemala border (photo credit: Lenin Corrales).

In the southern Caribbean region of the Yucatán Peninsula, land-use change driven by high tourist demand is the most common process, particularly in Quintana Roo, Mexico. The development of the city of Cancun as a tourism hub has triggered a high demand for land and the construction of tourist infrastructure, often directly in mangrove areas (Velázquez-Salazar *et al*., 2019). A notable case of negative effects in the region is El Playón, near Tulum. The primary factor contributing to mangrove degradation was the obstruction of surface and subsurface water flow, due to construction of the site's access road (Herrera-Silveira *et al*., 2015). According to CONABIO (Arriaga *et al*., 2000), this area is designated as a Terrestrial Priority Region (RTP-147), Marine (RMP-65), and Hydrological (RHP108). The road construction in this region altered and disturbed over 450 hectares of mangroves due to alterations in hydrodynamic flows and sedimentation.

Panoramic view of road construction effects in El Playón with visible restoration efforts (green points). (photo credits: OIN, 2015).

Threat Classification

IUCN Threat Classification (version 3.3, IUCN-CMP, 2022) relevant to mangroves of the Tropical Northwestern Atlantic province:

1. Residential & commercial development

- 1.1 Housing & urban areas
- 1.2 Commercial & industrial areas
- 1.3 Tourism & recreation areas

2. Agriculture & aquaculture

- 2.1 Annual & perennial non-timber crops
    - 2.1.1 Shifting agriculture
    - 2.1.2 Small-holder farming
    - 2.1.3 Agro-industry farming
- 2.3 Livestock farming & ranching
    - 2.3.3 Agro-industry grazing, ranching or farming
- 2.4 Marine & freshwater aquaculture
    - 2.4.2 Industrial aquaculture

3. Energy production & mining

- 3.1 Oil & gas drilling
- 3.2 Mining & quarrying

4. Transportation & service corridors

- 4.1 Roads & railroads
- 4.2 Utility & service lines
- 4.3 Shipping lanes

5. Biological resource use

- 5.1 Hunting & collecting terrestrial animals
    - 5.1.1 Intentional use (species being assessed is the target)
    - 5.1.2 Unintentional effects (species being assessed is not the target)
- 5.3 Logging & wood harvesting
    - 5.3.1 Intentional use: subsistence/small scale (species being assessed is the target [harvest]
- 5.4 Fishing & harvesting aquatic resources
    - 5.4.1 Intentional use: subsistence/small scale (species being assessed is the target)[harvest]

6. Human intrusions & disturbance

- 6.1 Recreational activities
- 6.3 Work & other activities

7. Natural system modifications

- 7.2 Dams & water management/use
    - 7.2.1 Abstraction of surface water (domestic use)
    - 7.2.2 Abstraction of surface water (commercial use)
    - 7.2.3 Abstraction of surface water (agricultural use)

    - 7.2.5 Abstraction of ground water (domestic use)
    - 7.2.6 Abstraction of ground water (commercial use)
    - 7.2.7 Abstraction of ground water (agricultural use)
    - 7.2.8 Abstraction of ground water (unknown use)
    - 7.2.9 Small dams
    - 7.2.10 Large dams
- 7.3 Other ecosystem modifications

8. Invasive & other problematic species, genes & diseases

- 8.1 Invasive non-native/alien species/diseases
    - 8.1.2 Named species

9. Pollution

- 9.1 Domestic & urban wastewater
    - 9.1.1 Sewage
    - 9.1.2 Run-off
    - 9.1.3 Type Unknown/Unrecorded
- 9.2 Industrial & military effluents
    - 9.2.1 Oil spills
- 9.3 Agricultural & forestry effluents
    - 9.3.1 Nutrient loads
    - 9.3.2 Soil erosion, sedimentation
    - 9.3.3 Herbicides & pesticides
- 9.4 Garbage & solid waste

10. Geological events

- 10.2 Earthquakes/tsunamis

11. Climate change & severe weather

- 11.1 Habitat shifting & alteration
- 11.2 Droughts
- 11.3 Temperature extremes
- 11.4 Storms & flooding
- 11.5 Other impacts (sea-level rise)

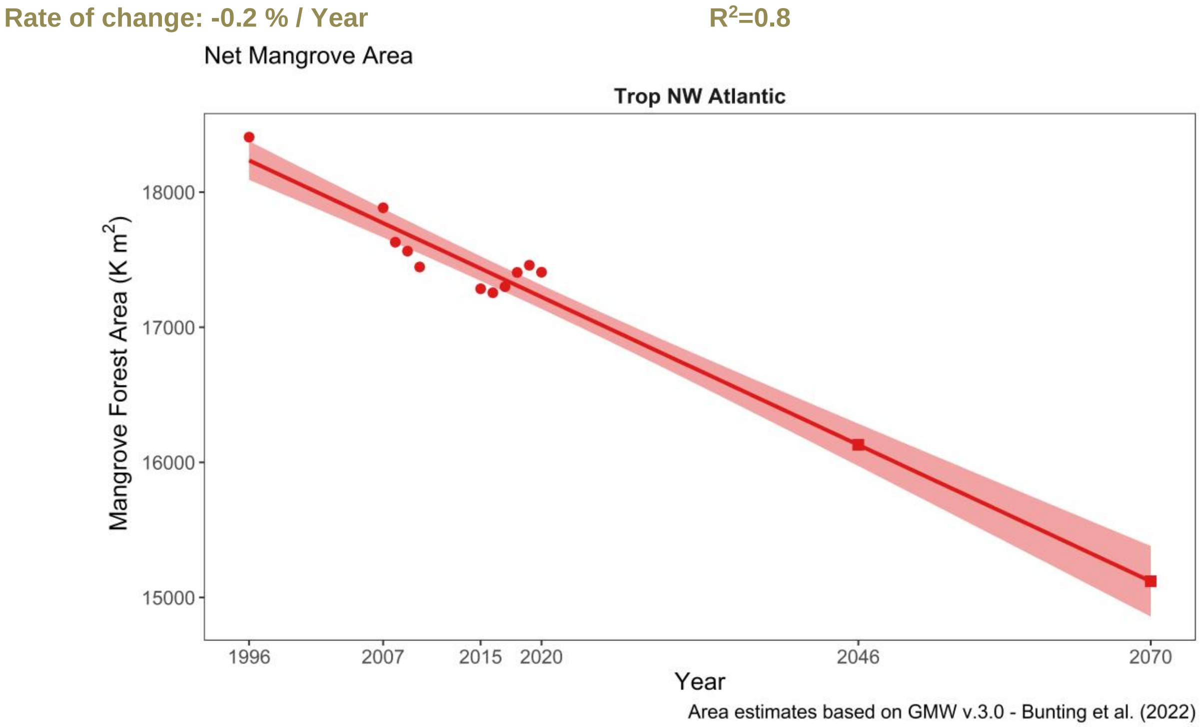
4. Ecosystem Assessment

Criterion A: Reduction in Geographic Distribution

Subcriterion A1 measures the trend in ecosystem extent during the last 50-year time window. Unfortunately, there is currently no common regional dataset, or national data for all the countries that provide information for the entire target area in 1970. Therefore, the Tropical Northwestern Atlantic mangrove ecosystem is classified as Data Deficient (DD) for this subcriterion.

Subcriterion A2 measures the change in ecosystem extent in any 50-year period, including from the present to the future: To estimate the Tropical Northwestern Atlantic mangrove area from 1996 to 2020, we used the most recent version of the Global Mangrove Watch (GMW v3.0) spatial dataset. The mangrove area in the province (and the corresponding countries) was corrected for omission and commission errors, utilizing the equations in Bunting *et al.* (2022). Historical estimates of the mangrove ecosystem area are accessible for specific countries (see Appendix 3) within this province. Despite a 3 to 8% deviation from the data provided by the Global Mangrove Watch (GMW) data, it is crucial to emphasize that the GMW dataset is the only available source for the entire study area.

The Tropical Northwestern Atlantic province mangroves show a net area change of -5.7% (1996-2020) (Bunting *et al.*, 2022). This value reflects the offset between areas gained (+ 0.1%/year) and lost (- 0.3%/year). The most significant decrease in mangrove area in this time series occurred between 1996 and 2007. Applying a linear regression to the area estimations between 1996 and 2020, we obtained a rate of change of -0.2%/year (Figure 5). Assuming this trend continues in the future, it is predicted that the extent of mangroves in the Tropical Northwestern Atlantic province will change by -12.4% from 1996 to 2046; by -17.9% from 1996 to 2070, but by -13.1% from 2020 to 2070. Given that these predicted changes in mangrove extent are below the 30% risk threshold, the Tropical Northwestern Atlantic mangrove ecosystem is assessed as **Least Concern (LC)** under subcriterion A2.



Area estimates based on GMW v.3.0 - Bunting et al. (2022)

Figure 5. Projected extent of the Tropical Northwestern Atlantic mangrove ecosystem to 2070. Circles represent the province mangrove area between 1996 and 2020 based on the GMW v3.0 dataset and equations in Bunting *et al.* (2022). The solid line and shaded area are the linear regression and 95% confidence intervals. Squares show the Tropical Northwestern Atlantic province predicted mangrove area for 2046 and 2070. It is important to note that an exponential model (proportional rate of decline) did not give a better fit to the data (R^2 = 0.8).

Subcriterion A3 measures changes in mangrove area since 1750. Unfortunately, there are no reliable data on mangrove extent for the entire province during this period. Therefore, the Tropical Northwestern Atlantic mangrove ecosystem is classified as **Data Deficient (DD)** for this subcriterion.

Overall, the ecosystem is assessed as **Least Concern (LC)** under criterion A.

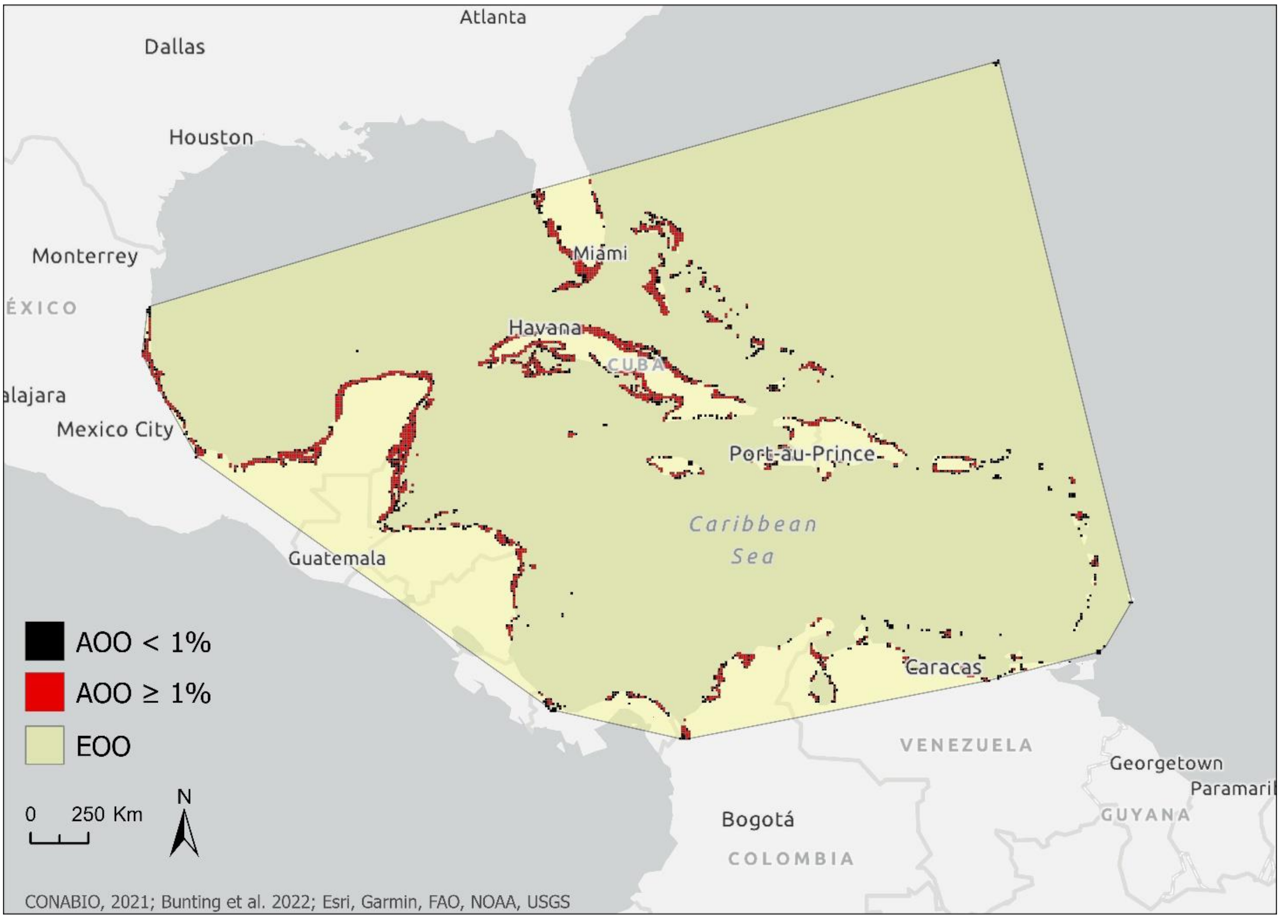
Criterion B: Restricted Geographic Distribution

Criterion B measures the risk of ecosystem collapse associated with restricted geographical distribution, based on standard metrics (Extent of Occurrence EOO, Area of Occupancy AOO, and Threat-defined locations). These parameters were calculated based on the 2020 Tropical Northwestern Atlantic province mangrove extent (GMW v.3).

Province	Extent of Occurrence EOO (km^2)	Area of Occupancy (AOO) >1%	Criterion B
The Tropical Northwestern Atlantic	5,682,300	1,800	**LC**

For 2020, AOO and EOO were measured as 1800 grid cells 10 x 10 km and 5,682,300 km^2, respectively (Figure 6). Excluding from the total of 2936 grid cells those that contain patches of mangrove forest that account for less than 1% of the grid cell area (< 1 km^2), the AOO is measured as 1,800, 10 x 10 km grid cells (Figure 6, red grids).

Considering the very high number of threat-defined locations, there is no evidence of plausible catastrophic threats leading to the potential disappearance of mangroves across their extent. As a result, the Tropical Northwestern Atlantic mangrove ecosystem is assessed as **Least Concern (LC)** under criterion B.



CONABIO, 2021; Bunting et al. 2022; Esri, Garmin, FAO, NOAA, USGS

Figure 6. The Tropical Northwestern Atlantic Mangrove Extent of Occurrence (EOO) and Area of Occupancy (AOO) in 2020. Estimates based on the 2020 GMW v3.0 spatial layer (Bunting *et al.*, 2022). The red 10 x 10 km grids (n=1800.) are more than 1% covered by the ecosystem and the black grids <1% (n= 1136).

Criterion C: Environmental Degradation

Criterion C measures the environmental degradation of abiotic variables necessary to support the ecosystem. Subcriterion C1 measures environmental degradation over the past 50 years: There are no reliable data to evaluate this subcriterion for the entire province, and therefore, the Tropical Northwestern Atlantic mangrove ecosystem is classified as **Data Deficient (DD)** for subcriterion C1.

Subcriterion C2 measures environmental degradation in the future or over any 50-year period, including from the present. In this context, the impact of future SLR on mangrove ecosystems was assessed by adopting the methodology presented by Schuerch *et al.* (2018). The published model was designed to calculate both absolute and relative change in the extent of wetland ecosystems under various regional SLR scenarios (i.e., medium: RCP 4.5 and high: RCP 8.5), considering sediment accretion. Therefore, the Schuerch *et al*. (2018) model was applied to the Tropical Northwestern Atlantic mangrove ecosystem boundary, with spatial extent based on Giri *et al*. (2011) and assuming mangrove landward migration was not possible.

According to the results, under an extreme SLR scenario of a 1.1-meter rise by 2100, the projected submerged area is ~ -75.9% by 2060, above 50% but below the 80% risk threshold. Therefore, considering that no mangrove recruitment can occur in a submerged system (100% relative severity), but that -75.9% of the ecosystem extent will be affected by SLR, the Tropical Northwestern Atlantic mangrove ecosystem should be assessed as Endangered (EN) for subcriterion C2.

However, recent studies suggest that the mangrove ecosystems in this province are demonstrating resilient responses to the challenges posed by increasing sea levels. Due to rising sea levels, estuarine waters are partially replacing some areas of mangroves, while these ecosystems are expanding their geographic distribution into urban and undeveloped uplands (Yu *et al*., 2019), indicating that landward migration of mangroves occur. In temperate and tropical coastal wetlands, mangrove forests encroach into salt marshes, marking significant ecological shifts with implications for both ecosystems and society (Bardou *et al*., 2023). Mckee *et al*., (2007) indicate that mangroves in the Caribbean region have adapted to rising sea levels by accumulating refractory roots beneath the surface. Additionally, sediment accumulation rates (SAR), measured in regions such as the Gulf of Mexico (Laguna de Términos, Mexico), have shown a twofold increase over the past decade, suggesting a remarkable capacity of mangroves to adapt to changing conditions (Jupin *et al*., 2023). However, it is also acknowledged that this adaptative capacity depends on sensitivity factors determined by mangrove structural and functional characteristics, which are related to geomorphological configuration and local hydrological dynamics (Table 2).

Table 2. Sensitive factors of mangrove forest related to sediment accumulation rates for the Tropical Northwestern Atlantic province (Adapted from Cinco-Castro *et al.*, 2022, 2023)

Coastal environmental settings	Dominant hydromorphic mangrove forest type	Structural complexity	Mean water source	Sediment input	Sediment Accumulation Rate
Delta river	Riverine and/or Fringe	High	River and/or Tides	High	Medium
Wave dominated	Fringe and/or Shrub	High	Tides and/or River	High	Medium
Lagoon	Fringe and/or Basin	Medium/Low	Tides and/or River	Medium	High
Estuary	Fringe and/or Basin	Medium/Low	River and/or Tides	Medium	High
Carbonate setting	Shrub and/or Hammock	Medium/Low	Underground aquifer	Low	Low or Medium

Consequently, the persistence of mangrove areas (Sánchez-García *et al.*, 2023) with SAR exceeding the average SLR, coupled with the gains of mangroves from marshes and uplands, could offset the loss of mangroves to estuarine water. This dynamic can result potentially in a net expansion of mangroves in certain regions under SLR scenarios (e.g., Colombia, see Appendix 4).

All of these factors, coupled with uncertainties in SLR estimates (Bindoff *et al*., 2007) and the distribution and extent of dominant hydromorphic mangrove forest types and coastal environmental settings (≈60% carbonate, ≈40% mineral sediments) in the province, underscore the need to acknowledge that under SLR scenarios, mangrove landward migration and persistence are viable. Therefore, it is considered that the relative severity of environment degradation is lower than previously assessed (100% relative severity) and falls within the range of ≥50% and <80%, leading to a final assessment of the Tropical Northwestern Atlantic mangrove ecosystem as **Vulnerable** (**VU**) under subcriterion C2.

The assessment of the subcriterion C2 highlights the need to conduct more customized assessments, considering not only sea level projections (Exposure factors) but also other structural and functional characteristics of the forest (Sensitivity factors) and even factors related to the adaptative capacity.

Subcriterion C3 measures change in abiotic variables since 1750. There is no reliable historical data on environmental degradation covering the entire province. Therefore, the Tropical Northwestern Atlantic province is classified as Data Deficient (DD) for this subcriterion.

Overall, the ecosystem is assessed as **Vulnerable (VU)** under criterion C.

Criterion D: Disruption of biotic processes or interactions

The global mangrove degradation map (Worthington and Spalding 2018) was used to assess the level of biotic degradation in the Tropical Northwestern Atlantic province. This map is based on degradation metrics calculated from vegetation indices (NDVI, EVI, SAVI, NDMI) using Landsat time series (≈2000 and 2017). These indices represent vegetation greenness and moisture conditions.

Mangrove degradation was calculated at a pixel scale (30m resolution) on areas intersecting with the 2017 mangrove extent map (GMW v2). Mangrove pixels were classified as degraded if two conditions were met: 1) at least 10 out of 12 degradation indices showed a decrease of more than 40% compared to the previous period, and 2) all twelve indices did not recover to within 20% of their pre-2000 value (detailed methods and data are available at: maps.oceanwealth.org/mangrove-restoration/). The decay in vegetation indices has been used to identify mangrove degradation and abrupt changes, including mangrove die-back events, clear-cutting, fire damage, and logging, as well as to track mangrove regeneration (Lovelock *et al.* 2017; Santana, 2018; Murray *et al.* 2020; Aljahdali *et al.* 2021; Lee *et al.* 2021). However, it is crucial to consider that changes observed in the vegetation indices can also be influenced by data artifacts (Akbar *et al.* 2020). Therefore, a relative severity level of more than 50%, but less than 80% was assumed.

The analysis shows that over 17 years (≈2000 to 2017), 4.1% of the Tropical Northwestern Atlantic mangrove area is classified as degraded, resulting in an average annual degradation rate of 0.24%. Assuming this trend remains constant, +12.1% of the Tropical Northwestern Atlantic mangrove area will be classified as degraded over a 50-year period. Since less than 30% of the ecosystem will meet the category thresholds for criterion D, the Tropical Northwestern Atlantic mangrove province is assessed as **Least Concern** **(LC)** under subcriterion D2b.

No data were found to assess the disruption of biotic processes and degradation over the past 50 years (subcriterion D1) or since 1750 (subcriterion D3). Thus, both subcriterion are classified as **Data Deficient (DD).**

Overall, the Tropical Northwestern Atlantic ecosystem remains **Least Concern (LC)** under criterion D.

Criterion E: Quantitative Risk

No model was used to assess the risk of ecosystem collapse to this ecosystem quantitatively; hence, criterion E was **Not Evaluated (NE)**.

5. Summary of the Assessment

CRITERION			
A. Reduction in Geographic Distribution	**A1** Past 50 years	**A2** Future or any 50y period	**A3** Historical (1750)
	DD	**LC**	**DD**
B. Restricted Geo. Distribution	**B1** Extent of Occurrence	**B2** Area of Occupancy	**B3** #Threat-defined Locations < 5?
	LC	**LC**	**LC**
C. Environmental Degradation	**C1** Past 50 years (1970)	**C2** Future or any 50y period	**C3** Historical (1750)
	DD	**VU**	**DD**
D. Disruption of biotic processes	**D1** Past 50 years (1970)	**D2** Future or any 50y period	**D3** Historical (1750)
	DD	**LC**	**DD**
E. Quantitative Risk analysis	**NE**		
OVERALL RISK CATEGORY	**VU**		

DD = Data Deficient; LC = Least Concern; NE = Not Evaluated; VU = Vulnerable.

Overall, the status of the Tropical Northwestern Atlantic mangrove ecosystem is assessed as **Vulnerable (VU).**

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7. Appendices

1. List of Key Mangrove Species

List of plant species considered true mangroves according to Red List of Threatened Species (RLTS) spatial data (IUCN, 2022). We included species whose range maps intersected with the boundary of the marine provinces/ecoregions described in the distribution section.

Class	Order	Family	Scientific name	RLTS category
Magnoliopsida	Ericales	Tetrameristaceae	*Pelliciera rhizophorae*	VU
Magnoliopsida	Lamiales	Acanthaceae	*Avicennia germinans*	LC
Magnoliopsida	Lamiales	Acanthaceae	*Avicennia schaueriana*	LC
Magnoliopsida	Malpighiales	Rhizophoraceae	*Rhizophora mangle*	LC
Magnoliopsida	Malpighiales	Rhizophoraceae	*Rhizophora racemosa*	LC
Magnoliopsida	Myrtales	Combretaceae	*Laguncularia racemosa*	LC
Polypodiospsida	Polypodiales	Petridaceae	*Acrostichum aureum*	LC

2. List of Associated Species

List of taxa associated with mangrove habitats in the Red List of Threatened Species (RLTS) database (IUCN, 2022). We included only species with entries for Habitat 1.7: “Forest - Subtropical/Tropical Mangrove Vegetation Above High Tide Level” or Habitat 12.7 for “Marine Intertidal - Mangrove Submerged Roots,” and with suitability recorded as “Suitable”, with “Major Importance” recorded as “Yes”, and any value of seasonality except “Passage”. We further filtered species with spatial point records in the GBIF (some species are excluded due to mismatch in taxonomic names, or lack of georeferenced records). The common names are those shown in the RLTS, except those in brackets from other sources.

Class	Order	Family	Scientific name	RLTS category	Common name
Polypodiospsida	Polypodiales	Pteridaceae	*Acrostichum danaeifolium**	LC	Giant leather fern
Actinopterygii	Albuliformes	Albulidae	*Albula vulpes*	NT	Bonefish
Actinopterygii	Anguilliformes	Muraenidae	*Gymnothorax funebris*	LC	Green moray
Actinopterygii	Anguilliformes	Ophichthidae	*Ahlia egmontis*	LC	Key worm eel
Actinopterygii	Anguilliformes	Ophichthidae	*Myrophis plumbeus*	LC	Leaden worm eel
Actinopterygii	Atheriniformes	Atherinidae	*Alepidomus evermanni*	LC	Cuban glassfish
Actinopterygii	Atheriniformes	Atherinopsidae	*Atherinella brasiliensis*	LC	Robust silverside
Actinopterygii	Atheriniformes	Atherinopsidae	*Atherinella chagresi*	LC	Chagres silverside
Actinopterygii	Atheriniformes	Atherinopsidae	*Atherinella milleri*	LC	Miller's silverside
Actinopterygii	Atheriniformes	Atherinopsidae	*Menidia colei*	VU	Golden silverside
Actinopterygii	Batrachoidiformes	Batrachoididae	*Batrachoides manglae*	LC	Cotuero toadfish
Actinopterygii	Batrachoidiformes	Batrachoididae	*Batrachoides pacifici*	LC	Pacific toadfish
Actinopterygii	Batrachoidiformes	Batrachoididae	*Opsanus phobetron*	LC	Scarecrow toadfish
Actinopterygii	Beloniformes	Belonidae	*Strongylura marina*	LC	Atlantic needlefish

Class	Order	Family	Scientific name	RLTS category	Common name
Actinopterygii	Beloniformes	Belonidae	*Strongylura notata*	LC	Redfin needlefish
Actinopterygii	Beloniformes	Belonidae	*Strongylura timucu*	LC	Timucu
Actinopterygii	Beloniformes	Hemiramphidae	*Hyporhamphus gilli*	LC	Choelo halfbeak
Actinopterygii	Beloniformes	Hemiramphidae	*Hyporhamphus roberti*	LC	Central american halfbeak
Actinopterygii	Clupeiformes	Clupeidae	*Harengula clupeola*	LC	False herring
Actinopterygii	Clupeiformes	Clupeidae	*Harengula humeralis*	LC	Redear herring
Actinopterygii	Clupeiformes	Clupeidae	*Jenkinsia lamprotaenia*	LC	Dwarf round herring
Actinopterygii	Clupeiformes	Clupeidae	*Lile piquitinga*	LC	Atlantic piquitinga
Actinopterygii	Clupeiformes	Engraulidae	*Anchoa trinitatis*	DD	Trinidad anchovy
Actinopterygii	Clupeiformes	Engraulidae	*Pterengraulis atherinoides*	LC	Wingfin anchovy
Actinopterygii	Cyprinodontiformes	Cyprinodontidae	*Cyprinodon artifrons*	LC	Yucatan pupfish
Actinopterygii	Cyprinodontiformes	Cyprinodontidae	*Cyprinodon dearborni*	LC	Willemstad pupfish
Actinopterygii	Cyprinodontiformes	Cyprinodontidae	*Floridichthys polyommus*	LC	Ocellated killifish
Actinopterygii	Cyprinodontiformes	Fundulidae	*Fundulus grandissimus*	VU	Giant killifish
Actinopterygii	Cyprinodontiformes	Fundulidae	*Fundulus similis*	LC	Longnose killifish
Actinopterygii	Cyprinodontiformes	Fundulidae	*Fundulus xenica*	LC	Diamond killifish
Actinopterygii	Cyprinodontiformes	Poeciliidae	*Gambusia manni*	LC	Bahama gambusia
Actinopterygii	Cyprinodontiformes	Poeciliidae	*Gambusia nicaraguensis*	LC	Nicaraguan mosquitofish
Actinopterygii	Cyprinodontiformes	Poeciliidae	*Gambusia rhizophorae*	LC	Mangrove gambusia
Actinopterygii	Cyprinodontiformes	Poeciliidae	*Gambusia xanthosoma*	EN	Cayman gambusia
Actinopterygii	Cyprinodontiformes	Poeciliidae	*Heterophallus echeagarayi*	DD	Maya gambusia
Actinopterygii	Cyprinodontiformes	Poeciliidae	*Limia caymanensis*	NT	Grand cayman limia
Actinopterygii	Cyprinodontiformes	Poeciliidae	*Limia rivasi*	CR	Rivas's limia
Actinopterygii	Cyprinodontiformes	Poeciliidae	*Limia vittata*	LC	Cuban limia
Actinopterygii	Cyprinodontiformes	Poeciliidae	*Poecilia orri*	LC	Mangrove molly
Actinopterygii	Cyprinodontiformes	Poeciliidae	*Poecilia vandepolli*	LC	Vandepoll's molly
Actinopterygii	Cyprinodontiformes	Poeciliidae	*Poeciliopsis fasciata*	LC	San jeronimo livebearer
Actinopterygii	Cyprinodontiformes	Poeciliidae	*Poeciliopsis turrubarensis*	LC	Barred livebearer

Class	Order	Family	Scientific name	RLTS category	Common name
Actinopterygii	Cyprinodontiformes	Rivulidae	*Kryptolebias marmoratus*	LC	Mangrove rivulus
Actinopterygii	Elopiformes	Elopidae	*Elops saurus*	LC	Northern ladyfish
Actinopterygii	Elopiformes	Elopidae	*Elops smithi*	DD	Southern ladyfish
Actinopterygii	Gobiiformes	Eleotridae	*Dormitator maculatus*	LC	Fat sleeper
Actinopterygii	Gobiiformes	Eleotridae	*Eleotris picta*	LC	Spotted sleeper
Actinopterygii	Gobiiformes	Eleotridae	*Erotelis smaragdus*	LC	Emerald sleeper
Actinopterygii	Gobiiformes	Eleotridae	*Gobiomorus dormitor*	LC	Bigmouth sleeper
Actinopterygii	Gobiiformes	Eleotridae	*Gobiomorus maculatus*	LC	Pacific sleeper
Actinopterygii	Gobiiformes	Eleotridae	*Guavina guavina*	LC	Guavi
Actinopterygii	Gobiiformes	Gobiidae	*Bathygobius curacao*	LC	Notchtongue goby
Actinopterygii	Gobiiformes	Gobiidae	*Bathygobius lacertus*	LC	Checkerboard frillfin goby
Actinopterygii	Gobiiformes	Gobiidae	*Bathygobius mystacium*	LC	Island frillfin
Actinopterygii	Gobiiformes	Gobiidae	*Bathygobius soporator*	LC	Frillfin goby
Actinopterygii	Gobiiformes	Gobiidae	*Ctenogobius smaragdus*	LC	Emerald goby
Actinopterygii	Gobiiformes	Gobiidae	*Ctenogobius stigmaturus*	LC	Spottail goby
Actinopterygii	Gobiiformes	Gobiidae	*Evorthodus minutus*	LC	Small goby
Actinopterygii	Gobiiformes	Gobiidae	*Gobionellus microdon*	LC	Estuary goby
Actinopterygii	Gobiiformes	Gobiidae	*Lophogobius cyprinoides*	LC	Crested goby
Actinopterygii	Gobiiformes	Gobiidae	*Microgobius miraflorensis*	LC	Miraflores goby
Actinopterygii	Gobiiformes	Gobiidae	*Sicydium gymnogaster*	LC	Smoothbelly goby
Actinopterygii	Mugiliformes	Mugilidae	*Mugil incilis*	LC	Parassi mullet
Actinopterygii	Ophidiiformes	Bythitidae	*Ogilbia jeffwilliamsi*	LC	Ghost brotula
Actinopterygii	Perciformes	Apogonidae	*Apogon binotatus*	LC	Barred cardilfish
Actinopterygii	Perciformes	Apogonidae	*Apogon planifrons*	LC	Pale cardilfish
Actinopterygii	Perciformes	Apogonidae	*Astrapogon puncticulatus*	LC	Blackfin cardilfish
Actinopterygii	Perciformes	Apogonidae	*Astrapogon stellatus*	DD	Conchfish
Actinopterygii	Perciformes	Apogonidae	*Phaeoptyx conklini*	LC	Freckled cardilfish
Actinopterygii	Perciformes	Apogonidae	*Phaeoptyx xenus*	LC	Sponge cardilfish
Actinopterygii	Perciformes	Blenniidae	*Chasmodes saburrae*	LC	Florida blenny

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Actinopterygii	Perciformes	Blenniidae	*Lupinoblennius vinctus*	NT	Mangrove blenny
Actinopterygii	Perciformes	Blenniidae	*Parablennius marmoreus*	LC	Seaweed blenny
Actinopterygii	Perciformes	Carangidae	*Caranx bartholomaei*	LC	Yellow jack
Actinopterygii	Perciformes	Carangidae	*Caranx hippos*	LC	Crevalle jack
Actinopterygii	Perciformes	Carangidae	*Chloroscombrus chrysurus*	LC	Atlantic bumper
Actinopterygii	Perciformes	Centropomidae	*Centropomus mexicanus*	LC	Largescale fat snook
Actinopterygii	Perciformes	Centropomidae	*Centropomus nigrescens*	LC	Black robalo
Actinopterygii	Perciformes	Chaenopsidae	*Protemblemaria punctata*	LC	Warthead blenny
Actinopterygii	Perciformes	Cichlidae	*Mayaheros urophthalmus*	LC	Mayan cichlid
Actinopterygii	Perciformes	Cichlidae	*Thorichthys helleri*	DD	Yellow cichlid
Actinopterygii	Perciformes	Dactyloscopidae	*Dactyloscopus amnis*	LC	Riverine stargazer
Actinopterygii	Perciformes	Dactyloscopidae	*Dactyloscopus zelotes*	DD	Imitator Sand-stargazer
Actinopterygii	Perciformes	Ephippidae	*Chaetodipterus faber*	LC	Atlantic spadefish
Actinopterygii	Perciformes	Epinephelidae	*Epinephelus itajara*	VU	Atlantic goliath grouper
Actinopterygii	Perciformes	Epinephelidae	*Mycteroperca acutirostris*	LC	Comb grouper
Actinopterygii	Perciformes	Epinephelidae	*Mycteroperca bonaci*	NT	Black grouper
Actinopterygii	Perciformes	Epinephelidae	*Mycteroperca interstitialis*	VU	Yellowmouth grouper
Actinopterygii	Perciformes	Epinephelidae	*Mycteroperca phenax*	DD	Scamp
Actinopterygii	Perciformes	Gerreidae	*Diapterus auratus*	LC	Irish mojarra
Actinopterygii	Perciformes	Gerreidae	*Eucinostomus harengulus*	LC	Tidewater mojarra
Actinopterygii	Perciformes	Gerreidae	*Eucinostomus havana*	LC	Bigeye mojarra
Actinopterygii	Perciformes	Gerreidae	*Eugerres awlae*	LC	Maracaibo mojarra
Actinopterygii	Perciformes	Gerreidae	*Eugerres brasilianus*	LC	Brazilian mojarra
Actinopterygii	Perciformes	Gerreidae	*Eugerres plumieri*	LC	Striped mojarra
Actinopterygii	Perciformes	Gerreidae	*Gerres cinereus*	LC	Yellow fin mojarra
Actinopterygii	Perciformes	Haemulidae	*Anisotremus surinamensis*	DD	Black margate
Actinopterygii	Perciformes	Haemulidae	*Haemulon aurolineatum*	LC	Tomtate
Actinopterygii	Perciformes	Haemulidae	*Haemulon bonariense*	LC	Black grunt

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Actinopterygii	Perciformes	Haemulidae	*Haemulon carbonarium*	LC	Caesar grunt
Actinopterygii	Perciformes	Haemulidae	*Haemulon chrysargyreum*	LC	Smallmouth grunt
Actinopterygii	Perciformes	Haemulidae	*Haemulon parra*	LC	Sailor's choice
Actinopterygii	Perciformes	Haemulidae	*Haemulon plumierii*	LC	White grunt
Actinopterygii	Perciformes	Haemulidae	*Haemulon sciurus*	LC	Bluestriped grunt
Actinopterygii	Perciformes	Labridae	*Halichoeres socialis*	EN	Social wrasse
Actinopterygii	Perciformes	Labridae	*Scarus coeruleus*	LC	Blue parrotfish
Actinopterygii	Perciformes	Labridae	*Scarus guacamaia*	NT	Rainbow parrotfish
Actinopterygii	Perciformes	Labrisomidae	*Labrisomus nuchipinnis*	LC	Hairy blenny
Actinopterygii	Perciformes	Labrisomidae	*Malacoctenus gilli*	LC	Dusky blenny
Actinopterygii	Perciformes	Labrisomidae	*Malacoctenus macropus*	LC	Rosy blenny
Actinopterygii	Perciformes	Lutjanidae	*Lutjanus cyanopterus*	VU	Cubera spper
Actinopterygii	Perciformes	Lutjanidae	*Lutjanus griseus*	LC	Grey spper
Actinopterygii	Perciformes	Mullidae	*Mulloidichthys martinicus*	LC	Yellow goatfish
Actinopterygii	Perciformes	Polynemidae	*Polydactylus oligodon*	LC	Littlescale threadfin
Actinopterygii	Perciformes	Polynemidae	*Polydactylus virginicus*	LC	Sevenfingered threadfin
Actinopterygii	Perciformes	Pomacentridae	*Stegastes leucostictus*	LC	Beaugregory
Actinopterygii	Perciformes	Pomacentridae	*Stegastes otophorus*	DD	Freshwater gregory
Actinopterygii	Perciformes	Sciaenidae	*Cynoscion acoupa*	VU	Acoupa weakfish
Actinopterygii	Perciformes	Sciaenidae	*Isopisthus parvipinnis*	LC	Bigtooth corvi
Actinopterygii	Perciformes	Sciaenidae	*Ophioscion gomezi*	LC	
Actinopterygii	Perciformes	Sciaenidae	*Sciaenops ocellatus*	LC	Red drum
Actinopterygii	Perciformes	Serranidae	*Hypoplectrus maya*	EN	Maya hamlet
Actinopterygii	Perciformes	Serranidae	*Hypoplectrus unicolor*	LC	Butter hamlet
Actinopterygii	Perciformes	Sparidae	*Archosargus rhomboidalis*	LC	Sea bream
Actinopterygii	Perciformes	Sparidae	*Lagodon rhomboides*	LC	Pinfish
Actinopterygii	Pleuronectiformes	Achiridae	*Achirus mazatlanus*	LC	Mazatlan sole
Actinopterygii	Pleuronectiformes	Achiridae	*Trinectes fonsecensis*	LC	Spottedfin sole
Actinopterygii	Pleuronectiformes	Achiridae	*Trinectes inscriptus*	LC	Scrawled sole
Actinopterygii	Pleuronectiformes	Bothidae	*Bothus lunatus*	LC	Plate fish
Actinopterygii	Pleuronectiformes	Paralichthyidae	*Citharichthys arenaceus*	LC	Sand whiff
Actinopterygii	Pleuronectiformes	Paralichthyidae	*Citharichthys spilopterus*	LC	Bay whiff

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Actinopterygii	Siluriformes	Ariidae	*Bagre marinus*	LC	Gafftopsail sea catfish
Actinopterygii	Siluriformes	Ariidae	*Bagre pinnimaculatus*	LC	Long-barbeled Sea Catfish
Actinopterygii	Siluriformes	Ariidae	*Cathorops belizensis*	DD	Belize sea catfish
Actinopterygii	Siluriformes	Ariidae	*Sciades herzbergii*	LC	Pemecou sea catfish
Actinopterygii	Syngnathiformes	Syngnathidae	*Hippocampus erectus*	VU	Lined seahorse
Actinopterygii	Syngnathiformes	Syngnathidae	*Hippocampus reidi*	NT	Long-snout Seahorse
Actinopterygii	Syngnathiformes	Syngnathidae	*Pseudophallus mindii*	DD	Freshwater pipefish
Actinopterygii	Tetraodontiformes	Tetraodontidae	*Canthigaster rostrata*	LC	Caribbean Sharpnose-puffer
Actinopterygii	Tetraodontiformes	Tetraodontidae	*Colomesus psittacus*	LC	Banded puffer
Actinopterygii	Tetraodontiformes	Tetraodontidae	*Lagocephalus laevigatus*	LC	Smooth puffer
Actinopterygii	Tetraodontiformes	Tetraodontidae	*Sphoeroides nephelus*	LC	Southern puffer
Actinopterygii	Tetraodontiformes	Tetraodontidae	*Sphoeroides testudineus*	LC	Checkered puffer
Amphibia	Anura	Eleutherodactylidae	*Eleutherodactylus caribe*	CR	Haitian marshfrog
Amphibia	Anura	Eleutherodactylidae	*Eleutherodactylus flavescens*	NT	Yellow Split-toed Frog
Amphibia	Anura	Eleutherodactylidae	*Eleutherodactylus juanariveroi*	CR	Plains coquí
Amphibia	Anura	Hylidae	*Osteopilus septentrionalis*	LC	Cuban treefrog
Amphibia	Anura	Leptodactylidae	*Leptodactylus melanonotus*	LC	Sabil frog
Amphibia	Anura	Ranidae	*Lithobates berlandieri*	LC	Rio grande leopard frog
Amphibia	Anura	Ranidae	*Lithobates grylio*	LC	Pig frog
Amphibia	Caudata	Plethodontidae	*Oedipina maritima*	CR	Maritime worm salamander
Aves	Accipitriformes	Accipitridae	*Accipiter gundlachi*	EN	Gundlach's hawk
Aves	Accipitriformes	Accipitridae	*Busarellus nigricollis*	LC	Black-collared Hawk
Aves	Accipitriformes	Accipitridae	*Buteo brachyurus*	LC	Short-tailed Hawk
Aves	Accipitriformes	Accipitridae	*Buteogallus aequinoctialis*	NT	Rufous Crab-hawk
Aves	Accipitriformes	Accipitridae	*Buteogallus anthracinus*	LC	Common black hawk
Aves	Accipitriformes	Accipitridae	*Buteogallus gundlachii*	NT	Cuban black hawk

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Aves	Accipitriformes	Accipitridae	*Buteogallus meridionalis*	LC	Savan hawk
Aves	Accipitriformes	Accipitridae	*Buteogallus urubitinga*	LC	Great black hawk
Aves	Accipitriformes	Accipitridae	*Elanoides forficatus*	LC	Swallow-tailed Kite
Aves	Accipitriformes	Accipitridae	*Geranospiza caerulescens*	LC	Crane hawk
Aves	Accipitriformes	Accipitridae	*Haliaeetus leucocephalus*	LC	Bald eagle
Aves	Accipitriformes	Accipitridae	*Ictinia plumbea*	LC	Plumbeous kite
Aves	Accipitriformes	Accipitridae	*Leucopternis melanops*	LC	Black-faced Hawk
Aves	Accipitriformes	Pandionidae	*Pandion haliaetus*	LC	Osprey
Aves	Anseriformes	Anatidae	*Cairina moschata*	LC	Muscovy duck
Aves	Anseriformes	Anatidae	*Dendrocygna arborea*	NT	West Indian Whistling-duck
Aves	Anseriformes	Anatidae	*Nomonyx dominicus*	LC	Masked duck
Aves	Caprimulgiformes	Apodidae	*Chaetura pelagica*	VU	Chimney swift
Aves	Caprimulgiformes	Caprimulgidae	*Nyctidromus albicollis*	LC	Pauraque
Aves	Caprimulgiformes	Nyctibiidae	*Nyctibius griseus*	LC	Common potoo
Aves	Caprimulgiformes	Trochilidae	*Amazilia coeruleogularis*	LC	Sapphire-throated Hummingbird
Aves	Caprimulgiformes	Trochilidae	*Amazilia edward*	LC	Snowy-bellied Hummingbird
Aves	Caprimulgiformes	Trochilidae	*Amazilia fimbriata*	LC	Glittering-throated Emerald
Aves	Caprimulgiformes	Trochilidae	*Amazilia lilliae*	EN	Sapphire-bellied Hummingbird
Aves	Caprimulgiformes	Trochilidae	*Amazilia tobaci*	LC	Copper-rumped Hummingbird
Aves	Caprimulgiformes	Trochilidae	*Amazilia tzacatl*	LC	Rufous-tailed Hummingbird
Aves	Caprimulgiformes	Trochilidae	*Anthracothorax mango*	LC	Jamaican mango
Aves	Caprimulgiformes	Trochilidae	*Anthracothorax prevostii*	LC	Green-breasted Mango
Aves	Caprimulgiformes	Trochilidae	*Campylopterus cuvierii*	LC	Scaly-breasted Sabrewing
Aves	Caprimulgiformes	Trochilidae	*Chlorostilbon maugaeus*	LC	Puerto rican emerald
Aves	Caprimulgiformes	Trochilidae	*Doricha eliza*	NT	Mexican sheartail

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Aves	Caprimulgiformes	Trochilidae	*Leucippus fallax*	LC	Buffy hummingbird
Aves	Caprimulgiformes	Trochilidae	*Phaethornis longuemareus*	LC	Little hermit
Aves	Cathartiformes	Cathartidae	*Cathartes burrovianus*	LC	Lesser Yellow-headed Vulture
Aves	Charadriiformes	Scolopacidae	*Numenius phaeopus*	LC	Whimbrel
Aves	Ciconiiformes	Ciconiidae	*Mycteria americana*	LC	Wood stork
Aves	Columbiformes	Columbidae	*Patagioenas cayennensis*	LC	Pale-vented Pigeon
Aves	Columbiformes	Columbidae	*Patagioenas corensis*	LC	Bare-eyed Pigeon
Aves	Columbiformes	Columbidae	*Patagioenas inornata*	NT	Plain pigeon
Aves	Columbiformes	Columbidae	*Patagioenas leucocephala*	NT	White-crowned Pigeon
Aves	Columbiformes	Columbidae	*Zenaida asiatica*	LC	White-winged Dove
Aves	Columbiformes	Columbidae	*Zenaida auriculata*	LC	Eared dove
Aves	Columbiformes	Columbidae	*Zenaida aurita*	LC	Zeida dove
Aves	Coraciiformes	Alcedinidae	*Chloroceryle aenea*	LC	American Pygmy-kingfisher
Aves	Coraciiformes	Alcedinidae	*Chloroceryle amazona*	LC	Amazon kingfisher
Aves	Coraciiformes	Alcedinidae	*Chloroceryle americana*	LC	Green kingfisher
Aves	Coraciiformes	Alcedinidae	*Chloroceryle inda*	LC	Green-and-rufous Kingfisher
Aves	Coraciiformes	Alcedinidae	*Megaceryle alcyon*	LC	Belted kingfisher
Aves	Coraciiformes	Alcedinidae	*Megaceryle torquata*	LC	Ringed kingfisher
Aves	Coraciiformes	Todidae	*Todus subulatus*	LC	Broad-billed Tody
Aves	Coraciiformes	Todidae	*Todus todus*	LC	Jamaican tody
Aves	Cuculiformes	Cuculidae	*Coccycua minuta*	LC	Little cuckoo
Aves	Cuculiformes	Cuculidae	*Coccyzus melacoryphus*	LC	Dark-billed Cuckoo
Aves	Cuculiformes	Cuculidae	*Coccyzus minor*	LC	Mangrove cuckoo
Aves	Cuculiformes	Cuculidae	*Crotophaga ani*	LC	Smooth-billed Ani
Aves	Cuculiformes	Cuculidae	*Crotophaga major*	LC	Greater ani
Aves	Cuculiformes	Cuculidae	*Piaya cayana*	LC	Common Squirrel-cuckoo

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Aves	Cuculiformes	Cuculidae	*Piaya mexicana*	LC	Mexican Squirrel-cuckoo
Aves	Falconiformes	Falconidae	*Daptrius ater*	LC	Black caracara
Aves	Falconiformes	Falconidae	*Micrastur semitorquatus*	LC	Collared Forest-falcon
Aves	Galliformes	Cracidae	*Ortalis garrula*	LC	Chestnut-winged Chachalaca
Aves	Galliformes	Cracidae	*Ortalis poliocephala*	LC	West mexican chachalaca
Aves	Galliformes	Cracidae	*Ortalis vetula*	LC	Plain chachalaca
Aves	Galliformes	Phasianidae	*Gallus gallus*	LC	Red junglefowl
Aves	Gruiformes	Aramidae	*Aramus guarauna*	LC	Limpkin
Aves	Gruiformes	Rallidae	*Aramides axillaris*	LC	Rufous-necked Wood-rail
Aves	Gruiformes	Rallidae	*Aramides cajaneus*	LC	Grey-cowled Wood-rail
Aves	Gruiformes	Rallidae	*Rallus crepitans*	LC	Clapper rail
Aves	Gruiformes	Rallidae	*Rallus longirostris*	LC	Mangrove rail
Aves	Passeriformes	Corvidae	*Aphelocoma californica*	LC	Western Scrub-jay
Aves	Passeriformes	Corvidae	*Cyanocorax violaceus*	LC	Violaceous jay
Aves	Passeriformes	Cotingidae	*Carpodectes hopkei*	LC	Black-tipped Cotinga
Aves	Passeriformes	Fringillidae	*Euphonia chlorotica*	LC	Purple-throated Euphonia
Aves	Passeriformes	Furnariidae	*Certhiaxis cinnamomeus*	LC	Yellow-chinned Spinetail
Aves	Passeriformes	Furnariidae	*Dendrocincla anabatina*	LC	Tawny-winged Woodcreeper
Aves	Passeriformes	Furnariidae	*Dendrocolaptes certhia*	LC	Amazonian barred woodcreeper
Aves	Passeriformes	Furnariidae	*Dendrocolaptes sanctithomae*	LC	Western barred woodcreeper
Aves	Passeriformes	Furnariidae	*Dendroplex picus*	LC	Straight-billed Woodcreeper
Aves	Passeriformes	Furnariidae	*Lepidocolaptes souleyetii*	LC	Streak-headed Woodcreeper
Aves	Passeriformes	Furnariidae	*Sittasomus griseus*	LC	Western olivaceous woodcreeper
Aves	Passeriformes	Furnariidae	*Synallaxis candei*	LC	White-whiskered Spinetail

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Aves	Passeriformes	Furnariidae	*Xiphorhynchus flavigaster*	LC	Ivory-billed Woodcreeper
Aves	Passeriformes	Furnariidae	*Xiphorhynchus guttatus*	LC	Buff-throated Woodcreeper
Aves	Passeriformes	Furnariidae	*Xiphorhynchus lachrymosus*	LC	Black-striped Woodcreeper
Aves	Passeriformes	Furnariidae	*Xiphorhynchus susurrans*	LC	Cocoa woodcreeper
Aves	Passeriformes	Hirundinidae	*Progne chalybea*	LC	Grey-breasted Martin
Aves	Passeriformes	Hirundinidae	*Progne cryptoleuca*	LC	Cuban martin
Aves	Passeriformes	Hirundinidae	*Stelgidopteryx ridgwayi*	LC	Yucatan Rough-winged Swallow
Aves	Passeriformes	Hirundinidae	*Stelgidopteryx serripennis*	LC	Northern Rough-winged Swallow
Aves	Passeriformes	Hirundinidae	*Tachycineta albilinea*	LC	Mangrove swallow
Aves	Passeriformes	Hirundinidae	*Tachycineta albiventer*	LC	White-winged Swallow
Aves	Passeriformes	Icteridae	*Agelaius assimilis*	LC	Red-shouldered Blackbird
Aves	Passeriformes	Icteridae	*Agelaius xanthomus*	EN	Yellow-shouldered Blackbird
Aves	Passeriformes	Icteridae	*Icterus bonana*	VU	Martinique oriole
Aves	Passeriformes	Icteridae	*Icterus laudabilis*	EN	St lucia oriole
Aves	Passeriformes	Icteridae	*Icterus leucopteryx*	LC	Jamaican oriole
Aves	Passeriformes	Icteridae	*Icterus mesomelas*	LC	Yellow-tailed Oriole
Aves	Passeriformes	Icteridae	*Icterus nigrogularis*	LC	Yellow oriole
Aves	Passeriformes	Icteridae	*Quiscalus lugubris*	LC	Carib grackle
Aves	Passeriformes	Icteridae	*Quiscalus mexicanus*	LC	Great-tailed Grackle
Aves	Passeriformes	Icteridae	*Quiscalus niger*	LC	Greater antillean grackle
Aves	Passeriformes	Mimidae	*Margarops fuscatus*	LC	Pearly-eyed Thrasher
Aves	Passeriformes	Parulidae	*Cardellina pusilla*	LC	Wilson's warbler
Aves	Passeriformes	Parulidae	*Geothlypis trichas*	LC	Common yellowthroat
Aves	Passeriformes	Parulidae	*Helmitheros vermivorum*	LC	Worm-eating Warbler
Aves	Passeriformes	Parulidae	*Parkesia noveboracensis*	LC	Northern waterthrush

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Aves	Passeriformes	Parulidae	*Protonotaria citrea*	LC	Prothonotary warbler
Aves	Passeriformes	Passerellidae	*Torreornis inexpectata*	NT	Zapata sparrow
Aves	Passeriformes	Phaenicophilidae	*Phaenicophilus palmarum*	LC	Black-crowned Palm-tager
Aves	Passeriformes	Phaenicophilidae	*Phaenicophilus poliocephalus*	NT	Grey-crowned Palm-tager
Aves	Passeriformes	Pipridae	*Chiroxiphia linearis*	LC	Long-tailed Makin
Aves	Passeriformes	Pipridae	*Pipra aureola*	LC	Crimson-hooded Makin
Aves	Passeriformes	Polioptilidae	*Polioptila caerulea*	LC	Blue-grey Gtcatcher
Aves	Passeriformes	Polioptilidae	*Polioptila plumbea*	LC	Tropical gtcatcher
Aves	Passeriformes	Thamnophilidae	*Formicivora grisea*	LC	Southern White-fringed Antwren
Aves	Passeriformes	Thamnophilidae	*Formicivora intermedia*	LC	Northern White-fringed Antwren
Aves	Passeriformes	Thamnophilidae	*Myrmotherula surinamensis*	VU	Guian streaked antwren
Aves	Passeriformes	Thraupidae	*Coereba flaveola*	LC	Baquit
Aves	Passeriformes	Thraupidae	*Conirostrum bicolor*	NT	Bicolored conebill
Aves	Passeriformes	Thraupidae	*Loxigilla barbadensis*	LC	Barbados bullfinch
Aves	Passeriformes	Thraupidae	*Loxigilla noctis*	LC	Lesser antillean bullfinch
Aves	Passeriformes	Thraupidae	*Paroaria nigrogenis*	LC	Masked cardil
Aves	Passeriformes	Thraupidae	*Pyrrhulagra portoricensis*	LC	Puerto rican bullfinch
Aves	Passeriformes	Tityridae	*Onychorhynchus coronatus*	LC	Amazonian royal flycatcher
Aves	Passeriformes	Tityridae	*Pachyramphus cinnamomeus*	LC	Cinmon becard
Aves	Passeriformes	Tityridae	*Pachyramphus polychopterus*	LC	White-winged Becard
Aves	Passeriformes	Tityridae	*Pachyramphus rufus*	LC	Cinereous becard
Aves	Passeriformes	Troglodytidae	*Campylorhynchus capistratus*	LC	Rufous-backed Wren
Aves	Passeriformes	Troglodytidae	*Campylorhynchus humilis*	LC	Sclater's wren
Aves	Passeriformes	Troglodytidae	*Campylorhynchus nuchalis*	LC	Stripe-backed Wren
Aves	Passeriformes	Troglodytidae	*Campylorhynchus rufinucha*	LC	Rufous-ped Wren

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Aves	Passeriformes	Troglodytidae	*Cantorchilus leucotis*	LC	Buff-breasted Wren
Aves	Passeriformes	Troglodytidae	*Thryophilus pleurostictus*	LC	Banded wren
Aves	Passeriformes	Turdidae	*Turdus fumigatus*	LC	Cocoa thrush
Aves	Passeriformes	Tyrannidae	*Attila cinnamomeus*	LC	Cinmon attila
Aves	Passeriformes	Tyrannidae	*Capsiempis flaveola*	LC	Yellow tyrannulet
Aves	Passeriformes	Tyrannidae	*Contopus bogotensis*	LC	Northern tropical pewee
Aves	Passeriformes	Tyrannidae	*Contopus caribaeus*	LC	Cuban pewee
Aves	Passeriformes	Tyrannidae	*Contopus latirostris*	LC	Lesser antillean pewee
Aves	Passeriformes	Tyrannidae	*Elaenia martinica*	LC	Caribbean elaenia
Aves	Passeriformes	Tyrannidae	*Inezia caudata*	LC	Pale-tipped Tyrannulet
Aves	Passeriformes	Tyrannidae	*Inezia tenuirostris*	LC	Slender-billed Tyrannulet
Aves	Passeriformes	Tyrannidae	*Myiarchus antillarum*	LC	Puerto rican flycatcher
Aves	Passeriformes	Tyrannidae	*Myiarchus barbirostris*	LC	Sad flycatcher
Aves	Passeriformes	Tyrannidae	*Myiarchus panamensis*	LC	Pama flycatcher
Aves	Passeriformes	Tyrannidae	*Myiarchus sagrae*	LC	La sagra's flycatcher
Aves	Passeriformes	Tyrannidae	*Myiarchus stolidus*	LC	Stolid flycatcher
Aves	Passeriformes	Tyrannidae	*Myiarchus swainsoni*	LC	Swainson's flycatcher
Aves	Passeriformes	Tyrannidae	*Myiarchus tyrannulus*	LC	Brown-crested Flycatcher
Aves	Passeriformes	Tyrannidae	*Myiodynastes maculatus*	LC	Northern streaked flycatcher
Aves	Passeriformes	Tyrannidae	*Myiodynastes solitarius*	LC	Southern streaked flycatcher
Aves	Passeriformes	Tyrannidae	*Phaeomyias murina*	LC	Mouse-colored Tyrannulet
Aves	Passeriformes	Tyrannidae	*Philohydor lictor*	LC	Lesser kiskadee
Aves	Passeriformes	Tyrannidae	*Pitangus sulphuratus*	LC	Great kiskadee
Aves	Passeriformes	Tyrannidae	*Sublegatus arenarum*	LC	Northern Scrub-flycatcher
Aves	Passeriformes	Tyrannidae	*Taeniotriccus andrei*	LC	Black-chested Tyrant

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Aves	Passeriformes	Tyrannidae	*Todirostrum maculatum*	LC	Spotted Tody-flycatcher
Aves	Passeriformes	Tyrannidae	*Tolmomyias flaviventris*	LC	Ochre-lored Flatbill
Aves	Passeriformes	Tyrannidae	*Tyrannus caudifasciatus*	LC	Loggerhead kingbird
Aves	Passeriformes	Tyrannidae	*Tyrannus dominicensis*	LC	Grey kingbird
Aves	Passeriformes	Tyrannidae	*Tyrannus melancholicus*	LC	Tropical kingbird
Aves	Passeriformes	Tyrannidae	*Tyrannus savana*	LC	Fork-tailed Flycatcher
Aves	Passeriformes	Vireonidae	*Cyclarhis gujanensis*	LC	Rufous-browed Peppershrike
Aves	Passeriformes	Vireonidae	*Hylophilus flavipes*	LC	Scrub greenlet
Aves	Passeriformes	Vireonidae	*Hylophilus insularis*	LC	Tobago greenlet
Aves	Passeriformes	Vireonidae	*Hylophilus viridiflavus*	LC	Yellow-green Greenlet
Aves	Passeriformes	Vireonidae	*Vireo altiloquus*	LC	Black-whiskered Vireo
Aves	Passeriformes	Vireonidae	*Vireo caribaeus*	VU	San andres vireo
Aves	Passeriformes	Vireonidae	*Vireo crassirostris*	LC	Thick-billed Vireo
Aves	Passeriformes	Vireonidae	*Vireo flavoviridis*	LC	Yellow-green Vireo
Aves	Passeriformes	Vireonidae	*Vireo latimeri*	LC	Puerto rican vireo
Aves	Passeriformes	Vireonidae	*Vireo magister*	LC	Yucatan vireo
Aves	Passeriformes	Vireonidae	*Vireo pallens*	LC	Mangrove vireo
Aves	Pelecaniformes	Ardeidae	*Ardea herodias*	LC	Great blue heron
Aves	Pelecaniformes	Ardeidae	*Ardea occidentalis*	EN	Great white heron
Aves	Pelecaniformes	Ardeidae	*Butorides striata*	LC	Green-backed Heron
Aves	Pelecaniformes	Ardeidae	*Cochlearius cochlearius*	LC	Boat-billed Heron
Aves	Pelecaniformes	Ardeidae	*Egretta caerulea*	LC	Little blue heron
Aves	Pelecaniformes	Ardeidae	*Egretta rufescens*	NT	Reddish egret
Aves	Pelecaniformes	Ardeidae	*Egretta tricolor*	LC	Tricolored heron
Aves	Pelecaniformes	Ardeidae	*Ixobrychus exilis*	LC	Least bittern
Aves	Pelecaniformes	Ardeidae	*Nyctanassa violacea*	LC	Yellow-crowned Night-heron
Aves	Pelecaniformes	Ardeidae	*Nycticorax nycticorax*	LC	Black-crowned Night-heron

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Aves	Pelecaniformes	Ardeidae	*Tigrisoma lineatum*	LC	Rufescent Tiger-heron
Aves	Pelecaniformes	Ardeidae	*Zebrilus undulatus*	LC	Zigzag heron
Aves	Pelecaniformes	Threskiornithidae	*Eudocimus albus*	LC	White ibis
Aves	Pelecaniformes	Threskiornithidae	*Eudocimus ruber*	LC	Scarlet ibis
Aves	Piciformes	Bucconidae	*Notharchus hyperrhynchus*	LC	White-necked Puffbird
Aves	Piciformes	Bucconidae	*Notharchus subtectus*	LC	Lesser pied puffbird
Aves	Piciformes	Bucconidae	*Notharchus tectus*	LC	Greater pied puffbird
Aves	Piciformes	Galbulidae	*Galbula galbula*	LC	Green-tailed Jacamar
Aves	Piciformes	Picidae	*Campephilus guatemalensis*	LC	Pale-billed Woodpecker
Aves	Piciformes	Picidae	*Celeus castaneus*	LC	Chestnut-colored Woodpecker
Aves	Piciformes	Picidae	*Celeus flavus*	LC	Cream-colored Woodpecker
Aves	Piciformes	Picidae	*Colaptes auratus*	LC	Yellow-shafted Flicker
Aves	Piciformes	Picidae	*Colaptes cafer*	LC	Red-shafted Flicker
Aves	Piciformes	Picidae	*Colaptes punctigula*	LC	Spot-breasted Woodpecker
Aves	Piciformes	Picidae	*Colaptes rubiginosus*	LC	Golden-olive Woodpecker
Aves	Piciformes	Picidae	*Dryobates scalaris*	LC	Ladder-backed Woodpecker
Aves	Piciformes	Picidae	*Hylatomus lineatus*	LC	Lineated woodpecker
Aves	Piciformes	Picidae	*Melanerpes herminieri*	LC	Guadeloupe woodpecker
Aves	Piciformes	Picidae	*Melanerpes portoricensis*	LC	Puerto rican woodpecker
Aves	Piciformes	Picidae	*Melanerpes radiolatus*	LC	Jamaican woodpecker
Aves	Piciformes	Picidae	*Melanerpes rubricapillus*	LC	Red-crowned Woodpecker
Aves	Piciformes	Picidae	*Melanerpes striatus*	LC	Hispaniolan woodpecker
Aves	Piciformes	Picidae	*Melanerpes superciliaris*	LC	West indian woodpecker
Aves	Piciformes	Picidae	*Nesoctites micromegas*	LC	Antillean piculet
Aves	Piciformes	Picidae	*Picumnus cinnamomeus*	LC	Chestnut piculet

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Aves	Piciformes	Picidae	*Picumnus exilis*	LC	Golden-spangled Piculet
Aves	Piciformes	Picidae	*Picumnus spilogaster*	VU	White-bellied Piculet
Aves	Piciformes	Picidae	*Veniliornis passerinus*	LC	Little woodpecker
Aves	Piciformes	Picidae	*Xiphidiopicus percussus*	LC	Cuban green woodpecker
Aves	Psittaciformes	Psittacidae	*Amazona albifrons*	LC	White-fronted Amazon
Aves	Psittaciformes	Psittacidae	*Amazona amazonica*	LC	Orange-winged Amazon
Aves	Psittaciformes	Psittacidae	*Amazona auropalliata*	CR	Yellow-ped Amazon
Aves	Psittaciformes	Psittacidae	*Amazona collaria*	VU	Yellow-billed Amazon
Aves	Psittaciformes	Psittacidae	*Amazona leucocephala*	NT	Cuban amazon
Aves	Psittaciformes	Psittacidae	*Amazona oratrix*	EN	Yellow-headed Amazon
Aves	Psittaciformes	Psittacidae	*Amazona vittata*	CR	Puerto rican amazon
Aves	Psittaciformes	Psittacidae	*Ara macao*	LC	Scarlet macaw
Aves	Psittaciformes	Psittacidae	*Forpus passerinus*	LC	Green-rumped Parrotlet
Aves	Psittaciformes	Psittacidae	*Psittacara leucophthalmus*	LC	White-eyed Parakeet
Aves	Strigiformes	Strigidae	*Bubo virginianus*	LC	Great horned owl
Aves	Strigiformes	Strigidae	*Ciccaba nigrolineata*	LC	Black-and-white Owl
Aves	Strigiformes	Strigidae	*Megascops cooperi*	LC	Pacific Screech-owl
Aves	Suliformes	Fregatidae	*Fregata magnificens*	LC	Magnificent frigatebird
Aves	Trogoniformes	Trogonidae	*Temnotrogon roseigaster*	LC	Hispaniolan trogon
Aves	Trogoniformes	Trogonidae	*Trogon citreolus*	LC	Citreoline trogon
Aves	Trogoniformes	Trogonidae	*Trogon massena*	LC	Slaty-tailed Trogon
Aves	Trogoniformes	Trogonidae	*Trogon melanocephalus*	LC	Black-headed Trogon
Aves	Trogoniformes	Trogonidae	*Trogon melanurus*	LC	Black-tailed Trogon
Aves	Trogoniformes	Trogonidae	*Trogon viridis*	LC	Green-backed Trogon
Chondrichthyes	Carcharhiniformes	Carcharhinidae	*Negaprion brevirostris*	VU	Lemon shark
Chondrichthyes	Carcharhiniformes	Carcharhinidae	*Negaprion brevirostris*	VU	Lemon shark
Chondrichthyes	Myliobatiformes	Potamotrygonidae	*Styracura schmardae*	EN	Atlantic chupare

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Chondrichthyes	Rhinopristiformes	Pristidae	*Pristis pectinata*	CR	Smalltooth sawfish
Chondrichthyes	Rhinopristiformes	Pristidae	*Pristis pristis*	CR	Largetooth sawfish
Gastropoda	Cycloneritida	Neritidae	*Vitta virginea*	LC	Virgin nerite
Gastropoda	Ellobiida	Ellobiidae	*Melampus coffeus*	LC	Coffee melampus
Gastropoda	Littorinimorpha	Littorinidae	*Littoraria angulifera*	LC	Mangrove periwinkle
Gastropoda	Neogastropoda	Conidae	*Conus paschalli*	LC	
Gastropoda	Sorbeoconcha	Potamididae	*Cerithidea pliculosa*	LC	Horn shell
Holothuroidea	Aspidochirotida	Holothuriidae	*Holothuria floridana*	LC	
Holothuroidea	Aspidochirotida	Holothuriidae	*Holothuria impatiens*	DD	Bottleneck sea cucumber
Holothuroidea	Aspidochirotida	Holothuriidae	*Holothuria mexicana*	LC	Donkey dung
Holothuroidea	Aspidochirotida	Holothuriidae	*Holothuria surinamensis*	LC	
Insecta	Coleoptera	Curculionidae	*Dryotribus mimeticus*	LC	
Insecta	Odonata	Aeshnidae	*Coryphaeschna viriditas*	LC	Mangrove darner
Insecta	Odonata	Libellulidae	*Erythrodiplax berenice*	LC	Seaside dragonlet
Liliopsida	Alismatales	Cymodoceaceae	*Halodule wrightii*	LC	
Liliopsida	Asparagales	Orchidaceae	*Myrmecophila thomsoniana*	EN	Ba orchid
Magnoliopsida	Boraginales	Cordiaceae	*Varronia brittonii*	LC	
Magnoliopsida	Boraginales	Cordiaceae	*Varronia integrifolia*	DD	
Magnoliopsida	Boraginales	Heliotropiaceae	*Euploca procumbens*	LC	Four-spike heliotrope
Magnoliopsida	Brassicales	Capparaceae	*Quadrella lindeniana*	LC	Negrita
Magnoliopsida	Caryophyllales	Cactaceae	*Epiphyllum phyllanthus*	LC	Climbing cactus
Magnoliopsida	Caryophyllales	Cactaceae	*Hylocereus monacanthus*	LC	Nightblooming cereus
Magnoliopsida	Caryophyllales	Cactaceae	*Rhipsalis baccifera*	LC	Mistletoe cactus
Magnoliopsida	Celastrales	Celastraceae	*Maytenus phyllanthoides*	LC	Sweet mangrove
Magnoliopsida	Ericales	Sapotaceae	*Sideroxylon americanum*	LC	
Magnoliopsida	Fabales	Fabaceae	*Cynometra hemitomophylla*	LC	Guapinolillo
Magnoliopsida	Fabales	Fabaceae	*Inga belizensis*	LC	
Magnoliopsida	Fabales	Fabaceae	*Inga davidsei*	VU	
Magnoliopsida	Fabales	Fabaceae	*Inga heterophylla*	LC	Pacae
Magnoliopsida	Fabales	Fabaceae	*Inga ruiziana*	LC	Cikile
Magnoliopsida	Fabales	Fabaceae	*Lonchocarpus cruentus*	LC	Marinero
Magnoliopsida	Fabales	Fabaceae	*Mimosa bahamensis*	LC	

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Magnoliopsida	Fabales	Fabaceae	*Mimosa platycarpa*	LC	Carbón
Magnoliopsida	Fabales	Fabaceae	*Muellera frutescens*	LC	Madre cacao macho
Magnoliopsida	Fabales	Fabaceae	*Pterocarpus officinalis*	NT	Bloodwood
Magnoliopsida	Gentianales	Rubiaceae	*Randia laetevirens*	LC	Crucero blanco
Magnoliopsida	Gentianales	Rubiaceae	*Randia obcordata*	LC	Tacuche
Magnoliopsida	Lamiales	Lamiaceae	*Aegiphila elata*	LC	
Magnoliopsida	Lamiales	Lamiaceae	*Aegiphila monstrosa*	LC	
Magnoliopsida	Magnoliales	Annonaceae	*Annona glabra*	LC	Monkey apple
Magnoliopsida	Magnoliales	Annonaceae	*Guatteria zamorae*	DD	
Magnoliopsida	Malpighiales	Clusiaceae	*Symphonia globulifera*	LC	Boarwood
Magnoliopsida	Malpighiales	Clusiaceae	*Tovomita turbinata*	DD	
Magnoliopsida	Malpighiales	Ochnaceae	*Ouratea insulae*	VU	
Magnoliopsida	Malpighiales	Salicaceae	*Banara wilsonii*	EX	
Magnoliopsida	Malpighiales	Violaceae	*Gloeospermum boreale*	LC	
Magnoliopsida	Malvales	Malvaceae	*Hibiscus tiliaceus*	LC	Coast cottonwood
Magnoliopsida	Malvales	Malvaceae	*Pavonia bahamensis*	NT	
Magnoliopsida	Malvales	Malvaceae	*Thespesia populnea*	LC	Portia tree
Magnoliopsida	Myrtales	Combretaceae	*Conocarpus erectus**	LC	Buttonwood
Magnoliopsida	Myrtales	Combretaceae	*Terminalia molinetii*	LC	
Magnoliopsida	Rosales	Moraceae	*Castilla elastica*	LC	Rubber tree
Mammalia	Carnivora	Felidae	*Leopardus pardalis*	LC	Ocelot
Mammalia	Carnivora	Felidae	*Panthera onca*	NT	Jaguar
Mammalia	Carnivora	Procyonidae	*Procyon cancrivorus*	LC	Crab-eating Raccoon
Mammalia	Carnivora	Procyonidae	*Procyon lotor*	LC	Northern raccoon
Mammalia	Carnivora	Procyonidae	*Procyon pygmaeus*	CR	Pygmy raccoon
Mammalia	Cetartiodactyla	Cervidae	*Mazama pandora*	VU	Yucatan brown brocket
Mammalia	Cetartiodactyla	Cervidae	*Odocoileus virginianus*	LC	White-tailed Deer
Mammalia	Cetartiodactyla	Tayassuidae	*Pecari tajacu*	LC	Collared peccary
Mammalia	Cetartiodactyla	Tayassuidae	*Tayassu pecari*	VU	White-lipped Peccary
Mammalia	Chiroptera	Noctilionidae	*Noctilio leporinus*	LC	Greater bulldog bat
Mammalia	Chiroptera	Vespertilionidae	*Eptesicus guadeloupensis*	EN	Guadeloupe big brown bat
Mammalia	Didelphimorphia	Didelphidae	*Didelphis marsupialis*	LC	Common opossum
Mammalia	Didelphimorphia	Didelphidae	*Didelphis virginiana*	LC	Virginia opossum

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Mammalia	Didelphimorphia	Didelphidae	*Metachirus nudicaudatus*	LC	Brown Four-eyed Opossum
Mammalia	Lagomorpha	Leporidae	*Sylvilagus floridanus*	LC	Eastern cottontail
Mammalia	Lagomorpha	Leporidae	*Sylvilagus palustris*	LC	Marsh rabbit
Mammalia	Pilosa	Bradypodidae	*Bradypus pygmaeus*	CR	Pygmy Three-toed Sloth
Mammalia	Pilosa	Bradypodidae	*Bradypus variegatus*	LC	Brown-throated Sloth
Mammalia	Pilosa	Cyclopedidae	*Cyclopes didactylus*	LC	Silky anteater
Mammalia	Pilosa	Myrmecophagidae	*Tamandua mexicana*	LC	Northern tamandua
Mammalia	Pilosa	Myrmecophagidae	*Tamandua tetradactyla*	LC	Southern tamandua
Mammalia	Primates	Aotidae	*Aotus zonalis*	NT	Pamanian night monkey
Mammalia	Primates	Atelidae	*Alouatta palliata*	VU	Mantled howler monkey
Mammalia	Primates	Atelidae	*Alouatta pigra*	EN	Yucatán black howler monkey
Mammalia	Primates	Cebidae	*Sapajus apella*	LC	Black-capped Capuchin
Mammalia	Rodentia	Capromyidae	*Capromys pilorides*	LC	Desmarest's hutia
Mammalia	Rodentia	Capromyidae	*Mesocapromys angelcabrerai*	CR	Cabrera's hutia
Mammalia	Rodentia	Capromyidae	*Mesocapromys auritus*	EN	Large-eared Hutia
Mammalia	Rodentia	Cricetidae	*Oryzomys gorgasi*	EN	
Mammalia	Rodentia	Echimyidae	*Diplomys labilis*	LC	Rufous tree rat
Mammalia	Rodentia	Sciuridae	*Sciurus niger*	LC	Delmarva fox squirrel
Mammalia	Sirenia	Trichechidae	*Trichechus manatus*	VU	American matee
Reptilia	Crocodylia	Alligatoridae	*Caiman crocodilus*	LC	Spectacled caiman
Reptilia	Crocodylia	Crocodylidae	*Crocodylus acutus*	VU	American crocodile
Reptilia	Squamata	Boidae	*Boa constrictor*	LC	Red-tailed Boa
Reptilia	Squamata	Boidae	*Boa imperator*	LC	Central american boa
Reptilia	Squamata	Boidae	*Chilabothrus granti*	EN	Virgin islands boa
Reptilia	Squamata	Boidae	*Chilabothrus strigilatus*	LC	Bahamian boa
Reptilia	Squamata	Boidae	*Corallus grenadensis*	LC	Greda tree boa
Reptilia	Squamata	Boidae	*Corallus ruschenbergerii*	LC	Ruschenberger's tree boa

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Reptilia	Squamata	Colubridae	*Chironius carinatus*	LC	Sipo
Reptilia	Squamata	Colubridae	*Chironius flavopictus*	DD	
Reptilia	Squamata	Colubridae	*Drymarchon melanurus*	LC	Western indigo ske
Reptilia	Squamata	Colubridae	*Leptophis diplotropis*	LC	Pacific coast parrot ske
Reptilia	Squamata	Colubridae	*Spilotes pullatus*	LC	Chicken ske
Reptilia	Squamata	Colubridae	*Tantilla calamarina*	LC	Pacific coast centipede ske
Reptilia	Squamata	Corytophanidae	*Basiliscus vittatus*	LC	Brown basilisk
Reptilia	Squamata	Dactyloidae	*Anolis allogus*	LC	Bueycito anole
Reptilia	Squamata	Dactyloidae	*Anolis baleatus*	LC	Dominican giant anole
Reptilia	Squamata	Dactyloidae	*Anolis conspersus*	LC	Grand Cayman Blue-fanned Anole
Reptilia	Squamata	Dactyloidae	*Anolis cristatellus*	LC	Puerto rico crested anole
Reptilia	Squamata	Dactyloidae	*Anolis cybotes*	LC	Hispaniolan stout anole
Reptilia	Squamata	Dactyloidae	*Anolis equestris*	LC	Knight anole
Reptilia	Squamata	Dactyloidae	*Anolis ferreus*	LC	Marie-galante anole
Reptilia	Squamata	Dactyloidae	*Anolis garmani*	LC	Jamaican giant anole
Reptilia	Squamata	Dactyloidae	*Anolis grahami*	LC	Graham's anole
Reptilia	Squamata	Dactyloidae	*Anolis kahouannensis*	NT	Kahouanne anole
Reptilia	Squamata	Dactyloidae	*Anolis lineatopus*	LC	Stripefoot anole
Reptilia	Squamata	Dactyloidae	*Anolis luteogularis*	LC	Western giant anole
Reptilia	Squamata	Dactyloidae	*Anolis maculiventris*	LC	Blotchbelly anole
Reptilia	Squamata	Dactyloidae	*Anolis marmoratus*	LC	Guadeloupe anole
Reptilia	Squamata	Dactyloidae	*Anolis opalinus*	LC	Bluefields anole
Reptilia	Squamata	Dactyloidae	*Anolis porcatus*	LC	Cuban green anole
Reptilia	Squamata	Dactyloidae	*Anolis quadriocellifer*	LC	Peninsula anole
Reptilia	Squamata	Dactyloidae	*Anolis semilineatus*	LC	Half-lined Hispaniolan Grass Anole
Reptilia	Squamata	Dactyloidae	*Anolis smaragdinus*	LC	Bahamian green anole
Reptilia	Squamata	Dactyloidae	*Anolis stratulus*	LC	Spotted anole
Reptilia	Squamata	Dactyloidae	*Anolis utilensis*	CR	Mangrove anole

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Reptilia	Squamata	Dactyloidae	*Anolis valencienni*	LC	Jamaican twig anole
Reptilia	Squamata	Dipsadidae	*Alsophis antillensis*	CR	
Reptilia	Squamata	Dipsadidae	*Alsophis sibonius*	LC	Antilles racer
Reptilia	Squamata	Dipsadidae	*Atractus macondo*	DD	
Reptilia	Squamata	Dipsadidae	*Cubophis caymanus*	LC	
Reptilia	Squamata	Dipsadidae	*Cubophis ruttyi*	LC	Little cayman racer
Reptilia	Squamata	Dipsadidae	*Cubophis vudii*	LC	Bahamian racer
Reptilia	Squamata	Dipsadidae	*Erythrolamprus cobella*	LC	Mangrove sk
Reptilia	Squamata	Dipsadidae	*Leptodeira maculata*	LC	Southwestern Cat-eyed Ske
Reptilia	Squamata	Dipsadidae	*Tretanorhinus mocquardi*	DD	Mocquard's swamp ske
Reptilia	Squamata	Dipsadidae	*Tretanorhinus nigroluteus*	LC	Orangebelly swamp ske
Reptilia	Squamata	Iguanidae	*Ctenosaura acanthura*	LC	Veracruz Spiny-tailed Igua
Reptilia	Squamata	Iguanidae	*Ctenosaura bakeri*	CR	Utila Spiny-tailed Igua
Reptilia	Squamata	Iguanidae	*Ctenosaura oedirhina*	EN	Roatán Spiny-tailed Igua
Reptilia	Squamata	Iguanidae	*Cyclura carinata*	EN	Turks and Caicos Rock Igua
Reptilia	Squamata	Iguanidae	*Cyclura pinguis*	CR	Anegada rock igua
Reptilia	Squamata	Iguanidae	*Iguana delicatissima*	CR	Lesser antillean igua
Reptilia	Squamata	Iguanidae	*Iguana iguana*	LC	Common green igua
Reptilia	Squamata	Loxocemidae	*Loxocemus bicolor*	LC	
Reptilia	Squamata	Phyllodactylidae	*Phyllodactylus ventralis*	LC	Margarita Leaf-toed Gecko
Reptilia	Squamata	Scincidae	*Mabuya cochonae*	CR	Cochons skink
Reptilia	Squamata	Scincidae	*Mabuya desiradae*	CR	Désirade skink
Reptilia	Squamata	Sphaerodactylidae	*Sphaerodactylus difficilis*	LC	Hispaniolan eyespot sphaero
Reptilia	Squamata	Sphaerodactylidae	*Sphaerodactylus elegans*	LC	Ashy gecko
Reptilia	Squamata	Sphaerodactylidae	*Sphaerodactylus macrolepis*	LC	Big-scaled Least Gecko
Reptilia	Squamata	Sphaerodactylidae	*Sphaerodactylus molei*	LC	Tobago least gecko
Reptilia	Squamata	Sphaerodactylidae	*Sphaerodactylus oliveri*	EN	Juventud least gecko

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Reptilia	Squamata	Sphaerodactylidae	*Sphaerodactylus phyzacinus*	EN	
Reptilia	Squamata	Teiidae	*Cnemidophorus rostralis*	NT	
Reptilia	Squamata	Teiidae	*Pholidoscelis auberi*	LC	Cuban ameiva
Reptilia	Squamata	Teiidae	*Pholidoscelis fuscatus*	LC	Dominican ameiva
Reptilia	Squamata	Teiidae	*Pholidoscelis plei*	LC	Anguilla bank ameiva
Reptilia	Squamata	Teiidae	*Pholidoscelis taeniurus*	LC	Hispaniolan Blue-tailed Ameiva
Reptilia	Squamata	Tropiduridae	*Leiocephalus barahonensis*	LC	Orange-bellied Curlytail
Reptilia	Squamata	Tropiduridae	*Leiocephalus carinatus*	LC	Northern Curly-tailed Lizard
Reptilia	Squamata	Tropiduridae	*Leiocephalus lunatus*	LC	Santo domingo curlytail lizard
Reptilia	Squamata	Tropiduridae	*Leiocephalus macropus*	LC	Monte verde curlytail lizard
Reptilia	Squamata	Typhlopidae	*Amerotyphlops brongersmianus*	LC	Brongersma's worm ske
Reptilia	Squamata	Typhlopidae	*Antillotyphlops naugus*	VU	Erica's worm ske
Reptilia	Testudines	Cheloniidae	*Eretmochelys imbricata*	CR	Hawksbill turtle
Reptilia	Testudines	Emydidae	*Malaclemys terrapin*	VU	Diamondback terrapin

3. National estimates for subcriterion C2

The risk maps related to SLR on the coast of Colombia correspond to the projection scenarios with the most forcing in the CMIP 5. These scenarios project SLR levels of 18 cm by 2040, 29 cm by 2070, and 40 cm by 2100. National estimates, made in 2017 by INVEMAR and IDEAM, indicate mangrove areas exposed to SLR scenarios in square kilometers for the study province during the years 2040, 2070, and 2100 (INVEMAR, IDEAM, 2017). These calculations were performed using the Lambert Azimuthal projection.

Table b. National assessment of mangrove ecosystem exposure to sea-level rise in the Tropical northwestern Atlantic province, Colombia.

Country	Scenario 2040	Scenario 2070	Scenario 2100	Reference
Colombia	618.6	633.5	645.7	INVEMAR, IDEAM (2017). Elaboración del análisis de vulnerabilidad marino costero e insular ante el cambio climático para el país. Informe Técnico Final (ITF)- 001. 256 p.