A Comprehensive Approach to Effective Coastal Environmental Management for Todos Santos, Baja California Sur, Mexico

by

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Abstract

This paper explores key aspects of enhancing local coastal management in Todos Santos, Baja California Sur, Mexico. I begin with an examination of the current state of the local coastal environment that encompasses its strengths and opportunities. The study also investigates the primary threats to the local coastal environment. Additionally, the research suggests a number of policy measures and improvements to address these challenges that could ensure effective management of the coastal environment. I employ secondary information sources, together with a household survey and semi-structured and informal interviews, to collect data for my study. I then adopt a comprehensive methodology to analyse the data that integrates Doctrinal legal research and a Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis. Findings underscore significant threats, including beachfront construction, uncontrolled population growth and land use, and potential large-scale tourism developments. The examination of legal aspects reveals contradictions within Mexico's environmental laws, indicating substantial gaps, inconsistencies, and disconnections, with the absence of specific legislation, which increases the difficulty of addressing these challenges.

Keywords: coastal management; effective management; SWOT analysis; doctrinal legal analysis; sand dunes; Todos Santos.

Dedication

I would like to dedicate this work to my partner, my best friend… the love of my life. I am truly blessed to have you as my partner in this adventure called life.

To the loving memory of my parents, although they have departed this world, their memories will live in my heart forever.

And finally, to my beloved dogs, now departed, who were by my side as I wrote this project.

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List of Acronyms

CIMARES	From its acronym in Spanish Comisión Intersecretarial para el Manejo Sustentable de Mares y Costas.
CONAFOR	From its acronym in Spanish *Comisión Nacional Forestal*, National Forestry Commission.
CONAGUA	From its acronym in Spanish Comisión Nacional del Agua, National Water Commission.
CONANP	From its acronym in Spanish *Comisión Nacional de Áreas Naturales Protegidas*, National Commission for Natural Protected Areas.
DOF	From its acronym in Spanish *Diario Oficial de la Federación*, National Official Bulletin
EIA	Environmental Impact Assessment
ENOETMC	From its acronym in Spanish *Estrategia Nacional para el Ordenamiento Ecológico del Territorio en Mares y Costas*, National Strategy for Ecological Planning of Territory in Seas and Coasts
FEDEA	From its acronym in Spanish *Fiscalía Especializada en Materia de Delitos Ambientales*, Environmental Prosecutor's Office.
IMPLAN	From its acronym in Spanish *Instituto Municipal de Planeación*, Institute of Municipal Planning.
INAPESCA	From its acronym in Spanish *Instituto Nacional de Pesca y Acuacultura,* National Institute of Fisheries and Aquaculture.
INECC	From its acronym in Spanish *Instituto Nacional de Ecología y Cambio Climático*, National Institute of Ecology and Climate Change.
INEGI	From its former Spanish acronym *Instituto Nacional de Estadística Geografia e Informatica*, now *Instituto Nacional de Estadística y Geografia*, but it retains the same acronym, National Institute of Statistics and Geography.
LAN	From its acronym in Spanish *Ley de Aguas Nacionales*, Law of National Waters.
LFD	From its acronym in Spanish *Ley Federal de Derechos*, Federal Law of Rights.
LFM	From its acronym in Spanish *Ley Federal del Mar*, Federal Law of the Sea.
LFRA	From its acronym in Spanish *Ley Federal de Responsabilidad Ambiental*, Federal Law on Environmental Liability.

LGAHOTDU	From its acronym in Spanish *Ley General de Asentamientos Humanos*, Ordenamiento Territorial y Desarrollo Urbano, General Law of Human Settlements, Territorial Planning and Urban Development.
LGBN	From its acronym in Spanish *Ley General de Bienes Nacionales*, General Law of National Assets
LGCC	From its acronym in Spanish *Ley General de Cambio Climático*, General Law on Climate Change.
LGDFS	From its acronym in Spanish *Ley General de Desarrollo Forestal Sustentable*, General Law of Sustainable Forestry Development.
LGEEPA	From its Spanish acronym *Ley General de Equilibrio Ecológico y Protección al Ambiente*, General Law of Ecological Balance and Environmental Protection.
LGPAS	From its acronym in Spanish *Ley General de Pesca y Acuacultura Sustentables*, General Law on Sustainable Fishing and Aquaculture
LGVS	From its acronym in Spanish *Ley General de Vida Silvestre*, General Law of Wildlife
MAB	UNESCO's Man and the Biosphere Programme.
MEA	Millennium Ecosystem Assessment
NAFTA	North America Free Trade Agreement
NOM	From its acronym in Spanish *Normas Oficiales Mexicanas*, Official Mexican Standards.
NPA	Natural Protected Areas.
OECD	The Organization for Economic Cooperation and Development
PALM	Puerto Adolfo López Mateos in Comondú, Baja California Sur, México.
PDU	From its Spanish acronym Programa de Desarrollo Urbano, Urban Development Program
PESTEL	Political, Economic, Social, Technological, Legal and Environmental analysis.
PGR	From its acronym in Spanish Procuraduría General de la República, General Attorney's Office
PNMCM	From its acronym in Spanish *Política Nacional de Mares y Costas de Mexico*, National Policy on Seas and Coasts of Mexico
PROFEPA	From its acronym in Spanish *Procuraduría Federal de Protección al Ambiente*, Office of the Federal Attorney for Environmental Protection

PSC	Puerto San Carlos in Comondú, Baja California Sur, México.
PSR	Pressure State Response analysis
SDG	United Nations Sustainable Development Goals
SEMARNAT	From its Spanish acronym *Secretaría del Medio Ambiente y Recursos Naturales*, Secretariat of Environment and Natural Resources
SENASICA	From its acronym in Spanish *Servicio Nacional de Sanidad, Inocuidad y Calidad Agroalimentaria*, National Service of Health, Safety, and Agri-Food Quality.
SRE	From its Spanish acronym S*ecretaría de Relaciones Exteriores* de México, Mexican Foreign Relations Ministry.
SWOT	Strengths, Weaknesses, Opportunities and Threat analysis.
TS	Todos Santos, Baja California Sur, México
UNCLOS	United Nations Convention on the Law of the Sea.
UNESCO	United Nations Educational, Scientific and Cultural Organization.
UNFCCC	United Nations Framework Convention on Climate Change.
ZOFEMAT	From its acronym in Spanish *Zona Federal Marítimo Terrestre*, Federal Maritime Terrestrial Zone.

Chapter 1. Introduction

1.1. Problem Statement

The conservation of the natural coastal environment in many coastal regions is confronted with substantial challenges that demand immediate action. For example, the coastal regions of Baja California Sur and the broader North Pacific coastlines of Mexico are continuously under threat, posing risks to their natural coastal environments such as sand dunes, lagoons, and other coastal ecosystems. These vital ecosystems play a pivotal role in safeguarding the shoreline from erosion, storm surges, and other coastal hazards (Barbier, 2015). Rapid urbanization, tourism, and infrastructure development along the coast pose the most significant threat to the natural coastal environment in Todos Santos and Baja California Sur. Increased construction activities, and inadequate land-use planning often result in the destruction, fragmentation, or degradation of sand dunes and other coastal ecosystems, compromising their effectiveness in mitigating coastal erosion and buffering against storms.

The existing legal and regulatory framework for coastal zone management and conservation in Todos Santos and Baja California Sur may lack comprehensive provisions or effective enforcement mechanisms to safeguard natural coastal ecosystems. Insufficient coordination among relevant government agencies, unclear land ownership, and weak land-use regulations may contribute to unsustainable development practices that disregard the importance of maintaining and protecting these vital ecosystems. Limited public awareness and understanding of the ecological value and importance of the natural coastal environment also can impede conservation efforts. Insufficient stakeholder engagement, including local communities, landowners, developers, and businesses, may hinder the adoption of sustainable land-use practices that prioritize the protection and restoration of sand dunes and coastal ecosystems (Ivanova et al., 2010).

The effects of climate change, such as sea-level rise, increased storm intensity, and coastal erosion, further exacerbate the vulnerability of the natural coastal environment in Todos Santos and Baja California Sur. These changes can disrupt the stability and resilience of sand dunes, mangroves, and other coastal ecosystems,

undermining their ability to protect against coastal hazards and adapt to changing environmental conditions.

Addressing these challenges is crucial to ensure the long-term conservation and sustainable management of the natural coastal environment in Todos Santos and Baja California Sur.

1.2. Location of the Study Area

Located in the southern part of the Baja California Peninsula in Mexico, Todos Santos is a town situated in the foothills of Mexico's Sierra de la Laguna Mountains. Positioned on the Pacific coast side of the peninsula, it is located approximately 50 kilometers (31 miles) north of Cabo San Lucas on Highway 19 and 85 kilometers (53 miles) southwest of La Paz, the capital city of Baja California Sur. The town falls within the municipality of La Paz and is situated near the Tropic of Cancer.

Todos Santos emerged as a vibrant community in the mid-1980s when Highway 19 from Todos Santos to Cabo San Lucas was paved. The highway attracted visitors, and the fertile farmlands experienced a revival. The town now prospers from farming vegetables, chilies, avocados, papayas, and mangoes, as well as from fishing and ranching (Brooke, 2002). More recently, there has been a significant increase in tourist activity and a boom in real estate development. Handicraft shops, owner-operated art galleries featuring landscape paintings of local scenes, upscale restaurants, boutique hotels and restored colonial buildings have contributed to the gentrification and redevelopment of the town.

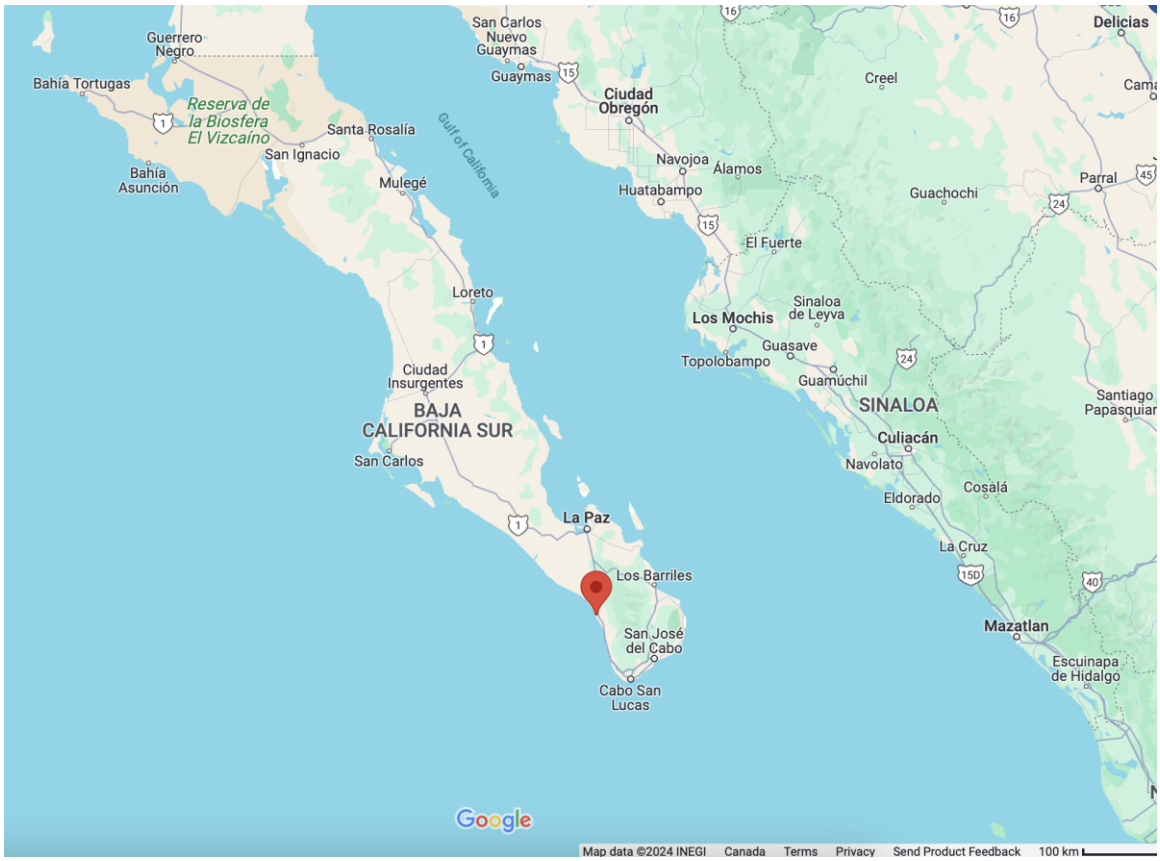

Figure 1 Location of Todos Santos on the Map of Baja California Sur State
Source: Google Map Data © 2024 INEGI

1.3. Research Approach

The community of Todos Santos is renowned for its attractive location, diverse mix of foreign and domestic residents, and its seasonal nature with a constant influx and outflow of people. While the region boasts significant environmental attributes and important coastal resources, it also faces a distinct set of pressures that while not currently overwhelming, hold the potential for improvement and resolution. Thus, the main focus of my research centers around identifying strategies to overcome these challenges and ensure effective management of the local coastal environment.

Initially, I assess the status and health of these coastal ecosystems. Subsequently, I analyze the current legal framework using Doctrinal legal research[1] to pinpoint gaps or ambiguities where the law may be insufficient or unclear in addressing

[1] Doctrinal legal research involves the examination and interpretation of legal sources, such as statutes and case law, to understand and apply legal principles (Bhat, 2020).

certain issues concerning the management of coastal environments in the research area. Additionally, I use a SWOT[2] analysis to identify the strengths, weaknesses, opportunities, and threats related to the management of the natural coastal environment in the study site. Furthermore, I formulate policy recommendations, based on integrating the SWOT analysis and legal framework analysis findings. These recommendations assess the potential to improve coastal management, identify legal obstacles, and suggest strategies for stakeholder engagement and public awareness on responsible coastal management.

By integrating a SWOT analysis with a legal framework evaluation, this project provides a comprehensive understanding of the challenges and possibilities faced by the community. With this interdisciplinary study, I contribute to the literature by bridging ecological and legal dimensions, while also providing residents and policymakers with practical insights to foster environmental conservation, strengthen legal governance, and advance overall coastal sustainability.

1.4. Research Questions

The project examines how the residents and municipal government of Todos Santos, Baja California Sur, Mexico can improve the management of the local coastal environment. To achieve this objective, I will answer the following questions:

1. What is the present condition of the local coastal environment?

2. What are the primary threats to the local coastal environment in the vicinity of Todos Santos? What measures are required to address these challenges affecting the community in order to ensure effective management of their coastal environment?

3. What policy measures and improvements are needed to address these identified threats and ensure the long-term management of the coastal environment near Todos Santos?

[2] SWOT Analysis is a method used to evaluate the ‘strengths’, ‘weaknesses’, ‘opportunities’ and ‘threats’ involved in an organization, a plan, a project, a person, or a business activity. (Gürel, 2017).

By addressing these questions, my research aims to provide valuable insights and recommendations for the preservation and enhancement of the coastal environment in Todos Santos.

1.5. Organization of the Study

In Chapter 2, I review the existing literature on natural coastal environment (i.e., sand dunes, lagoons, and mangroves), coastal zone management in general and specifically focusing in Todos Santos, Baja California Sur, Mexico, and the legal issues in coastal management worldwide. In Chapter 3, I will provide a background of the study area and legal framework. Chapter 4 will outline the methodology, covering qualitative approaches such as SWOT and legal framework analysis, along with fundamental statistical analyses and details regarding the household survey. Chapter 5 will present the results and analysis of the study. Chapter 6 will explore policy implications and offer recommendations. Finally, Chapter 7 will conclude the study, highlighting its limitations.

Chapter 2. Literature Review

2.1. Natural Coastal Environment

Coastal environments are among the most complex regions of the world's oceans. They represent the transition zone between the open ocean and terrestrial watersheds, where important and diverse spatial and temporal scales occur in both physical and biogeochemical processes. (Werner & Blanton, 2019). Coastal areas are highly dynamic zones that hold great importance for society, the economy, and the environment. They support thousands of communities worldwide that rely on coastal ecosystems for the services they provide for their livelihoods. (Nature Based Solutions, n.d.).

Coastal environments include sand dunes, lagoons, mangrove wetlands, estuaries, deltas, seagrass meadows, seaweed beds and coral reefs. These coastal ecosystems are natural defence systems that protect inhabitants and infrastructure from coastal hazards, such as erosion, flooding, and storm surges. These challenges are the primary concerns for coastal communities around the world. (Nature Based Solutions, n.d.)

Recognizing the critical importance of preserving these natural coastal environments, this literature review examines the current challenges impacting coastal environments, evaluates the effectiveness of existing legal frameworks in safeguarding these coastal ecosystems, and explores the management of coastal zones.

2.1.1. Coastal Sand Dunes

Coastal sand dunes are ecosystems along coastlines created by mounds of sand or grains of organic origin, particularly calcareous, resulting from the disintegration of coral reefs and mollusk shells. These dunes exhibit a variety of microenvironments due to the disturbances caused by various winds and tides, fostering the growth of patches of vegetation of varying ages (CONABIO, 2023).

Sand dunes serve as barriers to wind currents, reducing their speed and leading to a greater accumulation of sediments. Consequently, the dunes grow and prevent

salinity and sand from entering inland, playing a crucial role in preventing erosion caused by storms and hurricanes. Additionally, they act as rainwater filtration zones into the subsoil, contributing to the maintenance of its good quality (Mendoza-González, 2017).

Coastal protection is without a doubt the most important service this ecosystem provides against storms, tsunamis, and sea level rise. Sand dunes can vary in height and width, and as a consequence in their ability to attenuate waves, depending on the presence of vegetation and sand supply from the beach (Barbier et al., 2011). Sand dunes play a vital role in stabilizing sediment and protecting beaches and coastal properties, supporting leisure activities such as boating, fishing, swimming, and walking. These ecosystems are crucial for tropical countries like Mexico, where a significant portion of tourism revolves around beach-related activities.

2.1.2. Mangroves

Mangroves are coastal forests found in tropical and sub-tropical regions, many of them in areas subject to cyclones, hurricanes and typhoons and their associated storm surges. Mangroves provide a number of highly valued ecosystem services such as firewood, materials for building, and food in the form of shellfish and fish that live among the mangrove roots (Barbier et al., 2011). Mangroves also provide a range of regulating services, including coastal protection, pollutant assimilation, and macroclimate regulation and mitigation of global climatic change through carbon storage and sequestration (Adame et al., 2018).

Mangrove forests have some of the highest reported net primary productivity of any ecosystem on the planet, and their loss or deliberate removal leads to rapid build-up of acid sulfides in the soil, increased shoreline erosion and sedimentation onto offshore coral reefs, and collapse of intertidal food webs and inshore fisheries (Ellison & Farnsworth, 2001). Despite their usefulness, Mexico’s mangroves are being destroyed at an alarming rate, resulting in a loss of these vital ecosystem services.

2.1.3. Coastal Lagoons

Coastal lagoons are estuarine basins where freshwater inflows are trapped behind coastal dune systems, sand spits, or barrier islands which impede exchange with

the ocean. They are most frequent in regions where freshwater inflows to the coast are small or seasonal, so that exchange with the ocean may not occur for months or years at a time. (Harris, 2008). Coastal lagoons are among the most productive ecosystems in the world (Duck & Da Silva, 2012), sustaining important environmental services such as fisheries (Cañedo-Argüelles et al., 2012). These ecosystems have been of great importance providing resources for the settlement of human societies and reproduction of both animal and plant species. (Imaz-Lamadrid et al., 2020).

Natural coastal environments, including sand dunes, mangroves, and lagoons, play a pivotal role in maintaining ecological balance. Despite their relevance for conservation, natural coastal environments face several threats. Mexico's mangrove coverage is diminishing due to deforestation, driven by logging, agriculture, and mega-tourism, which is adversely affecting coastal communities and the Mexican economy. (Andersen, n.d.). Coastal lagoons are seriously threatened by eutrophication, pollution, urbanization, and diverse forms of modification in their watersheds, caused by human activity in the coastal zones of all continents (Esteves et al., 2008). Climate change-induced sea-level rise poses a grave threat to the stability of sand dunes and their ability to protect coastal communities (Spence, 2011). Rapid urbanization and tourism development have disrupted the natural dynamics of the coastline interrupting sediment movement and causing serious erosion problems in beach and coastal systems (Mendoza-González, 2017). This ecosystem is already contending with a pressing issue – its physical space is becoming smaller due to human development and other coastal zone activities, compromising its ecological integrity, and increasing vulnerability to sea-level rise. As a result, the potential economic costs due to the loss of its services are on the rise (Fernandez-Diaz, 2022).

2.2. Coastal Zone Management

Coastal management can broadly be defined as "the management activities at the coast, encompassing the management of everything and everyone on the coast within some form of united system or approach". (Kay & Alder, 2005). It includes the protection, conservation, rehabilitation, management, and ecologically sustainable development of the coastal zone (Queensland Coastal Protection and Management Act, 1995).

Coastal management initiatives are usually a response to a demand to resolve problems such as conflicting uses of coastal resources, urbanisation, access, pollution, and environmental degradation. Problems may also be related to poor liaison or inefficient coordination between those responsible for making decisions on the allocation of coastal resources (Kay & Alder, 2005).

2.2.1. Use of the Coast

Coastal areas are often prime locations for urban and industrial development due to their proximity to ports, transportation networks, and tourism potential. Coastal zones support a wide variety of human land uses. Tourist resorts, fishing communities, farming, aquaculture, and other land uses all compete for space on the coasts of the world. Historically, the coastal zone has been rich in resources and is uniquely suited to support economic activities such as trade, industry, and tourism, attracting settlement and migration (Cornell et al., 2023). The coasts are economic engines that support jobs in defense, fishing, transportation, and tourism and seaports serve as hubs of commerce that connect countries with their global trading partners (USGCRP, 2018).

For centuries, coastal areas have served as centers of human activity and home to the world's major centers of trade. As noted by Miller & Hadley (2005), human beings have not been insensitive to the wide array of opportunities provided by the coasts and have been attracted to them, making the coasts the most favored locations to live permanently, or for leisure, recreational activities, or tourism.

Coastal areas play a crucial role in supporting fishing activities ranging from small-scale artisanal fishing to large-scale commercial operations and sport fishing. Fisheries and aquaculture represent a very important economic as well as social activity in coastal areas. These activities generate employment, nutrition and food for many low-income families allowing them to meet their basic needs. (Azuz-Adeath & Cortés-Ruiz, 2017). Some coastal areas are used for agriculture and farming practices. Activities like saltwater farming (e.g., salt production, seaweed cultivation) and coastal agriculture such as rice paddies and mangrove-based agriculture contribute to local food production and livelihoods (Singh, 2020).

Ports have historically been the link between inland and marine transport, and their development can act as a driver for regional economic growth and employment opportunities (Kay & Alder, 2005). They are vital for the movement of goods and people within and between countries. As transportation hubs, coastal areas facilitate maritime shipping and trade through ports and harbors.

Given these factors, it is essential to recognize that the various coastal activities frequently overlap and may compete for access to limited coastal resources.

2.2.2. Conservation

Coastal zones are among the most diverse and productive environments in the world. The growing competition for maritime and coastal space, along with escalating pressures on resources, contributes to the degradation of natural, socioeconomic, and cultural resources. In recent decades, the development of economic sectors, like tourism and commercial and industrial port activity, have drawn people to the coast at alarming rates and has promoted its urbanization (Martínez et al., 2007). As a consequence, coastal environments are considered among the most exploited, inhabited and threatened areas in the world (Kiousopoulos, 2008), making its management a challenge.

In response to environmental challenges, countries have instituted environmental policies for their coastal zones (Portman et al., 2012). According to Bassett and Peimer (2015), regulatory spatial policy instruments are commonly the first environmental policies governments implement to address the impacts stemming from socio-economic activities, such as urban growth, land use change, emissions, and pollutants.

Conservation efforts worldwide have seen a growth in the number of marine and coastal protected areas over the last few decades, reflecting an increased awareness of the need to protect coastal environments. The international proliferation of integrated coastal zone management efforts (Sorensen, 1993), along with a peak in the 1990s showing an increasing number of marine protected areas reported by Burke et al. (2001), further underscores this global commitment to conservation.

According to Martinez, (2007) there are three major international protection schemes that operate on coastal ecosystems the RAMSAR sites, declared under the

Convention on Wetlands of International Importance especially as Waterfowl Habitat (1971), the Biosphere Reserves, declared under UNESCO's Man and the Biosphere Programme (MAB, 2023), and World Heritage sites, under the World Heritage Convention (1972). Other global agreements and conventions, such as the Convention on Biological Diversity (1992), the United Nations Framework Convention on Climate Change (UNFCCC, 1992), and the United Nations Convention on the Law of the Sea (UNCLOS, 1982), are instrumental in promoting coastal conservation. These agreements focus on climate change adaptation and resilience, emphasizing the restoration of natural buffers and the endorsement of nature-based solutions for coastal protection. Hence, the collaboration and partnerships among international governments, NGOs, local communities, and stakeholders are crucial for effective coastal conservation.

2.2.3. Context in Mexico

The Mexican coastline has undergone drastic modification due to increasing human impact, marked by the establishment of infrastructure, urban expansion, and industrial developments. These changes are evident in the development of cities, ports, and tourist zones along the length of the littoral (Mendoza-González et al., 2016). Mexico shares the most common socioeconomic impact experienced by coasts in other countries: habitat loss and fragmentation due to population growth and the expansion of urban, industrial, and agricultural frontiers (Martínez et al., 2007). As noted by Ortiz-Lozano et al. (2005), socioeconomic development in the Mexican coastal zone has been significantly influenced by the tourism, commerce, and industrial sectors, transforming the coastal landscape since the 1970s.

Undeniably, tourism in Mexico has been considered a national priority since the 1950s (Propín-Frejomil, 2017), because of the extensive coastline and abundance of sandy beaches. These sectors have also significantly contributed to the substantial population growth in coastal areas. Projections estimate that by 2030, there will be slightly over 60 million people living in these coastal zones (Azuz & Rivera, 2019). Studies of the state of coastal ecosystems have reported alterations in the majority of the different ecosystems present in Mexican coasts. The main problems are related to land-use changes (agricultural, urban, and touristic), resulting in decreased coverage and habitat fragmentation, primarily in mangrove ecosystems (Rodríguez-Zúñiga et al.,

2013). This has led to a growing tendency of deterioration in coastal ecosystems and resources (Nava Fuentes, 2017).

To address these issues, Mexico has undertaken substantial efforts in recent decades. The first actions emerged in the 1970s and early 1980s, marking the inception of the first environmental laws and agencies. However, it was not until the negotiations of the North American Free Trade Agreement (NAFTA), coupled with several amendments to the constitution, that the General Law of Ecological Balance and Environmental Protection (LGEEPA) was enacted in 1988, forming the basis of the country's environmental policy.

Since the beginning of the 21st century, innovative approaches, and tools for the legal protection of the environment have been integrated into Mexican regulation and coastal management. Among these is the constitutional recognition of the right to a healthy environment and the consequent protection of the environment from a human rights perspective, as enshrined in Article 4 of the Constitution. In recent years, significant efforts have been made at the federal level, including the creation of the National Strategy for Ecological Planning of Territory in Seas and Coasts (ENOETMC) (SEMARNAT, 2007) and the publication of the Program for Marine and Regional Ecological Planning of the North Pacific (DOF, 2018). Drawing on the ENOETMC, this program encompasses the marine and coastal zone of the western coastline of the Baja California Peninsula. In 2008 the Inter-ministerial Commission for Oceans and Coasts (CIMARES) was established to address the problems arising in this important zone. In 2010, the Wetland National Policy was published, outlining goals and targets for the sustainable use and protection of wetlands based on the RAMSAR Convention. Finally, the revised National Policy of Seas and Coasts of Mexico was published. (PNMCM, 2018).

Within the regulatory framework of the LGEEPA, various policy instruments were implemented. One example is the Protected Natural Areas Management Program, operated by the National Commission for Natural Protected Areas (CONANP), responsible for declaring Biosphere Reserves, National Parks, and other Protected Areas across the national territory. Additionally, the LGEEPA introduced operational tools, including Environmental Impact Assessments and Mexican Official Standards (NOMs), serving as mandatory regulations for products, processes, and services.

Mexico actively engages in international initiatives and agreements concerning coastal management and conservation. The country collaborates with neighboring nations in North America to address transboundary challenges, including shared fisheries and pollution control. Mexico's coastal management efforts are aligned with global frameworks, such as the United Nations Sustainable Development Goals – SDG (SRE, 2023) and the Convention on Biological Diversity (2012).

While beachfront property is one of the most popular lands in Mexico, it is susceptible to illegal encroachment due to factors such as high demand, tourism development, population growth pressure, and lax enforcement. This involves trespassing into ecologically sensitive zones like beaches, sand dunes, mangroves, or other coastal ecosystems without proper permits or adherence to environmental regulations. Despite conservation efforts, current degradation and expanding urban development on the beaches and coastal dunes of Mexico have restricted habitat availability for beach and dune species (Mendoza-González et al., 2016). Although progress has been made in coastal area management, challenges persist, including inadequate enforcement of regulations, lack of funding and resources, and conflicts between development interests and conservation priorities. Continued efforts are necessary to strengthen governance, enhance community participation, and ensure the sustainable use and conservation of Mexico's coastal resources.

Chapter 3. Background

3.1. Description of the Study Area

Mexico has a privileged geographic location, with access to the Pacific Ocean, the Gulf of California, the Gulf of Mexico, and the Caribbean Sea. The coastal extent in the country is 11,122 km, with 3,149,920 km of Territorial Sea and Exclusive Economic Zone, in addition to a wide continental shelf and insular territory that together provide diverse coastal ecosystems and resources (Instituto Nacional de Ecología y Cambio Climático, 2021). The vast extension of its coastal heritage in addition with the ecosystem diversity has led that this space be of a great importance for the coastal populations and for the economic development of the country (Nava-Fuentes, 2017).

3.1.1. Baja California Sur

Baja California Sur, located in the southern part of the Baja California Peninsula in northwestern Mexico, attained statehood in the mid-1970s. Encompassing an area of around 73,922 square kilometers, it constitutes 3.57% of Mexico's landmass. Boasting a coastline that spans 2,131 km, it is recognized as Mexico's longest state, accounting for 22% of the nation's overall coastlines (BCS nos une, n.d.).Baja California Sur shares its northern border with the state of Baja California, and it is bordered by the Pacific Ocean to the west and the Gulf of California – also known as the Sea of Cortez, to the east (Municipios mx, 2023). With a population of approximately 800,000 residents and a very low population density, it stands as the least populated state in the country (INEGI, 2023). Encompassing fishing communities, rural residents, and urban dwellers, it adds to a diverse cultural heritage and a lively social tapestry.

Baja California Sur operates within the Mexican legal framework, which includes environmental conservation laws, land use regulations, and tourism legislation. These laws aim to protect and manage the natural coastal ecosystems found in the region, such as sand dunes, lagoons, palm groves and mangroves. The state government plays a crucial role in enforcing these regulations to ensure sustainable development and the preservation of these valuable ecosystems (Inventario Regulatorio, 2023).

Baja California Sur relies heavily on tourism as a primary economic driver. The state's natural landscapes, including its coastal areas, attract visitors from around the world. The tourism industry provides employment opportunities and contributes significantly to the state's economy. Additionally, fishing, agriculture, and mining sectors also play roles in the local economy (Gobierno BCS, 2021).

However, Baja California Sur faces challenges in protecting its natural coastal environment. The rapid growth of tourism presents threats to fragile ecosystems, including habitat destruction, pollution, and overexploitation. Unregulated coastal development can lead to the loss and fragmentation of these valuable resources. Climate change exacerbates these challenges, with rising sea levels, increased storm activity, and altered weather patterns impacting the stability and resilience of coastal ecosystems.

3.1.2. La Paz and the Municipal Delegation of Todos Santos

The municipality of La Paz serves as the capital city of the state of Baja California Sur. It is situated on the eastern coast of the Baja California Peninsula, overlooking the waters of the Gulf of California – Sea of Cortez and comprises seven boroughs and their corresponding sub-boroughs. Todos Santos, founded in 1723 by Jesuit missionaries, is one of these boroughs and is a traditional colonial town located in a plateau at the foothills of the Sierra de La Laguna Mountains. Todos Santos sits on the Tropic of Cancer and is located 73 km north of Cabo San Lucas and 80 km south of the city of La Paz.

With a population of 7,185 residents, Todos Santos is the second most populated community within La Paz. (INEGI, 2020). It has become a home for many local and international artists. In 2006 Todos Santos was federally designated, “Pueblo Mágico" by the Ministry of Tourism. (Pueblos Mágicos, 2023). Todos Santos borough, within its urban and rural surrounding areas, is known for its agricultural areas. Coastal plains characterize the local landscape with rolling hills creating the foothills between the coast and the Sierra de La Laguna Mountain range. These plains have been shaped by surface water runoff and wind erosion and comprise alluvial deposits and a long stretch of coastal dunes on the Pacific coast (PDU, 2012).

3.2. Legal Framework

3.2.1. Applicable Legislation

The Federal Constitution is the most important political document in Mexico, serving as the source and origin for all Mexican law. The most important principle governing environmental protection in Mexico is enshrined in Article 4 of its constitution (1999). This article stipulates that every person has the right to a healthy environment for their development and well-being, and the state will guarantee this right. In Mexico, the main reference for maritime-coastal legislation is found within the Mexican Constitution. Here, the concepts of maritime and terrestrial national property are defined, and their sovereignty and jurisdiction are established as well.

It is important to highlight that Mexico's legislative framework for coastal management is structured in a sectoral manner (Nava-Fuentes, 2017). Specifically, laws like the General Law of National Goods and the General Law of Ecological Balance and Environmental Protection govern the terrestrial aspect. On the other hand, the maritime component is regulated by laws such as the Federal Law of the Sea (LFM) and the General Law on Sustainable Fishing and Aquaculture (LGPAS). Additionally, various laws and instruments are employed by Mexican government entities to address the utilization, conservation, and protection of coastal zones within Mexico's jurisdiction.

Mexico has enacted several laws and regulations to govern coastal area management. The following legislation are of particular significance to my research on coastal area management in Mexico:

Table 1 Environmental Legislation on Coastal Management in Mexico

Legislation	Details
Constitution	The Mexican constitution establishes the framework for environmental protection and conservation. It sets out fundamental principles and rights related to environmental matters, providing the foundation for subsequent environmental legislation.
General Law of Ecological Balance and Environmental Protection (LGEEPA).	This law provides the framework for environmental protection and management in Mexico. It establishes the guidelines for the conservation and sustainable use of natural resources, including coastal areas.
General Law of Sustainable Forestry Development (LGDFS)	While primarily focused on forests, this law also covers coastal mangrove ecosystems. It sets regulations for the protection, conservation, restoration, and sustainable use of mangroves and their associated ecosystems.
General Law of Wildlife (LGVS)	This law aims to protect and conserve Mexico's wildlife, including marine and coastal species. It establishes measures for the conservation of biodiversity and regulates activities related to wildlife management and protection in coastal areas.
Law of National Waters (LAN)	This law governs the management, use, and conservation of water resources in Mexico, including coastal waters. It establishes the legal framework for water allocation, pollution prevention, and the protection of marine ecosystems.
General Law of Human Settlements, Territorial Planning and Urban Development. (LGAHOTDU)	This law deals with land use planning and urban development, including coastal areas. It provides guidelines for sustainable development, zoning regulations, and the protection of coastal ecosystems.
General Law on Climate Change (LGCC)	This law addresses climate change mitigation and adaptation strategies in Mexico. It includes provisions related to coastal areas, such as measures to assess and manage coastal risks associated with climate change, sea-level rise, and coastal erosion.
Official Mexican Standards (NOMs)	These are technical regulations that establish specific criteria and guidelines for various aspects of coastal area management, such as water quality, beach conservation, and coastal development.
Specific regulations at the regional and local levels that further govern coastal area management.	These may include state-level laws, municipal regulations, and zoning plans that complement the national framework and address local conditions and priorities.
Criminal Code for Baja California Sur.	Establishes actions that qualify as environmental crimes within the state and outlines the corresponding penalties and fines for individuals who engage in such actions.
Todos Santos Urban Development Program (PDU).	Created to foster sustainable development in natural areas, preserve beaches, safeguard bodies of water, wetlands, and maintain a balance between the natural environment and urban development.

3.2.2. Scope of Environmental Laws

In Mexico, environmental laws are primarily regulated at the federal level. The federal government has jurisdiction over the establishment, implementation, and enforcement of environmental legislation throughout the country. However, there is also some degree of shared responsibility with state and municipal governments.

The main legislation governing environmental matters in Mexico is the General Law of Ecological Balance and Environmental Protection (LGEEPA). This law sets forth the basic principles for the conservation, protection, and restoration of the environment, as well as the prevention and control of pollution. The LGEEPA establishes the framework for environmental regulation, and it grants federal authorities the power to issue regulations, standards, and guidelines to address specific environmental issues. It covers various aspects, including air and water pollution, waste management, environmental impact assessments, protected areas, and biodiversity conservation.

Mexico is divided in three administrative levels, the Federal, State and Municipal government. The 115th Article of the Mexican Constitution establishes that the municipality is considered the basis of its territorial division and its political-administrative organization. At the state level, each state in Mexico can enact its own environmental legislation to complement and enforce federal laws. These state laws must be consistent with the provisions of the LGEEPA and cannot contradict or weaken the federal regulations. Additionally, municipal governments have the authority to enforce environmental regulations within their jurisdictions, focusing on issues such as waste management, local air and water pollution control, and urban planning. However, their actions must align with federal and state laws. Within this context, as cited by Nava-Fuentes (2018), the management of the coastal zone is under the jurisdiction of the federal administration. However, it involves coordination with state and municipal actions and programs due to the different governmental levels.

It is worth noting that Mexico has also entered into international agreements and treaties related to environmental protection, such as Earth Summit (1992), the Convention on Biological Diversity (1992), the North American Agreement on Environmental Cooperation – NAAEC (1994), the Paris Agreement (2016) on climate change, and the RAMSAR Convention (Convention on Wetlands of International

Importance especially as Waterfowl Habitat, 1971). These international commitments have influenced the development of domestic environmental initiatives, policies, and legislation.

Using the LGEEPA as a framework, the Ministry of Environment and Natural Resources (SEMARNAT) has developed several important policy instruments since the 2000s. The first coastal policy, the National Policy of Oceans and Coasts of Mexico, was approved for publication after five years of revisions and public consultation. In addition to this policy, other broader policies that affected coastal management were drafted. In 2004, the Hydric National Policy was published. In 2008, the Inter-ministerial Commission for Oceans and Coasts (CIMARES) was created by presidential decree, and in 2010, the Wetland National Policy, based on the Ramsar Convention, was established.

Environmental laws in Mexico pertaining to coastal area management have a broad scope and cover various aspects of environmental protection and sustainable use. These laws establish measures to conserve and protect coastal ecosystems, such as mangroves, coral reefs, dunes, and wetlands, by prohibiting activities that may cause environmental damage. They also provide for land use planning in coastal areas, promoting sustainable development and preventing unplanned urbanization through zoning criteria and environmental impact assessments. Legislation addresses water management, regulating the discharge of pollutants into coastal waters, and promoting sustainable use for ecosystem protection and human consumption. Provisions for pollution prevention and control ensure management of solid waste, sewage, and industrial discharges to maintain coastal water quality (Basurto, 2016).

Acknowledging the challenges posed by coastal erosion and sea-level rise, the laws may incorporate provisions for assessing coastal risks, implementing adaptation measures, and safeguarding vulnerable communities and infrastructure. Additionally, environmental impact assessments are mandatory for projects with potentially significant impacts on coastal areas, encouraging developers to evaluate and mitigate environmental effects.

Finally, with respect to promoting the conservation of coastal biodiversity, these laws establish protected areas, regulate the collection and trade of endangered species,

and set guidelines for the sustainable management of fisheries and aquaculture activities in coastal waters. Ultimately, Mexico's environmental laws play a pivotal role in preserving coastal ecosystems and resources while fostering practices that support sustainable development.

The scope of environmental laws in Mexico regarding coastal area management is comprehensive, aiming to balance economic development with the conservation and sustainable use of coastal ecosystems with the local social fabric. These laws provide a legal framework to safeguard the environmental integrity of Mexico's coastal areas and promote their long-term sustainability.

3.2.3. Enforcement of Environmental Laws

Mexico enforces its environmental laws through a combination of regulatory agencies, inspections, penalties, and legal mechanisms. For this purpose, the government has established mechanisms for enforcing environmental laws, but challenges related to capacity, resources, and corruption can affect the effectiveness of enforcement efforts.

In Mexico, the implementation of environmental laws involves multiple governmental bodies operating at the federal, state, and municipal levels. Among the key entities responsible for enforcing these laws are the Federal Ministry of Environment and Natural Resources (SEMARNAT) and, the Federal Attorney for Environmental Protection (PROFEPA).

SEMARNAT serves as the primary federal agency responsible for environmental policy and regulation. Its roles encompass the formulation and execution of environmental programs, establishment of standards and guidelines, granting of environmental permits, conducting environmental impact assessments, and overseeing environmental enforcement at the federal level.

PROFEPA, operating under the authority of SEMARNAT, assumes a crucial role in the enforcement of environmental laws in Mexico. Its mandate encompasses the monitoring, inspection, and enforcement of compliance with environmental regulations to safeguard and conserve the country's natural resources.

PROFEPA verifies compliance in diverse sectors, assessing environmental permits, and compliance records. PROFEPA has the authority to impose penalties, including fines and closure orders, and may involve the Environmental Prosecutor's Office for criminal cases. They also review environmental impact assessments to ensure adherence to regulations. Furthermore, PROFEPA conducts investigations of complaints filed by citizens and on-site inspections to rectify reported issues. (PROFEPA, 2023).

In addition to PROFEPA, there are other entities involved in the implementation and enforcement of environmental laws in Mexico. These entities, agencies and local bodies have specific responsibilities for environmental management and enforcement within their respective areas of jurisdiction. The following table shows some of these entities and their main responsibilities.

Table 2 List of Agencies, Their Jurisdiction and Responsibilities, Other Than PROFEPA, Involved in the Implementation of Environmental Laws in Mexico

Agency / Authority	Jurisdiction	Responsibilities
National Institute of Ecology and Climate Change (INECC)	Federal	INECC is a specialized agency under SEMARNAT. It provides scientific and technical support to the government in the areas of ecology, climate change, and environmental management. INECC assists in the implementation of environmental policies, monitoring programs, and the development of strategies for sustainable development.
National Water Commission (CONAGUA)	Federal	CONAGUA is responsible for managing and regulating water resources in Mexico. It oversees the implementation of water-related environmental laws, including the protection of water bodies, water quality monitoring, and the prevention and control of water pollution.
National Commission for Natural Protected Areas (CONANP)	Federal	CONANP is responsible for the conservation and management of protected natural areas in Mexico. It administers national parks, biosphere reserves, and other protected areas, ensuring their preservation and sustainable use. CONANP collaborates with SEMARNAT in enforcing environmental regulations within these protected areas.
Environmental Prosecutor's Office (FEDEA)	Federal	FEDEA is a specialized unit within the Attorney General's Office (Procuraduría General de la República, PGR) dedicated to investigating and prosecuting environmental crimes. It plays a crucial role in enforcing environmental laws and pursuing legal actions against individuals or entities involved in significant environmental violations.
National Forestry Commission (CONAFOR)	Federal	CONAFOR is responsible for the conservation, management, and sustainable use of forests and wooded areas in Mexico. It enforces regulations related to forest management, reforestation, and prevention of illegal logging. CONAFOR works in collaboration with SEMARNAT and PROFEPA to ensure compliance with environmental laws within forested areas.

Agency / Authority	Jurisdiction	Responsibilities
National Institute of Fisheries and Aquaculture (INAPESCA)	Federal	INAPESCA is responsible for the management and regulation of fisheries and aquaculture in Mexico. It enforces fisheries laws and regulations, monitors fishing activities, and ensures sustainable fishing practices. INAPESCA collaborates with SEMARNAT, PROFEPA, and other agencies to enforce environmental regulations related to marine ecosystems and the conservation of aquatic resources.
National Service of Health, Safety, and Agri-Food Quality (SENASICA)	Federal	SENASICA is the agency responsible for safeguarding the health and safety of agricultural and livestock products in Mexico. It enforces regulations related to agri-food production, animal health, and plant protection. SENASICA works in coordination with SEMARNAT and other environmental agencies to ensure compliance with environmental standards in the agricultural sector.
Federal Maritime Terrestrial Zone (ZOFEMAT)	Federal	ZOFEMAT oversees the regulation and management of Mexico's federal maritime land zone, which includes coastal areas, beaches, and adjacent land. It enforces regulations related to land use, construction, and environmental protection within the federal maritime terrestrial zone. ZOFEMAT collaborates with SEMARNAT, PROFEPA, and local municipal authorities to enforce environmental laws in coastal areas.
State and Municipal Environmental Agencies	State / Municipal	State and Municipal Environmental Agencies: Each state in Mexico has its own environmental agency responsible for implementing and enforcing environmental laws at the state level. These agencies work closely with their respective municipal environmental departments to enforce state-level environmental laws, issue permits, conduct inspections, and monitor environmental compliance within their jurisdictions.

The combined efforts of these governmental bodies, contribute to the enforcement of environmental laws in Mexico, ensuring compliance and promoting sustainable environmental practices across various sectors and regions of the country.

Chapter 4. Methodology

This chapter outlines the methodology adopted to address the research questions introduced in Chapter 1. First, I begin by presenting the approach used for primary data collection, which includes semi-structured interviews and a household survey. Subsequently, I introduce additional analytical approaches used, specifically SWOT analysis and Doctrinal legal research. Below, Figure 2 illustrates the methodology used in my research.

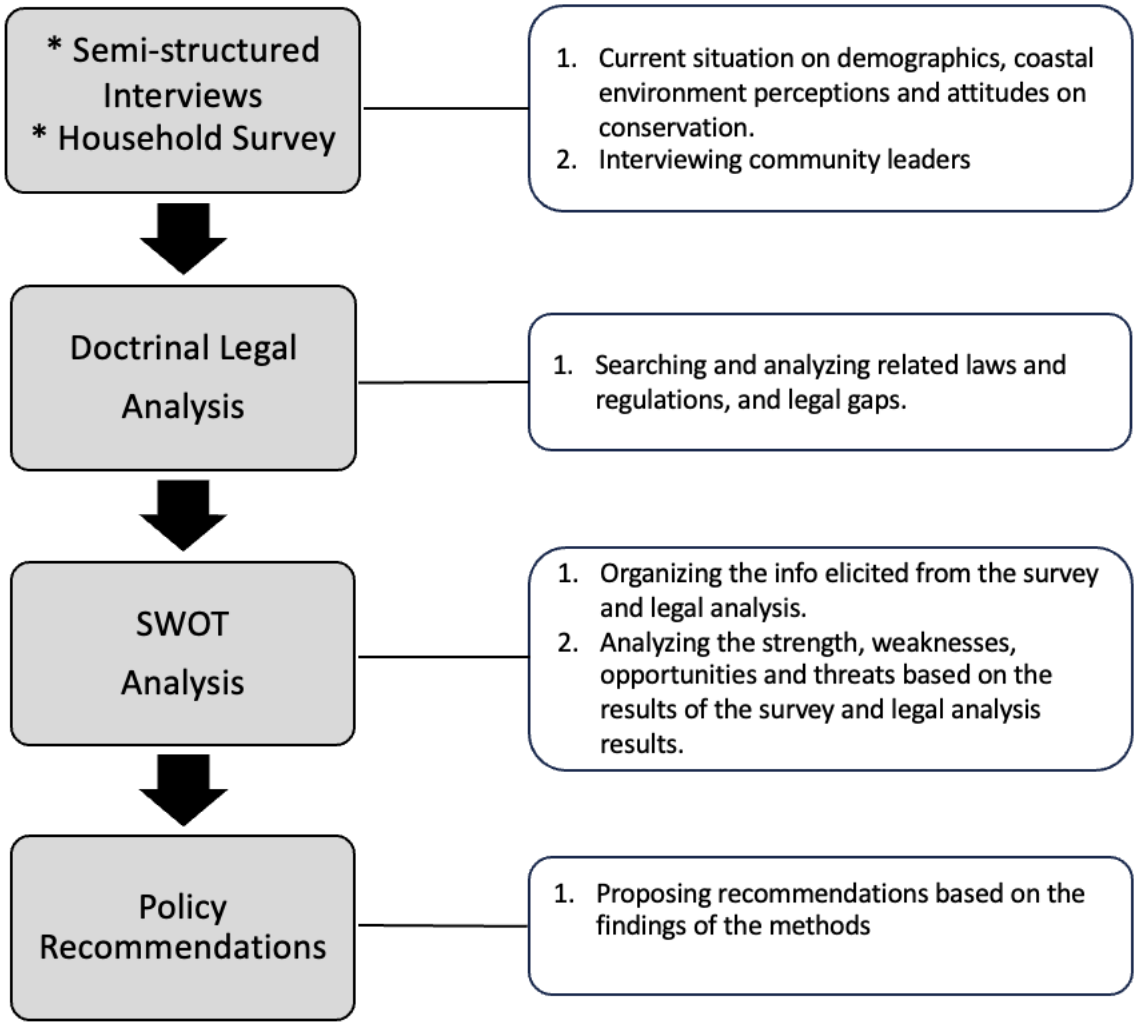

Figure 2 Methodology Flow

4.1. Primary Field Data Collection

In this section, I present the approach used for primary data collection, which includes semi-structured interviews and a household survey. In the subsequent sections, I elaborate on the survey design process and the approach used to administer the survey and analyse the survey data.

4.1.1. Semi-structured Interviews

I conducted semi-structured interviews with key informants to assist in designing and interpreting the household survey. Semi-structured interviews are a form of guided interviewing and listening in which only a portion of the questions and topics are established prior to the interview (Pretty and Vodouhê 1998). The interview appears like an informal conversation; however, the interview is actually controlled and structured and new avenues of questions can be pursued as they develop (Pretty and Vodouhê 1998). The subjects discussed in these interviews closely resembled those in the household survey, but I approached them in a more casual and informal manner. The interviews focused on perceptions of coastal environment, community attitudes towards conservation and economic development, tourism, and aspects of social capital. I conducted 6 semi-structured interviews with different leaders that represented several groups within the community. The interviews ranged in length from 30 minutes to 1 hour approximately.

Furthermore, I used informal interviews as an additional component to the semi-structured interviews to corroborate and add meaning to the data from the household survey. Informal interviews are characterized by a lack of structure or control and are based on remembering conversations during the day in the field and jotting down field notes (Bernard 2002:204). The information I obtained from the informal interviews during the application of the surveys assisted in interpreting the information collected from the household survey.

4.1.2. Household Survey

4.1.2.1 Survey Design

In developing the questionnaire (Appendix A), I incorporated feedback and insights gathered from both semi-structured interviews and informal conversations with community members. Additionally, I adapted relevant questions from previous studies conducted in Baja California Sur. These questions addressed aspects of social capital, such as trust, reciprocity, and connectedness in groups, which are pertinent to my research. Furthermore, I included statements from the New Environmental Paradigm (NEP) to assess respondents' attitudes. Additionally, I included a section on willingness to pay, with the prospect of pursuing this research in the future. This approach ensured that the questionnaire captured diverse perceptions and nuanced opinions regarding the coastal environment and conservation attitudes.

The survey was revised on an ongoing basis in English, with significant input from participants of pre-test surveys held in a public plaza in the city center of Todos Santos. The feedback received informed further refinements to the questionnaire, ensuring its clarity, understandability, and applicability to the intended audience.

As a result, the household survey included the following questions:

- Screening criteria (Section A)
- Perception of the coastal environment (Section B)
- Valuation method “Willingness to Pay” (Section C).
- Attitudes towards environment conservation and economic development (Section D)
- Social Capital (Section E)
- Demographic information (Section F)
- Livelihood / source of income information (Section G)

The finalized version of the questionnaire was translated into Spanish and revised on a rolling basis by me and two other bilingual members of the research team. Subsequently, I informed the Delegado in Todos Santos to obtain approval for beginning the administration of the household survey.

4.1.2.2 Sampling Procedure and Survey Administration

The target population was the residents of Todos Santos, consisting of 7,185 residents (INEGI, 2020). To establish the sampling frame, I obtained a gridded map of Todos Santos from the municipal delegate's office and used a random sampling technique based on the map's grids. Each grid contained several manzanas or neighborhoods and was assigned a number and randomized using Excel. The maps provide a basic sampling frame by roughly outlining the units of analysis from which to sample (Bernard 2006:149). Manzanas – neighborhoods, and lots divide the grids in the community on the map. However, the maps do not specify whether houses are situated on these lots, and there is no comprehensive database that includes information about both the residents and property owners within the study area.

Grids on the maps were randomly selected to ensure an unbiased survey of the community, resulting in the creation of a random sample. As Bernard (2006:161) notes, "by creating a series of essentially random chunks of different sizes, you distribute the error you might introduce by not knowing the density and that distribution lowers the possible error."

I administered both pilot and final surveys with the assistance of nine surveyors who are members of a volunteer network collaborating with the local government. These surveyors were recruited from a women's volunteer network, which is managed by a team of teachers and other social workers. Prior to engaging in fieldwork, I held 2 training sessions of 2-hour each, during which I ensured that surveyors understood and were familiar with the content, subject matter, and methodology of the surveys. I asked surveyors to repeatedly practice administering the survey and provided feedback on tone, pace, and performance to ensure they gained an acceptable level of comfort with the surveying technique. Each survey took approximately 15 to 20 minutes to complete.

Overall, 443 household surveys were administered, which, given the 2,065 households (INEGI, 2020) in Todos Santos and following Dillman's (2007) sample size calculations, constitutes a reasonable sample size that can be deemed representative.

4.1.2.3 Analysis of Survey Data

The household survey data was transcribed and entered into Excel to produce a database. The quantitative analysis of the survey data included descriptive statistics,

frequency distributions, and central tendency measures, using pivot and frequency tables in Excel. Furthermore, this database, along with data from previous studies conducted in Baja California Sur, served as the basis for creating graphs to visually represent trends and patterns. Additionally, tables were created to summarize and rearrange the data for validation and comparison of frequencies, offering different perspectives and insights into the characteristics of the data.

The data obtained from the answers to open-ended questions of the household survey were also analyzed through in-depth content analysis, in order to identify, analyse and report patterns within the gathered data (Braun & Clarke, 2006). Content analysis is a research method used to identify respondents' intentions, trends, or relationships within the database, as well as to analyze interviews, field research notes, or conversations, and to describe attitudinal and behavioral responses. By using this analysis, I was able to complement quantitative data that helped me uncover insights that can inform strategic planning and program implementation.

4.2. Doctrinal Legal Research

Legal research is the process of identifying and retrieving information necessary to support legal decision-making. It begins with an analysis of the facts of a problem and concludes with the application and communication of the results of the investigation (Barkan et al., 2015).

To address the challenges impacting the community and explore enhanced approaches for managing their coastal environment, I conducted a comprehensive examination of the current legal framework in Mexico, with a specific focus on its implications for the community of Todos Santos. The objective was to determine the necessary measures to overcome these challenges. During my legal research, I examined several legal research methods, with three emerging as the most suitable: Empirical, Comparative, and Doctrinal legal research. Empirical research is a specific type of non-Doctrinal research that relies on the collection and analysis of empirical data to study legal behavior, attitudes, and the impact of legal policies in society (Chakraborty, 2015). Comparative research, on the other hand, analyzes legal systems in different jurisdictions, uncovering similarities and differences that provide valuable insights for legal analysis and reform (Abugu, 2021). In contrast, Doctrinal legal research

involves the examination and interpretation of legal sources, such as statutes and case law, to understand and apply legal principles (Bhat, 2020). It simply means reviewing and studying different legal documents and other sources of legal information and then arriving at a comprehensive answer to the initial question posed through the use of reasoned interpretation.

As a result, when analyzing the current laws, policies, and regulations governing the coastal environment in Todos Santos, Doctrinal legal research presents several advantages over non-Doctrinal and Comparative legal research methods. By examining primary legal sources such as national and local legislation, case law, and administrative regulations, researchers gain a comprehensive understanding of the specific legal framework relevant to coastal management.

Additionally, Doctrinal research provides the necessary foundation for policy recommendations. By analyzing the existing legal framework, researchers can identify gaps, inconsistencies, or areas that require improvement (Singh, n.d.). From this analysis, policy measures can be recommended that can make the most of the current laws, policies, and regulations or propose enhancements.

In contrast, non-Doctrinal legal research, such as sociological analysis or empirical studies, may offer valuable insights into social dynamics, environmental practices, and stakeholder perspectives. However, it may not achieve the same level of insight in identifying specific legal gaps or inconsistencies. Comparative legal research, while helpful in understanding alternative approaches or jurisdictions, may not fully consider the distinctive legal context of Todos Santos and its specific challenges.

Therefore, in analyzing the current laws, policies, and regulations concerning the potential enhancement of local coastal management in Todos Santos, the chosen and most practical approach for this research is the Doctrinal legal research method.

4.3. SWOT Analysis

SWOT is a method used to evaluate the ‘strengths’, ‘weaknesses’, ‘opportunities’ and ‘threats’ involved in an organization, a plan, a project, a person, or a business activity. (Gürel, 2017). A SWOT analysis has become a fundamental tool for

organizations to evaluate their position in the market and is widely used to analyze the internal and external environments of organizations. (Rozmi et al., 2018).

SWOT, developed by Stanford University in the 1960s and 1970s for business firms, is a technique that involves devising strategies to leverage strengths, mitigate weaknesses, seize opportunities, and defend against threats (Vafaei, 2010).

4.3.1. SWOT Analysis of Environmental Issues

SWOT analysis can be a useful tool for the strategic planning component of environmental management. (Nikolaou & Evangelinos, 2010). It has been used for environmental management, specifically with the ecosystem services approach. (Bitoun et al., 2022). Previous studies used SWOT analysis to assess the ecosystem services framework itself (Bull et al., 2016) or to assess the opportunities for integrating ecosystem services into existing policy documents (e.g., Atumane & Cabral, 2021; Inkoom et al., 2017). Halla (2007), by using this method, conducted a strategic urban development planning process based on the case of Dar es Salaam in Tanzania and concluded that the method is stronger than the procedural or master-planning approach for planning in cities. Similarly, Nikolaou & Evangelinos (2010) used this framework to examine the strengths, weaknesses, opportunities and threats for the Greek mining and mineral Industry in implementing environmental management strategies; the authors claimed that the results could facilitate improved environmental performance.

Regarding the methodologies employed in SWOT studies, survey questionnaires are widely used methods of collecting data (Benzaghta et al., 2021), as observed in the works of Dawes (2002) and Hjermstad et al. (2011). Dawes (2012) has even contended that incorporating a five-point scale in items can enhance SWOT findings and lead to a high level of reliability. Furthermore, similar to Lozano (2007), conducting visits to the research area in order to get to know the opinions of the local authorities and residents of the area through semi-structured interviews serves as another valuable approach for data collection. It is evidently demonstrated by those studies that the SWOT analysis approach is a better tool for investigating problems from a strategic perspective (Yuan, 2013).

Thus, by conducting a thorough SWOT analysis, groups and organizations can develop tailored strategies to protect natural coastal environments. These strategies may involve implementing conservation initiatives, promoting awareness and education, and advocating for policies that prioritize the preservation of coastal ecosystems. Furthermore, when SWOT analysis is correctly applied, it is a very appropriate technique to identify recommendations for organizations, economic policy, and public administrations (Lozano, 2007).

4.3.2. Alternatives to SWOT Analysis

4.3.2.1 Pressure-State-Response (PSR) Framework

The Pressure-State-Response (PSR) framework was conceived by Statistics Canada (Friend & Rapport, 1979) then further developed and adopted internationally in many countries. The Organization for Economic Cooperation and Development (OECD) later adopted this framework for environmental reporting (Waheed, 2009). A typical PSR model includes three components: pressures, states, and responses, and it has been widely adopted as a tool for sustainability assessment in many fields (Li et al. 2021). The PSR indicators propose to evaluate the pressures of human activities on environmental states and to provide political responses in order to reach a “desirable state”.

PSR indicators provide a useful and simple tool to formalize environmental problems due to its intuitive structure—human pressure on the environment and political responses to adopt solutions. (Levrel et al. 2009). However, while the PSR framework is valuable for ecological analysis, the PSR model was developed for measuring environmental sustainability (Li et al. 2021). The PSR framework has been criticized for its challenges in linking the three PSR framework indicators suggesting it oversimplifies complex social and ecological interactions. (Levrel et al. 2009 – ibid)). Moreover, it focuses primarily on the cause-effect relationships and may not provide a comprehensive understanding of legal gaps or policy implications.

4.3.2.2. PESTEL Analysis

PESTEL analysis is a strategic framework used to analyze and monitor a system's macro-environment (Øivind Madesn & Ove Grønseth, 2022). PESTEL stands for Political, Economic, Social, Technological, Legal and Environmental factors. A

PESTEL analysis is often used as an exhaustive, comprehensive fact-finding exercise that assists an organisation in determining the external variables that may affect internal choices. (Martinez-Contreras, 2022). This analysis framework can provide an advance warning of potential threats and opportunities. Additionally, it may help devise ways to mitigate risks and enhance their chances (Pathak 2021). However, the most significant disadvantage of the model is it is only based on an assessment of the external environment and the data used may be based on assumptions that later may prove to be unfounded. (Oxford College of Marketing, 2016).

SWOT analysis, on the other hand, is ideal for evaluating internal and external factors affecting a specific location, making it suitable for focused assessments of local coastal environments. Thus, when conducting an analysis of the natural coastal environment at a specific site, using SWOT analysis is more practical and effective. SWOT analysis is very familiar, user friendly, and does not require computer systems or software (Beeho & Prentice, 1997). It allows for a targeted evaluation of the site's strengths, weaknesses, opportunities and threats and the development of site-specific conservation strategies.

In conclusion, I found the SWOT analysis to be the most appropriate method for this research context. It offers a comprehensive approach for understanding site dynamics and formulating conservation strategies and policy recommendations to improve coastal management.

Chapter 5. Results / Analysis

In this chapter, I present the outcomes of the research using three distinct methods: a household survey, including insights from community leaders through semi-structured and informal interviews, a legal analysis, and a Strengths, Weaknesses, Opportunities, and Threats analysis (SWOT). Section 5.1 shows the results from the demographic and attitudinal analysis conducted through the survey. Section 5.2 explores the findings stemming from the legal analysis. Lastly, Section 5.3 presents the outcomes drawn from the SWOT analysis.

5.1. Demographic and Attitudinal Analysis

5.1.1. Demographic Characteristics

In this section, I provide details concerning the demographics, livelihood, and community resources of the respondents, as reported by the household survey, along with a comparative analysis with census data for the state of Baja California Sur.

With regards to the demographic composition of the survey sample, the results indicated a gender distribution of 55% women and 45% men, differing from the gender breakdown in the broader state population, where women account for 49.2%, and men for 50.8% (INEGI, 2020). This difference showed some influence on the overall views expressed in the survey, a point I will elaborate on further ahead. The mean age among the respondents was 45 years, with participants ranging from 18 to 92 years of age. It's important to note that individuals below 18 years of age were unable to take part in the survey, but there was no upper age limit for inclusion. In contrast, census data for the year 2020 indicates a mean age of 29 in the state. This difference in mean age can be attributed to the exclusion of all residents below the age of 18 (Appendix D).

The average household consists of 4.1 occupants, with the sample ranging from 1 to 15 individuals. This differs slightly from the census, which saw an average of 4 occupants in the year 2000, decreasing to 3.3 in 2020 (INEGI, 2020). Among the surveyed residents, an average of 2.2 individuals were actively employed.

In terms of education, 32 % of respondents obtained a high school education, 28% secondary education, 27% elementary education, 8 % university education, and 5% report receiving graduate education, other education, or no education at all. Respondents, on average, have completed about 10.5 years of formal education, ranging from a minimum of zero to a maximum of 19 years. This finding is consistent with the statistical data pertaining to Baja California Sur, indicating that individuals aged 15 and older usually attain 10.3 years of formal education. Moreover, it correlates with the observation that 98% of the community is literate (INEGI, 2020).

5.1.2. Livelihood and Resources

Approximately one-fifth of the sample's first source of income was directly related to employment in tourism (18%), followed by sales and services (17%), and subsequently by construction (16%). For the second source of income, the results reveal that the three most frequent employment activities are similar to the first source, with (30%) employed in tourism, (28%) in sales and services, and (10%) in construction. These results closely align with the 2019 economic census data for the state of Baja California Sur (INEGI, 2019) where tourism, retail, and services captured most people. Remaining employment activities are listed in order of frequency in Figure 3. Approximately three-quarters of respondents (71%) earned an income greater than $5,000 pesos/month. Moreover, reported earnings peaked with the ($5,001 – 8,300 pesos/month) and ($8,300 – 16,600 pesos/month) income categories, with 34% and 28% of responses falling in these ranges, respectively. Overall, the average income for Baja California Sur was $8,600 for the year 2021 (ENOE, 2021).

One-third of the low-income earners, representing 3% of the respondents, earn less than 2,500 pesos/month and are unemployed, receiving income through remittances, pensions, or other sources. By comparison, the state unemployment rate was 3.6% (ENOE, 2021). The frequency distributions of reported sample incomes are depicted in Figure 4.

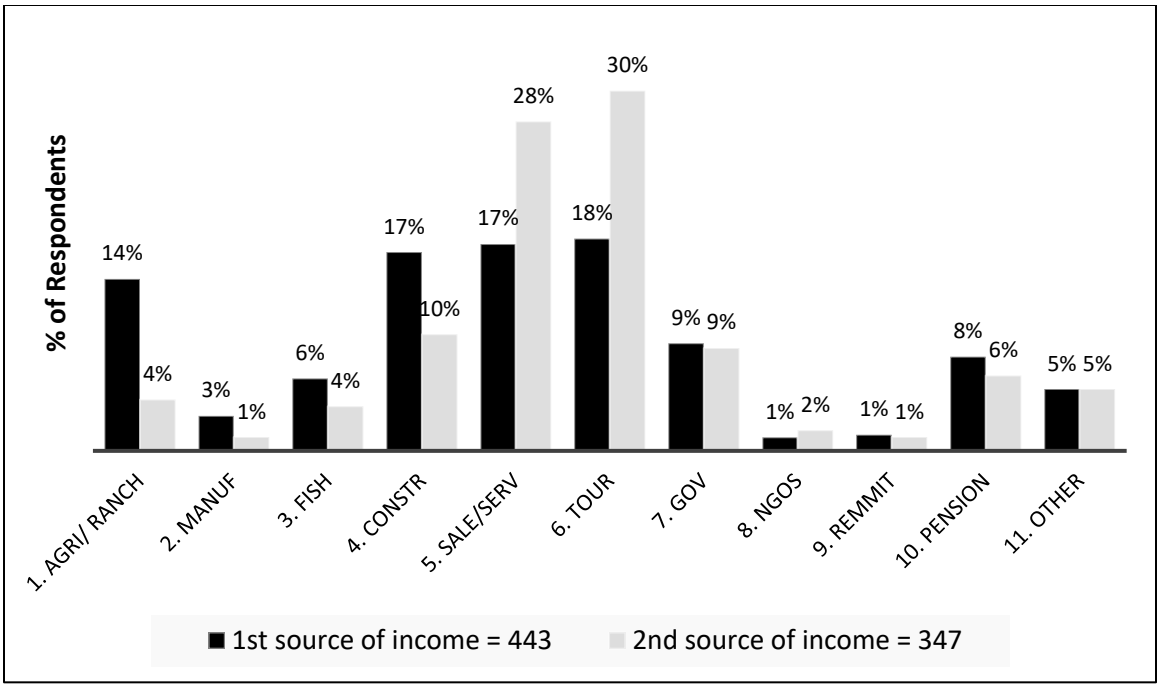

Figure 3 Reported Employment Activities in Todos Santos by Primary and Secondary Income Sources, 2021

Source: Survey Data

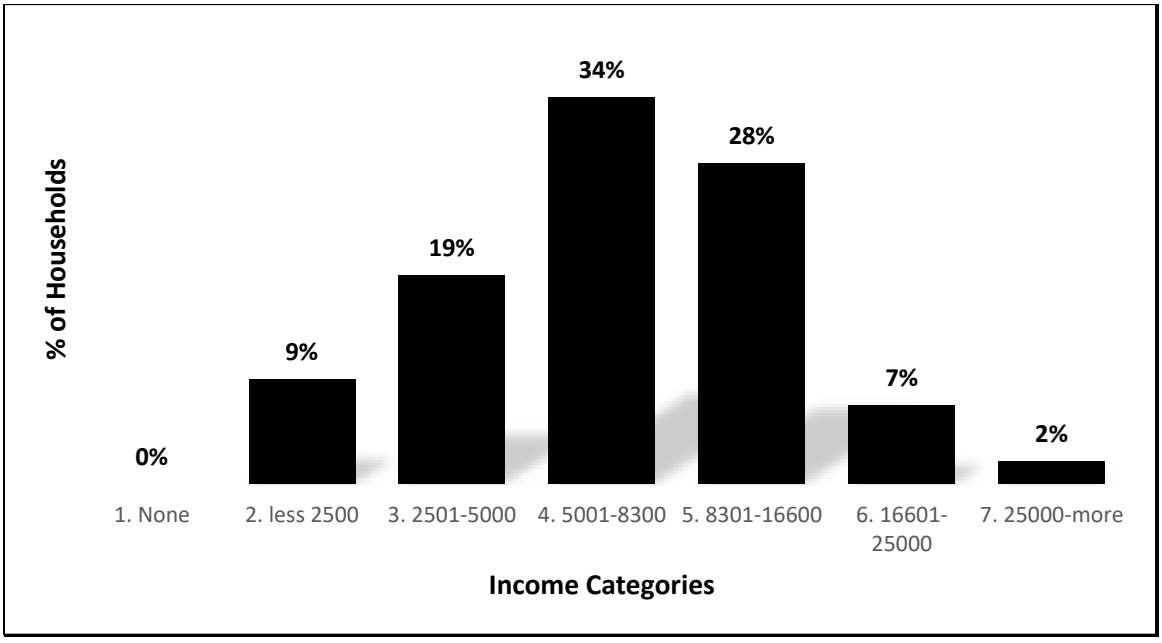

Figure 4 Reported Household Income by Income Ranges in Todos Santos, 2021

Source: Survey data

5.1.3. Social Capital Characteristics

In this section, I describe the social capital attributes identified in Todos Santos, considering demographic and livelihood factors for their relevance. Subsequently, I analyze social capital variables and provide an overview of three components: trust, reciprocity, and exchanges, as well as connectedness in networks and groups within the community. Following this analysis, I compare the findings on social capital with those of previous studies conducted in different towns in Baja California Sur.

Trust facilitates cooperation by minimizing transaction costs between people. Reciprocity and exchanges not only boost trust but also contribute to the development of long-term obligations between individuals. Connectedness in networks and groups refers to individuals participating in groups or associations within the community and the connections between these groups and other agencies, whether inside or outside the community (Pretty and Ward, 2001).

First, I assessed social capital using the aforementioned components. Similar to Sawatsky (2008), I measured relations of trust by asking respondents if they feel that most people within and outside of Todos Santos can be trusted. Subsequently, I assessed reciprocity and exchanges by asking respondents the number of days they contributed to community activities and volunteering, and also the number of days that respondents regularly visit their neighbours in a 2-week period. Finally, to assess connectedness in networks and groups I asked respondents if they were members of any group or association in Todos Santos (e.g., ejido, fishing cooperative, environmental group, political party, religious group, etc.). I conclude by comparing these analyses with previous studies on social capital in Baja California Sur.

5.1.3.1. Relations of Trust

Slightly more than half the respondents do not trust the people in the community. The values are 51% that do not trust the people versus 36% that do trust, the remaining people do not know if they trust people in their community. For the trust in people outside Todos Santos the difference in values was even more significant than for trust in people in the community. The percentage of people who do not trust people outside Todos Santos is 64%, while those who do trust is only 12%. The remaining people do not know if they trust people outside Todos Santos (Figure 5). This can be attributed to various

factors, such as negative past experiences with other community members or groups, changes in social values, or the perception of newcomers as potential disruptors to the status quo, as conveyed by some community members during informal conversations in the field.

Despite the low levels of trust, these values suggest that Todos Santos is more trusting than the values recorded by the World Values Survey for Mexico (2018) as a whole, where only 10% of people have trust in most people and 89% of people think that one should not be too trusting.

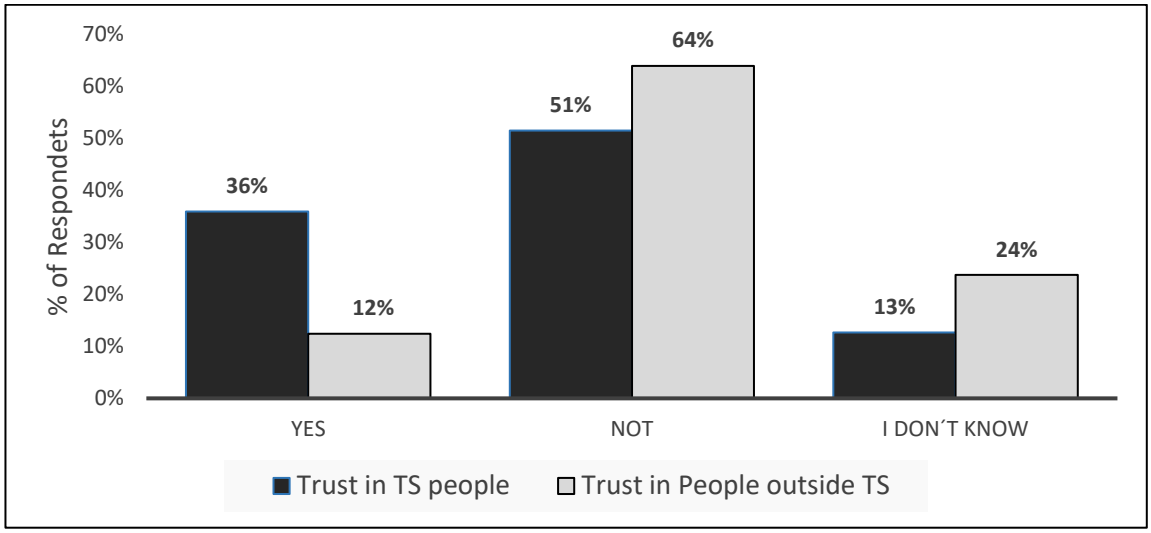

Figure 5 **Percentage of Survey Respondents in Todos Santos That Trust People in the Community and Trust People Outside the Community, 2021**

Source: Survey data

Regarding the perceptions of trust within the community in relation to the number of years respondents have lived in Todos Santos. Respondents who trust most people within the community have, on average, lived in the community for 38.4 years, while those who do not trust most people have lived in the community for an average of 40.8 years.

On the other hand, in the perceptions of trust outside Todos Santos, respondents who trust most people outside the community have, on average, lived in the community for 29.4 years, whereas those who do not trust most people have lived in the community for an average of 41.5 years. This can be ascribed to limited interaction with both

national and international newcomers, cultural differences, as well as past conflicts and negative experiences with outsiders, as noted by some community members.

5.1.3.2. Reciprocity and Exchanges

The survey results reveal that volunteering in Todos Santos is relatively limited, with an average of just 2 days of volunteer work (0.5%) over the past twelve months. Interacting with neighbours shows a slightly higher level of engagement, as respondents visited their neighbours for an average of 2 days (14.8%) during a two-week period. Additional analyses comparing these results to other studies conducted in Baja California Sur can be found in Section 5.1.3.4 (also see Table 3).

5.1.3.3. Participation in Groups

Various types of groups and associations operate in Todos Santos. These include social groups, environmental groups, neighborhood & community groups, school committees, political groups, sports groups, and religious associations. Among the 443 respondents, 265 individuals representing 60% of the sample are members in one or more groups or associations in Todos Santos. (Figure 6).

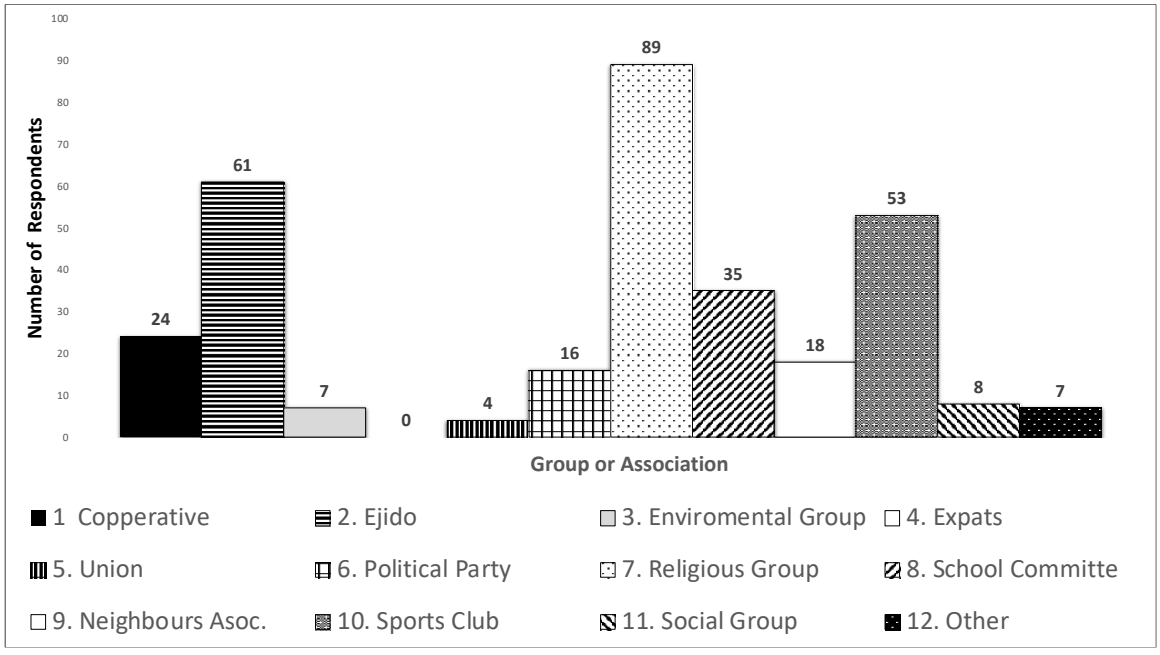

Figure 6 Number of Respondents in One or More Groups or Associations in Todos Santos, 2021

Source: Survey data

5.1.3.4. Comparing Todos Santos Social Capital with Other Baja California Sur Communities

In this section, I will draw on previous studies conducted in Baja California Sur to contextualize social capital in Todos Santos. A case study carried out in Magdalena Bay, Baja California Sur, Mexico, examined the social capital within three of its communities to assess the potential for nature-based tourism (Sawatsky, 2008). To facilitate a comparative examination of social capital in Todos Santos (TS), I directed my focus to two specific communities: Puerto San Carlos (PSC) and Puerto Adolfo Lopez Mateos (PALM). These two small fishing communities are located in the Municipality of Comondú, approximately 350 kilometers north of Todos Santos, with respective populations of 5,742 and 2,227 residents according to the 2020 census (Dirección de Informática y Estadística, 2023). Sawatsky's (2008) study employed a broader array of variables to scrutinize social capital. However, for the purpose of comparison, I specifically focused on five of those variables — two associated with trust and three with reciprocity and exchange — as well as on connectedness in networks and groups, which were used in my research. Results for the comparison are outlined in Table 3.

To carry out the comparison, I adapted and reassessed the variables from Sawatsky's (2008) study to align with the specific variables employed in my research. The comparison reveals higher levels of trust variables in PALM compared to both PSC and TS. Additionally, concerning reciprocity and exchange variables, the number of days respondents spent visiting neighbours in a two-week period is higher in PALM than in both PSC and TS.

Similarly, the number of days volunteering in a twelve-month period is higher in PALM but equal in PSC and TS. Conversely, the number of days spent outside the community is higher in TS, followed by PSC and PALM respectively (Table 3). Todos Santos is characterized by lower levels of trust, and in general low levels of reciprocity and exchange.

Table 3 Comparison of Social Capital Variables Across Towns in Baja California Sur by Percentage and Numerical Values

Social Capital Variables		TS	PSC	PALM
Trust	Trust in most people within the community (%)	36%	39%	72%
	Trust in most people outside of the community (%)	12%	16%	34%
Reciprocity	Days visiting neighbours (visits/2 weeks)	2.0	4.8	6.6
	Days volunteering (days/12 months)	2.0	2.0	3.2
& Exchange	Days outside Todos Santos (days /12 months) *	10.0	6.1	4.7

* (Sawatsky, 2008) Times outside the Municipality (times / 12 months).

Source: Data Survey and Results from Sawatsky (2008)

In summary, the configuration of social capital in Todos Santos might be associated with decreased interaction among residents. This can be partly attributed to the seasonal nature of the community, marked by the influx and outflow of people, as well as the diverse backgrounds of residents—either local, nationals from other parts of mainland Mexico, or international—and the size of the community.

Moreover, low levels of trust within and outside the community can be attributed to past conflicts and negative experiences with other groups within the community or with outsiders. The perception of newcomers as potential disruptors to the current social fabric and the relaxed atmosphere in the community fosters a sense of reluctance to trust. These factors shape some of the social capital characteristics of Todos Santos, influencing the dynamics of interaction and the levels of trust among its residents.

Regarding the number of respondents who are members of a group or association, there are significant differences among the communities. Membership is highest in Todos Santos, followed by PSC, and subsequently by PALM (Table 4).

Table 4 Comparison of Participation in Groups or Associations Across Communities in Baja California Sur by Percentage and Number of Respondents

Social Capital Variable			Todos Santos			P. San Carlos			P. Adolfo Lopez M	
		Total number of respondents	n	%	Total number of respondents	n	%	Total number of respondents	n	%
Connectedness in networks and groups	Membership in Groups / Associations	443	178	40%	277	47	17%	211	23	11%

n= Number of respondents participating in a group or association

Source: Data Survey and Reults from Sawatsky (2008)

Participation in groups or associations has been tied to a variety of positive outcomes, some of them include lower crime rates, improved local economy and civic welfare and higher rates of voluntary participation (Whitman, 2012). Participation in voluntary associations entails commitments to organized groups, fostering enduring and closely-knit bonds (Welzel, 2005). Thus, when community members are connected through various associations, they can respond more effectively to challenges and are often better positioned to advocate for their interests. In Todos Santos, where community participation in groups and associations is notably high, the most significant resource management benefit lies in the creation of a cohesive and empowered community. This engagement can foster collaborative decision-making, community-led conservation initiatives, and effective enforcement of regulations.

On the other hand, low levels of community trust, volunteering, and visiting neighbours can have implications in coastal and resource management. Challenges arise in the implementation of community-wide projects, such as conservation programs or sustainable tourism efforts. Additionally, insufficient levels of interaction with neighbours and limited participation in community activities can result in social fragmentation, creating obstacles in building the trust and cooperation essential for effective resource management (Walker et al., 2022).

5.1.4. Importance of the Coastal Zone in Todos Santos

In this section, I communicate the findings of the attitudinal analysis based on the data collected from the household survey. I begin by presenting the community's perceptions of the coastal environment. Following that, I then examine the residents' perspective on economic development in the study area. Lastly, I discuss their attitudes towards both environmental conservation and economic development.

5.1.4.1. Perception of Coastal Environment

Survey participants were queried about their familiarity with the coastal environment, such as sand dunes, coastal lagoons, palm trees, and mangroves. I found that 72% of respondents expressed a degree of familiarity, with 19% indicating a high level of familiarity (Appendix C). Furthermore, participants were asked about the importance of coastal sand dunes in protecting against flooding from hurricanes, which can impact groundwater and farmlands.The results indicated that 85% regarded this protection as highly important, while 14% considered it somewhat important (Appendix D).

Additionally, the survey queried the participants on the importance of benefits provided by the coastal environment of Todos Santos, such as enjoyment of natural landscapes and beaches, the presence of habitats for different species like sea turtles and birds, and the provision of materials like palm leaves. Habitat provision for species provided by the beach was considered the most valuable benefit by two-thirds of the respondents, followed by enjoyment of the beach and natural landscapes. The provision of materials such as palm leaves was ranked third by a significant margin (Figure 7). These findings are consistent with the results obtained by Rodriguez-Revelo et al. (2018), who conducted a literature search in international and local scientific bibliography databases for the Baja California Peninsula and found that the habitat function was the most frequently cited ecosystem service on the Pacific Ocean coast of the Peninsula.[3]

[3] According to the list of 25 ecosystem services offered by coastal dunes provided by Everard et al. (2010). These services are categorized based on the four ecosystem functions considered by the Millennium Ecosystem Assessment (MEA) in 2005.

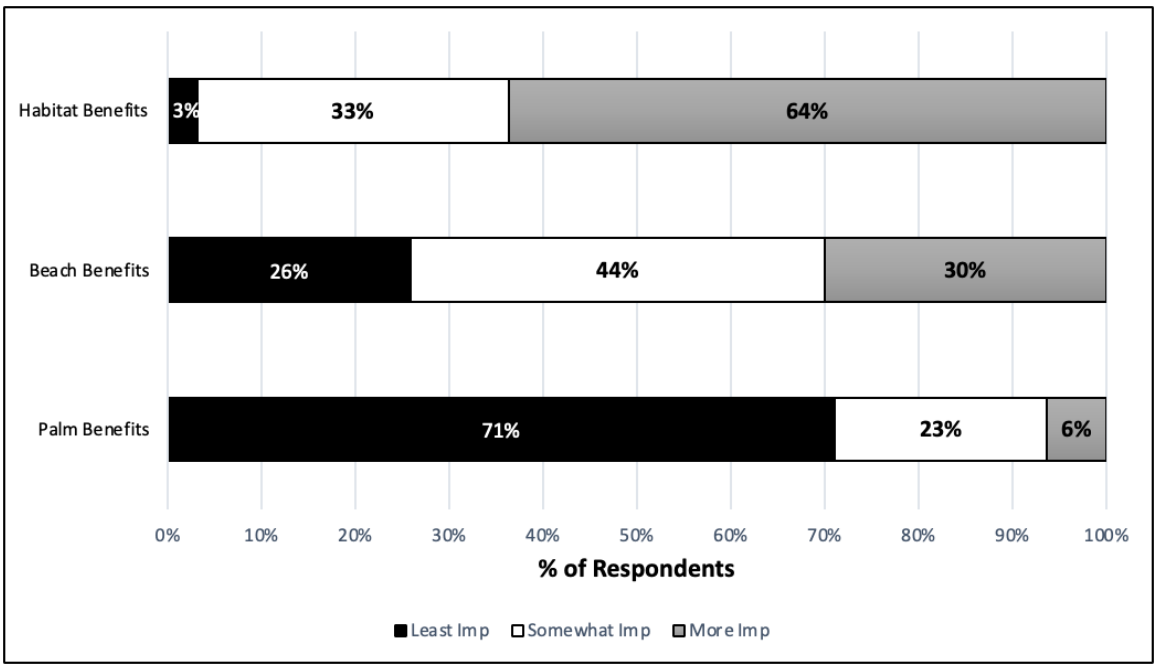

Figure 7 Percentage Distribution of Coastal Environmental Benefits in Todos Santos, ranked from Least to Most Important

Source: Survey data

5.1.4.2. Economic Development

The survey included questions regarding the residents' perspectives on the relationship between economic development and the environment in Todos Santos. Participants were presented with several potential economic activities, including small tourist developments, large hotel developments, beachside residential developments, port & industrial activities, and agriculture & fish hatcheries. They were asked to indicate which of these options were important or not important and from them, to identify the activity they considered the most important (Figure 9).

I further found that respondents prefer small tourism developments like whale watching, sport fishing, and restaurants, followed by traditional activities such as agriculture and fish hatcheries, and port and industrial activities. Thus, large hotel developments and beachside residential developments were not favored by the residents (Figure 8). The preference for agriculture and fishing, as well as industrial and port activities over large hotel and beachside residential developments can be attributed to respondents' views that they provide better and more stable jobs. Additionally, during informal conversations in the field, some respondents conveyed that these activities do

not necessarily require newcomers or settlement in sensitive areas within the community.

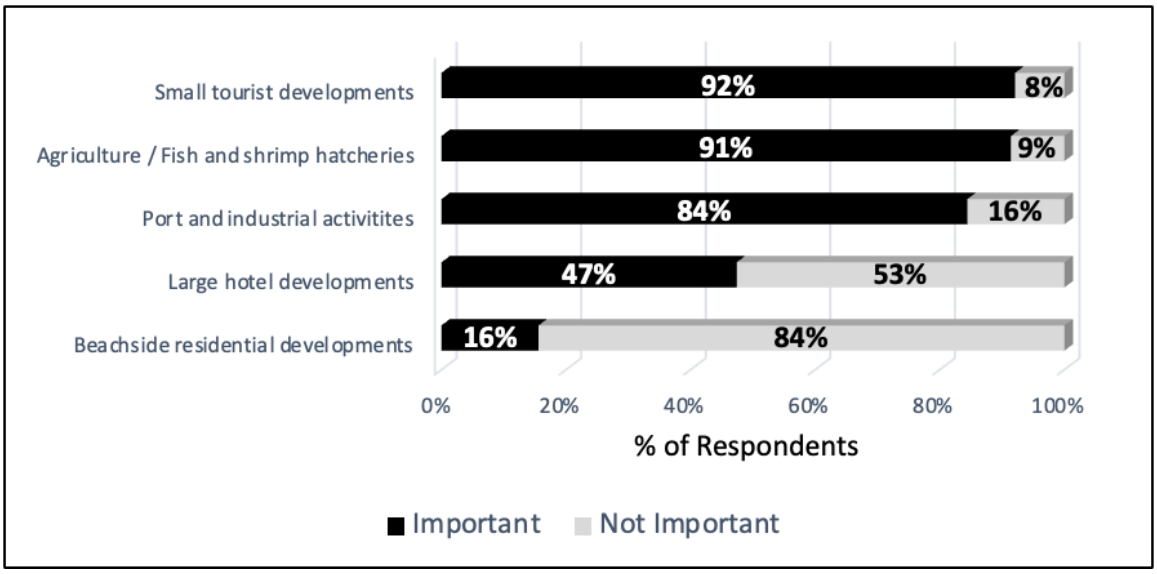

Figure 8 Percentage Distribution of Preferred Economic Activities to be Developed in Todos Santos in the Future.

Source: Survey data

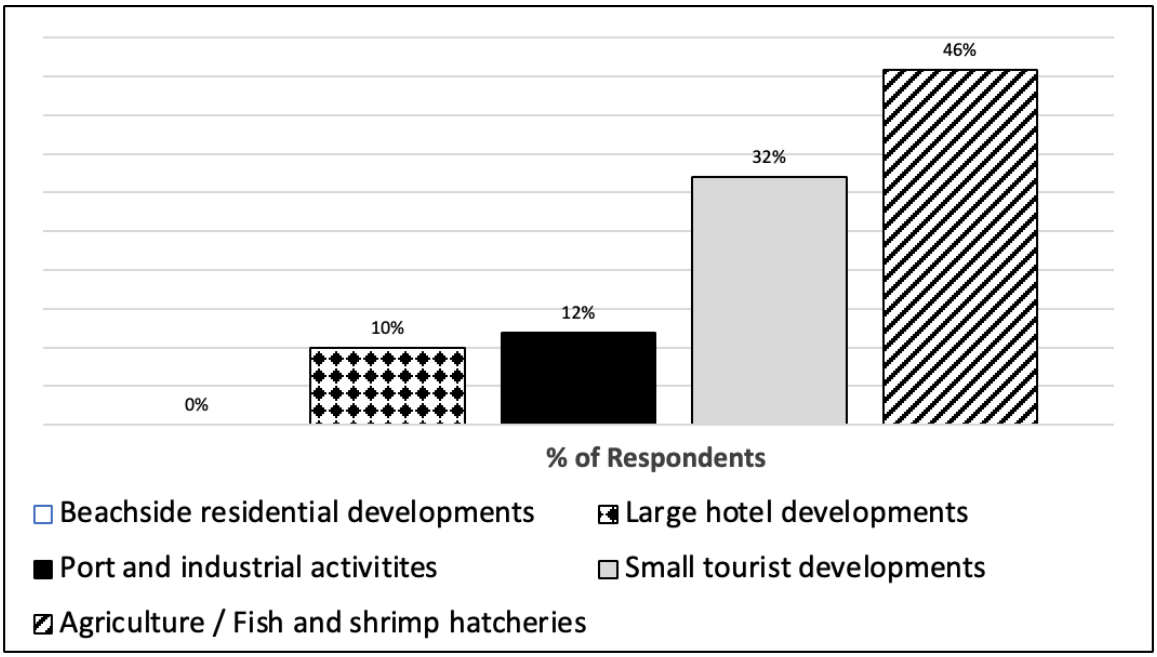

Figure 9 Percentage Distribution of Preference of the Most Important Activity to be Developed in Todos Santos in the Future.

Source: Survey data

5.1.4.3. Attitudes Towards Environmental Conservation and Economic Development

Participants were asked to express their opinions concerning the environment. For environmental attitudes, I included a modified version of the New Environmental Paradigm (NEP).[4] These statements focused on various attitudes related to conservation, government participation, risk, biocentric, and anthropocentric views. Respondents primarily indicated agreement or strong agreement towards attitudes associated with conservation and biocentric views, including support for a more active role of the government in environmental protection. This suggests possibilities for collaboration between the community and government agencies in coastal management, as well as increased support for policies prioritizing environmental conservation and protection. Therfore, these findings can have positive implications for coastal management by promoting conservation-oriented policies, fostering stakeholder engagement, and encouraging collaborative efforts towards sustainable coastal development.

The sample was divided concerning environmental attitudes related to environmental risk and anthropocentric views. Indeed, the sample demonstrated polarized views about whether humans have the right to modify the environment and whether risk of harm to the environment is justified when the benefits of development are high (Figure 10). These divergent opinions reveal varying perspectives on balancing human activities, environmental preservation, and development benefits. Such differences can have several implications for coastal management decision-making, leading to potential challenges in achieving consensus on management strategies, policies, and environmental protection priorities. However, they also present opportunities for fostering dialogue, collaboration, and innovative approaches for effective coastal management.

[4] The NEP was developed in 2000 (as a revision of a 1978 version) as a measure of environmental worldview. The NEP scale consists of 15 statements regarding the relationship between humans and the environment (Dunlap, 2008). To expedite the survey process, the scale employed in this study was condensed to five questions.

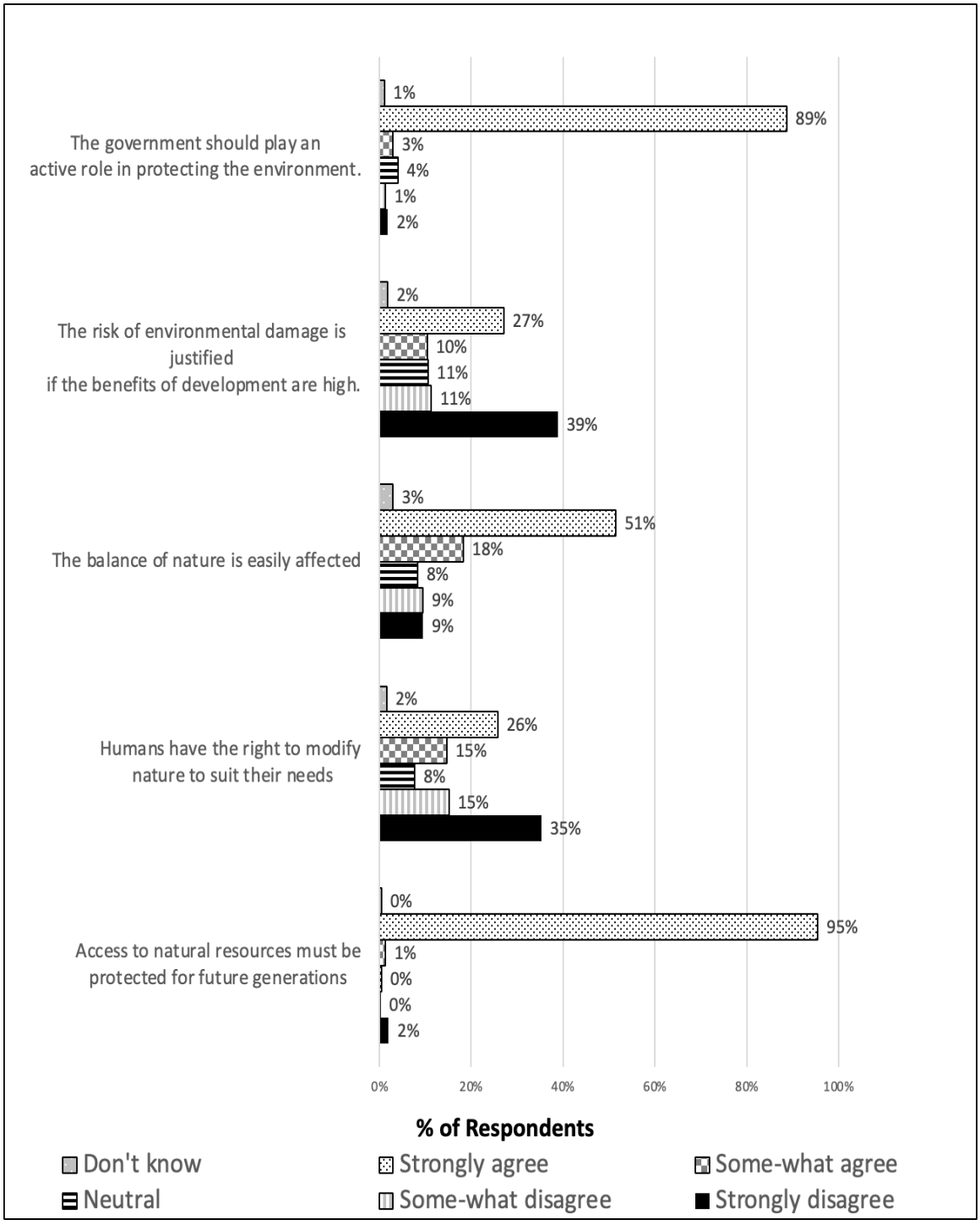

Figure 10 Attitudes Towards Conservation in Todos Santos
Source: Survey data

5.1.5. Community Characteristics and Attitudes Diagnosis

Todos Santos exhibits a unique combination of demographic characteristics and community attitudes that significantly influence the prospects and challenges associated with coastal management in the region. The large number of young residents in Todos Santos suggests a potential for innovative coastal management strategies. Additionally, the community's education levels suggest openness to environmental education, promoting informed decision-making and environmental awareness.

Regarding the gender distribution in the survey sample, the overrepresentation of women may have influenced the overall attitudes and views expressed. An example of this arose during the interviews where some female respondents revealed a preference for avoiding visits to neighbors due to past conflicts among community groups, suggesting a potentially lower level of trust than their male counterparts. Despite this preference, these women continued to support their husbands and family members who were associated with various community groups and they themselves continue to actively participate in various community groups, including religious or school associations.

In the context of social capital, while low levels of community trust and volunteering may pose challenges, the high participation in groups or associations provides a potential platform for fostering community collaboration in conservation initiatives. Therefore, effectively leveraging existing group participation is crucial for engaging the community in coastal management initiatives.

Moreover, to increase social participation in promoting improved coastal management in Todos Santos, several mechanisms can be implemented. These include organizing community and town hall meetings to discuss coastal management issues with decision-makers, collecting opinions from the community, promoting education programs, involving community members in the decision-making process, and ensuring information transparency. These mechanisms aim to empower the community, foster a sense of ownership in the decision-making process, and enhance trust among community members and between the community and external stakeholders.

Regarding the perception of the coastal environment, economic development, and attitudes towards conservation, recognizing the value of ecosystem services and

preferring small tourism projects and agriculture, over large-scale tourism projects indicate a potential conservation-oriented mindset. Prioritizing these preferences in coastal management is crucial for ensuring community support. With respect to the attitudes towards conservation, the community's support for an active government role in environmental protection indicates possibilities for collaboration between the community and government agencies in coastal management. Leveraging this support can lead to more effective enforcement of conservation measures.

5.2. Legal Analysis

In this section, I present the results of the legal analysis conducted to identify and examine the effects of the legislative dynamics on the implementation and enforcement of the legal framework for coastal management and the preservation of the natural coastal environment across the three levels of government.

This analysis identified thirteen legal instruments that influence the use and management of the natural coastal environment in the study area. Seven of these are federal laws, forming the core legal framework for the environment in Mexico. Additionally, four Mexican Standards provide different levels of protection to coastal areas, and the remaining two consist of state and municipal regulations dedicated to safeguarding and preserving natural resources. See Appendix E for a detailed presentation of analysis of these legal instruments for coastal management.

More specifically, my legal analysis considered the constitutional provisions related to wetland protection, the relevant environmental laws concerning the preservation of coastal environments, namely the General Law of Ecological Balance and Environmental Protection (LGEEPA), the General Law of Sustainable Forest Development (LGDFS), the General Law on Climate Change (LGCC), the General Law of National Assets (LGBN), the Federal Law of Rights, as well as various state and local regulations, and several Official Mexican Standards (NOMs) addressing the safeguarding of beaches and ecosystems such as sand dunes, mangroves, and lagoons. Below is a discussion of my key findings.

5.2.1. Sand Dunes Regulations

The coastal dunes are protected by federal ecological regulations, which establish the criteria for how and where to locate construction or infrastructure. The NMX-AA-120-SCFI-2016 standard establishes the requirements and specifications for maintaining the sustainability of beaches where sand dunes are located.

The Criminal Code for the State of Baja California Sur offers protection to coastal dunes as well. This code provides that any action harmful to the protected area and the ecosystems to be preserved is considered a criminal offense. This offense can be committed by the individual directly responsible, someone who did not prevent it, or someone who actively promotes such detrimental activities for profit, be they individuals or corporations. These crimes against the environment are described in several articles of the Criminal Code that also describe punishments and fines for occupation and encroachment, illegal change in land use, illegal waste disposal and illegal removal of soil and ground cover in a protected area or area of environmental value.

At the local level, regulations also protect the dunes along the Todos Santos coastline because of their critical role in offering coastal erosion protection, safeguarding homes from flooding, and creating a natural biological corridor facilitating wildlife movement. Since the enactment of the Todos Santos Urban Development Plan (PDU) in 2012, construction has been prohibited on the first and second line of dunes because they provide essential ecological services. Within the dune zone, only temporary items such as umbrellas, chairs, and hammocks are allowed. The installation of palapas or beams on the dunes is strictly prohibited. Furthermore, the PDU (2012) imposes restrictions on the use of motorized vehicles on the dunes. This measure aims to prevent erosion, safeguard natural grasses, and facilitate the secure passage of newly hatched and endangered sea turtles to the ocean by minimizing the impact of tire tracks.

In the study area, coastal dunes are deemed unsuitable for any agricultural, urban, or industrial purposes, and such activities are strictly prohibited in any form. In the event that someone fails to adhere to the guidelines established for the protection and conservation of this geographical area, the Federal Attorney for Environmental Protection (PROFEPA) assumes responsibility for enforcing the law. While PROFEPA is tasked with suspending irregular construction projects, it is the municipality of La Paz

that handles building permits for the Todos Santos region, causing confusion and highlighting the lack of accountability and enforcement due to a lack of coordination.

According to the Mexican Constitution, Municipalities have the authority to regulate, collect and manage the assets within their jurisdiction. However, they must operate in accordance with the provisions of Federal and State laws and policies, while still retaining their full legal prerogatives. In this context, despite the limited number of legal tools available for the conservation of coastal dunes, their protection unfortunately relies on fragmented levels of government that can lead to confusion, a lack of coordination, and potentially inhibit an integrated management of these ecosystems.

5.2.2. Mangroves Regulations

A review of the various laws and regulations safeguarding mangroves (and wetlands generally) revealed that mangroves fall within the scope of the General Law of Wildlife (LGVS) due to their classification as a species at risk. This classification stems from the exception stated in the second paragraph of article 1 of the LGVS, which reads as follows:

> *Article 1.- This Law is of public order and of social interest, regulation of the third paragraph of article 27 and of section XXIX, paragraph G of article 73 of the constitution. Its purpose is to establish the concurrence of the Federal Government, the governments of the States and the Municipalities, within the scope of their respective competences, regarding the conservation and sustainable use of wildlife and its habitat in the territory of the Mexican Republic and in the areas where the Nation exercises its jurisdiction.*
>
> *The sustainable use of timber and non-timber forest resources and species whose entire livelihood is water-dependent will be regulated by forestry and fisheries laws, respectively, except in the case of species or populations at risk.*

Mangroves were originally intended to be regulated by the Official Mexican Standard NOM-022-SEMARNAT-2003, which establishes the specifications for the preservation, conservation, sustainable use, and restoration of coastal wetlands in mangrove areas. The NOM seeks the preservation of mangroves; however, some canal works can be authorized with the destruction of areas in exchange for replacement. This legal confusion began with the addition of point 4.43 in 2004, to the initial NOM, to read as follows:

4.43.- The prohibition of works and activities stipulated in paragraphs 4.4 and 4.22 and the limits established in paragraphs 4.14 and 4.16 may be excepted provided that in the preventive report or in the environmental impact assessment, as the case may be, measures of compensation for the benefit of wetlands, and the corresponding land use change authorization is obtained.

The creation of compensation was interpreted by many environmental organizations as economic compensation mechanisms. The inclusion of point 4.43 in NOM-022, allowing environmental impacts as long as they were compensated financially, generated a series of reactions that culminated in the issuance of proposals and projects. These existing legal provisions have been a source of substantial debates and disagreements among the federation, states, and municipalities, given the impacts on their development plans in social, economic, and environmental terms.

Faced with this situation, in February 2007, article 60 TER was added to the General Wildlife Law seeking to improve the range of legal instruments available to environmental authorities and individuals to develop protection, preservation and non-extractive use projects of mangrove forests in the country, that reads as follows:

Article 60 Ter.- The removal, filling, transplanting, pruning, or any work or activity that affects the integrity of the hydrological flow of the mangrove is prohibited; of the ecosystem and its area of influence; of its natural productivity; the natural carrying capacity of the ecosystem for tourism projects; of the nesting, reproduction, refuge, feeding and juvenile areas; either of the interactions between the mangrove, the rivers, the dune, the adjacent maritime zone and the corals, or that causes changes in the ecological characteristics and services.

Works or activities that are intended to protect, restore, investigate, or conserve mangrove areas will be exempted from the prohibition referred to in the preceding paragraph.

It is noticeable that the addition of article 60 TER, above was not enough to prevent the degradation of the mangrove since this vegetation continues to be devastated even though these articles prohibit it for various situations. Despite existing laws and regulations, inadequate planning in urban, industrial, and tourist infrastructure, coupled with agriculture and aquaculture development, urban waste, pollutants, and oil-related activities, is the primary cause of mangrove deforestation (PROFEPA, 2023). As a consequence of this loss, Mexico ranks among the top ten countries with significant

mangrove deforestation challenges, averaging 10,000 hectares annually (CONANP, 2015).

On the other hand, the land where these ecosystems exist is regulated by other laws that have nothing to do with the preservation or conservation of natural resources, such as the General Law of National Assets (LGBN), which in its article 119, paragraph III mentions:

> *"[…] In the case of lakes, lagoons, estuaries, or natural deposits of marine water that communicate directly or indirectly with the sea, the twenty-meter strip of federal maritime-terrestrial zone will be counted from the point where the largest annual reservoir or limit of high tide reaches, in the terms determined by the regulation […] "*

In this way, the mangroves that live in the lagoons and estuaries of Mexico come to be considered within an area called the "federal maritime-terrestrial zone" (ZOFEMAT). The problem here is that the federal maritime-terrestrial zone is a legal instrument that serves to regulate land use - and sometimes used to privatize - the coastal areas of Mexico. Article 8 of (LGBN) also prescribes that:

> *"All the inhabitants of the Republic may use common use assets, without any restrictions other than those established by laws and administrative regulations. For special uses on common use assets, a concession, authorization or permit granted with the conditions and requirements established by law is required."*

The "special uses" mentioned in this article of the law are defined by another law, the Federal Law of Rights (LFD) which in its article 232-C, mentions the only four "Uses" that can be given to the beaches, reclaimed land and the federal maritime-terrestrial zone: General (meaning profitable), Protection (meaning do not disturb anything), Ornate (decorate without causing impact on the environment) and Aquaculture. These permits have costs and fees depending on the general income of the coastal region where the concession is obtained. Furthermore, it makes it clear that the land where mangroves live can be used for aquaculture (ironically, the main activity for which mangroves are lost worldwide).

In practice, the application of legislation to the mangrove ecosystem has been flawed, leading to changes in land use, ecological imbalances, and a threat to the diverse species reliant on this natural habitat. While the legislation states its commitment to protecting natural resources, it conflicts with this aim and instead may encourage

economic and social development agendas, by directly or indirectly endorsing activities that contribute to the modification or destruction of mangrove-inhabited areas.

5.2.3. Environmental Policy Instruments

Within the environmental policy instruments established in the General Law of Ecological Balance and Environmental Protection (LGEEPA), it is suggested in Article 19, Section IV of the law that ecological planning should consider the balance that must exist between human settlements and their environmental conditions. However, it is possible that this provision is not being interpreted and used as an instrument by government and society to promote sustainable land use (Oseguera et al., 2010). On the other hand, according to the provisions of Article 23, Section III of this law, it is necessary to promote the integration of residential and productive uses and to avoid affecting areas with high environmental value when determining areas for population expansion, which unfortunately has not been implemented properly.

Considering the aforementioned, it is worth noting that SEMARNAT, as established in the LGEEPA, requires (Article 28, Section X) that any "works or activities in wetlands, mangroves, lagoons, rivers, lakes, and estuaries connected to the sea, as well as in their foreshores or federal zones," have prior authorization (from the Secretariat) in terms of environmental impact. Furthermore, as discussed earlier, NOM-022-SEMARNAT-2003 delineates the specifications for preserving, conserving, sustainably using, and restoring coastal wetlands in mangrove areas. Nevertheless, it is important to highlight that the implementation of these measures has not been consistent. This inconsistency is evident in the historical establishment of human settlements in environmentally vulnerable areas, such as sand dunes, mangroves, and coastal lagoons as observed in the study area.

5.2.4. Summary and Conclusions for the Legal Analysis

The relationship between environmental laws in Mexico is evident; however, their practical implementation frequently falls short, leading to potential contradictions. Despite its robustness, the legal and normative framework concerning coastal and maritime zones lacks comprehensiveness. This deficiency, coupled with the involvement of numerous federal, state, and municipal government entities authorized to operate

within these areas, has led to the development of fragmented and disjointed public strategies.

The major limitations of this framework include excessive sectoral regulation, with a notable absence of specific laws for coastal management, inconsistencies and incongruences among various legal instruments, presence of legal gaps, conflicts, or disconnection between different levels of authority, and inadequate levels of monitoring and enforcement.

At the beginning of 2023, the Municipal Planning Institute of La Paz (IMPLAN), launched the process of updating the Subregional Urban Development Program (PDU) for Todos Santos, El Pescadero, and Playitas. The existing program, in effect since 2012, is now under comprehensive review and open for public consultation. The proposal to update the Regional PDU for Todos Santos raises concerns about the adequate implementation of environmental regulations. It appears to prioritize those regulations that only promote socio-economic development. Hence, conservation efforts face obstacles when they focus exclusively on socio-economic demands, and the preservation of natural ecosystems cannot be guaranteed if land use changes continue to be promoted and authorized without adherence to the existing legal framework designed to protect the environment.

5.3. SWOT Analysis

SWOT analysis helps further understanding of the conditions facing a community such as Todos Santos. It is particularly useful in identifying the advantages and associated opportunities, the obstacles to be avoided and finally the threats in the future. Furthermore, it helps to understand what is being done well and derive better actions to enhance, in this case, local coastal management.

In developing a visual presentation of the SWOT analysis, I relied on the outcomes from the household survey, including insights from community leaders through semi-structured and informal interviews, and the legal analysis (Figure 11). When elaborating the SWOT matrix, I followed Lozano (2007), and chose not to distinguish between common internal and external factors. I have found it more comprehensible to differentiate directly among strengths, weaknesses, opportunities, and threats.

Figure 11 SWOT Analysis: 4-Quadrant Diagram Depicting Identified Strengths, Weaknesses, Opportunities, and Threats in Todos Santos

5.3.1. Strengths

5.3.1.1. Advantageous Geographic Location

Nestled on the Pacific coast of the Baja California Peninsula, Todos Santos enjoys a strategically advantageous location. It is just a one-hour drive to the north of the bustling Cabo San Lucas via Highway 19, and similarly, merely an hour's drive southwest from the tranquil city of La Paz. This central placement has naturally made Todos Santos an obligatory stopover for travelers commuting between these two prominent cities. (PDU, 2012). Moreover, it serves as a destination in itself for expats seeking a less commercial and bustling environment. Due to its position on the Baja California Sur peninsula, Todos Santos is blessed with exceptional ecosystems. This geographic advantage enables the community to unlock its potential for growth in both primary and tertiary sectors.

5.3.1.2. Scenic Beauty: Beautiful Beaches and Landscapes

A remarkable characteristic of Todos Santos is its exceptional natural beauty. The town boasts beautiful golden sand beaches, awe-inspiring sunsets, and captivating landscapes that draw beachgoers, nature enthusiasts, and adventurers. These factors contributed to the Mexican government's decision in 2006 to designate Todos Santos as a “Pueblo Mágico,” a recognition granted only to small towns celebrated for their natural beauty, cultural treasures, and historical importance (Pueblos Mágicos, 2023).

5.3.1.3. Active Urban Development Program (PDU) with Community-wide Approval

The Urban Development Program, known as PDU in Spanish, was officially published in the State Government's Official Bulletin in August 2012. The community embraced the PDU more than a decade ago, aiming to rely on it to guide responsible growth and environmental preservation. It has been legally binding and active for over a decade, covering a coastline stretch of more than thirty miles up and down the coast from Todos Santos.

5.3.1.4. Large Numbers of Youth Concerned About Environmental Matters

The younger population in Todos Santos shows a significant commitment to environmental awareness. An important proportion of young residents between the ages of 18 to 42 in Todos Santos expressed heightened concern for environmental matters, as indicated by the household survey results. This demographic group shows a greater awareness of the coastal environment, places value on its benefits, and recognizes the vital role of dune protection. In contrast, older residents, ranging from 43 to 92 years old, show comparatively lower levels of concern in these environmental areas.

5.3.1.5. High Membership in Groups and Associations

The findings of the social capital analysis revealed that Todos Santos has a high number of community members engaged in various groups and associations. As noted by Whitman (2012), participation in groups or associations has been linked to several favorable outcomes, such as decreased crime rates, improved local economy and community well-being, and higher rates of voluntary participation.

5.3.1.6. Diverse Population from Many Originating Areas

A community characterized by residents from diverse backgrounds contributes to a rich tapestry of cultures and traditions. It ignites creativity in culinary experiences, the flourishing of art forms, the potential encouragement of various health practices, holistic well-being approaches, and the fostering of an inclusive and vibrant atmosphere. Additionally, such communities often hold a strong appeal for tourists, driving economic expansion and offering a wide range of business opportunities. Multilingualism is commonly advantageous in these settings, easing communication and promoting cultural exchange.

5.3.2. Weaknesses

5.3.2.1. Urban-related Challenges Due to Rapid Population Growth

The economic activities of the coastal zones, such as tourism, fishing, and ports, serve as points of attraction for the population of the coastal municipalities, generating pressure and uncontrolled development in those communities where there are job offerings.

5.3.2.2. Land-use Changes Driven by Economic Pressures

Uncontrolled growth is associated with common problems such as territorial planning, inadequate use of urban spaces, changes in the use of land commonly driven by economic activities incompatible with the local environment. These factors increase infrastructure risks and the vulnerability of the local population.

5.3.2.3. Weak Legal Enforcement Mechanism

Sufficent mechanisms are missing to enforce local PDU regulations between the delegation and municipal authorities, as well as local enforcement involving other agencies from the state or federal government. Additionally, addressing inadequate resource allocation for enforcement and protection is vital to ensuring the effectiveness of environmental laws and regulations.

5.3.2.4. Unclear Jurisdictional Competencies and Ambiguous Implementation of the Legal Environmental Framework

The absence of effective inter-agency cooperation mechanisms has led to uncertainties and challenges in fully enforcing and complying with established environmental laws and regulations. These challenges include regulatory overlaps, a lack of coordination between government and agencies at various levels and the disconnection between authorities within the same administrative level.

5.3.3. Opportunities

5.3.3.1. Empower Todos Santos Municipal Delegation to Approve or Veto Construction Projects

Empowering the municipal delegation to have authority over construction projects in Todos Santos presents an opportunity to enhance accountability in decision-making processes, preserve cultural heritage, and promote community engagement. This opportunity ensures that construction projects authentically align with the community's interests and concerns, fostering sustainable growth and preserving natural beauty.

5.3.3.2. Municipal Compliance with the PDU for Permit Issuance

There is an opportunity to minimize environmental risks and ensure long-term sustainability by improving compliance with established regulations in the planning, issuance of development project permits, and conservation initiatives for coastal environments.

5.3.3.3. Clearer Public Consultation and Community Involvement in Decision Making

There is an opportunity to enhance and consolidate mechanisms for public consultation and community participation in the decision-making process regarding environmental matters. While some mechanisms for public participation in planning and environmental protection were identified in Todos Santos (IMPLAN, 2023) and within SEMARNAT at the federal level (SEMARNAT, 2023), public participation is often perceived as a mere formality, occasionally limited to the publication of projects, and plans on the institutional website (Nava-Fuentes, 2017).

5.3.3.4. Improved Intergovernmental Planning and Coordination

There is an opportunity for improvement in coastal management by enhancing intergovernmental planning between different government levels and by creating efficient coordination mechanisms between their respective offices and agencies. This opportunity has the potential to address these challenges in Mexico, where ministries with conflicting interests simultaneously implement policies and laws for managing coastal resources.

5.3.3.5. Promote Conservation Through Alternative Tourism

The survey results indicated that 92% of respondents support the development of small tourist developments and eco-tourism among the various economic activities that could be established in Todos Santos in the future. Notably, 45% of those in favor of this economic activity fall within the age group of 18 to 42 years, highlighting an opportunity to promote conservation among the youth and future generations for the preservation of the dunes and other coastal environments still in good shape.

5.3.4. Threats

5.3.4.1. Additional Irregular Beachfront Residential Construction Leading to Environmental Impacts

Additional irregular beach front constructions on the sand dunes or by the creeks and rivers in the beach would have a negative impact on the quality of the coastal environment at Todos Santos. In particular, these constructions can damage the biodiversity of the coastal dunes with impacts on rare flora and the protection service offered by the coast against storms. (Network Nature, 2021).

5.3.4.2. Construction of Large Tourism Developments

The potential changes to current regulations, as proposed in the update of the PDU, are argued to make it more possible to construct large tourism developments. Respondents, who were informally interviewed during the survey, expressed concerns about the impact of large hotel developments on the community's cultural and historical heritage and its laid-back atmosphere, which has traditionally been a key attraction for tourists. Additionally, survey results show that the majority of respondents, 53%, do not

support the construction of these types of tourism projects. These developments will attract more people, potentially exceeding the community's capacity to deal with them.

5.3.4.3. Ongoing Unplanned Population Growth and Land Use Change

As long as tourism continues to attract people to coastal zones that are without proper planning and organized activities, as well as without a comprehensive evaluation of the environmental impact on the community, inadequate use of urban spaces and changes in land use will continue to increase. Without sufficient intergovernmental planning and coordination to define the economic activities and promote developments compatible with the natural characteristics of the area, the threat will only worsen.

5.3.4.4. Environmental Preservation at Risk Due to Authorities' Pressure for PDU Changes

The recent update to the Subregional Urban Development Program (PDU) poses risks to environmental regulations in Todos Santos, El Pescadero, and Playitas. The proposal, initiated by the Municipal Planning Institute of La Paz - IMPLAN, raises concerns as it appears to prioritize economic activities and real estate developments, potentially jeopardizing the controlled, sustainable growth, and environmental protections established by the current PDU in 2012.

5.3.4.5. Risks from the Continuous Sectoral Nature of Environmental Laws and Regulations

The apparent coverage of environmental laws in Mexico conceals a potential threat as their practical implementation frequently falls short, creating potential contradictions. Despite their seemingly comprehensive nature, these laws are sectoral, revealing a gap between regulations for land and sea (Nava-Fuentes, 2017). Legal analysis has exposed specific threats, including the notable absence of specific laws for coastal management, the lack of clarity in the legislative texts, inconsistencies in regulations or standards, and weak environmental assessments. These gaps and inconsistencies pose a significant threat to the effectiveness of environmental protection measures.

5.3.5. SWOT Diagnosis

A comprehensive SWOT analysis revealed the strengths, weaknesses, opportunities, and threats in Todos Santos. The results indicate that to enhance its coastal management strategies, Todos Santos should leverage its strengths, which include its favorable geographic location, diverse population, and an active PDU committed to preserving the coastal environment. Additionally, the community's high level of environmental awareness and its proactive role in preventing irregular projects that violate the law have positioned Todos Santos as a leading example for other communities in the state, making it essential to capitalize on this strength.

In contrast, Todos Santos also exhibits weaknesses, primarily related to land use changes influenced by economic pressures, ambiguities in the implementation of the legal environmental framework, and weak legal enforcement. These weaknesses pose significant challenges to its future coastal management improvement.

The findings also present some important opportunities for Todos Santos, particularly by empowering the municipal delegation to approve or veto construction projects and by enhancing public consultation and community involvement in decision-making processes. However, some potential threats must be addressed, such as ongoing and future beachfront residential construction, the avoidance of large tourism developments that could contribute to uncontrolled population growth and land use, and the resolution of legal inconsistencies and jurisdictional competencies in environmental laws.

Chapter 6. Conclusions and Policy Recommendations

This research presented three primary questions related to the coastal environment in Todos Santos: (1) concerning the present situation, what is the state of the local coastal environment in Todos Santos, going forward (2) what are the main threats to the coastal environment in and around Todos Santos, and (3) What policy measures and enhancements are necessary to confront the identified threats and guarantee the sustainable management of the coastal environment near Todos Santos? Despite the region's significant environmental features, it faces distinct challenges that, while not presently overwhelming, require attention for effective resolution. The following summary highlights key findings and their implications for coastal management.

6.1. Conclusions

Results from the various research analyses conducted demonstrate that, despite respondents in the study area having only a moderate familiarity with the local coastal environment, the majority of them recognize the importance of the sand dunes and coastal environment for protection against hurricanes and flooding, as well as for providing habitat for species. In addition, respondents were clear in their attitudes towards conservation. They emphasized that the government should play an active rol in protecting the environment and that acces to natural resources must be safeguarded for future generations. This gains particular relevance because, as highlighted by Ascher & Healy (1990), future generations are not represented in the decision-making process, and an emphasis on reaping benefits in the present is especially pressing in any developing country context.

These strengths and opportunities underscore the community's commitment to environmental care and conservation. While the challenges faced by coastal ecosystems in Todos Santos may not be presently overwhelming, as observed by Jiménez-Orocio et al. (2015), who assert that the dunes of the Mexican North Pacific are practically intact, the community has demonstrated an interest in preserving coastal ecosystems and promoting the development of low-impact economic and touristic activities.

In the context of social capital, as previously discussed, low levels of community trust and volunteering can pose challenges and influence participation in coastal management endeavors within the community. Conversely, the high participation in groups typically associated with positive outcomes provides an avenue for fostering a cohesive and empowered community, which in turn promotes collaborative decision-making, community-driven conservation initiatives, and effective enforcement of regulations.

In addressing the second question, an integration of findings has revealed that certain activities and legal issues pose a threat to the preservation of the coastal environment. On the one hand, there are activities such as the presence of irregular beachfront residential constructions, the potential construction of new projects, and the development of large tourist infrastructure. Also, ongoing unplanned land use and population growth have collectively intensified the pressures affecting coastal ecosystems. On the other hand, the identification of legal gaps and inconsistencies in laws and regulations, as well as their implementation, emphasizes the need for improved coordination between different levels of government, specifically that between the municipality of La Paz and the Todos Santos delegation.

Moving to the third question, the analyses reveal that coastal management regulation in Mexico involves multiple sectors and institutions, leading to overlapping jurisdictions and coordination challenges. While typically addressed through a hierarchical structure involving the federal government, state government, and municipalities, this arrangement often hinders active participation by states and municipalities in decision-making processes related to coastal management.

An example of this is in the apparent direction of revisions to the Todos Santos PDU, which residents argue may contradict federal laws for urban development and have negative consequences for coastal management. Proposed zoning changes could significantly increase lots and population, mirroring San Jose del Cabo's current size by 2050. This rapid growth would strain water resources, services, and infrastructure, representing a step backward for the community's well-being.

Identifying and addressing legal gaps, such as inconsistencies or omissions in laws and regulations, is crucial for ensuring the effectiveness of the environmental legal

framework. Weak enforcement of environmental statutes further undermines the effectiveness of existing legal provisions. Even if environmental laws are comprehensive, inadequate enforcement mechanisms may lead to non-compliance and environmental degradation. Therefore, addressing legal gaps and improving enforcement are essential components of ensuring environmental protection, and achieve legal certainty and compliance.

Mexico has various laws and regulations concerning coastal management but lacks specific legislation for integrated coastal zone management. This underscores the need for enacting comprehensive laws outlining jurisdictions, responsibilities, and mechanisms for coordination, monitoring, and evaluation. Implementing this legislation entails integrating legal, institutional, and policy tools through stakeholder collaboration and consideration of social, economic, and environmental factors. Its feasibility will depend on political will, legislative support, and stakeholder engagement.

In conclusion, it is crucial to highlight the importance of promoting community education and engagement on environmental matters. The achievement of effective coastal management relies on the cooperation of various stakeholders, including the government, organizations, and, most importantly, community members who should be recognized as the primary drivers of local development.

6.2. Policy Recommendations

6.2.1. Need for Policy Development

Effective coastal management in Todos Santos requires significant policy development for the region. Despite the significant progress made with the publication of Mexico's National Policy for Oceans and Coasts a decade ago, and multiple deputies' unsuccessful attempts to submit legislative initiatives to Congress for the creation of a Law for Sustainable Beaches and a General Law for the Comprehensive and Sustainable Management of Mexican Coasts, there remains a need for specific regulations and a federal law for coastal management. Achieving this requires a commitment to a more comprehensive and unified regulatory framework. This underscores the significance of legal instruments for effective coastal management. A

cohesive legal framework is essential for governing coastal activities, protecting sensitive ecosystems, and ensuring sustainable coastal management.

Furthermore, the recommendation to enhance social participation in data gathering and decision-making underscores the importance of involving local communities, stakeholders, and experts in the coastal management process. This highlights the democratic and inclusive nature of effective coastal governance. Informed and engaged communities should play a pivotal role in shaping coastal management strategies, ensuring that policies are well-informed and representative of diverse interests.

This community involvement has been demonstrated in Todos Santos, where the community came together to prevent irregular projects that had threatened the natural coastal environment in the past. One such case involved halting the construction on the sand dunes of Las Tunas, and a similar effort was seen with the Tres Santos development a few years ago.

The call for better coordination between government levels and agencies underscores the need for interagency collaboration and cooperation. It emphasizes the importance of breaking down silos and working together to address coastal management challenges in a more comprehensive manner. Interagency cooperation is essential for achieving integrated and sustainable coastal management practices, ensuring that coastal challenges are addressed comprehensively and with a shared vision.

Environmental issues are closely related to economic and social issues. The promotion of environmental education is essential for the development of sustainable lifestyles (Sanchez-Ocampo et al., 2022). Additionally, encouraging community education and engagement in environmental matters implies that informed and engaged communities are more likely to support and participate in coastal management efforts. This highlights the importance of building awareness and capacity at the local level, fostering a sense of shared responsibility for the coastal environment. Informed and engaged communities will be more committed to sustainable coastal practices and will actively participate in the preservation and protection of the coastal ecosystem.

6.2.2. Specific Policy Recommendations

In light of this policy development, I put forward the following policy recommendations to address the coastal management challenges in Todos Santos, BCS, Mexico:

1. Specific regulations for coastal management should be implemented. A federal law for coastal management that integrates all policies and instruments in favor of coastal management is required. This will establish a unified legal framework to govern coastal activities and protect sensitive ecosystems.

2. Strengthen mechanisms for interagency coordination between different government levels and agencies. Breaking down bureaucratic barriers is crucial for achieving a comprehensive and integrated approach to coastal management.

3. Encourage and expand community education and engagement on environmental matters. Promote awareness and capacity-building at the local level to empower communities and enhance their active involvement in sustainable coastal practices. This could build on existing community groups in which participation is high in Todos Santos.

4. Enhance mechanisms for social participation in data gathering and decision-making processes, building on existing social structures. Foster meaningful engagement of local communities, stakeholders, and experts to ensure a democratic and inclusive approach to coastal management.

5. Empower the Todos Santos Municipal Delegation to approve or reject changes to its Urban Development Program (PDU) and construction projects. To improve accountability in decision-making processes, preserve cultural heritage, foster community engagement, and achieve a balance between socio-economic and environmental regulations.

These recommendations and the associated legal implications aim to guide the development and implementation of comprehensive coastal management policies in Todos Santos, creating a more resilient and environmentally sustainable coastal ecosystem while fostering community involvement and intergovernmental cooperation.

6.2.3. Legal Implications of Policy Development

The policy recommendations for effective coastal management in Todos Santos, BCS, Mexico carry significant legal implications, potentially requiring legislative reforms at the federal and state levels to establish a unified legal framework governing coastal management. Such reforms might involve ensuring the integration of various regulations and policies related to environmental conservation, interagency coordination, provisions for enforcement mechanisms, land use planning, zoning regulations, and public participation in decision-making processes related to coastal management.

Furthermore, considering the absence of an administrative or legal framework that enables local authorities to comprehensively manage the coastal zone, changes might also involve granting them the authority to make decisions related to coastal zones while adhering to federal and state policies and regulations.

Community engagement and education also have legal implications related to community rights and access to information. Property rights and land use regulations may require adjustment to align with the goals of coastal management, while Environmental Impact Assessment (EIA) regulations should be reinforced to ensure better environmental awareness and engagement. Liability and enforcement mechanisms, including clearly defined fines and restitution for environmental damages, as well as zoning and permitting systems for construction, and community engagement in reporting violations, must be in place to hold non-compliant parties accountable.

To address these legal implications, collaboration among government agencies, stakeholders, and experts is essential in crafting, passing, and enacting relevant legislation, then ensuring it is enforced. Striking a balance between environmental conservation, land-use regulations, and community interests presents complex legal challenges, emphasizing the integral role of legal considerations in achieving successful coastal management.

6.3. Limitations of the Study

Despite considerable effort to use appropriate statistical and social investing methods, all research suffers from some limitations. For example, conducting face-to-face surveys offers several advantages, such as providing the surveyor with the

opportunity to clarify questions and elicit thorough responses in case of any misunderstandings (Bernard, 2002). However, responses may be influenced by the interviewer's expectations regarding a respondent's answer, the respondent's appearance, living situation, or other provided responses. Additionally, the interviewer's demeanor, attitude, or reactions can exert an influence on the responses (Neuman, 2006).

An additional limitation of this study relates to the survey's design. Both the questionnaire and sampling frame were developed by me and the research team from Canada, none of whom are residents of the community. As Chambers (1997) notes, when formulated by outsiders, questions may be susceptible to bias.

In the actual implementation of the surveys, the majority occurred in the city center of the community, where household density is higher compared to other parts of the town. Certain surrounding areas were surveyed to a lesser extent due to factors like lower density or safety concerns in neighborhoods or specific areas. The seasonal nature of the community during the survey period in July 2022 meant that a significant number of international residents were absent from town and, consequently, were not included in the survey. These circumstances have, to some degree, impacted the resulting data.

In addition, Doctrinal research forms the base of legal research in the academic field of law. It provides quick answers to the practical problems at hand by analyzing the legal principles, concepts, and doctrines and reveals gaps, ambiguities, and inconsistencies in the law (Singh, n.d.). Nevertheless, Doctrinal research has its drawbacks. Subjectivity and the researcher's perceptual biases can influence the interpretation of the studied subject, leading different individuals to arrive at entirely distinct perspectives on the same question. Additionally, it is characterized by a high degree of theoretical abstraction and limitation (Dahiya, 2021). To overcome these challenges, I combined the outcomes of the analysis with household survey data and conducted a strengths, weaknesses, opportunities, and threats analysis to support my research.

Finally, while SWOT analysis is widely applied in strategic decision support for business management, as well as for environmental management and assessment

(Nikolaou & Evangelinos, 2010), it has its draw backs. One of the shortcomings of SWOT analysis is its subjectivity, which can lead to inconsistencies and omissions (Helms & Nixon, 2010). Other disadvantages refer to a variety of shortcomings regarding this method such as its simplistic, static, and subjective character.

While the application of SWOT alone has its limitations (Scolozzi et al., 2014), this study seeks to address some of these challenges by incorporating information from both a household survey and a Doctrinal legal analysis. This dual approach aims to provide more accurate insights and mitigate the subjectivity that can be a prevalent issue in similar research efforts.

6.4. Further Research

Future research endeavors should focus on several important aspects to advance the understanding of local coastal management in Todos Santos, Baja California Sur, Mexico. Considering its limitations described above, future research should involve additional surveys, particularly gathering the opinions of international residents. A comparative study between the opinion of the local and international residents may yield interesting results, and new insights to enhance coastal management.

Conducting a thorough examination of the socio-economic and cultural factors driving beachfront constructions, uncontrolled population growth, and land use is essential for the effective implementation of targeted strategies. To enhance this examination and drawing on insights from Panagiotou and van Wijnen (2005), incorporating a PESTEL approach to complement the SWOT analysis in the identification of external factors impacting an organization can contribute to future research. This methodology aims to identify issues such as a lack of coordination among local institutions, unclear government policies, and unreliable financing mechanisms (Kansongue et al., 2023) in coastal management.

Additionally, further research should aim to bridge the identified gaps and resolve inconsistencies within Mexico's environmental laws, proposing specific legislative measures for effective coastal management. Continuous monitoring and evaluation of implemented policy measures are essential to assess their impact and identify areas for

improvement. Expanding the social capital study could also contribute to a deeper understanding of community dynamics and engagement in coastal management initiatives.

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Appendix A.

Full Household Survey

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Valuation of the coastal environmental services of Todos Santos

[Oral consent script will be read out to participants before proceeding with the following questions]

A. Screening Questions

A1. Are you at least 18 years old?

☐ Yes ☐ No

A2. Do you consider yourself a permanent or non-permanent resident of Todos Santos? [*Permanent resident is someone who lives at least 6 months per year in Todos Santos*].

☐ Permanent resident
☐ Non-permanent resident
☐ Neither (non-resident) [*If neither, thank respondent*]

A3. In Todos Santos there currently exist the "*Asociación de Colonos de Todos Santos",* Are you a member of this association?

☐ Yes ☐ No [*If yes, thank respondent, and comment that in the future they will be contacted by email*]

B. Perceptions of the coastal environment

[*The following information in **bold** at the beginning of each section is to be read out to the respondent before proceeding to the questions*].

I would like to start by asking you about the importance of the coastal environment in Todos Santos.

The coastal environment includes natural habitats such as sand dunes, palm trees, mangroves and coastal lagoons that provide important environmental benefits.

B1. How familiar are you with the coastal environment of Todos Santos?

Not familiar	Somewhat familiar	Very familiar
1	2	3

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B2. Which of the following benefits of the coastal environment of Todos Santos do you consider the most important and which the least important?

Environmental Benefit	Most Important	Least Important
Enjoy the beach and natural landscapes		
Provide habitat for species, such as sea turtle and birds		
To provide materials, such as palm leaves		

B3. Coastal dunes protect against potential flooding from hurricanes that can affect groundwater, farmland, and private property. How important is such protection to you?

Not important	Somewhat important	Very important
1	2	3

C. Willingness to pay for conservation of the coastal environment.

Now, I would like to ask you about a possible scenario for the conservation and management of the coastal environment in Todos Santos.

Of a 2-kilometer stretch of beach in front of the Todos Santos community, approximately 5% has been modified by its owners for residential, commercial and tourist developments. Continuing with this type of development in the future could impact the sand dunes, the palm groves, and the lagoon, reducing their environmental benefits. For example, fewer opportunities to enjoy beaches and loss of coastal protection.

Now suppose that a new association would be created to organize a plan to protect the coastal environment of Todos Santos. The activities of this association would successfully limit the environmental damage in the coastal strip to its current level, in exchange for annual payments made by the association to the owners. It should be noted that without this plan, the impact would extend to the remaining 95% of the coastal environment in the next 10 years, which represents an approximate area of 60,000 square meters (6 hectares). The association would work with donations from residents of Todos Santos, who would be periodically informed of the actions carried out. *However, it will only be able to operate if at least 50% or more of the residents contribute.*

C1. ¿Would you be willing to donate to the association $_____ pesos annually for the next 10 years for the protection of the coastal environment of Todos Santos?

☐ Yes ☐ No [*Read table below according to the answer provided*]

Per Year	Per day
50	14 cents
100	28 cents
250	70 cents
500	1.40 pesos
1000	2.70 pesos
2500	7 pesos
5000	14 pesos
10000	28 pesos

If answered "Yes" in C1 (ask only C2 and C3)	If answered "No" in C1 (ask only C4 and C5)
C2. How confident are your that you would make this contribution to the association? ☐ Not confident ☐ Somewhat confident ☐ Very confident ☐ Not sure	**C4.** Why did you answer "No"? ☐ I don't think the plan is necessary. ☐ I don't agree with the plan ☐ I don't have the funds. ☐ I don't think other people would contribute ☐ I don't think the plan would work
C3. Apart from the previous amount (in C1), What would be the maximum amount that you would be willing to donate to the association? $_____ pesos per year.	**C5.** What would be the maximum amount you would donate? $_____ pesos per year.

D. <u>Attitudes towards environmental conservation and economic development</u>

Now, I am going to ask you questions related to your opinions on economic development and the environment in Todos Santos.

D1. In your opinion, how important is to preserve the coastal environment of Todos Santos?

Not important	Somewhat important	Very important
1	2	3

D2. What effects has the economic development had on the coastal environment of Todos Santos (e.g., on the sand dunes, palm groves and mangroves)?

Many negative effects	Some negative effects	None	Some positive effects	Many positive effects
1	**2**	**3**	**4**	**5**

D3. There are various economic activities that could be developed in Todos Santos in the future. In your opinion, which of the following options are important and non-important, and from all of them, which is the most important one to you?

Economic Activities	Important	Non important	Most important
Small tourist developments, (e.g., whale watching, sport fishing, restaurants)			
Large hotel developments			
Beachside residential developments			
Port and industrial activities (e.g., fish processing)			
Agriculture / Fish and shrimp hatcheries			

D4. The following statements ask about your general attitudes towards conservation and the environment. Please, indicate how strongly you agree or disagree with each statement.

	Strongly disagree. 1	Some-what disagree 2	Neutral 3	Some-what agree 4	Strongly agree. 5	Don't know. 6
Access to natural resources must be protected for future generations.						
Humans have the right to modify nature to suit their needs.						
The balance of nature is easily affected.						
The risk of environmental damage is justified if the benefits of development are high.						
The government should play an active role in protecting the environment						

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E. Social Capital

Now, I am going to ask you some questions about your community and how people interact with each other.

E1. In a 2-week period, how often did you visit neighbours or have neighbours visit your household? _____visits in 2 weeks

E2. Generally, do you participate in community events, projects or meetings that take place in Todos Santos?

☐ Yes ☐ No ☐ Unsure

E3. In the last 12 months, how many days did you contribute to community activities (e.g., volunteer, clean-ups, or organizing social events)? _____days.

E4. Do you feel that most people in Todos Santos can be trusted?

☐ Yes ☐ No ☐ Unsure

E5. Do you feel that most people from outside Todos Santos can be trusted?

☐ Yes ☐ No ☐ Unsure

E6. In the last 12 months, how many days did you spend away from Todos Santos? _____ days in the last 12 months.

Now, I am going to ask you questions about the community groups that are most important for you.

E7. What community groups, organizations or other associations do you belong to?

No.	Name of Organization	Member? [Please check]
1	Fisheries coop [Which one: _____]	
2	Ejido	
3	Environmental group	

4	Expatriates/foreigners association	
5	Labor union/professional association	
6	Political party or group	
7	Religious group	
8	School committee	
9	Neighborhood association	
10	Sports group/team	
11	Social group (e.g., Rotary)	
12	Other: _____	

F. Demographics

Now, I am going to ask you some questions about yourself and your household that will be used in the study for analysis purposes.

F1. How old are you? _____ years

F2. How many years have you lived in Todos Santos? _____ years

F3. Did you live somewhere else prior to Todos Santos?

☐ Yes ☐ No [*If yes, what State or country:* _____]

F4. What level of education have you completed?

☐ None
☐ Primary
☐ Secondary
☐ High school
☐ College or University
☐ Post-graduate degree
☐ Other Training (How many years: _____)

F5. How many people reside in your household at least 6 months of the year?

_____ people.

F6. Of these, how many are working? _____ people.

F7. What gender are you?

☐ Man ☐ Woman ☐ Prefer not to answer.

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G. Livelihood / Source of Income

Now, I would like to ask you about your livelihood activities and sources of income in the last 12 months.

G1. What were the **two** most important sources of income in your household in the last 12 months?
[*Check all that apply and include only permanent household members*].

Sources of Income	**1st source**	**2nd source**
Agriculture & ranching		
Manufacturing (including fish processing)		
Fishing (commercial)		
Construction & transportation		
Retail and services (not tourism)		
Tourism and related (e.g., hotels, restaurants, etc.)		
Government (including schools, police)		
Non-governmental organizations		
Remittances from other family members		
Pensions		
Other - please specify: _____		

G2. How much income did your household earn from the above-mentioned activities **in the last 12 months**? [*Including the 1st and 2nd sources of income*]

- ☐ No income
- ☐ less than 2,500 pesos/month
- ☐ 2,501 – 5,000 pesos/month
- ☐ 5,001 – 8,300 pesos/month
- ☐ 8,301 – 16,600 pesos/month
- ☐ 16,601 – 25,000 pesos/month
- ☐ Más de 25,001 pesos/month

THANK THE RESPONDENT FOR PARTICIPATING IN THE SURVEY!

Appendix B.

Descriptive data of Demographics and Livelihood

Gender	Frequency	%	Cumulative Percent
Male	200	45%	45%
Female	243	55%	100%
Education			
1. None	7	2%	2%
2. Elementary	122	28%	29%
3. Secondary	124	28%	57%
4. Tech / other	12	3%	60%
5. High school	140	32%	91%
6. Undergraduate	35	8%	99%
7. Posgraduate	3	1%	100%
1st Source of household Income			
1. Agricultre/ Ranching	64	14%	14%
2. Manufacture (Inc. fish processing)	13	3%	17%
3. Fishing (commercial)	27	6%	23%
4. Construction & Transportation	74	17%	40%
5. Sales/Services (not tourism)	77	17%	58%
6. Tourism (Hotels, restaurants)	79	18%	75%
7. Government (Inc. schools & police)	40	9%	84%
8. NGOs	5	1%	86%
9. Remmitances	6	1%	87%
10. Pension	35	8%	95%
11. Other	23	5%	100%
2nd Source of household Income			
1. Agricultre/ Ranching	15	3%	3%
2. Manufacture (Inc. fish processing)	4	1%	4%
3. Fishing (commercial)	13	3%	7%
4. Construction & Transportation	34	8%	15%
5. Sales/Services (not tourism)	96	22%	37%
6. Tourism (Hotels, restaurants)	105	24%	60%
7. Government (Inc. schools & police)	30	7%	67%
8. NGOs	6	1%	68%
9. Remmitances	4	1%	69%
10. Pension	22	5%	74%
11. Other	18	4%	78%
12. None	96	22%	100%
Ranges of Income (pesos/month)			
1. None	0	0%	0%
2. less 2500	41	9%	9%
3. 2501-5000	82	19%	28%
4. 5001-8300	152	34%	62%
5. 8301-16600	126	28%	91%
6. 16601-25000	31	7%	98%
7. 25000-more	9	2%	99.5%
8. None	2	0%	100%

Source: Survey data

Appendix C.

Perceptions of the Coastal Environment – Familiarity

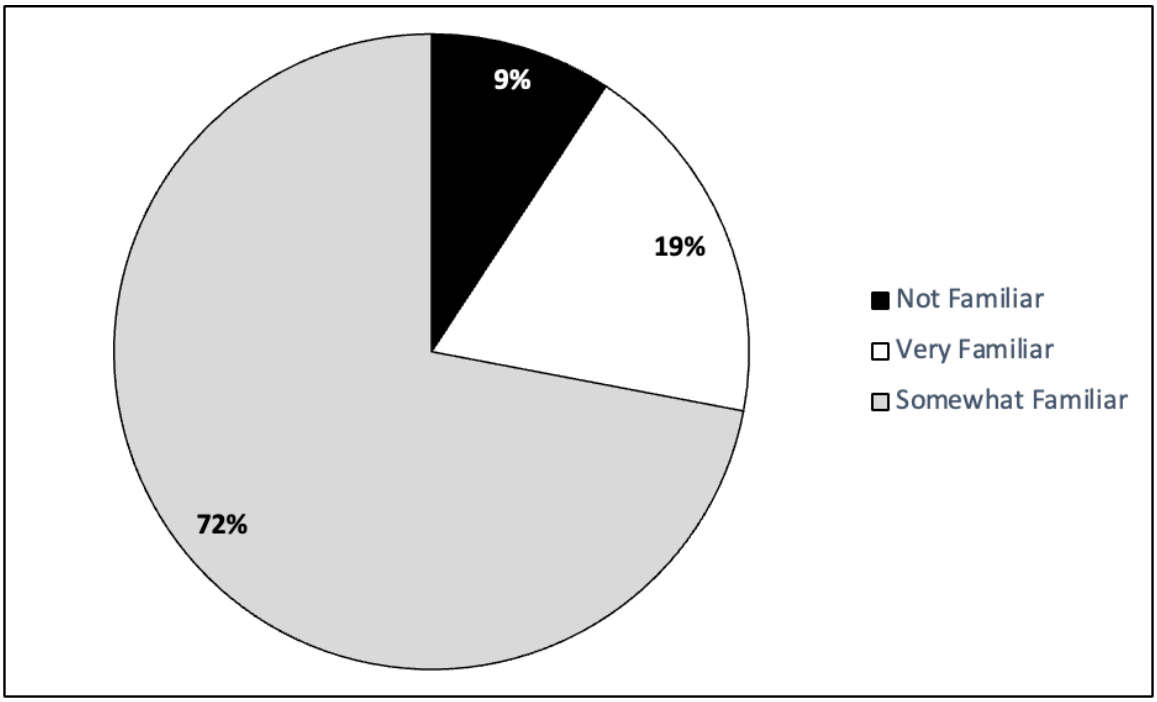


Figure C1. Familiarity with the Coastal Environment in Todos Santos (% of Respondents)

Source: Survey data

Appendix D.

Perceptions of the Coastal Environment – Coastal Dunes

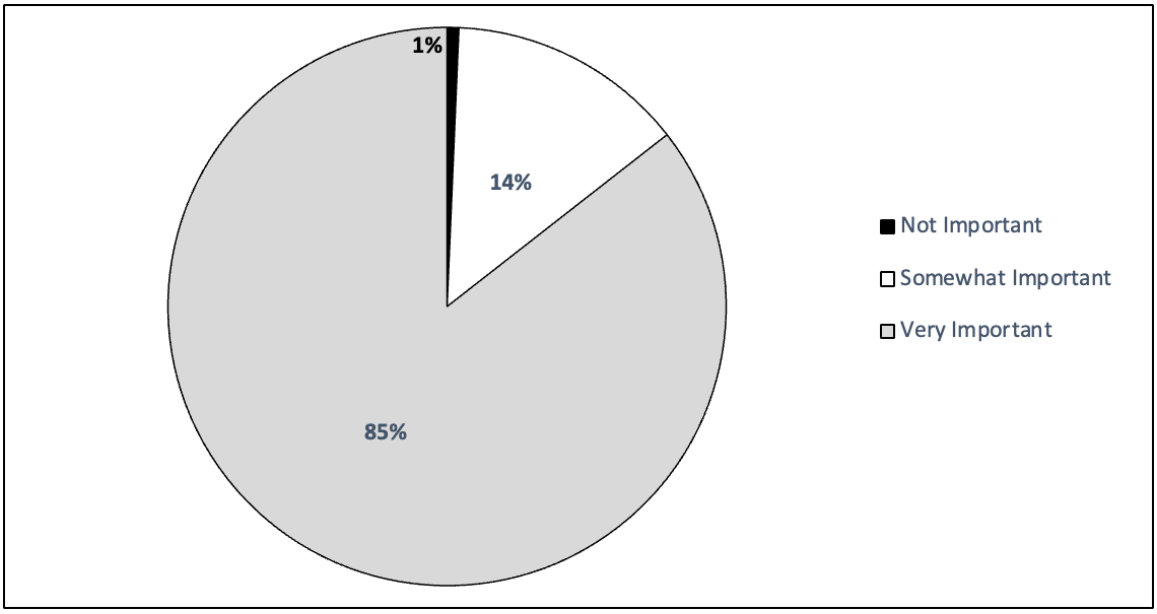


Figure D1. Importance of Protection Provided by Coastal Dunes Against Floods & Hurricanes (% of Respondents)

Source: Survey data

Appendix E.

Key Coastal Management Legislation in Mexico

Applicable Law	Jurisdiction	Provisions	Matter	Responsibility
Constitution	Federal	4	Right to a healthy environment	The core concept of this Article is that all individuals have the right to a suitable environment that promotes their health and development. The well-being and progress of people are contingent upon the presence, conservation, restoration, and responsible and sustainable utilization of the country's natural resources.
		25	Rational use of natural resources and economic development.	This Article asserts that the Mexican state is obliged to incorporate the environmental factor into the national planning strategy. It emphasizes that economic development should not come at the cost of depleting the country's natural resources. Instead, a balance must be struck between productive activities and their responsible utilization, ensuring the rational use of natural resources.
		27	Natural resources preservation and concessions.	This Article stipulates that natural resources that can be privately owned are subject to regulation in the interest of the public. The exploitation and utilization of these resources require concessions, which are granted based on the terms and conditions outlined by Mexican laws. The article highlights the government's authority to establish measures aimed at preserving and restoring ecological balance.

Applicable Law	Jurisdiction	Provisions	Matter	Responsibility
		73	Use of Natural Resources	This article states that the utilization and exploitation of natural resources are subject to regulation and restrictions as established by the corresponding federal laws approved by the Mexican Congress.
		115	Local Governance Powers	This Article holds significance in terms of local governance, as it sets forth the regulations governing municipal organization, their legal authorities, and the rules to which they are bound. Municipalities are empowered to: Formulate, approve, and manage municipal plans for zoning and urban development. Issue licenses and permits for construction projects. Contribute to the establishment and management of ecological reserve zones, as well as participate in the implementation and development of programs related to this matter.
		124	Distribution of powers	indicates that "those powers not expressly granted by this Constitution to federal officials, shall be considered as reserved to the States".
General Law of Ecological Balance and Environmental Protection (LGEEPA)	Federal	28	Wetlands and coastal areas	This article sets out the conditions that will govern the issuance of environmental impact authorizations in projects that may cause ecological imbalance: [...] *X.- Projects and activities in wetlands, mangroves, lagoons, rivers, lakes, and estuaries connected to the sea, as well as in their coastal areas or federal zones.*
		45		This article discusses the objectives of establishing Protected Natural Areas

Applicable Law	Jurisdiction	Provisions	Matter	Responsibility
		98		This article establishes the criteria to consider for the preservation and sustainable use of land.
General Law of Wildlife (LGVS)	Federal	1	Species at risk, namely mangroves.	This provision establishes an exception for species or populations at risk, stating that the sustainable use of timber and non-timber resources, as well as species whose livelihood depends on water, will be governed by this law rather than forestry and fishing laws.
		4	Sand dunes and wetlands in general	Provides for the responsibility of inhabitants to conserve wildlife and the prohibition of its disturbance, damage or detriment.
		18	Sand dunes and wetlands in general	Provides for the rights and responsibilities of the property owners where wildlife exists for the conservation of the wildlife and their habitat
		107	Sand dunes and wetlands in general	Provides for the right that any person has to denounce to the Federal Attorney for Environmental Protection (PROFEPA), of any damage caused to wildlife and their habitat.
		60 Ter	Sand dunes and wetlands in general	The addition of this article was intended to prevent devastation of mangroves, adjacent wetlands, and dunes.
General Law of National Assets (LGBN)	Federal	119 Paragraph III	Federal maritime-terrestrial zone	This article defines and delimits what is included within the federal maritime-terrestrial zone.
		8	Use of common assets	Provides that common use assets may be used by the residents of the republic and establishes the need of an authorization for special use of common use assets.
Federal Law of Rights (LFD)	Federal	232-C	Use of common assets	Provides for the uses that can be given to beaches, reclaimed land, and the federal maritime-terrestrial zone

Applicable Law	Jurisdiction	Provisions	Matter	Responsibility
General Law on Climate Change (LGCC)	Federal	26	Sand dunes and wetlands in general	This provision sets out the principles to be followed in climate change public policy for the conservation of wetlands, mangroves, dunes, and coastal lagoons.
Federal Law on Environmental Liability (LFRA)	Federal	10	Responsibility for environ. damages.	Provides for the responsibility of persons and companies for damage to the environment and their obligation to repair the damage.
		25	Responsibility for environ. damages.	This article establishes the responsibility for omission to prevent damage to the environment.
		27	Responsibility for environ. damages.	This provision establishes the persons that can have legal actions, sue environmental responsibility, and receive compensation for damages caused.
		28	Responsibility for environ. damages.	This provision establishes the persons that can have legal actions, sue environmental responsibility, and receive compensation for damages caused.
Standard NMX-AA-120-SCFI-2016	Federal		Sand dunes	Establishes the requirements and specifications for quality sustainability of the beaches.
NOM-022-SEMARNAT-2003	Federal		Mangroves and wetlands.	Sets out the specifications for the preservation, conservation, sustainable use, and restoration of coastal wetlands in mangrove areas.
Amendment of point 4.43 to NOM-022-SEMARNAT-2003	Federal		Mangroves and wetlands	The addition allows for the exemption of certain prohibitions on works and activities that were previously established in the standard, on the condition that compensation is obtained for the benefit of wetlands.
NOM-059-SEMARNAT-2010	Federal		Mangroves	Provides for the list of the 4 species of mangroves in the country that are at risk

Applicable Law	Jurisdiction	Provisions	Matter	Responsibility
Criminal Code for the state of Baja California Sur.	State	365		Sets out the punishment and fines for occupation or encroachment of environmental areas, namely (…) III.- Dunes or priority areas in state jurisdiction adjacent to the federal maritime-terrestrial zone.
		366		Sets out the punishment and fines for illegal change of land use of (…) III.- Dunes or priority areas in state jurisdiction adjacent to the federal maritime-terrestrial zone.
		367		Sets out the punishment and fines for illegal waste disposal at (…) V.- Dunes or priority areas in state jurisdiction adjacent to the federal maritime-terrestrial zone.
		368		Sets out the punishment and fines for illegal extraction of environmental material from, (…) IV.- Dunes or priority areas in state jurisdiction adjacent to the federal maritime-terrestrial zone.
Todos Santos Urban Development Plan (PDU)	Municipal			Sets out provisions banning construction on the dunes are found on pages 35-38 of the PDU

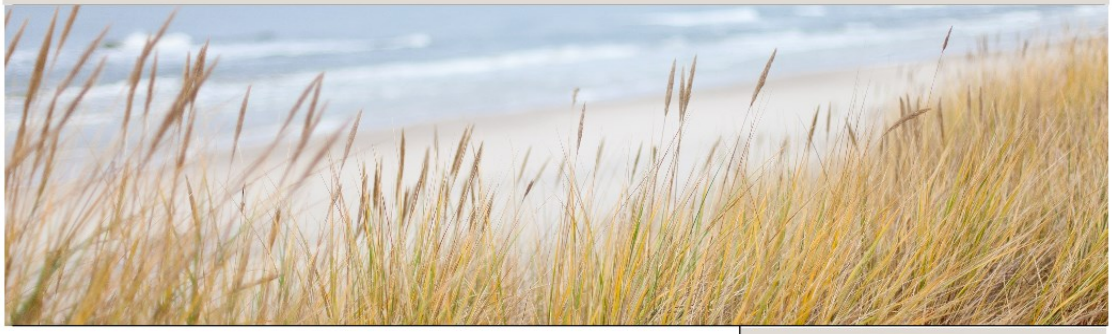
Appendix F.

Newsletter May 2023

In May 2023, an initial newsletter, featuring preliminary results from the survey and research project as shown below, was presented to several residents and community leaders in Todos Santos.

Valuation of the coastal environmental services of Todos Santos

SIMON FRASER UNIVERSITY | MAY 2023 | RESEARCH PROJECT



Natural Coastal Defences

Natural coastal defences refer to the use of natural features such as sand dunes, palm groves, mangroves, and lagoons to protect the coast from the damaging effects of storms, erosion, and sea-level rise. These features help to absorb the energy of waves and reduce the impact of coastal flooding.

The use of natural coastal defences is becoming increasingly important in coastal management due to their many advantages. They are a cost-effective and sustainable solution for safeguarding coastal areas, in contrast to artificial coastal defences like seawalls and breakwaters. They provide habitat for coastal biodiversity and enhance the aesthetic and recreational value of coastal regions.

Project Objectives and Overview

As climate change increasingly impacts coastal regions worldwide, it is essential to preserve and understand the value of natural coastal defences. For this reason, the project's objective is to assess the value of ecosystem services provided by local coastal features to the people of Todos Santos, Baja California Sur, Mexico.

It will also pinpoint primary threats to the coast in Todos Santos, including human activities that may be contributing to environmental degradation, and suggest policy measures and improvements to protect these environments.

IN TOTAL, 443 SURVEYS WERE ADMINISTERED, WHICH PROVIDES A REASONABLE SAMPLE SIZE THAT CAN BE CONSIDERED REPRESENTATIVE.

Project Methodology

To determine the importance that residents of Todos Santos attribute to the ecosystem services provided by local coastal features, we conducted a household survey that evaluated their perception of the coastal environment, including familiarity, benefit significance and protection offered by coastal dunes, willingness to pay for environment preservation, and views on conservation and economic development.

To establish the sampling frame, we obtained a gridded map of Todos Santos from the municipal Delegado's office and used a random sampling technique based on the map's grids. Each grid was assigned a number and randomized using Excel.

The data collected has been analyzed, and some preliminary results are provided on the next page.

Research Team

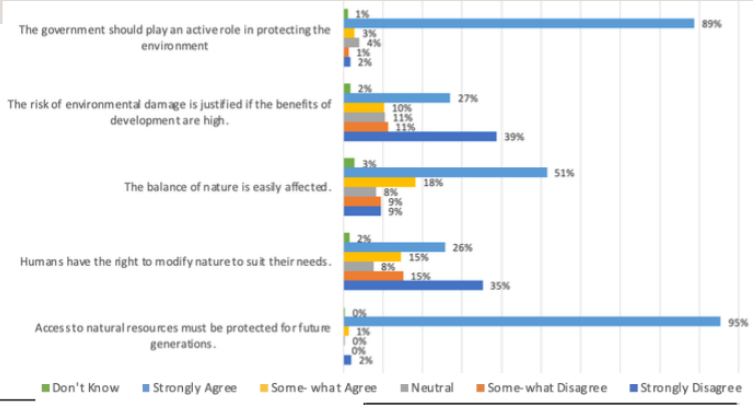
Dr. Duncan Knowler - Principal Investigator
Dr. Salvador García & Sergio Fernandez - Co-investigators
UABCS -partner
Javier Gonzalez - Graduate Student Lead
(e-mail: jgg4@sfu.ca)

Demographics

With regards to the demographic characteristics of the survey sample, a balance of both genders of respondents was obtained to avoid a gender bias; as such, 55% of respondents were women and 45% of respondents were men. The mean age was 46 and respondents ranged from 18 to 92 years old.

Attitudes towards environmental conservation and economic development

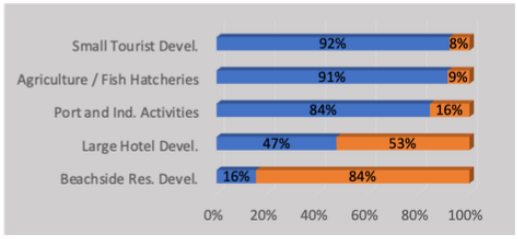
Participants were asked to express their opinion on five statements concerning the environment. These statements focused on various attitudes related to conservation, government participation, risk, biocentric, and anthropocentric views. Respondents primarily indicated agreement or strong agreement towards attitudes associated with conservation and biocentric views, including the more active role of the government in environmental protection.
The sample is more divided across environmental attitudes related to risk and anthropocentric views. This indicates that within the sample, there are polarized views about whether humans have the right to modify the environment and whether risk of harm to the environment is justified when the benefits of development are high.



Economic Development

The survey included questions regarding the residents' perspectives on the relationship between economic development and the environment in Todos Santos. Participants were presented with several potential economic activities, including small tourist developments, large hotel developments, beachside residential developments, port & industrial activities, and agriculture & fish hatcheries. They were asked to indicate which of these options were important or not important and to identify the activity they considered most important.
The survey results indicate that respondents preferred small tourism developments like whale watching, sport fishing, and restaurants, followed by traditional activities such as agriculture and fish hatcheries, and port and industrial activities. However, large hotel developments and beachside residential developments were not favored by the residents.

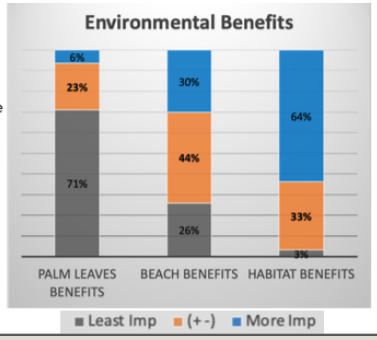
Economic activities that could be developed in the future



Perception of Coastal Environment

The survey queried the participants to rate the importance of different benefits provided by the coastal environment of Todos Santos, such as enjoyment of natural landscapes and beaches, the provision of habitats for different species like sea turtles and birds, and the provision of materials like palm leaves.

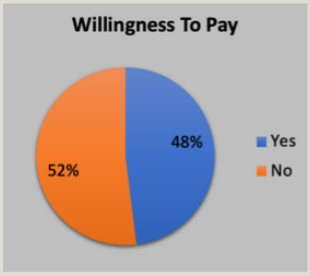
According to the results, habitat provision for species provided by the beach was considered the most valuable benefit by two-thirds of the respondents, followed by enjoyment of the beach and natural landscapes. The provision of materials such as palm leaves was ranked third by a significant margin.



Willingness To Pay

In the survey, participants were presented with a hypothetical scenario for the conservation and management of the coastal environment in Todos Santos, where a beach stretch in front of the community has been modified by property owners for residential, commercial, and tourism purposes. In this scenario a new association would be created to limit environmental damage in the coastal strip to its current level, in exchange for annual payments to owners. In the survey respondents were asked if their household would be willing to donate $50, $100, $250, $500, $1000, $2500, $5000, or $10000 pesos annually for the next 10 years.

The results indicate that around 52% of the participants are uninterested in donating, while only 48% are willing to pay for the preservation of the coastal surroundings that would be supervised by the association. This could be attributed to various factors, including but not limited to income levels, livelihood activities, the level of trust in both the members of the community and outsiders, and other factors that require further analysis.



Acknowledgements
We would like to express our gratitude to the residents, community leaders, surveyors, and organizations of Todos Santos, especially those who participated in our survey and shared their valuable insights, which were instrumental in the success of our project.
Our project would not have been possible without the support and collaboration of Prof. Francisco Javier Salgado Agundez, the Municipal Delegate, and his team. We appreciate his contributions and partnership in this significant undertaking.

Appendix G.

Newsletter November 2023

In November 2023, a second newsletter featuring the final results from the survey and research project, as shown below, was presented to several residents and community leaders in Todos Santos.

Management of Natural Coastal Environments

Coastal environments worldwide are under significant stress due to the effects of climate change, human activities, and a lack of proper legal protection. The effective management of coastal regions is essential for maintaining ecological balance and the well-being of local communities.

Efforts to manage coastal areas in Todos Santos are notable. Despite these efforts, substantial challenges persist with implementation of the legal environmental framework and in achieving consistent outcomes for diverse stakeholders in the region.

Project Objectives and Overview

The community of Todos Santos is renowned for its attractive location, diverse mix of foreign and domestic residents, and its seasonal recreational attractions. While the region boasts significant environmental attributes and important coastal resources, it also faces a distinct set of pressures that while not currently overwhelming, hold the potential for improvement.

The main focus of our research centers around identifying strategies to overcome these challenges and ensure effective management of the local coastal environment. Furthermore, we identify the unique advantages of the region, the obstacles that should be avoided, the opportunities that may arise, and the threats to the Todos Santos coastline, including human activities that may be contributing to environmental degradation. We also propose policy recommendations and improvements aimed at safeguarding these environments.

Research Methodology

The methodology for the present analysis comprised three distinct approaches. First, we conducted a household survey to gather insights into residents' perceptions of the coastal environment. This included their attitudes towards environmental conservation and economic development, as well as social capital and demographic characteristics. Second, we undertook a legal analysis to assess and diagnose the existing legal framework governing coastal management. Finally, we carried out a SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis to provide further information to guide the analysis and to develop recommendations.

We have analyzed the data we collected, and this second newsletter presents our final results from the project.

Research Team

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IN TOTAL, 443 SURVEYS WERE ADMINISTERED, PROVIDING A REASONABLY LARGE AND REPRESENTATIVE SAMPLE SIZE.

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Photo: TripAdvisor

SWOT (Strengths, Weaknesses, Opportunities and Threats analysis)

SWOT analysis helps in understanding the conditions facing coastal management in Todos Santos. In particular, it highlights the community's advantages and disadvantages, which is essential for identifying realistic opportunities available to the community. Additionally, the analysis detects any threats that must be overcome and helps to identify what is being done well. As a result, better actions can be formulated to enhance local coastal management.

A summarized version of the SWOT analysis is presented below showing the key elements considered in the analysis.

Strengths

- Advantageous geographic location.
- Scenic beauty: beautiful beaches and landscapes.
- Active Urban Development Program (aka PDU in Spanish) with community-wide approval.
- High levels of youth concerned about environmental matters.
- High membership in groups and associations.
- Diverse population from many originating areas.

Weaknesses

- Urban-related challenges created by rapid population growth.
- Land-use changes driven by economic pressures.
- Authorities pressure for PDU changes at the expense of environmental preservation.
- Weak legal enforcement mechanism.
- Ambiguous implementation of the legal environmental framework.

S W T O

Threats

- Presence of irregular beachfront residential construction and the potential construction of new projects that cause environmental impacts.
- Construction of large tourism developments.
- Legal gaps and inconsistencies in environmental laws and regulations.
- Unclear jurisdictional competencies among government levels.
- Ongoing unplanned population growth and land use.

Opportunities

- Empower Todos Santos municipal delegation to approve or veto construction projects.
- Municipal compliance with the PDU for permit issuance.
- Clearer public consultation and community involvement in decision making.
- Improved intergovernmental planning and coordination.
- Promote conservation through alternative tourism.

Policy Recommendations

Based on the previous analyses, we generated a concise set of policy recommendations to enhance coastal management in Todos Santos. These recommendations include:

1. Specific regulations for coastal management should be implemented. A federal law for coastal management that integrates all policies and instruments in favor of coastal management is required.
2. The mechanisms of social participation regarding data gathering and decision-making must be enhanced.
3. Mechanisms for better coordination between the different levels of government and between agencies is required.
4. Community education and engagement on environmental matters needs to be encouraged and expanded.

Social Capital

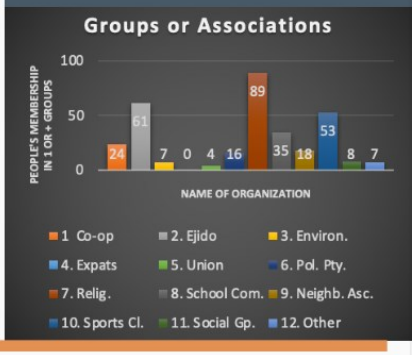
Social Capital is a collective asset in the form of shared norms, values, beliefs, trust, networks, social relations, and institutions that facilitate cooperation and collective action for mutual benefits.

We examined social capital in terms of both its 'bonding' and 'bridging' elements. Bonding refers to relations between family members, close friends, and neighbours, while bridging refers to the ties across groups and individuals who are different from each other.

The results show that in Todos Santos bonding variables are low, while in contrast, bridging variables have a low-to-medium rating.

This finding might be associated with lower interaction among residents, which can be partly attributed to the seasonal nature of the community. This situation is characterized by the influx and outflow of people, the relatively large size of the community, and the diverse backgrounds of residents, whether from other parts of mainland Mexico or international.

Conversely, of our 443 survey respondents, 265 individuals (60%) are members in one or more groups or associations in Todos Santos. The groups include social groups, environmental groups, neighbourhood & community groups, school committees, political groups, sports groups, and religious associations (Table below).



Early this year, the Municipal Planning Institute of La Paz (IMPLAN), launched the process of updating the Subregional Urban Development Program (PDU) for Todos Santos, El Pescadero, and Playitas. The existing program, in effect since 2012, is now under comprehensive review. The public consultation period, initially set to gather comments, questions, and concerns, has been extended until November 30 this year.

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