STRENGTHENING THE NATIONAL MARITIME AUTHORITY OF GUATEMALA FOR CONSERVATION OF COASTAL MARINE RESOURCES.

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ABSTRACT

The National Maritime Authority of Guatemala is the governing state institution in the maritime field, in the national territory, over the ships and seafarers and everywhere over the maritime vehicles of Guatemalan flag, through the legal regime, the resources of the Ministry of National Defense.

Increased marine trade, natural disasters, climate change, tropical storms, hurricanes, population growth, and population displacement put marine biodiversity on Guatemala's coasts at risk. The 2019 Global Assessment Report on Biodiversity and Ecosystem Services shows that three quarters of the terrestrial environment and about 66% of the marine environment have been significantly altered by human activities, that more than one million species are at risk of extinction due to human activities, it also stresses that biodiversity loss represents a significant threat to human well-being, it also identifies the main drivers of these changes, which include the modification of land and sea use, direct exploitation of species, climate change, pollution and invasive alien species. For this reason, Guatemala must strengthen and prevent the loss and contamination of coastal marine resources.

This research presents information on the Ministry of Defense, National Maritime Authority, its relationship with other ministries to protect state assets, as well as information on the Maritime Policy 2023 - 2043, and provides an updated overview of Guatemala and the laws in the maritime field.

The document also makes a series of recommendations for future action and capacity building. It aims to improve adaptive capacity at a national level and includes the articulation of international conventions for disaster risk mitigation and reduction.

The document concludes that the protection of coastal marine ecosystems through joint public-private efforts and prevention as the first line of defense contributes to the sustainable development of the country and improves the quality of life of its inhabitants.

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LIST OF ACRONYMS

CIV	Ministerio de Comunicaciones, Infraestructura y Vivienda/ Ministry of Communications, Infrastructure and Housing.
CIIHO	Comisión Interinstitucional de Investigación Hidro-Oceanografía/ Inter-institutional Commission for Hydro-Oceanographic Research.
CONAP	Consejo Nacional de Áreas Protegidas / National Council of Protected Areas.
CODEMAR	Comisión de Contingencia en caso de Derrames de Hidrocarburos, sus Derivados y Sustancias Potencialmente Peligrosas en la Mar y Regiones Marino Costeras/ Contingency Commission for Spills of Oil, Oil Derivatives and Potentially Hazardous Substances at Sea and in Coastal Marine Regions.
CONAMAR	Comisión Nacional de Administración Marítima/ National Commission of Maritime Administration
DIGEMAR	Dirección General de Asuntos Marítimos / Directorate General of Maritime Affairs
DIGECAP	Dirección General de Capitanías de Puerto/ General Directorate of Port Captaincy.
CONRED	Consejo Nacional para la Reducción de Desastres / National Council for Disaster Reduction
INE	Instituto Nacional de Estadística/ National Institute of Statistics.
INSIVUMEH	Instituto de Sismología, Vulcanología, Meteorología e Hidrología/ Institute of Seismology, Volcanology, Meteorology and Hydrology.
LEA	Lista de Especias Amenazadas/ List of Endangered Species.
MAGA	Ministerio de Agricultura, Ganadería y Alimentación / Ministry of Farming, Livestock, and Food.

MPAs	Maritime Protected Areas.
MARN	Ministerio de Ambiente y Recursos Naturales / Ministry of Environment and Natural Resources.
MINDEF	Ministerio de la Defensa Nacional/ Ministry of National Defense.
MEM	Ministerio de Energía y Minas/ Ministry of Energy and Mines
MINECO	Ministerio de Economía/ Ministry of Economy.
MINEX	Ministerio de Relaciones Exteriores/ Ministry of Foreign Affairs
MINFIN	Ministerio de Finanzas Publicas/ Ministry of Public Finances.
SEGEPLAN	Secretaria de Planificación y Programación de la Presidencia/ Secretariat of Planning and Programming of the Presidency.
SIGAP	Sistema Guatemalteco de Áreas Protegidas / Guatemalan System of Protected Areas.
UNCLOS	United Nations Convention on the Law of the Sea.
UNESCO	United Nations Educational, Scientific and Cultural Organization.

UNITS USED IN THE RESEARCH

Km	Kilometer
Km^2	Square Kilometer
Nm	Nautical Mile
Q.	Quetzales, (Guatemalan currency)
TEUs	Twenty-Foot Equivalent Unit

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INTRODUCTION

Guatemala is a country located in the north of Central America, with more than 1700 years of heritage to humanity since in this country occurred the transition from the Olmec civilization to the appearance of the first Mayas, recognized by UNESCO in two 2023 on two different criteria[1].

This privileged geographical position gives it access to the Pacific Ocean and the Atlantic Ocean (Caribbean Sea), which suggests an opportunity for commercial development in comparison with other countries. Guatemala has a megadiverse biological wealth of fauna and flora and one of these riches is the mangrove forests located on the coasts of the Pacific Ocean.

The country has proven to be resilient to various global challenges as it is the largest economy in Central America in terms of population and economic activity, during the COVID 19 pandemic, The country had one of the smallest economic contractions (-1.8%) in the Latin America and Caribbean region in 2020[2].

National policies are also being formulated in different areas to continue with this culture of prevention against the different threats that affect Guatemalans, for example, in relation to national security: the National Security Policy, the National Defense Policy, the Maritime Security Policy of the Ministry of National Defense, in the area of economic development, the National Policy for the Development of Tourism in Guatemala and the National Policy to Prevent and Combat Fraud in Customs Smuggling, in relation to the conservation of environmental resources, the National Policy for Environmental Management and the National Policy to Prevent and Combat Fraud in Customs Smuggling: the National Policy for the Development of Tourism in Guatemala and the National Policy to Prevent and Combat Fraud in Customs Smuggling, in relation to the conservation of environmental resources the Environmental Management Policy, Biosecurity Policy for Living Modified Organisms, National Policy on Biological Diversity, Policy for the Integral Management of Guatemala's Coastal Marine Zones, and the National Policy for the Protection of the Environment.

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[1] Too see all UNESCO information about National Park **Tak'alik Ab'aj** visit: https://whc.unesco.org/en/list/1663/gallery/.

[2] World Bank (n.d.). Guatemala: Overview. Retrieved July 24, 2024, for more information of Guatemala economy visit: https://www.bancomundial.org/es/country/guatemala/overview.

Guatemala has demonstrated its commitment to the United Nations as one of the fifty founding countries of the United Nations, having participated in the San Francisco Conference in 1945, for this reason in the creation of national policies the Sustainable Development Goals (SDGs) of the 2030 Agenda are used, but in this document, we will present the governmental agreements, national policies, national plans that are related to the following SDGs:

SDG No. 3: The main beneficiaries are all Guatemalans, so policies that contribute to improving their health and well-being are generated.

SDG No. 4: To have quality education and specifically to raise awareness of the benefits of the sea.

SDG No. 6: The country is committed to protecting and restoring ecosystems related to water, sanitation and easy access in places such as forests, mountains, wetlands and rivers.

SDG 8: Strengthening and protecting the ecosystem ensures direct and indirect employment opportunities in the sustainable development of the country.

SDG No.11: Invest in the population so that change reaches the most remote communities and Guatemalans live in safe and sustainable communities.

SDG No. 12: Reduce the environmental impact caused by the misuse of resources, rethink production methods and strengthen sustainable economic practices that are less harmful to the environment.

SDG No. 13: Guatemala is suffering the effects of global warming, as evidenced by the irreparable damage to climatic conditions, which is why measures are urgently being adapted to adapt to climate change and its effects to prevent further damage.

SDG No. 14: This is the main objective on which this research will focus as it is the working area of the National Maritime Authority, so it will present the progress in the protection of coastal marine resources, and how to improve the efforts against pollution, sustainable use of resources and the actors of such actions.

This research will present the interaction of all the different ministries, government entities, civil groups and how they interact in the conservation of the environment of Guatemala in the different programs, plans and national policies, which are: Ministry of Communications, Infrastructure and Housing (hereinafter: CIV), Ministry of Farming, Livestock, and Food (hereinafter: MAGA),

Ministry of Environment and Natural Resources (hereinafter: MARN), Ministry of National Defense (hereinafter: MINDEF), Ministry of Energy and Mines (hereinafter: MEM), Ministry of Economy (hereinafter: MINECO), Ministry of Foreign Affairs (hereinafter: MINEX), Ministry of Public Finances (hereinafter: MINFIN), National Council of Protected Areas (hereinafter: CONAP), National Council for Disaster Reduction (hereinafter: CONRED).

It is important to mention that the acronyms of the acronyms will be kept by their names in Spanish, because if they are used in English they can lead to misinterpretation or confusion when reading the information presented in this research.

Definition of the problem

As a developing country, Guatemala faces a variety of problems, such as global warming, loss of ecosystems, drug trafficking, pollution from international threats that threaten national sovereignty and territory.

The way in which these problems have been tackled over the years has not been sufficient and very slow to implement. This is due to weak governance in the maritime sphere, which is what generates this research, so it is necessary for the Maritime Authority to act in maritime matters and focus on the development of the country, the conservation of coastal maritime ecosystems, and to protect the lives of Guatemalans who depend on the sea for their daily lives.

The general objective is to present the problems that affect the Maritime Authority in the development of its functions, to identify the needs for the fulfilment of its functions and to analyze the damage caused by natural effects in the country.

Research questions.

Knowing that the country is vulnerable to natural events, suffers from land-based pollution caused by its inhabitants or by natural events, three questions arise:

1. What are the problems that the National Maritime Authority faces in strengthening its capacities and protecting Guatemala's maritime biodiversity?
2. How does the National Maritime Authority respond to various threats caused by land-based pollution, marine-based pollution and/or oil spills?

3. How can the Guatemalan Maritime Authority protect the maritime environments and species within its jurisdiction to prevent the effects of global threats in the maritime field?

These questions will be answered in order to identify ways in which the Maritime Authority's actions can be strengthened, to meet international standards and conserve resources for future generations.

Research structure.

In the first part of this document, the reader is introduced to a mayan culture, where the most valuable aspects of the country are presented, its citizens, their origins, information about the country, problems that have existed and how this cultural heritage must be adapted to improve their quality of life, as the habitants of Guatemala are the cause of pollution from the land, and that the misuse of pesticides, chemicals or wastes affect the environment.

This context will be useful to present the second section of this chapter since it exposes the direct relationship between the population and the natural risks presented by the topography of the country, due to its geographical position, Guatemalan inhabitants suffer the effects of nature in every corner of the country.

The second chapter presents the legal framework of the law of the sea in Guatemala, an analysis of the National Maritime Policy and a breakdown of the four axes, goals and objectives to be acheived in this national policy.

The first section of this chapter presents the background of pollution in the country, the problems that have existed in lakes, rivers and of course the problems of pollution in the oceans, this information provides an overview of the problems, the people affected and the objectives on which the maritime authority must work.

The second part presents those in charge of working to achieve these objectives, the National Maritime Authority, its functions, the problems that affect the fulfilment of the axes of the national maritime policy, as well as the needs and equipment that the Maritime Authority needs to carry out its functions and to comply with the commitments of the international agreements, Guatemala can continue to be the country of eternal spring if it continues to work in an organized and continuous manner to protect the environment. For this reason, the actions that the country has taken to protect the interests of Guatemalans along the country's coasts are presented.

What is expected from this research?

It is expected that outcomes of this reserch is will serve as a guide for the National Maritime Authority to become the leading entity in ocean awareness in Guatemala, sustaining pollution prevention efforts through a strengthened structure at the national level. This structure should include the public and private sector, local authorities, civil society, universities and educational centers, to identify and address risks to vulnerable communities on the Pacific and Atlantic (Caribbean Sea) coasts of the country. These communities are caught between development and potential pollution, as well as the natural effects of climate change, which may create a gap in the development of the Maritime Authority.

It is essential to show how training and capacity building in Guatemala, together with international training, support communities and the state in combating pollution and promoting conservation of the coastal marine environment. In addition, it is essential to articulate an efficient emergency system to respond to pollution.

PART ONE: GUATEMALA THE COUNTRY OF THE ETERNAL SPRING

The origin of the name Guatemala is not 100% confirmed since there are many Mayan languages, even Aztec, it can be defined from the Nahuatl: Quauhtlemallan, "place of many trees"[3], officially the Republic of Guatemala.

It is known as the country of eternal spring because of its tropical location there are only two distinct seasons, summer known as dry season which lasts from April to November and winter known as rainy season, which normally begins in May and ends in October, due to its topography the temperatures can vary with warm climates at sea level, and extremely cold climates at more than 4200 Mtrs above sea level, allows the perfect climate that in the country there are so varied ecosystems ranging from the mangroves on the coasts of the Pacific Ocean to the cloud forests of high mountains. This temperature variation allows the country to have seven different biomes[4]: tropical rainforest, tropical rainforest, mountain rainforest, chaparral or thorny scrub, mountain forest, subtropical rainforest and tropical humid savannah, distributed throughout the eight regions of Guatemala[5], with its own climate, flora, fauna, different between each. For this reason, the National Council of Protected Areas (CONAP) has published the list of Specially Endangered Species (LEA)[6], which classifies birds, insects, mollusks, mammals, reptiles, fish, aquatic mammals such as the manatee, mangrove and different types of coral that are part of the Great Caribbean as species at high risk of extinction.

Despite being a small country in territorial extension, it has an ancestral culture accompanied by an invaluable biological diversity, which is why it is necessary to make a maximum joint effort for the protection and conservation of natural resources, with a correct adaptation to the threats of climate change and the different types of contamination that affect the whole world.

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[3]Historical Biographical Dictionary of Guatemala. FHCG. (n.d).P.(12) Retrieved August 25, 2024. From: https://www.fundacionhcg.org/libros/dhbg/#p=12.

[4] See Figure I.

[5] See Figure II.

[6]To see all list of endangered species visit: https://conap.gob.gt/wp-content/uploads/2022/12/Lista-de-Especies-Amenazadas-en-Guatemala-LEA-2.pdf.

Chapter 1: The Republic of Guatemala

The Republic of Guatemala is sovereign, free and independent[7], and is the third largest country in Central America with a land area of 108,892 km^2. Administratively it is divided in twenty-two departments and three hundred and forty municipalities[8], and shares borders in the southeast with El Salvador, in the east with Honduras, in the north and west with Mexico, and in the northeast with Belize[9] (now in dispute in the Court of Justice), in the south with the Pacific Ocean and in the north east the Atlantic Ocean.

The Constitution of the Republic of Guatemala recognizes that Guatemala is made up of diverse ethnic groups among which are the indigenous groups of Mayan descent. The State recognizes, respects and promotes their ways of life, customs, traditions, forms of social organization, the use of indigenous dress, languages and dialects, as well as recognizes in Article 121 that they are assets of the State: The waters of the maritime zone surrounding the coasts of its territory, lakes, rivers, springs and streams that serve as the international boundary of the Republic, the maritime-terrestrial zone, the continental shelf and airspace, to the extent and in the manner determined by laws or international treaties ratified by Guatemala.

Likewise, Article 142,[10] empowers the State to exercise full sovereignty over: "The national territory constituted by its soil, subsoil, internal waters, the sea and the airspace extending over it, the contiguous zone and the natural and living resources of the seabed and subsoil and those existing in the waters adjacent to the coasts outside the territorial sea, in accordance with international practice".

The Constitution recognizes the diversity of its citizens and the land and maritime territory. In this chapter we will see the problems that arise from the interaction of these and the effects of natural disasters on both.

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[7] Political Constitution of the Republic of Guatemala. (1993). Article. 140. Guatemala.

[8] Political Constitution of the Republic of Guatemala. (1993). Article. 224. Guatemala.

[9] Gall, F. (1976). Geographical Dictionary of Guatemala. Volume I. Second Edition. National Geographic Institute. Retrieved May 5, 2020, from https://bit.ly/3cjHEUR.

[10] Political Constitution of the Republic of Guatemala. (1993). Article. 142. Guatemala.

Section A: Guatemalan heritage, and culture

This section examines two important actors related to article 207: Pollution from land-based sources, and the main protagonist, its citizens who have characteristics inherited from ancient times which are presented in the following pages.

The National Institute of Statistics (hereinafter: INE) published on March 6, 2024 the indicators of prevalence of violence against women in Guatemala, where according to the information collected during the year 2023, Guatemala has a total population of 17 million 843 thousand 132 inhabitants, of which eight million seven hundred and seventy-seven thousand three hundred and seventy-nine (8,777,379) are men and nine million sixty-five thousand seven hundred and fifty-three (9,065,753) are women, meaning that 50.8% of the population are women, according to population projections of the INE. [11]

The population is divided into four main ethnic groups: Ladinos, Maya, Xinca and Garifuna[12], different cultures living together allow every corner of the country to be different, and every place you visit is different in language, customs, dress and traditions. According to the 2018 census, 43.56% of the population is Indigenous including 41.66% Mayan, 1.77% Xinca, and 0.13% Garifuna. Approximately 56% of the population is "non-Indigenous", referring to the Ladinos (Mestizo) population[13].

Ladinos (mestizos) are those of mixed Spanish-Maya origin, Mayans and Xinca are not the same, and Garifuna are people of mixed African and Caribbean descent. Their ancestors migrated to the Central American coast from the Caribbean islands in the 18th century.[14]

The article 59 of the Political Constitution of the Republic mandates the “Protection and investigation of culture. It is a primary obligation of the State to protect, promote and

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[11] To read all survey result of INE visit: https://www.ine.gob.gt/2024/03/07/el-ine-presenta-indicadores-de-prevalencia-de-violencia-contra-las-mujeres-en-guatemala/. Visited August 25, 2024.

[12] Barrios, L. (2016). El rostro y el ser de los cuatro pueblos de Guatemala: Elementos para la interculturalidad (2nd ed.). Ministry of Culture and Sports, General Directorate of Cultural Development and Strengthening of Cultures. Retrieved from https://mcd.gob.gt/wp-content/uploads/2017/02/el-rostro-y-el-ser-de-los-cuatro-pueblos.pdf.

[13] National Institute of Statistics (INE). (2018). XII National Population Census and VII Housing Census 2017-2018. Guatemala: Retrieved form INE. https://censo2018.ine.gob.gt/censo2018/poblacion.php?form=MG0AV3

[14] Encyclopaedia Britannica (n.d.). Guatemala. In Encyclopaedia Britannica. Retrieved from https://www.britannica.com/place/Guatemala/.

disseminate national culture; to issue laws and provisions that tend to its enrichment, restoration, preservation and recovery; to promote and regulate its scientific research, as well as the creation and application of appropriate technology"[15].

The Political Constitution of the Republic of Guatemala in Chapter II, (Social Rights), section three (Indigenous Communities) [16], which covers from Article 66 to Article 70, deals with issues related to the recognition, protection of indigenous identity, conservation of their lands and their rights such as education in their mother tongue and/or bilingual, economic development to preserve the ancestral heritage that inhabits Guatemala.

The official language of Guatemala is Spanish. However, the country also speaks the Xinca language (non-Mayan), the Garifuna language (Afro-Antillean) and twenty-two Mayan languages, which are: Achi, Akateko, Awakateko, Chalchiteko, Chorti', Chuj, Itza, Ixil, Jakateko/Popti, Qánjob'al, Kaqchikel, K'iche', Mam, Mopan, Poqomam, Poqomchi, Q'eqchi', Sakapulteko, Sipakapense, Tektiteko, Tz'utujil, and Uspanteko. The Congress of the Republic established April 23 as "Language Day" to promote and protect these twenty-five languages. With the intention of raising awareness and promoting the conservation of these languages, since some of them are at risk of disappearing.[17]

After Spanish, the K'iche' Mayan language is the second most spoken language in Guatemala. It is used in sixty-five municipalities in seven different departments. It is important to mention that the topography of the country has allowed many people to preserve their languages since they live in the highlands and mountains of the western part of the country, and there are many places where more than two Mayan languages are spoken and multilingual places where more than three languages are used.

These areas of difficult access allow the conservation of the Mayan peoples with their customs and traditions, but generate difficult development conditions, for this reason the INE conducted in 2023 the National Survey of Living Conditions (hereinafter: ENCOVI), on August 21, 2024 were presented the results of the survey which concluded that 56.0% of

[15] Political Constitution of the Republic of Guatemala. (1993). Art.59. Guatemala.

[16] Political Constitution of the Republic of Guatemala. (1993). Art. 66, 70. Guatemala.

[17]To see the Congress new https://www.congreso.gob.gt/noticias_congreso/6187/2021/4.

the population is in poverty, of which 16.2% live in extreme poverty and 39.8% in non-extreme poverty. The 44.0% of the population is considered non-poor. [18]

This survey also shows that only 2% of households living in extreme poverty have access to residential internet (satellite internet, since the communities are very remote, so the quality is very low or almost non-existent), and 67% have access to a mobile telephone network. Ninety-seven percent use firewood for cooking since the kitchens are rustic and there is no propane gas service. In terms of basic services, 55% are connected to a water distribution network, 61% have access to an electricity network and 14% are connected to a drainage network[19].

Regarding households in non-extreme poverty: The result was that 11% have access to residential internet and 74% to a cell phone network. Eighty-seven percent use firewood for cooking. These households show an improvement in access to basic services, with 73% connected to a water distribution network, 85% are connected to the electricity network and 39% are connected to a drainage network[20].

The departments with the highest incidence of poverty in 2023 were: Alta Verapaz, with 90.3%, followed by Quiché with 86.4%, Huehuetenango with 81.2%; Baja Verapaz with 80.2% and Jalapa with 80.0%. In contrast, the departments with the lowest incidence of poverty are Guatemala 21.6%, followed by Sacatepéquez with 38.7% and Escuintla with 39.1%[21]. Escuintla is a department in the south of Guatemala, of great economic importance, many industries and tourism take place in this department as it has a coastline with the Pacific Ocean, within it are the most important port terminals of the country.

These complicated living conditions force families living in extreme poverty to migrate to other departments where the opportunities for improvement are more favorable, where the temperature and lifestyle is different from what they were used to making many of their

[18] To see the official information of the ENCOVI visit: https://www.ine.gob.gt/2024/08/21/el-ine-presenta-cifras-de-pobreza-en-guatemala/.

[19] Ibid.

[20] Ibid.

[21] Ibid.

customs and even the language is lost, to this we include racism, social pressure and more now with the advancement of social networks.

The Mayans have been in the news for many things, the most recent being the prediction that the world would end in the year 2012, due to a misinterpretation of the Mayan calendar[22], which generated different films, books, as well as for their contributions in mathematics (the implementation of the number 0), architecture (the creation of pyramids, cities that are still standing) and astronomy (solar and lunar calendars), today they continue to make the news by appearing in national and international newscasts, newspapers or social networks for their constant struggle to demand their rights, to demand more opportunities, as well as for the application of their laws, punishments or corrective measures.

One of the most representative organizations of the Mayan peoples, which has the name of 48 cantons of Totonicapán, is presented as a reference on its official website describes itself as "the government and highest authority of the Maya K'iché' People of Totonicapán, which unifies and articulates the different ancestral and community indigenous authorities of the villages, cantons and zones of the municipality of Totonicapán, constituting the voice of the 48 Cantons and representing the social, political, economic, cultural and territorial interests of the Maya K'iché' People of the municipality" [23].

These cantons base their customs on traditions written in the book Título de los Señores de Totonicapán, a book written approximately between 1554 and 1562, which is a sacred relic for the K'iche's and is kept in a secret place, guarded by the Yax clan of the Totonicapán community[24].

Justice is imparted by means of correctives that punish people who have committed common crimes such as theft of animals, vehicles, violence, the name of these correctives in the K'iche Mayan language is Xikay (Xik'a'y), which consists of being whipped on the back, legs and arms the number of times determined in consultation with the indigenous elders. There is

[22]To see all interview visit: https://news.un.org/es/audio/2012/10/1398961

[23] Council of Mayors of 48 Cantons of Totonicapán (n.d.) Who are we? 48 Cantones. Visited august 31, 2024. Retrieved from: https://48cantones.org/quienes-somos/

[24] Ibid.

also Xuculem which translated into Spanish means 'to kneel' (Xuculem is also a name for ceremonies, but in the context of the application of correctives it is only the literal meaning of kneeling).

Increased violence has led to ungovernability, insecurity and poverty, as they engage in robbery and kidnapping in their communities. For this reason, many families migrate to another department. Due to the high cost of living, they often do not have the economic capacity to pay the rent for a house, so they tend to invade land belonging to the State, often in protected areas[25], where they survive on the resources offered by these virgin lands and endanger the balance of the ecosystem by indiscriminately hunting animals or overexploiting the resources.

The reason why these are linked to Article 207 of UNCLOS is that people, regardless of their ethnic group or socio-economic status, contribute to pollution from land-based sources through a variety of everyday activities. The most common being the use of fertilizers and pesticides in agriculture, which drain different chemical pollutants into lakes, rivers and eventually the ocean. Also, because of the lack of infrastructure necessary for the adequate treatment of wastewater, mostly in rural areas, but also in some urban areas, people are forced to use water bodies as drainage for domestic and industrial waste.

The most notable form of pollution caused by Guatemalans is solid waste, as can be seen in the report: 'Generation of solid waste in the country reaches 3 million tons per year'[26], which reports that it is estimated that each Guatemalan generates 1.14 pounds per day, taking as a reference the total number of inhabitants of the country, we are talking about more than 7,665 million pounds per year, just over 3,000 million 400 thousand tons of rubbish per year.

It is also detailed that 56% of the total solid waste comes from organic matter, 14% is sanitary waste, the biggest enemy of the oceans is plastic 13%, paper products 6%, various products

[25] Prensa Libre. (2024, September 12) Conap denounces attempted invasion in Laguna Lachuá National Park. Prensa Libre. https://www.prensalibre.com/guatemala/comunitario/conap-denuncia-intento-de-invasion-en-parque-nacional-laguna-lachua-breaking/.

[26] TV Azteca Guatemala (2023). Generation of solid waste in the country reaches 3 million tons per year. Retrieved from https://tvaztecaguate.comhttps://tvaztecaguate.com/nacionales/2024/09/13/generacion-de-desechos-solidos-en-el-pais-alcanza-los-3-millones-de-toneladas-al-ano/?form=MG0AV3.

of different materials 4%, products made from glass 3%, waste that due to its content is a risk and is considered hazardous to health 2%, and materials containing ferrous and non-ferrous metals 2%.

the mismanagement of different solid materials can be seen along the coasts of Guatemala's oceans, the most talked about case in the news was the island of rubbish that was found floating in the waters of the Caribbean sea between the north of Honduras and Guatemala, many national and international reports turned to see this problem that was identified in 2017, in the report 'Clothes, plastics, dead animals and even human bodies': the gigantic 'sea of rubbish' that strains relations between Honduras and Guatemala.[27], It can be seen that the management of rubbish in the national territory directly affects the oceans and binational relations, and the most alarming thing is that among the waste that has been found is hospital waste, animals and corpses.

With the context of the major land-based pollutants we can talk about the second form of pollution, which is non-human pollution caused by the country's own qualities, separate from the pollution caused by people in their daily interaction with their environment, the country itself can generate complications for the conservation and prevention of pollution which is presented in the following pages of this research.

[27] BBC World (2017). How Guatemala's garbage dump became a source of wealth for a few. Retrieved from https://www.bbc.com/mundo/noticias-41811097.

Section B: Natural disasters, climate exchange, affect ocean development?

This section will present how the different components of Guatemala's topography and its geological position have affected the country and the risks they pose to sustainable development, the natural disasters that occur are volcanic eruptions, floods, forest fires, as well as civil organizations greatly affect the objectives of the government and slow economic growth.

Guatemala besides being the cradle of the ancient Mayas also has a varied topography, this is due to the fact that, for its geographical position is also part of the ring of fire, known as the Circum-pacific Belt, under the Guatemalan soil is three tectonic plates: North America, Caribbean and Cocos[28], which changes the topography of the country and makes it sensitive to earthquakes, this three tectonic plates create thirty-seven (37) volcanoes, only four (04) of them active [29,] as well as mountains most of them covered by forest, valley, plains, plateaus, rivers, lakes across all the territory, and also there is a big area with rainforest in the north.

The Austrian-Guatemalan photographer Christian Hartmann, in an interview for CNN Español tells his experience of living in Antigua Guatemala and being surrounded by volcanoes, he narrates that "Depending on the strength of the eruption, it is similar to an earthquake with thunder: everything shakes". Volcano tourism is in fashion worldwide, so Guatemala is a privileged destination for the diversity of volcanoes throughout the country.

The volcanoes have also been part of history for catastrophes that have affected the lives of Guatemalans, being the first catastrophe recorded on September 11, 1541, after a great storm in the current Antigua Guatemala, the mud of the crater of the Volcan de Agua, could not withstand the amount of water and the mud flow destroyed Santiago, killed many neighbors[30]. for this reason, the city of Guatemala was moved to the current position.

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[28]More information about the tectonic plates sees: https://insivumeh.gob.gt/?p=1887.

[29] To read more about Guatemala topography see: https://aprende.guatemala.com/historia/geografia/geografia-de-guatemala/.

[30] See all the history of the Volcan de Agua in: https://cvc.cervantes.es/artes/ciudades_patrimonio/antigua/historia_tradicion/historia_02.htm#:~:text=Todo%20empez%C3%B3%20durante%20la%20madrugada,ahog%C3%B3%20a%20su%20infeliz%20gobernante.

On 3 June 2018, at 3 p.m., the Fuego volcano in Guatemala erupted for the second time that year. The Fuego volcano, one of the four active volcanoes in Guatemala, began to rumble, it is worth mentioning that for the populations that live near them it is common to hear the lava giants make sounds and the earth tremble during their volcanic activities, but this time it was not the same, this event was particularly unusual and destructive because the eruption did not occur in the main crater, it was a lateral eruption, as it pierced the west and southwest side, according to the special volcanological bulletin issued by the National Coordinator for Disaster Reduction (CONRED) [31], the strong explosions sent columns of ash rising as high as 15,000 meters above the sea level rise, making the pyroclastic flows descend quickly and violently towards the San Miguel los Lotes colony, At least 110 people are dead and over 200, including children, are still missing. The volcanic material released by Fuego was a mix of ash, rock, and volcanic gases which erupted rapidly, leaving almost no evacuation time. As a result, people, communities, and towns were trapped[32]. The government sent immediate aid to help the population, but there was not much that could be done, for this reason the government of Guatemala deplored that area as a cemetery because of the amount of people that were buried.

The eruption of Volcán de Fuego in 2018 was a devastating tragedy for Guatemala as volcanic ash, which rose to great heights and affected crops more than 14 kilometers around, volcanic ash contains sulfur and other minerals that can be very harmful to health, causing respiratory and eye diseases.

In addition to volcanic activity tectonic plates add tremors and earthquakes, in 2023, the Institute of Seismology, Volcanology, Meteorology and Hydrology (INSIVUMEH)reported a total of 4,630 earthquakes in Guatemala. In 2024, to date, more than 500 seismic events have been recorded.[33].

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[31] UNICEF. (2019). Case study: Guatemala Volcán de Fuego 2018 - participatory production and strengthening local capacity for accountability to affected populations. PreventionWeb. https://www.preventionweb.net/publication/case-study-guatemala-fuego-volcano-2018-participatory-production-and-strengthening.

[32] ReliefWeb. (2023, agosto 30). Emergency in Guatemala: Volcán de Fuego aftermath. ReliefWeb. https://reliefweb.int/report/guatemala/emergency-guatemala-volc-n-de-fuego-aftermath.

[33] INSIVUMEH official reports.

Interestingly, INSIVUMEH was created because of the 1974 earthquake, through a Governmental Agreement dated March 26, 1976, and began formal operations on January 1, 1997[34].

The earthquake of February 4, 1974, in Guatemala took the Guatemalan population by surprise, at 3:00 in the morning, an earthquake with a magnitude of 7.5 on the Richter scale shook the entire country, the epicenter was in the department of Izabal in the northeast of the country near Honduras.

This earthquake caused the death of approximately 23,000 people and injured more than 76,000. It is estimated that in addition to the human toll it destroyed more than 250,000 houses affecting more than one million Guatemalans who lost their homes. The intensity of the earthquake was so high that it was felt in neighboring countries such as Belize, El Salvador, Honduras and Mexico.

INSIVUMEH provides the service of permanent systematic monitoring of volcanic and seismic activity, maintaining hydrometeorological data, maintenance, reactivation and expansion of operational and institutional activities in terms of rehabilitation and reconstruction of stations or monitoring points of a climatic nature[35], publishes sensitive and non-sensitive earthquakes on its official website, as well as monitors tropical storms and hurricanes, which affect the country annually, since the hurricane season in recent years has been stronger and more dangerous due to the intensity and aggressiveness of the winds and tides generated by these low pressure systems.

Due to the topography of the country there are different climates being the predominant a tropical climate that varies according to the elevation, the entire coastline of the Pacific Ocean areas are warm and humid while in the highlands temperatures are colder and windy, the Tajumulco Volcano is the highest volcano in Guatemala and Central America with a height of 4, 220 meters above sea level, in this area it is very common that the temperature drops below 0° Celsius, in December 2023 in the departments of San Marcos and Quetzaltenango temperatures of -5.6° Celsius were recorded, covering with ice different

[34] INSIVUMEH official website, visit: https://insivumeh.gob.gt/?p=130

[35] Ibid.

towns of these two departments, being the lowest temperature in history -10.5° Celsius in January 2002[36].

The beginning or duration of each season is not precise and can be delayed each year has been varying due to climate change, which generates longer summers with higher temperatures which allows forest fires to spread throughout the country, as well as shorter winters so that the amount of rain that falls saturates the absorption capacity of the soil generating floods in many departments of the country.

Which generates two other problems the floods and fire, starting with the fire season that develops during the summer, according to the report 237 of the fire season 2023-2024, dated April 16, in the country were recorded one thousand five hundred and forty (1550) fires, of which one thousand one hundred and seventy-four (1174) were reported as forest fires and three hundred and seventy-six (376) were reported as non-forest fires, occurred in fourteen of the country's twenty-two departments[37].

Regarding floods, CONRED reports that during the 2024 rainy season, 1,168 incidents have been reported throughout the country as of July 9. Therefore, through the CONRED System, 2,584,513 people have been attended throughout the country, because during this season 326 floods, 165 landslides, 129 landslides and 93 incidents caused by strong winds were reported[38].

Latin America and the Caribbean is the second most disaster-prone region in the world. Up to seven major hurricanes (category 3 or higher) have been forecast for the 2024 Atlantic hurricane season, an increase of at least 60% compared to the average of the past 30 years[39].

In the Pacific Ocean there are three protected areas, a private natural reserve La Chorrera - Manchon Guamuchal, a national park Sipacate - Naranjo and a multiple use area Monterrico.

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[36]Prensa libre, (Decembre 19, 2023), to read the complete report see the page: https://www.prensalibre.com/guatemala/comunitario/temperaturas-en-guatemala-cual-ha-sido-el-dia-mas-frio-en-los-ultimos-30-anos-segun-el-insivumeh/, visited August 20, 2024.

[37] CONRED Information Bulletin No.093-2024.

[38] National Coordinator for Disaster Reduction (CONRED). (n.d.). Most recorded incidents during the rainy season. Retrieved from https://conred.gob.gt/incidentes-mas-registrados-en-la-epoca-de-lluvias/.

[39] UNICEF. (2024). What you need to know about the 2024 hurricane season. UNICEF Latin America and the Caribbean. Retrieved from https://www.unicef.org/lac/emergencias/temporada-huracanes-2024

On the Atlantic Ocean coast there are four protected areas, none of them in the territorial sea or contiguous zone.

Decree 4-89[40] establishes the creation and organization of the SIGAP, integrating all protected areas and the entities that manage them, in order to conserve, enhance and protect the country's natural resources and biological diversity to maintain areas in their unaltered state to ensure evolutionary processes, also maintain samples of all types of landscapes and physiological forms to ensure natural diversity and environmental regulation and prevent the loss of plant and animal species to maintain natural communities and gene flow, manage watersheds to ensure the continuous flow of pure fresh water, reducing vulnerability to natural disasters.

While it is very true that pollution is mostly the result of the activities carried out by man as a result of the work he does for the economic development of his family, there are also other types of pollution that should be taken into account in the long run, since to date there are no studies that demonstrate the impact they can have on humans or the diversity of the sea, such is the case of underwater noise pollution and the effects of the drugs dumped in the ocean, as for example the fish found in Washington's Puget Sound have tested positive for cocaine, Xanax, Prozac, Lipitor, and a cocktail of 77 other drugs,[41] and also the sharks tested positive to cocaine in Brazil[42], how to prepare the country to prevent future problems of new forms of pollution.

[40] Food and Agriculture Organization of the United Nations (FAO). (1989). Decree 4-89: Protected Areas Law. Retrieved from https://www.fao.org/faolex/results/details/es/c/LEX-FAOC060538/#:~:text=El%20presente%20Decreto%20aprueba%20la,sostenida%20de%20las%20especies%20y.

[41] Aimer, T. (2016). Fish in Washington test positive for cocaine, Xanax, and a cocktail of 79 other drugs. The Inertia. Retrieved from https://www.theinertia.com/environment/fish-in-washington-test-positive-for-cocaine-xanax-and-cocktail-of-79-other-drugs/.

[42] Science (2023). Coke sharks found in Brazilian waters. Retrieved from: https://www.science.org/content/article/cocaine-sharks-found-waters-brazil.

Chapter 2: Guatemala's maritime legal framework

The beginning of the laws in the administration of the sea in the Republic of Guatemala post-independence from Spain was on February 13, 1822 when even being part of the great Central American Union, the freedom of trade was decreed, to increase the number of ships calling in Guatemala and free the Spanish restrictions, although it seems that the interest was fast after 52 years, the first important recognition related to maritime delimitation was on December 25, 1882.

But due to the growth of international trade in the late nineteenth century, early twentieth century, the Republic of Guatemala initiates laws to strengthen port activities and therefore the national maritime authority, during this time an important historical event arises, on January 2, 1959, It is reported that "pirate ships" were dedicated to plundering the natural maritime resources, and that "in addition to stealing large quantities of fish and shrimp, emboldened by the lack of surveillance in that area, they have taken their audacity to make furtive landings at different points along the coast, to smuggle weapons and harmful drugs" [43]. The president ordered the Guatemalan Air Force to attack these ships, being the first time that Guatemala uses force at sea to protect its natural resources.

After this unfortunate event, the lack of interest in ocean governance continued, a sample is that Guatemala has approximately four hundred two (402) km of coastline in the Pacific and Atlantic oceans that have not been measured or recognized for lack of capacity but is currently working to present the delimitation of the territorial sea of the Republic of Guatemala.

The MINDEF as maritime authority to make the change based on Part XII Protection and preservation of the marine environment section 1. General Provision Article 192 General Obligation: "States have the Obligation to protect and preserve the marine environment". Launches the national maritime policy which is the basis for sustainable development of the sea, port infrastructures and sustainable use of resources for the inhabitants of coastal marine areas.

[43]Prensa libre (January 21, 2017) Mexico breaks off diplomatic relations with Guatemala in 1959. Too see all new visit: https://www.prensalibre.com/hemeroteca/operacion-drake-entre-guatemala-y-mexico-en-1959/.

Section A: National Maritime Policy.

The oceans and ports are vital for trade, transportation and economic development in Guatemala, which has a privileged geographical position that places it in the belt of the Central American isthmus[44], providing it with a wide biodiversity and availability of natural resources, in addition to being a commercial bridge that connects to the world. Guatemala's maritime transportation is developed on both coasts and currently has five maritime ports; likewise, through the fishing sector, it generates employment, contributing to food and nutritional security.

According to data from the According to the United Nations Conference on Trade and Development over 80% of the volume of international trade in goods is transported by sea[45].

Due to the need to contribute to the integral development of Guatemala in maritime matters, the National Commission of Maritime Administration (CONAMAR) was created by Governmental Agreement No. 58-2015 dated March 4, 2015, as a temporary body, whose primary purpose is to coordinate inter-institutionally the activities of the State in the maritime field.

CONAMAR, through plans, programs and strategies in accordance with the specific functions of each entity involved in national maritime development, recommends to the Executive Branch a policy that provides a solution to the weak governance in the maritime field, seeking to consolidate and strengthen it, creating the National Maritime Policy 2023-2043.

On September 22, 2023, the Ministry of National Defense, acting as National Maritime Authority, held the Second Extraordinary Meeting of the CONAMAR, which was chaired by the Vice Minister of the Navy of the Ministry of National Defense, with the participation of representatives of the MINEX, MAGA, CIV, MEM, MARN, MINECO, and CONAP, as well as the General Directorate of Maritime Affairs and the General Directorate of Port

[44] Central America (n.d.) Why is Central America an isthmus? América Central. Retrieved from: https://www.americacentral.info/por-que-centroamerica-es-un-istmo.

[45] United Nations Conference on Trade and Development. (2023). Review of Maritime Transport 2023. Retrieved from https://unctad.org/publication/review-maritime-transport-2023

Captaincies of this Ministry, which exercise functions related to the maritime field[46]. They officially present the National Maritime Policy 2023-2043 approved in Governmental Agreement Number 211-2023.

Table I. The National Maritime Policy 2023-2043 is divided in four specific axes:

No.	Axes	Responsible	Potential co-responsible parties
1	Sustainable use of natural marine and coastal resources.	MARN	CIV. MAGA, MINDEF, CONAP, MEM, MINEX, MINECO.
2	Promote the increase of maritime infrastructure.	CIV	MARN, MAGA, MINDEF, CONAP, MEM, MINEX, MINECO.
3	Generate conditions for an appropriate exploration and exploitation of maritime resources.	MINDEF	MEM, IGN, MINEX, MAGA, CIV, CONAP.
4	To promote and expand educational training and scientific capacity.	MINDEF	MARN, CIV, MAGA, CONAP, MEM, MINEX, MINECO.

1. **Sustainable use of natural marine and coastal resources.**

Overexploitation, sea level rise, climate change, are factors that put the sustainable use of resources at risk along the coasts of the country. This axis proposes that by 2033, 231,085 hectares of marine and coastal marine ecosystems will be incorporated into the SIGAP, with the peculiarity that directly involves the inhabitants who are engaged in fishing to promote sustainable aquaculture and conservation of coastal resources.

To comply with this axis, actions must be articulated so that each institution in its area of competence complies with the implementation of procedures, methodologies and national and international instruments related to the protection of marine-coastal resources.

[46] Ministry of National Defense (2024, September 18). Officially delivers maritime policy [Press release]. Retrieved from https://prensa.gob.gt/comunicado/ministerio-de-la-defensa-nacional-entrega-de-manera-oficial-la-politica-maritima.

The MARN as responsible for this axis uses the Policy for the Integral Management of the Marine Coastal Areas of Guatemala (AG-328-2009)[47], to address the socio-environmental problems in the country's marine coastal areas. This policy seeks the responsible participation of all sectors interested in economic and social development, without compromising environmental protection and ecological balance. It is divided into four main objectives: Ecosystem Protection and Management, Equitable Socioeconomic Development, Prevention of Degradation and Pollution, and Ecosystem Conservation and Restoration.

To carry out these objectives, this policy proposes land use planning, institutional strengthening, ensuring compliance with the national and international legal framework, adequate generation and transfer of knowledge to ensure the sustainable future of the country's coastal zones.

It also uses the Regional Strategy for Blue Growth (ERCA)[48] of the Central American Integration System (SICA)[49] and the Central American Commission for Environment and Development (CCAD)[50] that seeks to promote sustainable development in SICA member countries through the blue economy, which aims to improve the quality of life of people through the economic development of sectors related to the sea and aquatic resources, ensuring the conservation and protection of the environment.

It considers environmental sustainability, economic development, social inclusion and the development of projects and actions for the creation of green jobs and the promotion of education and training in blue economy issues.

In 2021 MARN launche the National Low Emission Development Strategy (ENDBE), its main objective is to achieve sustainable economic growth while reducing greenhouse gas emissions and to contribute to the global goal of keeping the temperature increase below 1.5

[47] Government of Guatemala (2009). Governmental Agreement 328-2009. Diario de Centro América.

[48] Central American Integration System (SICA). (n.d.). Executive summary: Regional strategy for blue growth in SICA countries. Retrieved from https://www.sica.int/documentos/resumen-ejecutivo-estrategia-regional-para-el-crecimiento-azul-en-los-paises-del-sica_1_126696.html.

[49] To read about SICA visit: https://www.sica.int/sica/vista.aspx.

[50] To read what is CCAD and its functions visit: https://cambioclimatico-regatta.org/index.php/es/instituciones-clave/item/comision-centroamericana-de-ambiente-y-desarrollo-ccad.

degrees Celsius. The ENDBE is a planning instrument that seeks to guide climate actions in Guatemala[51]. This new tool serves for the development of sustainable economic activities on the coasts of the country, such as the development of renewable energies, transportation and urban planning, and the development of better industrial techniques for the reduction of greenhouse gases[52].

The joint work, the correct implementation of the strategies, the fluid and opportune communication in coordination with the other potential correspondents proposes to comply with this important axis to recover, protect and develop in a sustainable way the coastal marine areas of Guatemala.

2. **Promote the increase of maritime infrastructure.**

Guatemala's maritime-coastal zones are of great importance, as they are home to a series of productive and conservation activities that involve approximately 25% of the Guatemalan population in activities such as fishing, agriculture, tourism and international trade.

In the executive summary of the National Development Plan: K'atun, Our Guatemala 2032, specific strategies are listed to comply with the national plan, in which the development of the sea, the protection of resources and in this specific case, port infrastructure, are mentioned[53].

Therefore, the second axis of the National Maritime Policy promotes the increase of maritime infrastructure, the CIV as responsible for this axis has as a strategy the modernization of port infrastructure, with the intention that by 2033 the number of tourists entering Guatemala by sea will increase to 195,770, in the cruise season 2023-2024 it is reported that 45,791 passengers and 23,358 crew members entered in 32 cruise ships that

[51] Ministry of Environment and Natural Resources (MARN) (2023). MARN presents strategy to reduce greenhouse gas emissions and contribute to global goals. Retrieved from: https://www.marn.gob.gt/marn-presenta-estrategia-para-reducir-la-emision-de-gases-de-efecto-invernadero-y-contribuir-con-las-metas-globales/.

[52] Guatemala (2021). National Low Emissions Development Strategy. United Nations Framework Convention on Climate Change (UNFCCC). Retrieved from https://unfccc.int/documents/281183.

[53] Secretariat of Planning and Programming of the Presidency (SEGEPLAN) (2014). P. (66). Plan Nacional de Desarrollo K'atun: Nuestra Guatemala 2032 Resumen Ejecutivo. Guatemala: SEGEPLAN. Retrieved from https://www.transparencia.gob.gt/wp-content/uploads/2017/07/KATUN-2014-004.pdf.

have docked at Puerto Quetzal and Puerto Santo Tomás de Castilla[54], totaling 69,149 passengers, but even more important to increase the movement of ships in port facilities, so it is proposed that by 2043 there will be 4,670 ships docking in the country's ports, during the year 2023 in the ports of the Atlantic Ocean, port Santo Tomas de Castilla 1146 ships are reported, in Puerto Barrios 615, in the Pacific Ocean ship movements in Puerto Quetzal were 1091 ships, and in Puerto San Jose 214 for a total of 3066 ships[55], With this increase in vessel movements, it is proposed to improve and expand the existing port facilities to increase the amount of goods received at the port yards and thus improve capacity and efficiency.

The expansion of the port yards is expected to increase the cargo reception capacity to 47,650 TEUs, to facilitate the transportation of goods to and from the seaports. It is important to mention that the ports already have the X-Ray system, which was implemented in Empresa Portuaria Nacional, Santo Tomas de Castilla in September 2020 and in December of the same year in Empresa Portuaria Quetzal[56] to generate investment conditions.

These actions strengthen the capacity of the ports, the country's economic development, the efficiency of the procedures and the increase of global economic competitiveness, generating greater employment opportunities for Guatemalan citizens while considering the greatest possible care to minimize the environmental impact.

3. **Generate conditions for an appropriate exploration and exploitation of maritime resources.**

   The Ministry of National Defense as responsible for this axis has as a strategic plan this involves the development of projects that facilitate the investigation of maritime resources with the intention of adequately exploring the living and non-living resources in the sub

[54] To see all new visit: https://agn.gt/guatemala-ha-recibido-a-mas-de-45-mil-turistas-en-la-temporada-de-cruceros-2023-2024/

[55] Data from DIGECAP

[56] To see all new visit: https://portalportuario.cl/presidente-de-guatemala-inaugura-sistema-de-revision-no-intrusiva-en-empresa-portuaria-quetzal/

adjacent waters in the bed and subsoil of the territorial sea, prior to the sustainable exploitation that allows the development of the Guatemalan economy.

This axis is emphatic in that no action will be taken on the Caribbean coast until the resolution of the International Court of Justice on the territorial, maritime, and insular dispute between Belize and Guatemala is issued.

In this axis it is proposed that by 2027 a regulatory framework be established to explore and exploit coastal maritime resources in a sustainable manner. It is also projected that by 2033, 35 aquaculture concessions will be granted within the national territory. It is necessary to emphasize that this will be done after having the results of an adequate exploration of resources through research and exploration projects through the Inter-Institutional Commission for Hydro-Oceanographic Research (CIIHO).

Once the results of the CIIHO are available, the results will be analyzed so that MEM, together with the National Geographic Institute and MAGA, will develop a concession plan that includes clear and specific regulations for exploitation, in order to subsequently give the concessions to the appropriate people according to their capacities, where monitoring and supervision of the use of the concessions will be carried out and the necessary training and support will be provided.

4. **<u>To promote and expand educational training and scientific capacity.</u>**

This axis is of vital importance since it proposes the involvement of the population at the national level for the promotion of mechanisms that generate social awareness, educational training, culture and capacities that strengthen the integrated generation of scientific knowledge focused on the conservation and sustainable use of maritime resources.

By the year 2033, two programs for the training of seafarers will be implemented, increasing by an average of seven thousand the number of Guatemalans with skills to work in the world maritime fleet, allowing to achieve greater competitiveness in the maritime field, with the intention of doubling the human resource with technological and scientific knowledge in the maritime field, to achieve this result it is proposed to generate and implement awareness strategies to the population in conjunction with other institutions, and the formation of the center for maritime technical studies, to have a national strategy to generate awareness and maritime culture with the support of MARN, CIV, MAGA, CONAP, MEM, MINEX and MINECO.

Section B: The pollution in the Pacific and Atlantic Ocean in Guatemala.

Guatemala is moving forward to become a developed country with sustainable habits, with opportunities for its citizens, to create a society aware of the consequences caused by the mismanagement of waste or products used for the performance of their daily activities. This section discusses the causes of pollution due to which lakes, rivers and oceans of Guatemala have suffered serious pollution problems.

The most serious effect of pollution is seen in inland waters, lakes and rivers, as the surrounding populations depend on these water resources for their daily lives, transportation or commerce, but do not have the culture or information on the proper management and protection of the lakes or rivers.

Another important problem is that there are no areas near the populations for solid waste management, in some cases there are, but they tend to produce flies or are visited by wild animals, so the bodies of water are generally used as garbage dumps. They are also used for washing clothes with polluting chemicals and for irrigation of crops so they are diverted from their course in them are made mixtures of chemicals and pesticides to protect local crops, it is estimated that 95% of rivers and lakes in Guatemala suffer from some kind of pollution.

The following are the most important cases of pollution in the country, starting with the lakes which are the ones that receive the pollution coming from the rivers and finally the cases of pollution in the Atlantic and Pacific Ocean.

Lakes:

Within the national territory there are 23 lakes and lagoons of different sizes and depths, as well as 119 minor lagoons, which cover an area of approximately 950 square kilometers, even sharing a lake on the border with El Salvador and Mexico.

Lake Izabal: one of the most important lakes in the northeastern part of the country because all the municipalities that border it use it as a source of food, to move between communities, but above all as a source of income since they are dedicated to tourism.

At the beginning of 2017, a red stain appeared on the lake, as well as a contamination focus was identified in one of the lake's springs. An important fact is that a mining company is

located in this area, which is why the locals blamed the company for the damage caused to the lake. The Ministry of Environment together with the San Carlos University of Guatemala investigated and determined that the reason for the red stain was caused by contamination of organic and chemical waste from the Polochic River, it was determined that more than 90% of the contamination in the lake was caused by the discharge of sewage into the Polochic River[57].

Lake Amatitlan: this lake is located in the department of Guatemala near the capital city, it bears the name of the municipality, is a tourist and recreational place for national or foreign people, is located near the international airport La Aurora and from the air it is observed that the color of the water of this lake is green, due to the high level of contamination, This is due to the fact that the waters have a high content of nitrogen and phosphorus caused by the poor management of sewage and solid waste from 14 municipalities that flow into the Villalobos River, which is drained into the lake, as well as many industries use the waters of the lake as a discharge area for industrial or chemical waste.

The cause of this green color is the microalgae Microcystis, which dyes the water fluorescent green[58], this lake has been national and international news, due to the multiple attempts to stop the growth of this algae, in spite of the attempts to clean the waters one of the biggest problems is the lack of supervision in the processes, the maximum factor that affects the cleaning of the lake is the global warming since the high temperature helps the algae in its feeding and reproduction, reason for which the ecosystem is in high risk since the amount of oxygen affects the fish and animals that live in the lake.

The lack of supervision and commitment of civil society results in the lakes suffering from different types of contamination. It is worth mentioning that in both lakes the National Defense Navy has facilities and military personnel to support people in case of emergencies, regulate and protect the safety of people navigating the lakes and to carry out search and rescue operations.

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[57] Gonzalez, L. (2022, February 11). ¿Qué causó la contaminación en el lago de Izabal en 2017? *República*. https://republica.gt/guatemala/que-causo-la-contaminacion-en-el-lago-de-izabal-en-2017–202221118220.

[58] BBC News World (2022, October 28). Guatemala's Lake Amatitlan: Fighting pollution and algae blooms. BBC. Retrieved from https://www.bbc.com/mundo/noticias-internacional-63420685.

Rivers:

The hydrographic network in the country is divided into three watersheds, and most importantly each one is different from the other, which means that each one has different basins, physical qualities such as flow, depth and pollution problems, being the following:

Pacific watershed: this watershed rises from the Sierra de las Minas, its flow is fast at its source but becomes slow on the coast, the rivers flow into the Pacific Ocean, these rivers are short in size, they are susceptible to flooding because the rivers due to their proximity to volcanoes carry large amounts of stones and volcanic ash, These floods occur in short but consecutive periods of time, causing garbage that accumulates in the streets or in clandestine dumps along the southern coast to be washed into the mouths of the rivers and into the ocean.

Ocosito river: this river is the main source of water and at the same time of contamination of the Manchon Guamuchal, a natural conservation area where there are mangrove forests so many international agencies are helping to its conservation, the pollution that affects this river is the accumulation of sediment and garbage which has reduced the amount of water that drains into the wetland Manchon Guamuchal affecting the life of the species that live in this protected area[59].

In this watershed, the biggest problem is plastic pollution, which is dumped or left near rivers that overflow into the ocean, causing plastics and microplastics to float in the ocean[60].

Atlantic watershed: This watershed is divided into two sub-slopes: the Caribbean Sea and the Gulf of Honduras. The rivers are more extensive with much more flow and depth, they are suitable for navigation and fishing.

Motagua river: It is the longest river in Guatemala and flows into the Caribbean. It has made world news not because of its size but because of the amount of garbage it carries to the Gulf

[59] Rojas, A. F. (2021, June 23). This is the project to stop pollution in Manchón Guamuchal. Prensa Libre. Retrieved from https://www.prensalibre.com/ciudades/retalhuleu/proyecto-para-detener-la-contaminacion-en-el-manchon-guamuchal/

[60] González, J. (2022). Contamination in the Pacific slope of Guatemala. Science, Technology and Health, 5(2), 123-145. https://revistas.usac.edu.gt/index.php/cytes/article/download/904/855.

of Honduras[61], which is why Honduras has filed several complaints and has even filed an international lawsuit because of the amount of garbage that affects both marine life and coastal communities. For this reason, both countries are working together to attack this contamination head on[62], and bio-fences have been placed to stop the advance of tons of garbage.

Las Vacas River: This river flows through the country's capital and joins the Motagua River, transporting an average of 20,000 tons of garbage per year [63]. It is considered one of the most polluted rivers in the country, since it is used as a sewage drainage system, seriously affecting the ecosystem and nearby communities.

Much of the waste from this river, along with garbage from other rivers that are part of the Motagua River tributary, including rivers in Honduras, ends up on the shores of the Gulf of Honduras being mostly solid waste and sewage.

These pollution problems are being addressed jointly by Guatemala and Honduras, hand in hand with many international organizations, but require integrated management and coordinated efforts to mitigate the impacts and protect the water resources of the region.

Gulf of Mexico watershed: The rivers of this watershed drain through the Yucatan peninsula into Mexican territory. They are long and mighty rivers, but like the other watersheds, they have suffered from pollution, the worst of them:

La Pasion River: in 2015 this river suffered one of the most serious disasters related to chemical contamination, since 150 km were polluted, affecting 16 communities because they suffered the death of all fish, amphibians, aquatic mammals, turtles and alligators. The contamination lasted several weeks, affecting more than 12,000 inhabitants who stopped using the river water because of this contamination. People who used the water for bathing

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[61] Historia sin Fronteras (n.d.). Projects: Motagua River. Retrieved from https://historiassinfronteras.com/proyectos/rio-motagua/index.html

[62] United Nations Development Programme. (n.d.). *Guatemala y Honduras trabajan en la protección de la cuenca del río Motagua*. Retrieved from https://www.undp.org/es/honduras/noticias/guatemala-y-honduras-trabajan-en-la-proteccion-de-la-cuenca-del-rio-motagua.

[63] To see pictures of the level of contamination of the river visit: https://diariolatino.net/impactantes-imagenes-de-la-contaminacion-de-un-rio-en-guatemala/

suffered skin diseases and those who drank it or used it to prepare food suffered from stomach diseases, affecting fishermen, farmers and cattle ranchers,[64].

Pollution of lakes and rivers in Guatemala affects not only biodiversity, but also the health and well-being of local communities. The lack of adequate wastewater treatment systems and inefficient solid waste management directly affect the population. The main sources of contamination include industrial and agricultural waste and untreated wastewater that is intentionally dumped by residents, often with the endorsement of the municipality.

Oceans:

The following are the most relevant facts of pollution in Guatemala's seas, in addition to pollution from rivers and land, pollution from hydrocarbons, potentially hazardous chemicals and external sources of pollution.

Pacific Ocean: The greatest number of commercial activities in the country are carried out in the Pacific Ocean, activities in which transportation in ships is needed, such as tourism, sport fishing, exports and imports and port activities. These same waters, besides being of vital importance for national commerce, generate a national security problem since they are used as a bridge for the transfer of illicit substances, narcotics, synthetic drugs coming from South America and destined for North America.

These substance traffickers, when they realize that the Guatemalan security forces have intercepted them, sometimes choose to sink or dump the cargo into the sea [65], Often the illicit material is not recovered and is lost in the ocean, this technique is used worldwide to avoid identifying the origin of the illicit material[66], This new type of pollution poses a new risk, since the chemical compounds used to manufacture these substances can contaminate the

[64] International Union for Conservation of Nature. (2016). *Emergencia en el río La Pasión*. Retrieved from https://iucn.org/sites/default/files/content/documents/2016/emegencia_rio_la_pasion_2016.pdf

[65] Ortega, J. C. (2023, November 18). More than Q90 million in cocaine: Authorities give details of drug seizure on Guatemala's Pacific Coast. Prensa Libre. Retrieved from https://www.prensalibre.com/guatemala/comunitario/mas-de-q90-millones-en-cocaina-autoridades-dan-detalles-del-decomiso-de-droga-en-las-costas-del-pacifico-de-guatemala-breaking/

[66] El Mundo. (2024, November 8). Four arrested 280 miles from Cádiz after sinking the 'narco-submarine' in which they were travelling when it was intercepted by a Customs Surveillance boat.. El Mundo. Retrieved from https://www.elmundo.es/espana/2024/11/08/cuatro-detenidos-narcosubmarino-cadiz.htm

ecosystem and the effects on fish, corals or marine mammals and the subsoil are still unknown.

Atlantic Ocean: the Caribbean coast, although small, is not spared from the effects of pollution, as already mentioned the problems with the Motagua River, also has a history of contamination caused by hydrocarbons and potentially hazardous materials.

On 14 August 2020, in Santo Tomas de Castilla, Izabal, as a result of a fire in three fuel tankers, 600 gallons of fuel fell into the Cacao River, the Local Contingency Committee in case of spills of oil, its derivatives and other potentially hazardous substances in the sea and marine-coastal regions of the Caribbean coast (COLDEMAR), activated the prevention protocols to prevent the fuel from contaminating the bay and the port area. In the same area, on 20 October of the same year, a possible palm oil spill was reported at the Santo Tomás de Castilla port dock[67].

On 22 December 2023, a yacht named Stella Maris caught fire near Punta de Manabique, Izabal, the incident resulted in the death of two people and the rescue of 20 others. The cause of the fire has not yet been determined, but it is suspected that a short circuit may have been the origin[68].

Likewise, in the Bay of Amatique, Puerto Barrios, Izabal, there is a boat that has been abandoned for more than 10 years, the owner of the boat has a lawsuit for which the boat has been anchored in the same place, currently the level of deterioration of the boat is a concern of security and potential contamination in this locality[69].

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[67] Emisoras Unidas (2020, October 27). Guatemala: MP investigates oil spill in Santo Tomás de Castilla. Emisoras Unidas. https://emisorasunidas.com/2020/10/27/guatemala-mp-derrame-aceite/?form=MG0AV3

[68] Escobar, J. (2023, December 22). After boat fire, two dead and several rescued. La Hora. https://lahora.gt/nacionales/jescobar/2023/12/22/tras-incendio-de-embarcacion-fallecen-dos-y-varios-rescatados/

[69] Republic (2024): What is known about the abandoned ship in the bay of Amatique and why is it causing concern? Republic. https://republica.gt/guatemala/que-se-sabe-del-barco-abandonado-en-la-bahia-de-amatique-y-por-que-causa-preocupacion--2024151810?form=MG0AV3

PART TWO: GUATEMALA AND MARITIME AUTHORITY

The National Maritime Authority as stipulated in article 19 of the CONVEMAR carries out and executes measures to regulate the innocent passage of ships, such as maritime safety, navigation regulation and law enforcement in national maritime spaces, for this reason in order to exercise and enforce the laws the Maritime Authority performs operations in the field of navigation safety, maritime security, naval operations, to prevent threats affecting the country. It also carries out operations to guarantee compliance with the concepts of Article 98, such as search and rescue operations, support for shipwrecked persons, in order to guarantee prompt assistance in emergency cases, as well as operations for the protection and preservation of the marine environment, as indicated in Article 204, the use of naval units in inter-institutional support for the prevention of marine pollution caused by maritime activity and the application of contingency plans.

It also exercises functions as Article 79: Coastal State, authorising applications for marine scientific research, exploration and exploitation of the living and non-living resources of the Continental Shelf, analysis and authorisation for the laying of submarine cables and pipelines. Article 218: Port State and Article 94: Flag State, in relation to the control of navigation, the Port Command and Harbour Master in the different ports or navigable lakes have the control and authorisation of vessels that comply with the documents required by national law, carry out inspections of Flag State, verification and evaluation of tonnage and displacement of cargo permitted on national vessels, audits in ports of the republic, hydrographic surveys, technical training of crew members, qualifications and certification of seafarers.

The Maritime Authority, like the preamble of UNCLOS, recognises that the development of initiatives and the use of the concepts of this convention will contribute significantly to the strengthening of peace, security, cooperation and friendly relations among all nations. In this way, efforts are made for Guatemala to meet the objectives of sustainable development, based on justice and equal rights, demonstrating commitment to the protection of the environment to create sustainable economic development for its inhabitants and neighbouring peoples.

Chapter 1: National Maritime Authority

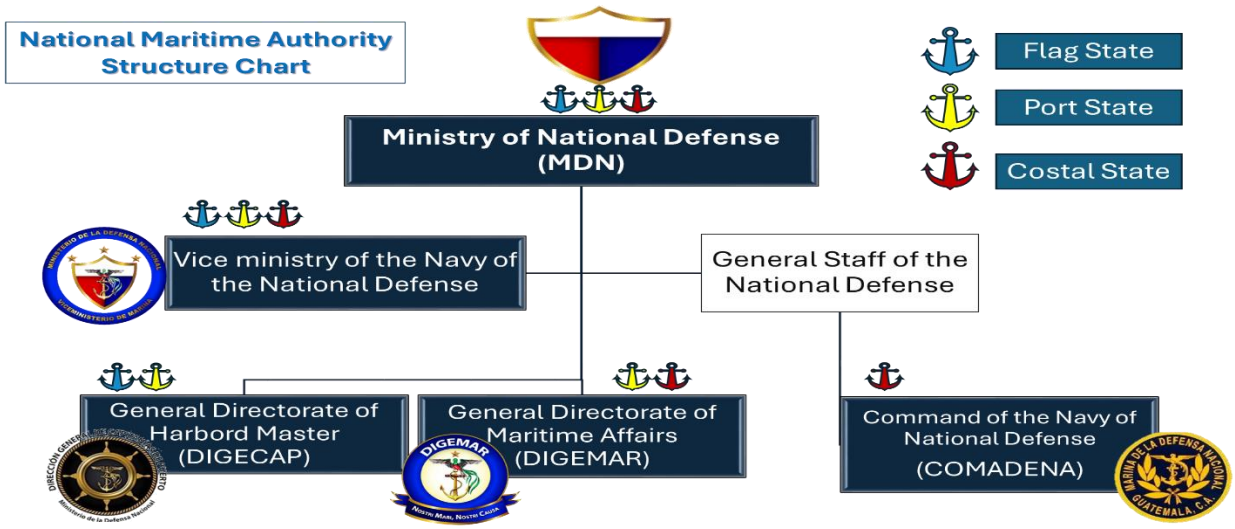
The President of the Republic leads the National Maritime Authority, through the Ministry of National Defense, delegated to the Navy of National Defense.

The National Maritime Authority exercises the sovereign power of the State, in the national territory, over the ships and seafarers and everywhere over the maritime vehicles of Guatemalan flag, by means of the legal regime, the resources of the Ministry of National Defense that include the administrative organs, coercive means and trained technical personnel; integrated with the logistic and coordination systems, in matters of navigation safety, maritime protection, use of the spaces, prevention of pollution and exploitation of the resources, in function of the Coastal State, Port and Flag Rector.

To strengthen and promote the development of the national maritime sector and defend the interests of Guatemalans at sea, the National Maritime Authority carries out actions to control sovereignty and rule of law, as well as to ensure the safety and security of national vessels. It also ensures the safety and protection of vessels and port facilities and assists in the prevention of pollution from ships and is responsible for compliance with the IMO conventions and protocols to which the State of Guatemala is a party in maritime matters.

The structure of the Guatemalan Maritime Authority is as follows:

Figure III. Structure of the Guatemalan Maritime Authority



Section A: Gaps between the Goals.

Talking about the complications that a developing country has for the fulfilment of the objectives of sustainable development can be approached and demonstrated in many ways, in this case we begin with a topic that is indispensable for dealing with issues at sea, the lack of delimitation of the baselines of the republic, as mentioned above, the lack of official delimitation of the baselines, complicates the administration and conservation according to the jurisdiction relating to the territorial sea, this is a simple example of the absence that existed in the country of the maritime authority.

The congress of the republic in 1976 in decree number 20-76[70], recognizes a territorial sea of 12 NM and an exclusive economic zone of 200 NM, (both measured from the baseline, which will be defined in the coming years as MINDEF is carrying out studies and measurements to meet this requirement).

UNCLOS articles 3 (Width of the territorial sea) and 57 (Width of the exclusive economic zone) delimit the same distances, so it can be seen that Guatemalan legislation is consistent with international instruments. It can also be observed that with reference to article 33 (Contiguous zone) and 76 (Definition of the continental shelf), UNCLOS is also consistent with what is established in article 121 of the Political Constitution of the Republic of Guatemala, where the assets of the State are the maritime zones to the extent and in the form that international laws ratified by Guatemala and article 142 defines the contiguous zone and the continental shelf.

The MINDEF interacts with the 14 government ministries in different tasks and coordinated activities for the fulfilment of national objectives, from this ministerial interrelationship national policies and plans are fulfilled. This interaction, despite being indispensable, often does not expedite the progress of the obligations dictated by the different laws and national plans, due to many factors such as lack of personnel, lack of resources, lack of equipment, lack of legal support for decision-making and/or assistance in national emergencies.

[70] Congress of the Republic of Guatemala (1976) Decree Number 20-76. Law for the Protection and Development of Aquatic Fauna. Available at: https://www.un.org/depts/los/legislationandtreaties/pdffiles/gtm_decreto_20-76.pdf 1

Lack of personnel: a strengthened Maritime Authority needs to have personnel with the necessary skills and knowledge to carry out its functions, which range from surveillance patrols, rescue operations, support in national emergencies or environmental protection.

As presented above, the geographical position of this country adds many areas of operations for natural disasters compared to other countries that do not have these topographical qualities, so the demand for elements to cover the national territory is not sufficient. Article 244 of the Political Constitution of the Republic is clear in defining that the Guatemalan Army is unique and indivisible, essentially professional, apolitical, obedient and non-deliberative; but the most interesting thing is that this article indicates that it is integrated by land, air and sea forces.

The number of naval officers in the country is not sufficient to fill the organic vacancies in the different Naval Commands, so officers from other specialties have been appointed to cover the absence of personnel.

Table II. Number of Naval Officers of the National Defense Navy year 2023

Rank	Assets	Naval Officers with missions outside the Navy	Number of Seats allocated to the Navy	Vacancies in the Navy
Officers	255	40	287	72

As can be seen in the table, of the 255 naval officers, 40 are serving in other areas within MINDEF, which generates a need for 72 officers to fill the maximum number of posts within the National Defense Navy.

This lack of personnel affects the Navy's ability to cover 100% of the tasks under its responsibility and affects the availability of sending officers for technical maritime training. In addition, many of these officers during the year carry out rescue and support operations for communities affected by natural disasters, without neglecting the duties of the post they hold.

The Pacific Coast, the most extensive in the country, runs from the southeastern border with El Salvador to the southwestern border with Mexico, is the most productive for the country,

as it has three ports, so there are more job opportunities, it is a destination for sport fishing, but there are threats such as gangs dedicated to organized crime that use the ocean as a means of transporting illegal substances, something important to note is that its beaches are covered with black volcanic sand.

Due to the importance of this ocean, MINDEF has deployed different brigades and special units along the southern coast to protect this strategic area of the country. The Pacific Naval Command, in charge of ensuring national sovereignty in the territorial sea[71], is also installed in this area, it is the largest and most important, as its facilities include the Guatemalan Naval School, responsible for training seafarers and future Navy Officers, and the Naval Special Force Command, dedicated to combating drug trafficking and foreign threats. As a result, the demand for officers in this area of operations is much greater and is applicable in different fields, such as training, counter-narcotics, naval operations and disaster support operations.

The Atlantic coast, on the other hand, is more touristy as it is part of the wider Caribbean and is known for its white sandy beaches. This area is home to the Garifuna people, who are an important part of tourism and biodiversity conservation. As on the Pacific coast, there is a threat from organized groups that use the mountains and jungles of this region to grow illicit crops and to smuggle products such as cigarettes and alcohol. For their protection, MINDEF has three navy commands, one of which is the Caribbean Naval Command, responsible for exercising command, supervision, control and coordination in its assigned area of responsibility[72], this command shares facilities with the Guatemalan Naval Shipyard where naval officers oversee promoting, manufacturing and maintaining the floating units of the Navy and is also open to the public.

Lack of technical assistance: Article 202 of UNCLOS, scientific and technical assistance to developing States, has shortcomings that complicate the development of the functions of the

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[71] Ministry of National Defense of Guatemala. (n.d.). *Segundo Comando Naval del Pacífico*. Retrieved September 16, 2024, from https://www.mindef.mil.gt/Organizacion/3fuerzas_aire_mar_tierra/fuerza_mar/2comando_navalpacific/2comando_navalpacific.html

[72] Ministry of National Defense of Guatemala. (n.d.). *Tercer Comando Naval del Caribe*. Retrieved September 16, 2024, from https://www.mindef.mil.gt/Organizacion/3fuerzas_aire_mar_tierra/fuerza_mar/3comando_navalcaribe/3comando_navalcaribe_vision.html

maritime authority in relation to subparagraph a), promoting programmes of a scientific, educational and technical nature for the protection and preservation of the marine environment and the prevention, reduction and control of marine pollution.

(i) training of their scientific and technical personnel: there is a need to train naval personnel in Hydrographic Specialty, for the development of hydrographic information to create nautical charts with updated information for navigation by identifying underwater hazards, water depth and seabed conditions. To monitor and manage marine and coastal resources. To collect data from jurisdictional waters for the coordination and response in cases of emergencies or pollution by potentially hazardous liquids, hydrocarbons, etc.

(ii) facilitating their participation in relevant international programs; Nippon Fellowship Programme, DOALOS, the greater number of staff working with the same line of thinking enables the advancement of initiatives, as it is easier to present the objectives standardized by these international programmes.

(iii) supplying them with necessary equipment and facilities; the increased capacities and obligations of the maritime authority create the need to expand the working areas to give the necessary attention to the different requests coming into the offices. To contribute to the efficient work it is necessary to have the appropriate equipment for the provision of data to assist the maritime authority, among which can be mentioned the need to acquire special equipment such as a Side Scan Sonar to create detailed images of the seafloor and detect objects on or near the seabed, Echo boat or Teledyne Z-Boat to carry out hydrographic surveys, reducing the need for manned vessels.

(v) advice on and developing facilities for research, monitoring, educational and other programmes; participation of officers in international programmes with specialization in cartography, for the planning of projects that allow national development with the creation and updating of national nautical charts.

(b) provide appropriate assistance, especially to developing States, for the minimization of the effects of major incidents which may cause serious pollution of the marine environment.

Guatemala, as a party to the International Convention on Oil Pollution Preparedness, Response and Cooperation (OPRC), has many needs for the implementation of the

Convention, such as lack of training in OPRC procedures, lack of equipment such as skimmers and bio barriers necessary for immediate response to oil spills, lack of facilities for the storage of equipment, lack of cooperation and coordination with other countries in the region for the development of regional plans and response to pollution threats.

(c) provide appropriate assistance, especially to developing States, concerning the preparation of environmental assessments, to promote conservation Guatemala needs all the advice for the adaptation of MPAS, NO TAKE, to protect strategic areas in which overexploitation is prevented.

Legal system: Guatemala's effort to strengthen the Maritime Authority can be seen in the strong legislation formulated to define the obligations and scope of the National Maritime Authority; this demonstrates the commitment to the sustainable development of the oceans, the problem is that the development of these laws has not been formulated in the same direction, which complicates the integration of hierarchical, in addition many records or capacities are scattered in different agreements, decrees or governmental agreements.

To solve this problem, it is necessary to be able to order and analyze the different laws so that they are congruent with international and regional conventions, and for this purpose it is necessary to have professionals dedicated to the law of the sea.

Currently, there are no officers specialized in maritime affairs and the Law of the Sea in the country. In addition, lack of political interest has created a vacuum in national legislation. To solve this problem, it is necessary to define, unify and implement concrete measures that articulate the country's commitments through an effective legislative process. In this way, the Congress of the Republic will be able to generate a Framework Law that integrates all the regulations related to the National Maritime Authority and grants the necessary powers to increase its effectiveness.

Section B: Why prevention must be the priority for the four axes of the National Maritime Authority Policy?

Prevention is a fundamental part of a country in all applicable areas, such as health, safety, security and the maritime environment. It should be a priority for any nation, as it is the foundation for building a sustainable future. For this reason, this section presents the damage caused by the rainy season, fires and hurricanes, to demonstrate that natural hazards must be considered paramount before the development of a national policy. It is essential to bear in mind that ecosystems suffer the most from economic development and anthropogenic and natural phenomena.

Rainy season:

The rainy season usually starts at the end of May and ends at the beginning of November. This year the rainy season has been worse than last year due to a higher incidence of emergencies and damage caused by the rains; CONRED reports a lot of rainfall because of climate change as it has altered rainfall patterns in the country.

This increase in emergencies is because in the same period more rain falls, which directly affects the lives of Guatemalans, as can be seen in the fact that 11,435 people are at risk of suffering an emergency, 15,756 are catalogued as victims and 30,744 were evacuated because the risk produced by the rains affects the lives of these people[73].

In addition to the Guatemalan people, the territory of Guatemala is suffering the effects of climate change, not only their lives are affected, but also their homes, which were presented in the first chapter, and public buildings such as schools, roads and bridges. For example, on 13 June of this year, at km 44[74] of the highway that leads to Puerto San Jose, department of Escuintla, a landslide occurred, which to date has not been enabled for free use, due to the

[73] Publinews (2024, 7 November). Rainy season in 2024 caused more emergencies than last year. Retrieved from https://www.publinews.gt/noticias/2024/11/07/temporada-lluviosa-en-2024-provoco-mas-emergencias-que-el-ano-pasado/

[74] Prensa Libre (2023). Autopista Palín-Escuintla: chronology of 40 days after collapse and plans to recover the section. Retrieved from https://www.prensalibre.com/guatemala/comunitario/autopista-palin-escuintla-cronologia-de-40-dias-tras-hundimiento-y-planes-para-recuperar-el-tramo/

rains, of the 4 lanes that allowed access to the port of San Jose and the return to the capital city, only two can be used.

It must be considered that year after year, what is destroyed in winter must be rebuilt during the summer, although the rainy season of 2023 did not affect as strongly as the current rainy season, the cost of recovery of last year's damage is added to the repair cost of 2024, as evidenced in the following table:

Table III. Report on rain damages 2023 - 2024 season[75]

No.	Emergencies	2023	2024
01	Rain incidents	1,783	2,427
02	Roads affected	466	841
03	Bridges destroyed	17	08
04	Affected homes	1,382	1,720
05	Schools affected	90	295
06	Dead	65	35
07	Disappeared	13	02

Mitigation and awareness-raising measures for the population in their different languages must be strengthened so that Guatemalans can be prepared and understand the signs and warnings to safeguard their lives in the future.

Fire season:

Another effect of climate change is the droughts that the country suffered in April 2024, as in this month forest fires and agricultural burns exceeded the amount of 4000, double compared to the amount reported in 2023.

[75] Data collected from newsletters CONRED

According to the technical report 'Quantification of areas affected by forest fires and agricultural burnings in Guatemala, 2024' prepared by the Central American Association Centro Humboldt (ACCH)[76], the environmental impact caused by the frequent fires in the national territory not only generates a risk for human beings, but also puts biodiversity at risk for the economy, as they not only increase in quantity but also in intensity, which means that fighting them requires more resources for a longer period of time.

These fires are divided in two, forest fires and burning in agricultural areas, which are estimated to have affected 12.7% of the national territory (equivalent to 13,930 Km^2), the amount of greenhouse gases that these fires release into the atmosphere increase the effects of global warming.

Burning in agricultural areas has been criticised for many years, but Guatemalans continue this practice to clear land for planting, many of them get out of control and become forest fires. The impact of fire on the soil and subsoil affects the rainy season, as the degradation of the soil affects its capacity to absorb rainfall.

The country's efforts should focus on the prevention of air pollution, as it affects the development of national objectives, since the effects of fires promote irreparable damages that end the sustainable development of the country.

The implementation of sanctions, fines and even imprisonment should be necessary to prevent the deterioration of ecosystems. Likewise, mangrove reforestation campaigns should be intensified to collaborate with the reduction of greenhouse gases.

Prevention of pollution:

Oceans and seas not only regulate the global climate, but also provide an essential source of food, employment and recreation for millions of people. In addition, marine ecosystems are home to extraordinary biodiversity.

[76] Asociación Centroamericana Centro Humboldt (ACCH). (2024, 5 May). Alarming increase in forest fires and agricultural burning in Guatemala: an urgent environmental challenge. Retrieved from https://acch-ca.org/2024/05/incremento-alarmante-de-incendios-forestales-y-quemas-agricolas-en-guatemala-un-desafio-ambiental-urgente/

Pollution control measures become more complicated with the increase in population, due to the need for more living space, higher food demand, higher energy consumption, increased land and maritime traffic to supply national and international markets, which creates a latent risk of different types of pollution, the state must continue to combat the causes of pollution from land-based sources as stated in Article 213 of UNCLOS, nipping pollution from land-based sources in the bud (Article 207) must be tackled with awareness campaigns, due to the number of different languages in the country, national procedures must be established which must be translated and socialised throughout the country.

The Maritime Authority must strictly comply with Article 199 of the Pollution Emergency Plans and develop plans that commit the participants to their faithful compliance, especially in cases of high risk such as pollution caused by ships (Article 211, UNCLOS) which can alter the entire marine ecosystem and set back the progress of sustainable development in the marine environment, but in addition to the creation of plans, socialisation is of vital importance to generate a national, regional and international commitment to pollution prevention; preventing pollution of the seas is everyone's responsibility.

Preservation of the marine environment:

Pollution, overfishing and the destruction of marine habitats such as coral reefs and mangroves have devastating and potentially irreversible effects on the world.

The best way to protect the marine environment is to establish preventive and environmental protection measures as set out in article 117 of UNCLOS Duty of States to take measures for the conservation of the living resources of the high seas, which is fundamental to ensure the sustainability of marine resources and the resilience of coastal communities.

The formulation of national plans or policies should be designed following environmental assessments so that these strategies minimise the impact of human development on the marine environment, promoting sustainable and responsible practices. Only through prevention and proper management can we ensure that the oceans continue to be a source of life and livelihood for future generations.

Part XII Protection and Preservation of the Marine Environment of UNCLOS is clear on the obligations of the state in the protection of the marine environment, something that must be

protected in terms of the terms defined in Article 195 Duty not to transfer damage or hazards or transform one type of pollution into another, the lack of experience or the implementation of new techniques should be analysed to avoid complicating pollution containment processes, which is accompanied by Article 196 Use of technologies or introduction of foreign or new species, ecosystems due to the different effects of global warming are vulnerable and a hasty decision may affect more than what is being done.

Ecosystems are sustainable if there is a balanced food chain that allows the control of species and the interaction between predators and prey, for this reason it is necessary to reinforce the measures for the protection of marine mammals (Article 65 of UNCLOS), to preserve this healthy balance it is necessary to carry out the necessary studies for the creation of Marine Protected Areas (MPAs) which according to the information gathered from the studies will allow the conservation of migration areas, reproduction, feeding for the different marine species including marine mammals and endangered species, If these results show a deterioration that means a threat of extinction, it is also necessary to delimit NO-TAKE ZONES to allow a natural recovery of the living resources in the seas of Guatemala.

Establishing these zones does not guarantee that the ecosystems will recover on their own, it is necessary to establish monitoring programmes and periodic evaluations to identify what measures are needed to support this environmental recovery, among which could be reforms to fishing regulations.

These regulations should include the concepts set out in Article 116 for a proper protection of marine species on a regional basis, and on a national basis by establishing the necessary measures to strengthen conservation actions (Article 117, UNCLOS), de esta forma se garantiza que el medio ambiente sea optimo para el soportar el desarrollo de cualquier politica nacional.

Chapter 2: Guatemala, the country of eternal spring, for how long?

Considering that the threat of global warming and its predicted effects on the country, which include rising sea levels, stronger tropical storms, increased sea surface temperature and acidification of waters, are already noticeable on the country's coasts, and year after year affect the quality of life of Guatemalans and coastal marine species, as it complicates the sustainable use and development of the coastal population, strongly affecting the country.

The effort being made in Guatemala to prevent and reduce irreparable damage to its diversity caused by global threats continues to advance at a slow but steady pace, working hand in hand with ratified international conventions and national laws to reduce the effects of the different global threats, in such a way that they are controlled in an efficient manner and avoid an environmental catastrophe that puts national biodiversity at risk, and worse still, the lives of Guatemalans.

To give an example of how Guatemala makes a regional effort, it is part of the Antigua Convention, also known as the Convention for the Cooperation in the Protection and Sustainable Development of the Marine and Coastal Environment of the Northeast Pacific, a regional agreement whose objective is to promote cooperation among the countries of the Northeast Pacific for the protection and sustainable development of their marine and coastal resources.

At the national level, MINDEF developed the Green Book of National Defense, which is aligned with the axis ‘Natural resources today and for the future’, whose general objective is to protect and increase natural resources in order to stabilize social, cultural, economic and territorial development in a balanced manner, so that current needs can be met in a sustainable manner and future generations are not deprived of resources, taking into account the risks of natural phenomena.

Both documents demonstrate the country's commitment to establish a framework for the sustainable use of one of the world's most vulnerable treasures, natural diversity, for the benefit of both present and future generations.

Section A: National framework combating pollution.

Article 194 of UNCLOS is very clear in explaining the measures to prevent, reduce or control pollution of the marine environment, so in this section we will analyse the actions of the Maritime Authority and other public-private institutions that collaborate against pollution for the faithful fulfilment of article 192 of UNCLOS.

The Congress of the Republic of Guatemala in Decree 20-76, Article 5 states that the corresponding organisms will dictate the laws and regulations related to the coast, conservation of species, sea pollution and other relevant activities in the territorial sea, Exclusive Economic Zone, and continental platform. Article 7: states that in conferences related to maritime affairs, a naval officer shall attend as a delegate (in 1976, by custom, the Navy exercised Maritime Authority). Likewise, Article 8 indicates that the Guatemalan Army oversees ensuring respect for the rights of the Republic in the territorial sea and the EEZ.[77]

Guatemala signed the United Nations Convention on the Law of the Sea (UNCLOS) on July 8, 1983. Later, the Congress of the Republic of Guatemala approved the signing through Decree number 56-96 on July 29, 1996, and ratified the Convention on February 11, 1997. It also participates in the UNEP Regional Seas Programme to ensure the implementation and adoption of appropriate and efficient measures to combat pollution from land-based sources that pollute the marine environment.

Regionally the country as a member of the Central American Committee for Maritime Transport (COCATRAM) joins the regional cooperation for the protection of the marine environment and pollution management in the Caribbean and North-East Pacific region.

In addition, the Congress of the Republic has ratified numerous international instruments for the protection and care of coastal maritime zones, safety of navigation and seafarers, which has allowed the formulation and adaptation of international instruments to comply with Article 211 of UNCLOS.

[77] Congress of the Republic of Guatemala (1976) Decree Number 20-76. Law for the Protection and Development of Aquatic Fauna. Available at: https://www.un.org/depts/los/legislationandtreaties/pdffiles/gtm_decreto_20-76.pdf 1.

Table IV. Pollution-related conventions ratified by Guatemala.

No.	Name	Ratified
01	Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter,1972.	Decree 25-75. 5 May 1965.
02	International Convention on Civil Liability for Oil Pollution Damage, 1969 (CLC)	Decree 72-82. 30 August 1982.
03	Protocol Concerning Cooperation in Combating Oil Spills in the Wider Caribbean Region, 1983	Governmental Agreement 32-891. 30 May 1989.
04	Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, 1992.	Decree 3-95. 15 May 1995.
05	International Convention for the Prevention of Pollution from Ships, 1973 and Protocol of 1978 (MARPOL)	Decree 77-96. 10 September 1996.
06	1996 Protocol London Convention	Decree 17-2018. 22 August 2018.
07	Cooperation Agreement for the Protection and Sustainable Development of the Marine and Coastal Areas of the Northeast Pacific, 2002.	Decree 67-20051. 26 October 2005.

In 2014 the National Development Plan was adopted: K'atun, Our Guatemala 2032 is the long-term national development policy that articulates the policies, plans, programs, projects and investments for global development, from a multisectoral approach. where the national long-term development policy that articulates the policies, plans, programs, projects and investments for global development, from a multisectoral approach[78].

[78]Food and Agriculture Organization of the United Nations. (2014). Plan Nacional de Desarrollo K'atun: nuestra Guatemala 2032. https://www.fao.org/faolex/results/details/es/c/LEX-FAOC143736/

Contingency Commission for Spills of Oil, Oil Derivatives and Potentially Hazardous Substances at Sea and in Coastal Marine Regions (CODEMAR)

To comply with Article 199 of UNCLOS, CONRED is responsible for implementing CODEMAR and developing emergency plans against pollution.

An important aspect of CODEMAR is that it directly involves the participation of private entities that have operations that may contaminate or have equipment for containment, thus allowing social interaction between central government and public and private entities. The members of CODEMAR are: MINDEF, MEM, MARN, CIV, CIV, MINEX, MAGA, CONRED, CONAP, National Port Commission.

Local Contingency Committee for Spills of Oil, Oil Derivatives and Potentially Hazardous Substances at Sea and in Coastal Marine Regions (COLDEMAR)

COLDEMAR is the operational part of CODEMAR, as they are developed in each of the country's coastlines, members send their regional delegates to monthly meetings normally held within the Naval Command, where they train, inform, manage training, raise projects or needs that are within the area of responsibility, this interaction allows the participation in support as a technical section, a technical committee and assets where each entity at its level and expertise support for the efficient performance of the response brigade. In these meetings, information on risk situations is provided, incident information is shared, drills, technical courses, practical exercises and coordination work is planned between government institutions, companies involved in hydrocarbon trade, companies that have equipment or participate in maritime environmental protection activities, port companies and local authorities for the development of the national response plan.

National Response Plan

The National System for Disaster Reduction has developed the national plan for response to emergencies and natural disasters, establishing organization, strategies and actions to reduce the impact of the different calamities that affect the country. Its general objective is to coordinate public and private sector actions to reduce the effects generated by

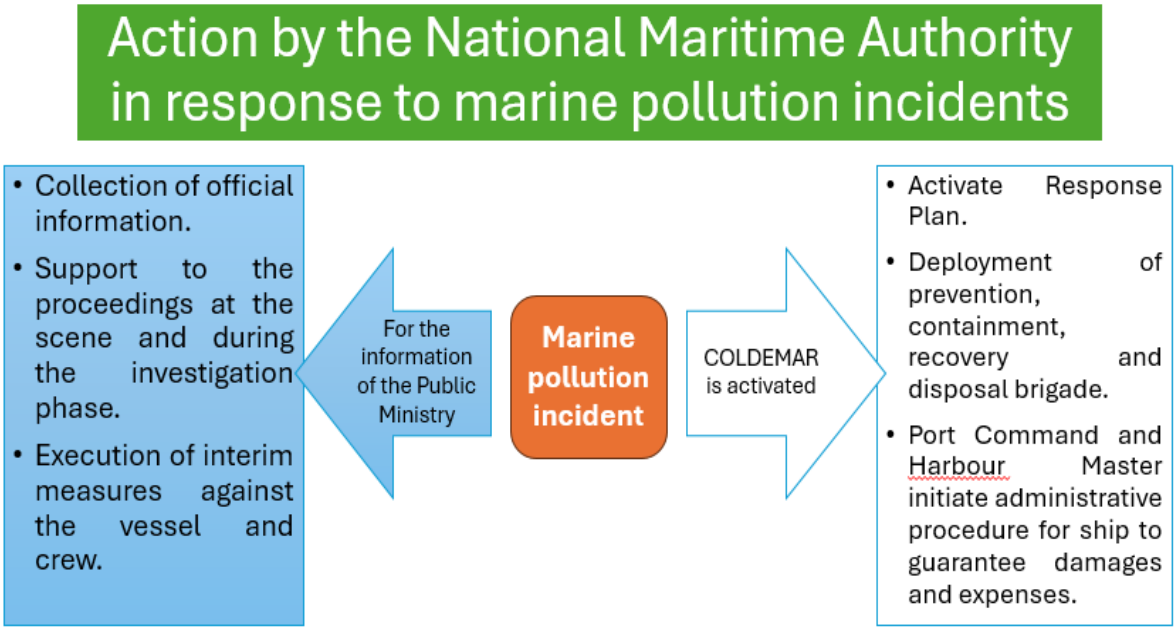
environmental, technological, health or anthropogenic events, contributing to preserve life, protect property and reduce the impact on the Guatemalan population[79].

National Oil and Other Potentially Harmful Substances Spill Plan

CODEMAR and CONRED, based on the National Response Plan, create the National Plan against Oil Spills and Other Potentially Harmful Substances, to be prepared and respond to potential threats of this nature, and the process of action of the national disaster reduction system, with local resources and strategies as required by the emergency.

This Plan establishes a methodology to integrate and support contingency operations to ensure local, national and international cooperation with the objective of minimizing the risks of incidents leading to the depletion of marine life and fishing areas, which are important sensitive areas due to their scenic, ecological, economic and social value.

Figure IV. Action by the National Maritime Authority in response to marine pollution incidents.[80]



[79]FAOLEX. (2022). Guatemalan legislation document. Retrieved from http://faolex.fao.org/docs/pdf/gua219256.pdf.

[80] UN/DOALOS-Norad Programas de asistencia, Lainfiesta-Soto, C. A. de J. y Cifuentes-Velasco, B., Estudio de Gobernanza Oceánica de Guatemala, 2023. consulted on [2024, October 15].

Plastic pollution

On 11 October 2018, Guatemala joined the UN Environment's Clean Seas campaign to efficiently combat and participate in global efforts to prevent plastic pollution in the oceans.

The national fight against plastic waste in the rivers that overflow into the seas has been stopped by means of artisanal nets (bio fences) installed in the rivers, which are made of recovered and arranged plastic waste. These bio-fences have been installed at 87 points within the national territory, helping communities to collect the waste and promote its reuse[81].

On 20 September 2019 Guatemala announces a ban on single-use plastics and expanded polystyrene articles, as an effective measure for solid waste containment, the products banned were single-use plastic bags, straws, plates, cups, mixers or stirrers, containers or food containers.

The ban also includes products made from expanded polystyrene, a material known as duroport, used to package food and other goods[82].

Dredging of rivers

On 23 August 2022, the Congress of the Republic of Guatemala reported on its website on the process of purchasing four dredgers and work equipment in the Chiquimulilla canal[83]. These dredgers are the responsibility of the Ministry of Communications, Infrastructure and Housing, but they are operated by MINDEF personnel, which is part of the operations of the National Maritime Authority, which dredges access channels, river mouths, with these actions have improved water quality, allowing easy navigation in these areas and prevents the accumulation of solid waste causing floods that damage crops and affect the country's

[81] United Nations Environment Programme (UNEP). (2018). Guatemala joins UN Clean Seas campaign. Retrieved from https://www.unep.org/es/noticias-y-reportajes/comunicado-de-prensa/guatemala-se-une-la-campana-mares-limpios-de-la-onu-e?form=MG0AV3

[82] El Comercio (2019). Guatemala announces ban on plastics to curb pollution. Retrieved from https://www.elcomercio.com/tendencias/ambiente/guatemala-prohibicion-plasticos-freno-contaminacion.html?form=MG0AV3

[83] Congress of the Republic of Guatemala (2022, March). Purchase of machinery for dredging is audited. https://www.congreso.gob.gt/noticias_congreso/8965/2022/3?form=MG0AV3

economy[84], especially the access of salt water to the estuaries, indispensable for the growth of mangroves, which are home to different species of marine animals, land animals and birds, has been improved.

Participation of the Population

As presented in the first part of this research, the population of Guatemala is the most valuable resource of the country and it is for this reason that the government makes its best effort to protect its citizens from all possible risks, although for many years they have been responsible for pollution, the conservation culture of Guatemalans has been changing, and understanding that change is everyone's responsibility, this can be seen in the article "Contamination in the seas and actions of CONAP"[85] , which addresses the problems of pollution in the oceans and the measures CONAP is taking to combat this problem.

In a joint effort with non-governmental organizations, local government, volunteers and mainly the inhabitants of the coasts, under the coordination of CONAP, activities are carried out such as clean-up days on the beaches of the two coasts, as well as training in the installation of bio-fences in rivers to trap waste and prevent it from reaching the sea.

For greater social involvement, CONAP, with the participation of non-governmental entities, carries out environmental education talks to raise awareness among the population about the importance of reducing the use of plastics and the proper way to manage waste.

This article also states that the pollution of the seas by solid waste not only affects marine life, the coastal marine environment and especially human health, but also confirms that large amounts of organic and inorganic waste are dumped into the oceans daily, but with these actions a culture of protection of the marine environment is created, which is believed to be the best way to ensure a sustainable future so that Guatemala will always be the country of eternal spring

[84] Archivo General de Centroamérica (6 August 2023). More than 500,000 cubic metres dredged in several rivers in the country. Retrieved from https://agn.gt/mas-de-500-mil-metros-cubicos-dragados-en-varios-rios-del-pais/

[85] National Council of Protected Areas (CONAP). (2022). Pollution in the seas and CONAP's actions. Retrieved from https://conap.gob.gt/contaminacion-en-los-mares-y-acciones-del-conap/?form=MG0AV3

Section B: National commitment to sustainable development, appropriate measures and legal support to protect marine biodiversity.

The Guatemalan Army is the institution destined to maintain the independence, sovereignty and integrity of the territory[86]. MINDEF has formulated different policies to fulfil its obligations under Article 37 of the Executive Branch Law [87], For this purpose, MINDEF delegates to the National Defense Navy as Maritime Authority, enforcing the legal regime relating to the defense of the sovereignty and integrity of the national territory.

Preservation of the environment and the protection of natural resources are a priority for MINDEF. To this end, the Guatemalan Army has defined actions in accordance with its capabilities and functions related to the conservation and protection of the environment based on current environmental regulations. To safeguard the natural and cultural heritage, contribute to reduce environmental risks and threats, the Guatemalan Army complies with strategic guidelines established in four areas of action, as follows[88]:

Figure V. Strategic guidelines of the MINDEF related to conservation.

1. Protection of Areas of Strategic Value: strategic value areas are spaces or areas (land, air and sea), where natural and/or material elements are found that are important for the economy, health and culture, but especially spaces for sustainable development. To protect these areas

[86] Political Constitution of the Republic of Guatemala. (1993). Art. 244. Guatemala.

[87] Secretaría de Planificación y Programación de la Presidencia. (2015). *Ley del organismo ejecutivo*. Retrieved from https://segeplan.gob.gt/downloads/2015/SPOT/Mandatos_y_Normativas/Mandatos/Ley_organismo_ejecutivo.pdf

[88] Ministry of National Defence of Guatemala (2022). Libro Verde de la Defensa (p. 52). Editorial Guatemalteca.

of strategic value, the Air, Sea and Land units of the Guatemalan Army carry out land and water reconnaissance patrols, reconnaissance flights, fire mitigation, reforestation programmes, medical campaigns, vaccination campaigns, and military civic activities.

2. Integrated Environmental Risk Management: In compliance with Article 249 of the Political Constitution of the Republic, the Guatemalan Army, in support of the populations affected by different natural and anthropogenic phenomena, makes use of its capabilities, equipment and personnel to develop search and rescue operations, flood evacuations, forest fire suppression, recovery and reconstruction of the road network. These operations are carried out in support of CONRED, it is necessary to mention that the Army is the executing arm of most of the actions, especially those of rescue, transfer of emergency patients by air, sea or land, support to reconstruction processes of state structures (bridges, hospitals, schools), nowadays the Army is the executing arm of most of the actions, Nowadays, due to the effects of climate change, forest fires are more intense and longer, and the effects of hurricane seasons are increasingly worse, so military personnel are always in constant action to protect the lives of the people and their material goods.
3. Conservation of the environment and natural resources: MINDEF is an important member in the conservation of the environment and natural resources. In order to work efficiently, conservation is divided into two main areas: Environmental Management, in which the following actions are carried out: environmental sanitation, solid waste management, control of oil spills from ships, and Biodiversity Conservation: This is carried out through programmes for the protection of sea turtles, whales and dolphins, hydrobiological species and regulations related to sailfish, as well as mangrove reforestation campaigns (there are also programmes for the reforestation of protected areas with schools and volunteers, programmes for the conservation of land mammals.
4. Inter-institutional Cooperation: The Guatemalan Army carries out different actions in coordination and cooperation with the following institutions: Directorate for Nature Conservation (DIPRONA), CONAP, National Forest Institute (INAB), Foundation for Ecodevelopment and Conservation (FUNDAECO), MAGA, Foundation for the Conservation of the Environment and Natural Resources Mario Dary Rivera (FUNDARY), to name a few, each of these different institutions are supported by troops or surface units (vessels, boats) The army's military personnel are often used to carry out their duties, as the

areas where they carry out their supervisory activities are often high-risk areas or are used by anti-social groups that engage in illegal acts.

Biodiversity conservation under MINDEF

The Navy of the National Defense as Maritime Authority in support of conservation activities deploys its units in the face of any calamity to safeguard the lives of Guatemalans and to safeguard ecosystems and endangered species.

The objective consists of the use of military units to rescue, conserve and protect endangered species of fauna in coordination or alliance with governmental and non-governmental institutions to guarantee the recovery and preservation of the population of endangered species in the short and long term.

Sea Turtles: As part of MINDEF's commitment to the protection of endangered species and the conservation of the marine environment, the elements of the Guatemalan Army, in addition to their duties, help rescue, conserve and protect the population of the six different types of sea turtles that inhabit the country's waters.

The Navy of the National Defense has set up the Sea Turtle Rescue Centre and turtle sanctuaries within the facilities of the Pacific Naval Command, they are cultivating, protecting and conserving eggs of Olive Ridley and Parlama turtles.

The Sea Turtle Rescue Centre collects the eggs that turtles lay in the months of June to November, this collection is done within the beach of the Pacific Naval Command (area prohibited for the use of the civilian population), as well as inspections of vehicles, motorbikes, boats, in search of these eggs, They are then transferred to the incubation area where they are protected from humans and predators until they hatch, and then turtle release days are held, together with children from different educational centers, civilian and military personnel, with the intention of raising awareness and promoting the conservation of sea turtles.

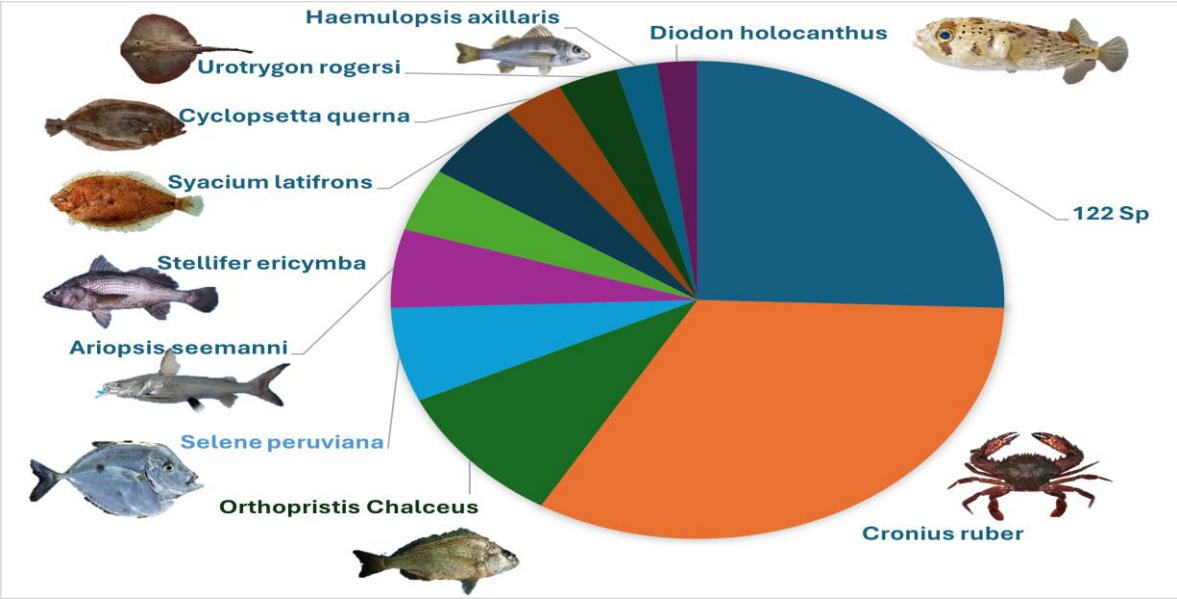
The species to be protected are the following: Parlama (Lepidochelys Olivacea), Baule (Dermochelys coriacea), Green (Chelonia Mydas), Hawksbill (Eretmochelys imbricata), Cabezona (Caretta caretta), Black or Pacific Green (Chelonia mydas agassizzi).

Whales and Dolphins: In coordination with governmental and non-governmental institutions, operations are carried out for the conservation, protection and monitoring of whales during their migration along the coasts of the Pacific Ocean, as well as monitoring and control of the dolphin population, the main focus of these operations is on the commercial fishing sector, to prevent cetaceans from being trapped in fishing nets, as well as companies dedicated to the manufacture of chemical components such as fertilizers and chemicals, as these pollutants can accumulate in the whales' bodies through the ingestion of fish that have had contact with toxins, causing possible illnesses[89].

On the coasts of the Pacific, you can find the following species Humpback whales (during their migration), bryde's whales, spotted dolphins and bottlenose dolphins.

Conservation of hydro-biological species: The navy's efforts in the protection of hydrobiological resources are of vital importance for the conservation of marine biodiversity. Control patrols and monitoring are carried out to prevent overexploitation and pollution of the marine environment, ensuring that the hydrobiological resources maintain a healthy population to be used as a source of food and sustainable employment.

Figure VI. Hydrobiological Species of Guatemala



[89] Marine Life (2023). Death nets: The impact of indiscriminate fishing on cetaceans. Retrieved from https://vidamarina.net/vida-marina/redes-muerte-impacto-pesca-indiscriminada-cetaceos/

Mangrove reforestation campaigns: In coastal regions, mangrove forests, together with other plant species, support the interaction of complex ecosystems and diverse animal species. Mangroves have the remarkable capacity to store six to eight times more carbon than terrestrial forests, thus contributing significantly to climate change mitigation. They are also of biological importance because they function as nurseries and protection for species such as mollusks and crustaceans, home to various types of birds, and refuge for reptiles and amphibians[90].

Regulations related to sailfish: one of the largest concentrations of Sailfish, belonging to the Istiophorusuno[91] species, is found off the Pacific coast of Guatemala, Sailfish is one of the fastest fish in the sea, reaching speeds of up to 110 km/h. It is so named because of its dorsal fin, (which is called a sail) and its snout, which narrows at the front and ends in a very sharp point.

This natural environment is created by the collision of the eastward flow from Mexico and the westward flow from El Salvador, creating a natural current rich in bait and pelagic fish. for this reason the country has become a destination for Sailfish fishing competition the Coast of the pacific, one of the most outstanding fishing championships is the National Sailfish Release Championship[92], Several measures have been implemented to protect the sailfish, In 2014, the National Commission for the Protection of Sailfish was created, as this species is reserved exclusively for sport and recreational fishing, and its commercialization is prohibited by law. To fish, a special hook (Circle Hook) is used, which reduces damage to the fish and dissolves in a few days if the line breaks.

The National Commission for the Protection of Sailfish also works to ensure the conservation of this species through law enforcement and the promotion of sustainable practices.

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[90] Ministry of Environment and Natural Resources (MARN) (2023). Mangroves: Essential ecosystems and barriers that contribute to face climate change. Retrieved from https://www.marn.gob.gt/manglares-ecosistemas-esenciales-y-barreras-que-aportan-a-enfrentar-el-cambio-climatico/?form=MG0AV3

[91] Animalia. (2023). Istiophorus. Retrieved from https://animalia.bio/istiophorus

[92] Autonomous Sports Confederation of Guatemala. (2020). Guatemala, world class destination for sailfish fishing and release. Retrieved from https://cdag.com.gt/2020/08/18/guatemala-destino-de-clase-mundial-para-la-pesca-y-liberacion-del-pez-vela/

CONCLUSION

A strengthened Maritime Authority generates a sustainable development of the sea, it must be recognised that covering all the different situations that affect the sea is very difficult and requires a lot of budgets, although progress is slow, it should not stop. In order to answer the questions posed in this research, the following responses have been identified:

1. **What are the problems faced by the National Maritime Authority in strengthening its capacities to protect Guatemala's maritime biodiversity?**

   Problems:

   A. **There are many state agencies and bodies with responsibilities in environmental protection and conservation**, each working independently and often with little inter-institutional relationship, which complicates the control or administration of projects as each institution must present the progress made during the year to justify the expenditure of the allocated budget.

   B. **Inadequate legal framework,** too many laws related to environmental conservation have been passed in the country, involving too many stakeholders, so that each state entity does its best to fulfil its protection responsibilities, and sometimes these responsibilities are duplicated. In addition to the number of laws dating back many years, the number is very large and it is difficult to compile and prioritise them.

   C. **Mismanagement of budget and resources,** The inadequate use of conservation funds affects the continuity of conservation programmes, as resources are not used to develop conservation activities, but rather to subcontract to another company or person at a higher cost than the market. This increases the time spent working on the same project, impeding the progress of programmes, and even worse the implementation of new sustainable initiatives, as it delays their execution, putting at risk the cancellation of projects that can generate important changes.

   D. **Lack of transparency and oversight,** The weak or non-existent supervision of the management of resources allows the few resources destined for conservation to continue to be misused.

2. **How does the National Maritime Authority respond to various threats caused by land-based pollution, marine-based pollution and/or oil spills?**

A. **Pollution from land-based sources:**

The current situation related to this type of pollution exceeds the capacities of the country, the efforts made by the different Ministries have not been sufficient.

Local measures in coastal areas and in towns bordering rivers are very weak in the application of sanctions and awareness of the correct way to handle solid waste. Furthermore, the lack of political interest in combating and correcting this problem is an issue that needs further cultural and scientific analysis and research.

B. Pollution of maritime origin:

In both oceans pollution in the seas is a fact that refers many resources, this lack of resources has complicated the containment management and cleaning of national seas, the marine of the Maritime Authority has worked in coordination and support to other institutions the combat of this type of pollution, but the pollution emergency increases significantly with the increase of the effects of climate change.

It is necessary that the Central Government designate the necessary funds for the acquisition of the necessary equipment, as was done recently with the acquisition of marine dredgers which have improved the quality of life of Guatemalans and the cleaning of areas of strategic value. Likewise, to provide technical training so that the elements of the Maritime Authority comply with international standards for the performance of their functions in the conservation of the marine environment.

C. Oil pollution:

CODEMAR has been of vital importance to the country, as it is the way to demonstrate that the public-private sector relationship helps to activate timely response programmes for spills caused by oil or potentially hazardous substances.

More than strengthening CODEMAR's capacities, it is necessary to start complying with the provisions of the International Convention on Oil Pollution Preparedness, Response and Cooperation (OPRC), at the regional level Guatemala must have the capacity, training and resources necessary to protect national seas and support the emergencies of neighbouring countries.

3. **How can the Guatemalan Maritime Authority protect the maritime environments and species within its jurisdiction to prevent the effects of global threats in the maritime domain?**

Restructuring of the Legal Framework, It is necessary to organise and restructure all the laws, governmental agreements and national policies in order to modify, adapt or eliminate documents that do not generate prevention measures or that complicate the functions of the different bodies involved.

Restructure the financial system, manage an economic readjustment with a due process of research and analysis considering all the necessary factors since talking about resources is a delicate subject.

the effectiveness of the results presented by each entity involved in marine conservation or living resource protection projects should be identified, and more resources should be redirected to those that show significant progress.

The effectiveness analysis can be used to encourage the continuity and/or expansion of work areas, and to establish the necessary mechanisms for monitoring and transparency.

This effectiveness analysis can be achieved by involving the civilian population and local government through consultations with the beneficiaries of these projects to rate the effectiveness of conservation and pollution control programs.

Acquiring the necessary personnel, equipment and technical training

The National Maritime Authority needs more personnel to be able to carry out the functions entrusted to it, as well as to receive national and international training. The National Maritime Authority needs to be allocated the necessary financial resources for the acquisition of specific equipment for the containment of pollution and the development of scientific activities, such as ships, measuring and exploration equipment, for the creation of scientific research units, environmental conservation patrols and the fight against hydrocarbon pollution, on both coasts of the country.

Acquisition of funds for conservation:

The Maritime Authority can design a proposal to the Guatemalan Government so that with conservation projects at the national level a specific fund for the conservation of marine

biodiversity is managed, which will be used for scientific research activities to increase protection, including the regional experience of the population for the best use of the resources.

Promote MPAs:

The results of this scientific research could be used to measure and carry out an MPA, currently it is estimated that a little more than 32% of Guatemala's territory is designated as protected areas, these areas include national parks, biological reserves, natural and cultural monuments, currently there are no MPAs which would be of great help for the protection of marine mammals, sailfish, turtles, corals and the entire coastal marine environment of the country.

These MPAs can also be added to the zones established by neighbouring countries such as the Mexican Pacific Deep Sea MPA, which borders the international political boundary of Guatemala, in which Mexico preserves deep sea marine environments, with the objective of protecting hydrothermal vents, abyssal plains, ridges, seamounts, canyons and possible animals that inhabit these areas for which little information is available.

The study for the delimitation of these areas will allow the creation of new conservation law initiatives, if the results of these scientific investigations demonstrate the existence of areas of vital conservation importance to start with the process of delimiting NO-TAKE zones, to ensure the healthy population of endangered species or species of scientific interest.

Protection of marine species:

In relation to fishery resources the information available on the sustainable use of fish stocks is very little, furthermore the damage caused by pollution of rivers, diversion of river water for agricultural use, and misuse of beaches complicate the conservation of healthy fish stocks.

The Maritime Authority can promote scientific studies in conjunction with the Ministry of Agriculture, Livestock and Food, local universities, and international organisations that focus on identifying the national situation of the national species, identifying the areas where the fish are born and formulating initiatives for the creation of MPAs.

Marine mammals and endangered species:

The Marine Authority should reinforce inspections and control of national and international persons using the country's waters for sightings of marine mammals, sea turtles, sailfish or any other endangered species, this can be done by periodically sending a naval delegate on board

the vessels to supervise the activities carried out by the persons. Also create a national guide to establish measures and implement sanctions if the situation warrants it.

Social awareness programmes in all national languages, using all available media:

For Guatemala promoting the sustainable use of rivers and seas promotes improvements to the economy, food and provides job opportunities for Guatemalans, this will be achieved by investing resources in social campaigns so that pollution does not spill into the oceans, this can be achieved through face to face campaigns, digital campaigns in all social networks, radio and television campaigns, to involve all Guatemalans, the Academy of Mayan Languages of Guatemala will translate the information into national languages so that everyone can join in the fight against pollution caused by chemicals, plastics, hydrocarbons or solid waste in general.

Accompanied by an efficient social awareness campaign, solid waste management areas should be established at the municipal level throughout the national territory by local authorities, which should take responsibility for being part of the solution and for managing with the central government the necessary resources for efficient waste management.

Creation of a sustainable use project:

It is necessary that conservation becomes a sustainable circle that generates economic resources that allow conservation areas to give the economic resources for the involvement of the Guatemalan population, to create protected, clean and sustainable communities and environments.

In conclusion, the strengthening of the National Maritime Authority must be progressive, orderly and efficient in all possible areas to ensure the sustainable development of its oceans and the protection of the marine environment.

This institutional strengthening is achieved through the implementation of effective policies, with the active participation of the bodies involved and a strong environmental culture campaign, together they guarantee that marine resources are used in a sustainable manner and are within the reach of all Guatemalans and preserved for future generations.

BIBLIOGRAPHY

Books

Barrios, L. (2016). El rostro y el ser de los cuatro pueblos de Guatemala: Elementos para la interculturalidad (2nd ed.).

Ministry of Culture and Sports, General Directorate of Cultural Development and Strengthening of Cultures.

FHCG. Historical Biographical Dictionary of Guatemala

Available at: https://www.fundacionhcg.org/libros/dhbg/

Gall, F. (1976). Geographical Dictionary of Guatemala. Volume I (2nd ed.).

National Geographic Institute.

Ministry of National Defence of Guatemala. (2022). Libro Verde de la Defensa

Editorial Guatemalteca.

Political Constitution of the Republic of Guatemala. (1993)

News

Aimer, T. (2016). Fish in Washington test positive for cocaine, Xanax, and a cocktail of 79 other drugs. The Inertia.

Available at: https://www.theinertia.com/environment/fish-in-washington-test-positive-for-cocaine-xanax-and-cocktail-of-79-other-drugs/

Archivo General de Centroamérica. (2023, August 6). More than 500,000 cubic metres dredged in several rivers in the country.

Available at: https://agn.gt/mas-de-500-mil-metros-cubicos-dragados-en-varios-rios-del-pais/

Asociación Centroamericana Centro Humboldt (ACCH). (2024, May 5). Alarming increase in forest fires and agricultural burning in Guatemala: an urgent environmental challenge.

Available at: https://acch-ca.org/2024/05/incremento-alarmante-de-incendios-forestales-y-quemas-agricolas-en-guatemala-un-desafio-ambiental-urgente/

BBC News World. (2022, October 28). Guatemala's Lake Amatitlan: Fighting pollution and algae blooms. BBC.

Available at: https://www.bbc.com/mundo/noticias-internacional-63420685

BBC World. (2017). How Guatemala's garbage dump became a source of wealth for a few.

Available at: https://www.bbc.com/mundo/noticias-41811097

Congress of the Republic of Guatemala. (1976). Decree Number 20-76. Law for the Protection and Development of Aquatic Fauna.
Available at: https://www.un.org/depts/los/legislationandtreaties/pdffiles/gtm_decreto_20-76.pdf
Congress of the Republic of Guatemala. (2022, March). Purchase of machinery for dredging is audited.
Available at: https://www.congreso.gob.gt/noticias_congreso/8965/2022/3?form=MG0AV3
El Comercio. (2019). Guatemala announces ban on plastics to curb pollution.
Available at: https://www.elcomercio.com/tendencias/ambiente/guatemala-prohibicion-plasticos-freno-contaminacion.html
El Mundo. (2024, November 8). Four arrested 280 miles from Cádiz after sinking the 'narco-submarine' in which they were travelling when it was intercepted by a Customs Surveillance boat.
Available at: https://www.elmundo.es/espana/2024/11/08/cuatro-detenidos-narcosubmarino-cadiz.htm
Emisoras Unidas. (2020, October 27). Guatemala: MP investigates oil spill in Santo Tomás de Castilla.
Available at: https://emisorasunidas.com/2020/10/27/guatemala-mp-derrame-aceite/
Escobar, J. (2023, December 22). After boat fire, two dead and several rescued.
Available at: https://lahora.gt/nacionales/jescobar/2023/12/22/tras-incendio-de-embarcacion-fallecen-dos-y-varios-rescatados/
Ministry of National Défense. (2024, September 18). Officially delivers maritime policy.
Available at: https://prensa.gob.gt/comunicado/ministerio-de-la-defensa-nacional-entrega-de-manera-oficial-la-politica-maritima
Ortega, J. C. (2023, November 18). More than Q90 million in cocaine: Authorities give details of drug seizure on Guatemala's Pacific Coast.
Available at: https://www.prensalibre.com/guatemala/comunitario/mas-de-q90-millones-en-cocaina-autoridades-dan-detalles-del-decomiso-de-droga-en-las-costas-del-pacifico-de-guatemala-breaking/

Prensa Libre. (2023). Autopista Palín-Escuintla: chronology of 40 days after collapse and plans to recover the section.
Available at: https://www.prensalibre.com/guatemala/comunitario/autopista-palin-escuintla-cronologia-de-40-dias-tras-hundimiento-y-planes-para-recuperar-el-tramo/
Prensa Libre. (2017, January 21). Mexico breaks off diplomatic relations with Guatemala in 1959.
Available at: https://www.prensalibre.com/hemeroteca/operacion-drake-entre-guatemala-y-mexico-en-1959/
Prensa Libre (2024, November 30). Temperatures in Guatemala: What has been the coldest day in the last 30 years according to Insivumeh?
Available at: https://www.prensalibre.com/guatemala/comunitario/temperaturas-en-guatemala-cual-ha-sido-el-dia-mas-frio-en-los-ultimos-30-anos-segun-el-insivumeh/
Prensa Libre. (2024, September 12). Conap denounces attempted invasion in Laguna Lachuá National Park.
Available at: https://www.prensalibre.com/guatemala/comunitario/conap-denuncia-intento-de-invasion-en-parque-nacional-laguna-lachua-breaking/
Publinews. (2024, November 7). Rainy season in 2024 caused more emergencies than last year.
Available at: https://www.publinews.gt/noticias/2024/11/07/temporada-lluviosa-en-2024-provoco-mas-emergencias-que-el-ano-pasado/
ReliefWeb. (2023, August 30). Emergency in Guatemala: Volcán de Fuego aftermath. ReliefWeb.
Available at: https://reliefweb.int/report/guatemala/emergency-guatemala-volc-n-de-fuego-aftermath
Republic. (2024). What is known about the abandoned ship in the bay of Amatique and why is it causing concern?
Available at: https://republica.gt/guatemala/que-se-sabe-del-barco-abandonado-en-la-bahia-de-amatique-y-por-que-causa-preocupacion--2024151810?form=MG0AV3
Rojas, A. F. (2021, June 23). This is the project to stop pollution in Manchón Guamuchal.
Available at: https://www.prensalibre.com/ciudades/retalhuleu/proyecto-para-detener-la-contaminacion-en-el-manchon-guamuchal/

Science. (2023). Coke sharks found in Brazilian waters.
Available at: https://www.science.org/content/article/cocaine-sharks-found-waters-brazil
TV Azteca Guatemala. (2023). Generation of solid waste in the country reaches 3 million tons per year.
Available at: https://tvaztecaguate.com/nacionales/2024/09/13/generacion-de-desechos-solidos-en-el-pais-alcanza-los-3-millones-de-toneladas-al-ano/?form=MG0AV3

Websites

Animalia. (2023). Istiophorus.
Available at: https://animalia.bio/istiophorus
Autonomous Sports Confederation of Guatemala. (2020). Guatemala, world class destination for sailfish fishing and release.
Available at: https://cdag.com.gt/2020/08/18/guatemala-destino-de-clase-mundial-para-la-pesca-y-liberacion-del-pez-vela/
Comisión Centroamericana de Ambiente y Desarrollo (CCAD). (n.d.).
Available at: https://cambioclimatico-regatta.org/index.php/es/instituciones-clave/item/comision-centroamericana-de-ambiente-y-desarrollo-ccad
Central America. (n.d.). Why is Central America an isthmus? América Central.
Available at: https://www.americacentral.info/por-que-centroamerica-es-un-istmo
Central American Integration System (SICA). (n.d.). Executive summary: Regional strategy for blue growth in SICA countries.
Available at: https://www.sica.int/documentos/resumen-ejecutivo-estrategia-regional-para-el-crecimiento-azul-en-los-paises-del-sica_1_126696.html
Centro Virtual Cervantes. (n.d.). Historia y tradición: Antigua Guatemala. Centro Virtual Cervantes.
Available at:
https://cvc.cervantes.es/artes/ciudades_patrimonio/antigua/historia_tradicion/historia_02.htm#:~:text=Todo%20empez%C3%B3%20durante%20la%20madrugada,ahog%C3%B3%20a%20su%20infeliz%20gobernante

Consejo Nacional de Áreas Protegidas. (2022, December). Lista de Especies Amenazadas en Guatemala (LEA).
Available at: https://conap.gob.gt/wp-content/uploads/2022/12/Lista-de-Especies-Amenazadas-en-Guatemala-LEA-2.pdf
Council of Mayors of 48 Cantons of Totonicapán. (n.d.). Who are we? 48 Cantones.
Available at: https://48cantones.org/quienes-somos/
Coordinadora Nacional para la Reducción de Desastres (CONRED)
Available at: https://conred.gob.gt/
Encyclopedia Britannica. (n.d.). Guatemala.
Available at: https://www.britannica.com/place/Guatemala/
Food and Agriculture Organization of the United Nations (FAO). (1989). Decree 4-89: Protected Areas Law.
Available at: https://www.fao.org/faolex/results/details/es/c/LEX-FAOC060538/#:~:text=El%20presente%20Decreto%20aprueba%20la,sostenida%20de%20las%20especies%20y
Food and Agriculture Organization of the United Nations. (2014). Plan Nacional de Desarrollo K'atun: nuestra Guatemala 2032.
Available at: https://www.fao.org/faolex/results/details/es/c/LEX-FAOC143736/
Guatemala. (2021). National Low Emissions Development Strategy. United Nations Framework Convention on Climate Change (UNFCCC).
Available at: https://unfccc.int/documents/281183
Historia sin Fronteras. (n.d.). Projects: Motagua River.
Available at: https://historiassinfronteras.com/proyectos/rio-motagua/index.html
Instituto Nacional de Estadística. (2024, August 21). El INE presenta cifras de pobreza en Guatemala. Instituto Nacional de Estadística.
Available at: https://www.ine.gob.gt/2024/08/21/el-ine-presenta-cifras-de-pobreza-en-guatemala/
Instituto Nacional de Estadística. (2024, March 7). El INE presenta indicadores de prevalencia de violencia contra las mujeres en Guatemala. Instituto Nacional de Estadística.
Available at: https://www.ine.gob.gt/2024/03/07/el-ine-presenta-indicadores-de-prevalencia-de-violencia-contra-las-mujeres-en-guatemala/

Instituto nacional de sismología, vulcanología, meteorología e hidrología (INSIVUMEH) Available at: https://insivumeh.gob.gt/

International Union for Conservation of Nature. (2016). Emergencia en el río La Pasión. Available at: https://iucn.org/sites/default/files/content/documents/2016/emegencia_rio_la_pasion_2016.pdf

Marine Life. (2023). Death nets: The impact of indiscriminate fishing on cetaceans. Retrieved from https://vidamarina.net/vida-marina/redes-muerte-impacto-pesca-indiscriminada-cetaceos/

Ministry of Environment and Natural Resources. (2009). Política para el Manejo Integral de las Zonas Marino Costeras de Guatemala. Available at: https://leap.unep.org/en/countries/gt/national-legislation/pol-tica-para-el-manejo-integral-de-las-zonas-marino-costeras-de

Ministry of Environment and Natural Resources (MARN). (2023). Mangroves: Essential ecosystems and barriers that contribute to face climate change. Available at: https://www.marn.gob.gt/manglares-ecosistemas-esenciales-y-barreras-que-aportan-a-enfrentar-el-cambio-climatico/?form=MG0AV3

Ministry of Environment and Natural Resources (MARN). (2023). MARN presents strategy to reduce greenhouse gas emissions and contribute to global goals. Available at: https://www.marn.gob.gt/marn-presenta-estrategia-para-reducir-la-emision-de-gases-de-efecto-invernadero-y-contribuir-con-las-metas-globales/

Ministry of National Defense of Guatemala. (n.d.). Segundo Comando Naval del Pacífico. Available at: https://www.mindef.mil.gt/Organizacion/3fuerzas_aire_mar_tierra/fuerza_mar/2comando_navalpacific/2comando_navalpacific.html

Ministry of National Defense of Guatemala. (n.d.). Tercer Comando Naval del Caribe. Available at: https://www.mindef.mil.gt/Organizacion/3fuerzas_aire_mar_tierra/fuerza_mar/3comando_navalcaribe/3comando_navalcaribe_vision.html

National Council of Protected Areas (CONAP). (2022). Pollution in the seas and CONAP's actions. Available at: https://conap.gob.gt/contaminacion-en-los-mares-y-acciones-del-conap/?form=MG0AV3

National Institute of Statistics (INE). (2018). XII National Population Census and VII Housing Census 2017-2018
Available at: https://censo2018.ine.gob.gt/censo2018/poblacion.php?form=MG0AV3
National Response Plan. (2022). Guatemalan legislation document. Faolex.
Available at: http://faolex.fao.org/docs/pdf/gua219256.pdf
Secretariat of Planning and Programming of the Presidency (SEGEPLAN). (2014). Plan Nacional de Desarrollo K'atun: Nuestra Guatemala 2032 Resumen Ejecutivo.
Available at: https://www.transparencia.gob.gt/wp-content/uploads/2017/07/KATUN-2014-004.pdf
Secretariat for Planning and Programming of the Presidency. (2015). Ley del organismo ejecutivo.
Available at: https://segeplan.gob.gt/downloads/2015/SPOT/Mandatos_y_Normativas/Mandatos/Ley_organismo_ejecutivo.pdf
Sistema de la Integración Centroamericana (SICA).
Available at: https://www.sica.int/sica/vista.aspx
United Nations Conference on Trade and Development. (2023). Review of Maritime Transport 2023.
Available at: https://unctad.org/publication/review-maritime-transport-2023
United Nations Development Programme. (n.d.). Guatemala y Honduras trabajan en la protección de la cuenca del río Motagua.
Available at: https://www.undp.org/es/honduras/noticias/guatemala-y-honduras-trabajan-en-la-proteccion-de-la-cuenca-del-rio-motagua
United Nations Environment Programme (UNEP). (2018). Guatemala joins UN Clean Seas campaign.
Available at: https://www.unep.org/es/noticias-y-reportajes/comunicado-de-prensa/guatemala-se-une-la-campana-mares-limpios-de-la-onu-e?form=MG0AV3

Academic Articles

González, J. (2022). Contamination in the Pacific slope of Guatemala. Science, Technology and Health.
Available at: https://revistas.usac.edu.gt/index.php/cytes/article/download/904/855

Gonzalez, L. (2022, February 11). ¿Qué causó la contaminación en el lago de Izabal en 2017? República.
Available at: https://republica.gt/guatemala/que-causo-la-contaminacion-en-el-lago-de-izabal-en-2017–202221118220
UNICEF. (2019). Case study: Guatemala Volcán de Fuego 2018 - participatory production and strengthening local capacity for accountability to affected populations.
Available at: https://www.preventionweb.net/publication/case-study-guatemala-fuego-volcano-2018-participatory-production-and-strengthening
UNICEF. (2024). What you need to know about the 2024 hurricane season. UNICEF Latin America and the Caribbean.
Available at: https://www.unicef.org/lac/emergencias/temporada-huracanes-2024
UN/DOALOS-Norad Programas de asistencia, Lainfiesta-Soto, C. A. de J., & Cifuentes-Velasco, B. (2023). Estudio de Gobernanza Oceánica de Guatemala.

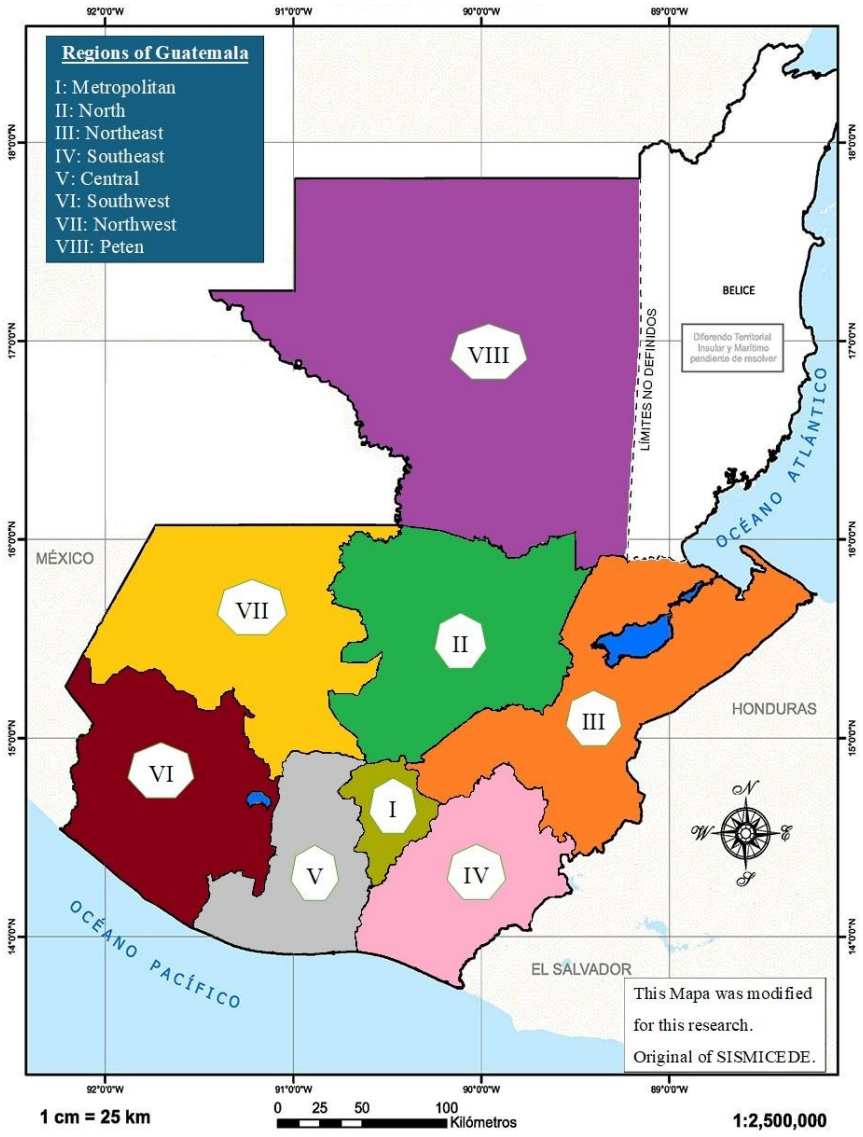
APPENDIX - SUPLEMENTARY FIGURES

Figure I. Biomes of Guatemala

Guatemala in its diversity of flora and fauna is divided into seven (07) biomes in the natural inventory of the country, the map shows the areas occupied by each biome, a small photograph for reference of the biome in question. Each biome is differentiated by its specific climatic and geographic conditions, which allows the biodiversity to be different and specific to each biome. More information visit: https://conap.gob.gt/

Reference: Footnote No. 4 Pp. 6

Figure II. Regions of Guatemala



Decree number 70-86 of the Congress of the Republic of Guatemala, Preliminary Law of Regionalization, the objective of which is to decentralize public administration and promote urban and rural development in the country, according to the needs of the population.

All the information on how the regions work with the Central Government for economic and social development is available at: https://inap.gob.gt/web/wp-content/uploads/2021/11/Dcto-70-86-Ley-Prel-Regionalizacion.pdf.

Reference: Footnote No. 5 Pp. 6