Cetaceans are a group of aquatic mammals that include whales and dolphins. Cetaceans play an important ecological role as top predators and ecosystems engineers, helping to maintain the integrity and balance of the ecosystems where they are found (Roman et al., 2014; Pace et al., 2015; Chami et al., 2019). However, cetaceans face various threats around the globe, such as habitat loss and degradation, pollution, food depletion due to overfishing, bycatch, boat collisions, unsustainable tourism practices, industrial disturbances, military operations, and climate change (Reeves et al., 2003). The Caribbean Sea of Guatemala is no exception: there are strong fishing pressure, high maritime traffic, pollution from rivers, coastal development, among others (CONAP, 2008). To implement management and conservation measures at local and potentially regional level with a focus on cetaceans and their ecosystems, information on their occurrence, distribution, seasonality, abundance, and conservation status is needed (Furry and Harrison, 2008).

In Guatemala, cetaceans have been studied only in the Pacific Ocean, where 18 species belonging to the Delphinidae, Kogiidae, Physeteridae, Ziphiidae, and Balaenopteridae families have been recorded (Cabrera et al., 2014; Quintana-Rizzo et al., 2021). In the Caribbean Sea of Guatemala, the study of cetaceans has been very limited or even absent. For example, the presence of “dolphins” is mentioned in a somewhat vague manner in national reports (Arrivillaga, 2004; Villagrán et al., 2004).

This note aims to compile and summarize unpublished data obtained from opportunistic sightings of cetaceans at the Caribbean Sea of Guatemala between 2007 and 2020 (Fig. 1). Reports of historical (1900 to 1999) and recent (2000 to 2020) cetacean strandings are also included, thus providing baseline information on the cetacean species that are present in the region.

Sighting data were gathered through several sources, including scientific publications, conference abstract books, theses, specimens deposited in national museums and collections, online databases (e.g. GBIF), citizen science platforms (e.g. iNaturalist), technical reports, local newscasts, and social media (e.g. Facebook). Personal communications were made with independent researchers working in the Caribbean Sea of Guatemala to obtain opportunistic, non-systematic records of cetaceans. Personnel from CONAP (from its acronym in Spanish, National Council of Protected Areas) Northeast Unit was also interviewed to obtain records of cetacean sightings in the region. Finally, sightings made by the authors were also included.

Photographs and/or videos of the sightings were requested to corroborate the reported taxonomic identification, age class estimation, and general behavior (Table 1). When in doubt, experts were consulted to confirm the identification of the species of the genus *Stenella*, since the characteristics of these organisms are not fully appreciated in the photographs. Subsequently, the compiled data was depurated, eliminating duplicate records. In order to visually represent the geographic location of cetacean sightings along the Caribbean Sea of Guatemala, maps were made with the geographic coordinates or the name of the geographical area using ArcMap V10.3 (ESRI, 2018). Because Amatique Bay is a complex estuarine ecosystem that consists of mangrove areas, fresh waters with intertidal influence, seagrass beds, and the adjacent continental platform (Yáñez-Arancibia et al., 2004).
Table 1. Description of the taxonomic identification, age class estimation, and behavior of the cetaceans registered for the Caribbean Sea of Guatemala.

| Item or category | Description |
|------------------|-------------|
| Taxonomic identification | The identification of the cetacean species was based on external morphological characteristics according to Shirihai and Jarret (2006) in the field guide “Whales, dolphins and other marine mammals of the world.” |
| T. truncatus | Notably robust body, short and well-defined snout, falcate and high dorsal fin, in a central position, and gray coloration. |
| S. frontalis | Presence of spots and faint blaze that meets dark cape just below and in front of the dorsal fin. |
| S. attenuata | Dark dorsal cape reaching lower on flanks in front of dorsal fin, presence of spots, and dorsal fin falcate and pointed. |
| S. longirostris | Extremely long beak, dorsal fin usually more or less triangular or slightly falcate, and tricolored pattern (dark cape, pale gray sides, and whitish belly). |
| G. macrocephalus | Black color, bulbous head, and falcate dorsal fin with a broad base. |
| M. novaengliae | Flattened and knobby rostrum, hump and dorsal fin shape, and extremely long arm-like flippers. |

Age class estimation

- Calf: recognized for being less than 75% the length of an adult and swimming in close association with the alleged mother.
- Adult: determined based on the length reported for each species by Shirihai and Jarret (2006).

Behavior

- Feeding: subgroups move at different speeds and in different directions in the area. Diving is characterized by the vertical lifting of the peduncle. There could be aerial behaviors, such as tail flicking and jumping.
- Traveling: movement of the group in the same direction and constant speed.
- Socialization: frequent physical contact, superficial displays (jumping) and games, sexual behaviors and parental care are observed. It also includes interaction with the boat, such as swimming in the bow.
- Resting: cetaceans generally keep buoying on the surface or moving slowly in undefined directions in the area.

1999), records that lacked geographic data and those that were associated with this wide region were not represented on the map but remain on the species list.

A total of 39 cetacean records were compiled: two historical records (1904 and 1995) and 37 sightings recorded between 2007 and 2020 (Table 2). Of these, 82% (n = 32) were sightings, 10% (n = 4) corresponded to strandings, and 8% (n = 3) to specimens stored in museums or collections. All 39 cetacean records correspond to opportunistic sightings reported by the authors (n = 12), institutional records of CONAP (n = 9); personal communications with independent researchers (n = 8), local newscasts/social media posts (n = 5), museum specimen (n = 1), online databases (n = 2), citizen science reports (n = 1) and a poster presentation (n = 1) (Table 2).

Tursiops truncatus (Montagu, 1821): Bottlenose dolphins were reported on 30 occasions (Table 2) year-round. However, only 73% of the reports included photographs or videos to confirm the species (Fig. 2A). Most of the sightings occurred in La Graciosa Bay (n = 12) and at different areas of Amatique Bay (n = 17), while only one was reported in the Dulce River region (Fig. 1). The group size of the bottlenose dolphins ranged from one to 20 individuals, with calves present in 11 sightings recorded in May, June, July, August, October, and December. Feeding behavior was observed in April, May, July, August, and September in La Graciosa Bay, and in April 2020 in Dulce River (Table 2).

Bottlenose dolphin records also included two strandings. The first one occurred on 14 August 2007, in Puerto Barrios, and involved a dead female calf. According to the necropsy report, it suffered skull and rib contusions along with internal bleeding (Dávila and Ixquiac, 2009). A second stranding occurred on 20 October 2018, in Punta de Palma and involved a newborn with a presumed skull injury (Relato, 2018). However, no necropsy was performed, and the sex of the animal is unknown, as it was returned to the sea by the fishers before the arrival of the corresponding authorities. A final record corresponds to a skull found in March 1995 and deposited in the Texas Cooperative Wildlife Collection (Prestridge, 2021).

Stenella frontalis (Cuvier, 1829): Two sightings of the Atlantic spotted dolphin were reported in August, 2019 (Table 2). The first report was published on social media by a tourism company in Izabal, on 11 August 2019. The sighting occurred in Punta de Manabique Wildlife Refuge (PMWR). The second group of up to
| No. | Species       | Date       | Locality                  | Coordinates                      | Group size | Calves | Type of record | Photo/Video | Source          | Reported by          | Notes                  |
|-----|---------------|------------|---------------------------|----------------------------------|------------|--------|----------------|-------------|------------------|-----------------------|------------------------|
| 1   | *Tursiops* truncatus | 01 Mar 1995 | Livingston*               | 15°50'48''N 88°46'35''W         | 1          | U      | Preserved specimen | N           | 4                | Prestridge (2021)     |                        |
| 2   | *Tursiops* truncatus | 15 Jul 2007 | Punta de Manabique        | 15°56'59''N 88°37'13''W         | 6          | U      | Sighting        | Y           | 1                | AGP                   |                        |
| 3   | *Tursiops* truncatus | 14 Aug 2007 | Puerto Barrios            | 15°44'11''N 88°36'17''W         | 1          | Y      | Stranding       | Y           | 2                | Dávila and Ixiquiac (2009) |                        |
| 4   | *Tursiops* truncatus | 21 Aug 2010 | La Graciosa Bay           | 15°51'2''N 88°31'59''W          | 2          | N      | Sighting        | Y           | 1                | OHMC                  |                        |
| 5   | *Tursiops* truncatus | 08 Dec 2010 | La Graciosa Bay           | 15°51'2''N 88°31'59''W          | 3          | N      | Sighting        | Y           | 1                | OHMC                  |                        |
| 6   | *Tursiops* truncatus | 15 Feb 2011 | La Graciosa Bay           | 15°51'2''N 88°31'59''W          | 4          | N      | Sighting        | Y           | 1                | OHMC                  |                        |
| 7   | *Tursiops* truncatus | 18 May 2015 | Punta Gruesa              | 15°51'38''N 88°31'34''W         | 6          | Y      | Sighting        | Y           | 6                | CONAP                 |                        |
| 8   | *Globicephala macrorhynchus* | 27 May 2015 | Corona Caimán             | 15°57'31''N 88°16'59''W         | 7          | Y      | Sighting        | Y           | 1                | AGP                   |                        |
| 9   | *Tursiops* truncatus | 20 Jul 2015 | La Graciosa Bay           | 15°50'47''N 88°31'52''W         | 7          | Y      | Sighting        | N           | 6                | CONAP                 |                        |
| 10  | *Tursiops* truncatus | 13 Aug 2016 | La Graciosa Bay           | 15°50'43''N 88°31'59''W         | 17         | Y      | Sighting        | Y           | 6                | CONAP                 |                        |
| 11  | *Tursiops* truncatus | 29 Sep 2016 | Punta Cocoli              | 15°52'46''N 88°49'48''W         | 2          | N      | Sighting        | Y           | 1                | OHMC                  |                        |
| 12  | *Tursiops* truncatus | 19 Dec 2016 | Livingston                | 15°50'16''N 88°45'4''W          | 4          | Y      | Sighting        | Y           | 1                | OHMC                  |                        |
| 13  | Delphinidae     | 03 Apr 2017 | Punta de Manabique        | --                               | 1          | N      | Stranding       | N           | 6                | CONAP                 |                        |
| 14  | *Tursiops* truncatus | 17 Sep 2017 | Dulce River Mouth         | 15°49'14''N 88°44'26''W         | 2          | U      | Sighting        | Y           | 5                | Ueda (2021)           |                        |
| 15  | *Tursiops* truncatus | 02 Feb 2018 | Siete Altares             | 15°51'37''N 88°46'42''W         | 6          | U      | Sighting        | Y           | 7                | G. Gálvez, FUNDAECO, pers. comm., 7 Oct 2020 |                        |
| 16  | *Tursiops* truncatus | 01 Mar 2018 | Siete Altares             | 15°50'30''N 88°46'42''W         | 6          | U      | Sighting        | Y           | 7                | G. Gálvez, FUNDAECO, pers. comm., 7 Oct 2020 |                        |
| 17  | *Stenella* attenuata | 01 May 2018 | Quehueche River           | 15°53'35''N 88°46'13''W         | 2          | N      | Sighting        | Y           | 8                | Noti 7 (2018)         |                        |
| 18  | *Tursiops* truncatus | 14 Jun 2018 | Apathique Bay             | 15°46'38''N 88°35'25''W         | 1          | N      | Sighting        | Y           | 1                | JSOW                  |                        |
| 19  | *Tursiops* truncatus | 15 Jun 2018 | La Graciosa Bay           | 15°51'13''N 88°33'19''W         | 13         | Y      | Sighting        | Y           | 1                | JSOW                  |                        |
| 20  | *Tursiops* truncatus | 18 Jul 2018 | Apathique Bay             | --                               | 1          | N      | Sighting        | Y           | 1                | JSOW                  |                        |
| 21  | *Tursiops* truncatus | 27 Jul 2018 | La Graciosa Bay           | 15°51'33''N 88°31'44''W         | 18         | Y      | Sighting        | N           | 6                | CONAP                 |                        |
| 22  | *Tursiops* truncatus | 14 Aug 2018 | La Graciosa Bay           | 15°50'53''N 88°31'47''W         | 20         | N      | Sighting        | N           | 6                | CONAP                 |                        |
| 23  | *Tursiops* truncatus | 21 Sep 2018 | Punta de Palma            | 15°47'59''N 88°40'59''W         | 7          | U      | Sighting        | Y           | 1                | AGP                   |                        |
| 24  | *Tursiops* truncatus | 20 Oct 2018 | Punta de Palma            | 15°45'30''N 88°38'42''W         | 1          | Y      | Stranding       | Y           | 8                | Relato (2018)         |                        |
| 25  | *Tursiops* truncatus | 15 Mar 2019 | Punta Gruesa              | 15°51'51''N 88°31'20''W         | 1          | N      | Sighting        | N           | 6                | CONAP                 |                        |
| 26  | *Stenella* longirostris | 30 Mar 2019 | Punta de Manabique        | 15°51'18''N 88°18'36''W         | 60-70       | U      | Sighting        | Y           | 7                | H. Araujo, Semillas del Océano, pers. comm., 5 Oct 2020 |                        |
| 27  | *Tursiops* truncatus | 11 Apr 2019 | La Graciosa Bay           | 15°50'45''N 88°33'4''W          | 24         | Y      | Sighting        | N           | 6                | CONAP                 |                        |
| 28  | *Stenella* frontalis | 11 Aug 2019 | Punta de Manabique        | --                               | 1          | N      | Sighting        | Y           | 9                | GTP Chalets de RioDulce |                        |
| 29  | *Stenella* frontalis | 22 Aug 2019 | Corona Caimán             | 15°57'9''N 88°16'19''W          | 9          | N      | Sighting        | Y           | 1                | AGP                   |                        |
| 30  | *Tursiops* truncatus | 17 Jan 2020 | Punta de Palma            | 15°45'57''N 88°37'58''W         | 5          | U      | Sighting        | Y           | 7                | M.R. Paz, Fundación Defensores de la Naturaleza, pers. comm., 7 Oct 2020 |                        |
| 31  | *Tursiops* truncatus | 18 Feb 2020 | Estero Lagarto            | 15°54'36''N 88°36'35''W         | 4          | U      | Sighting        | N           | 7                | G. Gálvez, FUNDAECO, pers. comm., 7 Oct 2020 |                        |
| 32  | *Tursiops* truncatus | 25 Mar 2020 | La Graciosa Bay           | 15°52'28''N 88°33'11''W         | 11         | Y      | Sighting        | N           | 6                | CONAP                 |                        |
| 33  | *Tursiops* truncatus | 30 Apr 2020 | El Golfo, Dulce River     | 15°10'45''N 88°50'5''W          | 10         | U      | Sighting        | Y           | 8                | Soy 502 (2020)        |                        |
10 individuals was sighted on 22 August 2019, near the Cayman Crown Reef. The animals approached a group of divers that were working in the area (AGP, pers. obs.; Fig. 2B).

Stenella attenuata (Gray, 1846): Pantropical spotted dolphins were reported only once, on 1 May 2018 (Table 2). The report corresponds to the live stranding of two adult individuals in the Quehueche River, Livingston, Izabal. The individuals were returned to the sea by local people, and the only evidence is a video that was broadcasted by a local news station (Noti 7, 2018). Information on the sex of the animals and if the release to the sea was successful, or if the individuals stranded again, are unknown (Fig. 2C).

Stenella longirostris (Gray, 1828): Spinner dolphins were reported only once on 30 March 2019 (H. Araujo, Semillas del Océano, pers. comm., 5 Oct 2020). The group size oscillated between 60 and 70 individuals. The sighting occurred in the neritic zone within the PMWR. The group displayed traveling behavior, although some individuals displayed a socializing behavior when approaching and swimming near the bow of the boat (Fig. 2D).

Globicephala macrorhynchus (Gray, 1846): Short-finned pilot whales were registered only once, on 27 May 2016 in Cayman Crown Reef (Table 2). The group consisted of eight individuals and at least two calves (APG, pers. obs.; Fig. 2E).

Megaptera novaeangliae (Borowski, 1781): An adult humpback whale was recorded on several occasions in a three-month period in the Caribbean Sea of Guatemala. Its presence was broadcasted by local newscasts on 25 January 2016. To aid the whale in case of a stranding event, CONAP technicians followed up the sightings reported by the local community in the area between January and April 2016 (Table 2). The photographs and videos that report the sighting only show the dorsal fin (Fig. 2F). Due to the lack of photographs of the ventral region of the fluke, the individual was unidentified. The humpback whale was observed in different areas of Amatique Bay, and it entered the Santo Tomás de Castilla Bay (Canal Antigua, 2016; Prensa Libre, 2016), an area with high boat traffic due to the presence of ports. Reports indicated that the whale had a tangled trammel net. Although it was released, the animal stranded on 25 April in Toledo District, Belize (Ramos et al., 2016).

Balaenoptera physalus (Linnaeus, 1758): The only record of a fin whale in the Caribbean Sea of Guatemala corresponds to a partial skeleton stored in the mammal collection of the Smithsonian National Museum of Natural History, in Washington. The fin whale skeleton was located in the Sarstoon River, Livingston, Izabal, in 1904 (Orrell, 2020). This specimen, collected ~117 years ago, represents the oldest cetacean ever recorded in the Caribbean Sea of Guatemala.

### Table 2

| No. | Species                  | Date       | Locality            | Coordinates          | Group size | Calves | Type of record | Photo/  Video | Type of source   | Reported by                          |
|-----|--------------------------|------------|---------------------|----------------------|------------|--------|----------------|--------------|------------------|-------------------------------------|
| 34  | Tursiops truncatus       | 22 May 2020| La Graciosa Bay     | 15°50′60″N 88°31′60″W| 14         | U      | Sighting       | Y            | 6                | CONAP                               |
| 35  | Tursiops truncatus       | 14 Jul 2020| La Graciosa Bay     | 15°52′6″N 88°32′55″W | 16         | Y      | Sighting       | Y            | 7                | A. R. Silva, independent researcher, pers. comm., 6 Oct 2020 |
| 36  | Tursiops truncatus       | 09 Sep 2020| Punta de Manabique  | 15°55′38″N 88°38′18″W| 10         | U      | Sighting       | Y            | 7                | H. Araujo, Semillas del Oceano, pers. comm., 5 Oct 2020 |

*Approximate location according to information from verbatim locality in the label of the specimen. U = Unknown; Y = Yes, N = No. Type of source: 1 = Author sighting, 2 = Poster presentation, 3 = National museum, 4 = Online database, 5 = Citizen science platform, 6 = Institutional record, 7 = Personal communication, 8 = Local newscast, 9 = Social media.
Unidentified species: An unidentified dolphin stranded in Punta de Manabique on 3 April 2017. Although the stranded event was attended by CONAP (Table 2), there is no photographic evidence of the specimen, and the species remains unidentified. Another unidentified whale skeleton is stored in the Museum of Paleontology and Archeology “Ing. Roberto Woolfolk Saravia” in Zacapa, Guatemala. This whale is thought to have stranded in Amatique Bay. Despite an initial misidentification, based on the arched shape of the upper jaw, it is suggested that the specimen belongs to the Balaenopteridae family, possibly the Balaenoptera genus (Table 2).

Concerning the conservation status, all the species mentioned in this study are classified by the International Union for Conservation of Nature (IUCN) Red List of Threatened Species as Least Concern, except for the fin whale, which is classified as Vulnerable (IUCN, 2021). According to the List of Threatened Species of Guatemala (LEA), by its acronym in Spanish (Diario de Centro América, 2021), all species mentioned in this note are listed in Category 2 (Endangered), except for the fin whale, probably because its distribution is unknown in national waters. Additionally, the dolphin species are found on Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), while the two whale species are on Appendix I (UNEP-WCMC, 2021).

This review compiled the presence of at least seven cetacean species in the Caribbean Sea of Guatemala, representing 23% of the 31 species reported for the Caribbean Sea by Ward et al. (2001). Overall, all the species of the Delphinidae family reported in this note have a wide distribution range since they can be found in tropical and temperate waters around the world, except for the Atlantic spotted dolphin, which is restricted to the Atlantic Ocean (Jefferson et al., 2003; Shirihai and Jarrett, 2006). However, the presence of these species in Guatemala is mainly supported by regional records from neighboring countries (Ward et al., 2001).

Most of the confirmed records in this note belonged to bottlenose dolphins. The bottlenose dolphin is reported as the most common cetacean species inhabiting the Mexican Caribbean (Niño-Torres et al., 2015) and the best-known marine mammal in Belize (Ramos et al., 2016). Bottlenose dolphin is also the most observed species in other countries of the region such as Costa Rica, Panama (May-Collado et al., 2018) and Puerto Rico (Rodríguez-Ferrer, 2018). The Atlantic spotted dolphins, pantropical spotted dolphins, spinner dolphins, and short-finned pilot whales are species that have also been reported in neighboring countries such as Belize (Ramos et al., 2016) and the Mexican Caribbean (Niño-Torres et al., 2015). Contrary to the few records of spinner dolphins and short-finned pilot whales in Guatemala, Maglevicuite (2007) reports these species as the most observed in the Island of Utila, Honduras. Considering the proximity between Honduras and Guatemala, it is suggested that the records of these species may be underestimated due to the lack of systematic research in the area, especially in open waters, outside Amatique Bay.

It is still uncertain that the pantropical spotted dolphin inhabits the Caribbean Sea of Guatemala, since the only record is associated with a stranding event. The stranded dolphin was probably weak or sick and was made ashore by the ocean currents. This highlights the need to conduct cetacean research in the Caribbean Sea of Guatemala to answer these and other concerns.

Regarding the baleen whales, while the winter areas of the Atlantic humpback whale population are well documented in the eastern Caribbean (Swartz et al., 2003; Whitt et al., 2011; Debrot et al., 2013; MacKay et al., 2016), it is necessary to expand studies in the western Caribbean region. The sighting of the humpback whale, as well as the records of the stranding of two rorquals (Balaenoptera spp. and B. physalus) on the coasts of the Caribbean Sea of Guatemala, may be an indication that their presence has gone unnoticed and could be underestimated (Ramos et al., 2016). Otherwise, the sightings reported here could correspond to disoriented or sick animals that were carried to land by sea currents (Tamayo-Millán et al., 2018). However, there are two reports of live rorquals stranding, one in Belize that occurred in 1986 (Ramos et al., 2016) and another in northern Quintana Roo, Mexico, in 2018 (García-Rivas et al., 2019). Therefore, the rorqual records compiled in this note could add to the evidence of the presence of this species in the Western Caribbean Sea.

The records compiled in this note come from opportunistic sightings as well as secondary and tertiary sources. Currently, while systematic studies focused on cetaceans in the Caribbean Sea of Guatemala are lacking, opportunistic records can contribute to preliminary analyses of the spatial and temporal distribution of cetaceans (Rodríguez-Ferrer et al., 2018). The generation of this baseline information is a fundamental step to establish effective actions and strategies for the conservation of these species.

La Graciosa Bay presented the highest number of records, followed by the coastal area, south of Amatique Bay (Fig. 1). La Graciosa Bay could be an important habitat for cetaceans due to its mangrove and seagrass habitats, which may serve as a refuge and breeding grounds for several fish species (Arrivillaga and Baltz, 1999), which in turn could serve as feeding grounds for dolphins (Grigg and Markowitz, 1997; Barros and Wells, 1998; Eierman and Connor, 2014). Considering the presumed association of dolphin presence and high primary productivity near river mouths (Cubero-Pardo, 2007; Valdes-Arellanes et al., 2011), the areas near the Sarstoon and Dulce river mouths in Amatique Bay could represent potential feeding areas. However, it should be noted that both areas have a greater chance of detecting cetaceans compared to the open sea. La Graciosa Bay is a protected area that is usually the study area for researchers and an area of frequent monitoring carried out by rangers, and Amatique Bay is an area with urban development, tourism, fishing and navigation activities, and ports.

Stranding records reported here raise two important situations. First, the intention of local people in supporting the attention to stranded animals. Second, the potential threat of vessel collisions with cetaceans, given that two of the stranded common bottlenose dolphins had skull and rib contusions. Both situations reflect the need to carry out environmental education campaigns with the local communities aimed at conserving cetaceans and the marine and coastal ecosystems of this area.

Finally, this note emphasizes the importance of conducting systematic surveys in the future focused on cetaceans in the Caribbean Sea of Guatemala, to solve information gaps on their spatio-temporal distribution, relative abundance, habitat use, ethology, anthropogenic threats, and the consideration of species with potential distribution in Guatemala, like fin whale, in the LEA. The importance of conducting research focused on the reports of cetacean sightings in La Graciosa Bay and river mouths is
also highlighted to evaluate the importance of these areas for dolphins. It is also emphasized that cetacean stranding records are crucial for the knowledge of this group, mainly when they refer to species that are difficult to observe in the field. Therefore, it is necessary to strengthen efforts to attend stranding events in this region. Such efforts are essential to propose strategies aimed at the sustainable management and conservation of the marine ecosystems of the Caribbean Sea of Guatemala.

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