The impacts of tourism within small coastal communities

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The impacts of tourism within small coastal communities

By

Elsa Adriana Pérez López

A thesis submitted to the graduate faculty
in partial fulfillment of the requirements for the degree of
MASTER OF COMMUNITY AND REGIONAL PLANNING

Major: Community and Regional Planning

Program of Study Committee:
Timothy Borich, Major Professor
J. Timothy Keller
Mônica A. Haddad
Steffen Schmidt

Iowa State University

Ames, Iowa

2006

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Graduate College
Iowa State University

This is to certify that the master's thesis of

Elsa Adriana Pérez López

has met the thesis requirements of Iowa State University

Signatures have been redacted for privacy
To Arturo:
Thanks for being with me even though you are no longer here.

To my family and friends in Mexico:
Who were my mean and my reason; your support while away from home gave me the strength and courage to achieve this goal.
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Interview with Mr. Dzib Chaan: Tourist Guide; Progreso, Yucatan
Interview with Dr. Quintal, Head of the Research Division Department, Yucatan State University (UADY); Yucatan, Mexico

Interview with Dr. Hernandez, Head Researcher at the CINVESTAV Mérida; Puerto Progreso, Yucatan

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<td>APA</td>
<td>American Planning Association</td>
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<td>API</td>
<td>Administracion Portuaria Integral (Integrated Port Administration)</td>
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<td>CEP</td>
<td>Caribbean Environment Program</td>
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<td>CINVESTAV</td>
<td>Advance Study and Research Center of the National Polytechnic Institute of Mexico</td>
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<td>CONABIO</td>
<td>Mexico National Commission for the Knowledge and Use of the Biodiversity</td>
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<td>State Trust Fund for Urban Development “Bahia de Zihuatanejo”</td>
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<td>National Trust Fund for Tourism Development</td>
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<td>GIS</td>
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<td>GPS</td>
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<td>ICZM</td>
<td>Integrated Coastal Zone Management</td>
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<td>INEGI</td>
<td>Mexico’s National Institute for Statistics, Geography, and Informatics</td>
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<td>NGO</td>
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<td>Special Area Management Plans</td>
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I thank those people I met during this study. Their experience and the concern for the future of their communities further fueled my knowledge on this topic. Learning how residents of tourism-based coastal towns have adopted and still struggle to adopt sustainable practices to protect their cultural and natural assets, provided me a great insight on this topic and crucial data for this research.
Preface

I grew up near and around the sea. Spending time around coastal areas has been one of my greatest privileges and passions. As a native Zihuatanejense, I was fortunate of enjoying visits to unique natural areas and breathtaking sites. I also enjoyed walks along pristine beaches. Unfortunately, I also witnessed throughout the years (as a result of a strategic economic development in the natural assets of the entire region) dramatic changes in my hometown: Zihuatanejo.

Proposed as an innovative economic alternative, tourism caused in Zihuatanejo rapid development and subsequently, misuse of natural resources, increased pollution, and gradual loss of local identity and cultural heritage. These common factors have occurred not only in beach towns like Zihuatanejo, but also in other small coastal towns such as Puerto Progreso at the Yucatan peninsula in Mexico.

Coastal tourism plays a major economic role in many communities, regions, and even countries. As a developing country, Mexico has considered and promoted coastal tourism as a successful economic alternative. Through direct and indirect activities, tourism requires high levels of resource consumption, creates considerable pollution and waste, and usually leads to irreversible environmental impacts. On
the other hand, if well planned, coastal tourism provides revenues for environmental protection, economic development, and social improvements.

In practical terms, coastal areas are perceived as zones with a high real estate value, where massive development provides a way to obtain substantial revenues. But in sustainable terms, due to their valuable assets, coastal areas must be perceived as places that have to be protected and preserved.

Although many things have definitively changed in Zihuatanejo, my concern about the future of the natural environment and the rapid development of the coastal zone in the region has remained strong. To complete this study, I dedicated almost three years on it. This research is mainly based on empirical examples from previous case studies and direct site observation from several tourism-based coastal towns from Mexico, the United States, Italy, Belize, and Grand Cayman.

The concepts covered in this research are related to economic and sustainable development, coastal zone management, cultural heritage, and political processes within the context of tourism. This research provides insight into how tourism may impact small coastal communities. In addition this study primarily focuses on how sustainability is essential—if not the only basis—to formulate adequate policies that can ensure a sustained community and economic growth while preserving local and regional assets.
Chapter 1: Context

1.1.1. Research Problem

Tourism is considered one of the world’s largest industries and one of the fastest growing economic sectors. In 2003, tourism accounted for some 10.2 per cent of the world’s GDP and approximately 7.7 per cent of total global employment (some 200 million jobs) (World Travel and Tourism Council [WTTC] 2003).

Tourism, like any other economic sector, uses resources, generates waste, and creates negative environmental, cultural, and social impacts. However, tourism also creates benefits as it contributes to local, regional, and national economies, and it may also foster conservation if a portion of the generated revenues is invested in protection (U.N. Department of Economic and Social Affairs, Division for Sustainable Development 2003).

Tourism-base coastal communities utilize pristine beaches, historic landmarks, scenic ecosystems, and sites with unique flora and fauna as main attraction (Gunn 1994). Such tourism communities seek economic benefits from visitors, which often come at the cost of maintaining their socio-cultural integrity.

This research will provide an overview and analysis of the direct relationship between tourism, sustainability, and the natural and socioeconomic environments. It will also analyze the conflicts and challenges that local authorities and residents of two small coastal communities face over the use and control of resources.
The impacts of coastal tourism development are rarely isolated from environmental impacts. Frequently, coastal tourism is based on natural resources attractions, and it is usually the largest economic activity. These same coastal resources and natural assets that attract and support tourism development, however, face increasing pressures (Hunter and Green 1995).

Negative tourism impacts may be short-term or long-term. Negative environmental consequences of tourism activities can lead to major difficulties, such as near-shore and marine habitat destruction; wetland, mangroves and seagrass loss; over fishing; sediment discharge on the sea ground from construction and sewage; oil leaks from boat engines; anchor damage; run-off pollution from golf courses; and removal of coral and marine species to name a few (U.N. Economic and Social Commission for Asia and the Pacific [ESCAP] 1995).

Coastal assets and pristine environments may cause rapid growth and coastal sprawl. Due to their relevance, natural environments and coastal resources are valuable ecological and economic assets. Coastal resources can be vital for transportation, recreation, seafood production, wild habitat, natural shoreline protection, and biological productivity, while pristine environments can encourage population growth and extensive investment, such as development of tourism harbor facilities (National Oceanic and Atmospheric Administration [NOAA] 1997).
1.1.2. *Purpose of Statement*

The purpose of this study is to discuss the impacts of tourism development within the context of small coastal communities and to discern if a sustainable approach can contribute to the reduction of the negative impacts associated with tourism development.

This research will present an examination of a sustainable approach, which will lead to recommendations for sustainable practices to mitigate potential threats. By suggesting sustainability, this research seeks to propose a sustained community development to preserve historic, cultural, and economic assets; to protect natural assets and to reduce the loss of habitat; and to increase awareness and sensitivity of resource-users.

According to Harris and Leiper (1995), natural environments are the basic resource of tourism, but these natural assets are being degraded by pollution and overuse. While tourism activities are not necessarily negative or harmful, the lack of planning, adequate tourism management, and sustainable practices is.

Why is it important to study whether tourism activities negatively impact the natural, cultural, and socioeconomic environments of small coastal communities? Because the lack of adequate planning and sustainable practices within tourism-base coastal communities may cause negative impacts.
1.1.3. Definition of terms

Development means different things to different people. The following are the most relevant terms related to tourism impacts, sustainable development, and coastal environments. The main idea of understanding these terms is to identify strategies that can be implemented to achieve sustainability to diminish negative impacts and prevent the loss of cultural heritage and local identity.

**Sustainable Development:** the term of sustainable development can have many different meanings (Hunter and Green 1995). Basically, sustainable development refers to the interaction between a given society and its physical and natural environments. It is taken to mean the existence of the ecological conditions necessary to support human life at a specific level of well being for future generations. For the purpose of this research, sustainable development is defined as a balanced relationship between efficient planning, management, tourism development, economic growth, cultural and natural assets conservation, and the sustainable future use of these resources (see figure 2, p. 18).

**Tourism Development:** Tourism is the action of traveling for leisure related purposes. Tourism encourages activities that attract visitors from outside the community. Tourism development depends on natural assets and socio-cultural attributes, which satisfy tourists’ needs.
Sustainable tourism: Environmentally, socially, and culturally sound, sustainable tourism is defined as management techniques that emphasize the local character of the community, achieve economic development, enhance and preserve biological diversity, and maintain cultural integrity. In addition to protecting natural resources, sustainable tourism also satisfies tourists' expectations, and the needs of the private and public industry. Sustainable tourism is a continuous and visionary process.

Rapid coastal growth: small coastal communities are being confronted by drastic changes resulted of rapid growth. Rapid growth causes other issues: natural processes and coastal ecosystems are affected and disrupted, and cultural and economic values are threatened. We may not hold back the rush of people from overwhelming coastal areas, but as coastal areas grow; many of the qualities that initially attracted development to the area become diminished.

Site-specific development guidelines: mechanism such as site-specific design may preserve the local character of communities. Site-specific guidelines may also encourage resource conservation, human-scaled, and compacted design. If legally adopted, this type of policies can provide the environmental-design
framework necessary to propose regional building materials and technologies to protect the environment and natural resources.

**Environmental impact assessment:** it requires from public or private development projects to provide a description with all the actions that may affect the quality of the surrounding build and natural environments. It can also includes a detailed statement of proposed actions to mitigate the environmental impacts related to the new project, any adverse environmental effect that could not be avoided and its potential impacts, and its possible alternatives. It also outlines the relationship between short-term use of natural assets, regulates long-term activities that may use natural resources, consider any irreversible damage that a proposed project may involves and how it would be approached. Environmental impact assessment is not a tool that planners decide to use to mitigate growth or sprawl; it is instead a tool that can be implemented to analyze and determine the resulting and potential impacts or changes that new development may causes.

**Exercise of powers:** governments have the sovereignty, the regulatory, and enforcement authority to implement progressive environmental policies and comprehensive regional-scale solutions to protect natural assets. This research suggest that for the case studies to be analyzed in this study, local governments must improve their efficiency, develop long-term goals and a vision of what is best.

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Notes taken from interviews with Mr. Calderon and Mrs. Banderas, both are residents in Zihuatanejo-Ixtapa.
for Zihuatanejo-Ixtapa and Progreso, and take the lead to accommodate coastal growth while implementing conservation efforts.

**Improving competitiveness:** tourism provides a mean of diversifying the local economy. Within both case studies, local businesses often seen tourism as an opportunity to earn revenues, but increasingly, local retail is being severely affected by the creation of all-inclusive vacation packages. Tourists do not make significant expenditures on the community because they usually remain for their entire stay at the cruise ships or resort facilities, where they are provided of everything they need. This situation left not much opportunity for local business to make profit from tourism².

**Regional cooperation:** regional cooperation and coordination is essential to the success of community development. Coastal regions must be shaped through a cooperative process to design policies, programs, and strategies at both, the regional and the community scale. Coastal regions must be conceived as a consistent unit: economically, ecologically, and socially.

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² Note taken from interview with the Director of the Chamber of Commerce in Zihuatanejo-Ixtapa.
1.1.4. The significance of the Study

This study attempts to demonstrate that when adopting sustainable strategies, small tourism-oriented communities can significantly enhance natural environments, maximize tourism's economic benefits, and protect their cultural assets, while becoming more competitive. It also seeks to determine how a sustainable concept can be translated into feasible and workable practices within the context of tourism-based coastal communities.

According to the ESCAP (1995) and the United Nations Environment Program [UNEP] (1997), inadequate and unregulated tourism development may alter unique natural landscapes, cause severe ecological damages, and affect local traditions. An assessment of the effects of the impacts of tourism on small coastal communities would help to understand relevant issues. First, adequate tourism impacts would help to analyze how community assets can promote tourism development, if relying on sustainability. Second, if implementing sustainable practices, tourism-based coastal communities can minimize the negative impacts of tourism and become more competitive among other tourism destinations. Third, if adopting a sustainable approach, tourism-base coastal communities can manage their resources in a way that economic development is achieved, while cultural integrity, habitats, and biological diversity are protected (Gunn, 1994).
Tourism is considered an important engine of economic growth for local, regional, and even national economies because it contributes to a significant portion of foreign revenues (UNEP 2001). But, if not well planned, tourism can negatively impact communities. Inadequate estimation of tourism impacts can cause permanent environmental problems and insufficient funding for protection programs. Overestimating tourism impacts can result in unrealistic revenue projections affecting funding to carry community programs.

It is relevant for policy-makers to balance conservation and business interests, while understanding that rapid changes in tourism may cause permanent changes (Dean 1999). Such changes may cause (as previous studies included on the literature review section have shown) negative impacts and irreversible loss.

This research focuses not only in the complexity of tourism problems experienced within small coastal communities, but it also present a comprehensive approach to coastal zone management and sustainable development. This study will suggest a problem-solving approach to achieve balance between the use and conservation of coastal resources and economic development. Such approach ought to rely on cooperation among policy-makers, developers, investors, public and non-profit institutions, and local residents.
1.1.5. Delimitation of the study

Considering tourism activities, coastal environments, and planning strategies complementary approaches, this study will analyze the impact of tourism development on two small coastal communities in Mexico: Zihuatanejo-Ixtapa and Puerto Progreso. Both communities have unique natural and cultural assets, which are their principal attraction. In both cases, tourism is their main economic activity.

The case studies presented here will be examined to determine how tourism development impact these communities, and why and how their environment should and can be protected. As economic and tourism development have occurred, both communities have been affected by rapid growth, but their tourism and planning approaches are being managed differently due to their geographical location and their social and political environments. Within both case studies, managing tourism growth has represented difficult challenges for coastal managers and elected officials. Paradoxically, tourism development has supported the local and regional economic growth but has placed pressure on the sociocultural and natural environments on both communities.

The case studies to be examined have experienced a dynamic and growing tourism and harbor development, but face diverse environmental, political, and social challenges. The land area in both communities also supports agricultural and
fishing activities. The findings attempt to provide relevant lessons on best coastal resource management, sustainable tourism, and site-design planning practices.

During the last three decades, both communities have experienced an impressive tourism and harbor growth. Also, these activities have a dominant economic role and provided a major contribution to the local and regional economies (City of Zihuatanejo 2004, National Trust Fund for Tourism Development [FONATUR] 2003, City of Progreso 2004). Such growth has certainly lead to the creation of public and private investment; employment; health and educational opportunities; increased flow of foreign revenues; and enhanced and improved infrastructure in and around nearby communities. These impacts should be analyzed not only on the basis of economic benefits and community growth, but also these should be challenged on other three important factors: on the grounds of social, cultural, and environmental cost; on the grounds of a in-depth analysis of the direct, indirect, and induced land-use impact; and finally, on the grounds of carrying capacity, which is crucial to protect the environment and the physical context.

The intent of comparing two case studies is not just to understand the negative impacts caused by tourism development, but (i) how these negative impacts can be reduced; (ii) how to achieve a cooperative process with active citizen
involvement; and (iii) how local governments would implement feasible policies and practices of sustainable development to improve efficiency on their local and regional management approach.

Managing coastal tourism, while preserving healthy ecosystems represents a challenge to both, public and private interests (Dean 1999). Because of its economic significance and its potential physical, environmental, and socio-cultural negative impacts, for both case studies, managing tourism in a sustainable manner involves both economic and environmental concerns.

This research will examine current environmental conditions of tourism development patterns. It will also examine potential changes caused by the impact of future demographic density and land-use changes that would occur due to tourism development.

Data from different time periods (past and current trends) will be compared, to show potential tourism development patterns and its possible future effects. This study's findings will be compared with previous research, to summarize what was learned. It will also analyze whether it provided additional knowledge to the planning field of how to implement sustainable tourism practices and growth management.
Chapter 2: Methods

2.1.1. Research Questions

The questions to be answer emphasizes why planning is essential in tourism-oriented coastal communities. They will answer why a sustainable approach should no longer be postponed within both case studies. The research questions were developed within a phenomenological context. The aim of this study is to answer:

1) What is the current planning process being followed within coastal communities?
2) What is the impact of tourism activities on coastal communities? 3) How can adverse tourism impacts be mitigated and what process can reduce these impacts?

Reviewing the hypotheses involved in this research, these are not considered as truths to be proven. Rather, this research will explore the core causes of assets degradation caused by tourism, and if sustainable practices can ameliorate negative impacts on the built and natural environments and foster competitiveness (see figure 1, p. 15). The approaches of previous research on tourism planning and sustainable development varied according to the focus of each author. The questions implied in this study are the results of the reflection of the preceding literature and my own personal interest and experiences on negative impacts caused by tourism, sustainable practices, and boom coastal development.

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3 A phenomenological inquiry is widely used within the social sciences and is often used to describe a research perspective that is distinct from, and set in opposition to more positivistic forms of inquiry (Bogdan and Taylor 1975, Creswell 2003).
2.1.2. Research assumptions

The initial hypothesis involved in this study is that tourism negatively impacts the sociocultural and natural environments. But tourism's impacts on coastal communities vary greatly depending on the causes, the effects, and the degree of the impact. In other words, tourism impacts occur under different circumstances and with different degree. Identifying these characteristics from two different sites would help not only to envision the direction for the future growth and redevelopment, but also would improve resource-management efforts between public and private entities. This would be essential to achieve a balanced economic growth and environmental quality locally and regionally.

After this initial hypothesis is developed, another hypothesis comes underplay: that hypothesis is that by implementing a sustainable tourism development approach, negative impacts can be reduced. Hence, this study attempts to propose how coastal communities can mitigate environmental degradation caused by tourism development. If this study's hypotheses prove to be supported, then the next step will be to propose policies to adopt a sustainable model to implement integrated coastal zone management, adequate planning, and efficient management of tourism practices to reach a sustained equilibrium between community development and environmental conservation.
2.1.3. **Variables and hypotheses in the study**

The hypotheses involved in this study analyze the potential effects of tourism activities within small coastal communities. Thus, these hypotheses seek to predict and discover the relationship among the implied variables (see figure 1).

**Hypothesis one**

- **(Tourism Activities) X1**
  - Independent Variable
  - (+) The more of unplanned tourism
  - (-) The less tourism planning

- **(Negative Impacts) Z1**
  - Dependent Variable
  - (+) (Negative Impacts) Z1
  - (-) The more negative impacts and unplanned tourism development, the greater loss of local assets
  - Note: (GIS mapping techniques may be use to identify areas with degradation)

- **(Decrement of Cultural and Natural Assets) Z2**
  - Dependent Variable

**Hypothesis two**

- **(Tourism Planning) X1**
  - Independent Variable
  - (+) The more tourism planning

- **(Local assets) Z1**
  - Dependent Variable
  - (+) The more tourism planning, leads to:
    - (+) Unique cultural and natural assets that may boost tourism growth

- **(Sustainable Development) Z2**
  - Dependent Variable

Figure 1. Variables and hypotheses involved
• Hypothesis one: An increase in unplanned tourism activities directly causes a decrease in the quality of the local assets.

• Hypothesis two: Adequate tourism planning and sustainable practices can lead to effectively protect the natural environment and preserve cultural heritage, thus minimizing tourism’s negative impacts and boosting its benefits.

This study considers unplanned tourism to contribute and increase levels of impacts, thus decline of coastal communities. To test the hypothesis one from the diagram above, if data is available, GIS techniques can be considered of key importance to analyze how tourism may affect coastal resources and changes in land use patterns. Mapping environmental changes and development patterns can lead to identify impacted areas. Hence, spatial analysis would be consider to be essential to: 1) evaluate current land-uses and propose suitable land for tourism expansion. 2) to identify impacted areas that require protection and conservation programs.

Spatial analysis may determine whether or not significant impacts caused by tourism development can occur, such as environmental degradation and habitat loss. It may support the proposal of a sustainable tourism approach by proposing vegetation buffers to improve water quality. It may also help to understand the relationship between surrounding land uses and how these affect the natural environment and critical ecosystems.
2.1.4. Research framework

The particular interest of studying small coastal communities and the consequences these communities face due to the pressures of rapid changes caused by the development of tourism, is that such activity may cause negative impacts on their cultural and natural assets and even the loss of coastal resources and unique sites. From this perspective and from a sustainable point of view, the framework developed for this research is represented in a visual model, which considers essential to integrate sustainable practices to control tourism's detrimental impacts, encourage economic growth, and protect cultural and natural assets.

Coastal communities are considered to have resources of great importance that involve the interest and well-being of many people (Carson 1962). In light of this thought, how can enduring tourism activities be accomplished, while achieving sustainable development? Coastal communities have to ensure that tourism is developed and managed in such ways that it would benefit the resident population. They also have to ensure that tourism does not contribute to the detriment of the natural and urban environments, but rather to their enhancement. If developing a sustainable model, legally enforced, communities would implement environmental sound designs, suitable carrying capacities, and site-designed planning strategies, thus ensuring that tourism will not become a financial burden to local authorities.
Figure 2 interprets the framework that integrates tourism management in such way that would result in sustainable development. This model represents the guiding framework for the study. Its goal is to explain the relationship between tourism development and the conservation of local assets. This integrated model focuses on economic development, efficient use of natural resources, preservation of biodiversity, maintenance of cultural integrity, and the improvement of quality of life. This model embraces the sequence of transforming impacts and the challenges that coastal communities face in attempting to improve the efficient management of tourism, natural resources, and land uses, while seeking economic growth.
2.1.5. The research process

The following three stages involve three stages. These stages outline the strategy to be followed to conduct this research: how to find background information, document the sources of information, analyze the site data, reach conclusions and propose recommendations. The next step is the research planning process, which is outlined in the research protocol section (page 113).

**STAGE 1**
- Identify and develop the study topic
- Find background information and bibliography
- Identify database sources, indexes of journal articles, and web sources
- Definition of terms

**Literature review:**
- Tourism impacts on coastal communities
- Sustainable tourism development
- Tourism planning

- Data web search
- Data gathering
- Primary and secondary data analysis
- Analysis of zoning ordinances and land use regulation plans
- Creation of case studies database

**STAGE 2**
- Site observation and field research
- Conducted interviews

**Site context:**
- Field research
- Field observations

- Translation and analysis of site interviews
- Analysis of tourism impacts according to interviewed participants

**STAGE 3**
- Analysis of research questions and hypotheses
- Analysis of key findings
- Conclusions
- Recommendations and future research

- Findings: answer to research questions based on site data and field interviews
- Building analysis and future recommendations with primary data, secondary data, field observation, and local interviews

- Recommendations at the local and regional context and site-specific design

Figure 3. The research process
2.2.1. Research approach: case study method

When analyzing contemporary social phenomena within a broad context, the most appropriate method is the use of case study (Yin 1994). The case study method is not just a fieldwork technique. Its objective is to evaluate the questions, findings and observations of the research. In order to reach this objective, case study methods must explain, describe, illustrate, and explore how and why the setting’s events have occurred and the role of the participants involved (Yin 1994).

Case study methods not only illustrate and explore real-life phenomena and events, but also describe them in a deep way (Creswell 2003). According to Yin (1994) among the various research and other sources of data collection techniques, case study method relies the most on the observation of participants and sites over a prolonged period of time. This observation process requires the researcher to be deeply immersed in the site, which results in a close interaction between researcher and participants (Marshall and Rossman 1999).

Marshall and Rossman (1999) and Yin (1994) define case study methods as a complex strategy, which involves multiple methods of gathering data such as interviews, direct observation, and secondary data analysis. Except for secondary data analysis, such as interviews and observations, which provide an opportunity for participants to share their perception of their conceptions.
The case study method contributes in a unique way to the knowledge of social, individual, or political phenomena. In addition, this method do not disturb the study site any more than is necessary, thus, prevents the researcher from manipulating the participant's behavior or controlling social phenomena (Creswell 2003, Yin 1994).

When using case study methods, researchers can better provide their audience with information about the participants' experiences and the circumstances of the social phenomenon. Obtaining data may be convenient, but the procedures for disclosing and reporting the data can be jeopardized because participants' permission must be secure and confidentiality must be guaranteed (Creswell 2003). In spite of the challenges involved when employing this type of method, this strategy is used in this research because of the already stated objective of this study, the exploratory nature of the inquiries that this research involves, and the desire of explaining complex real-life events.

Case study is a research strategy that has its own research designs. According to Yin (1994) the research design or action plan is the logical sequence that connects the empirical data to a study's initial questions and to its conclusions. The main purpose of the research design when using a case study method is that it can help to avoid a generalized and extended explanation of the findings, which
would result in presenting evidence that would not address the initial research questions (Yin 1994). The research design also determines whether the obtained data and interpretations can be used to generalize larger populations or different situations.

Finally, method of inquiry helps to shape the type of questions to be asked, the form of data collections, the steps of data analysis, and the narrative (Creswell 2003). According to Yin (1994) when designing a research strategy, in the outline, there are five specific inquire strategies and key components that are particularly important to consider: the study questions (how and why); the study propositions (which tell where to look for evidence); the unit of analysis of the case study (small coastal communities); the linkage of data between propositions (data analysis: past, current, and future trends; and the review of comprehensive plans and management programs); and the tools and criteria for analyzing and interpreting the findings (which represent the spatial analysis and comprehensive plan assessment).
2.2.2. Case study: strengths and weaknesses

Case study has been recognized as a separate research method from other research strategies such as experiments. An important strength of case study method is that it can be based on qualitative or quantitative methods or a mix of both methods (Yin 1994). However, many researchers have considered this method not as reliable as other inquiry methods, such as lab-conducted research or surveys. Thus, the convenience of this method is that the researcher need not visit the site if reliable data and adequate technical resources are available.

A recurrent criticism about the case study method is that it is time-consuming and requires extensive data collection and a long analysis process of data (Yin 1994; Marshall and Rossman 1999). Another criticism of the case study method is that the researcher often fails to develop adequate set of measures compared to subjective approaches for collecting data; in other words, the entire case study may be examined at an abstract level, lacking any clear measure of information (Yin 1994). Regardless of this criticism, case study method is preferred when analyzing contemporary events, where the case represents a relevant test of an existing theory, where the case is unusual or unique event, or where the case serves a revelatory purpose. Case study method also integrates subunits of analyses, which can provide a key opportunity for extensive analysis, enhancing the insights of the case.
2.2.3. **Multiple-case study vs. single case study**

This study as a whole includes two different sites, due to the nature of the research questions to be addressed. Thus, this research will involve a multiple-case study design. Each setting will be approached individually, under the same research strategy, but the study, as a whole will use a multiple-case study method.

In this research, the development of the theory involved is relevant for the site selection, because the results of each case are likely to be similar. If proven true, then both cases would provide sufficient support for the theoretical replication.

From the perspective of this research, both sites will be approached within the same methodological framework. The next step will be to determine a research strategy and type of measures and data collection. The results of one case will be tested against the theory applied rather than being compared with the other case results.

According to Yin (1994) conducting multiple-case studies would be expensive and it would require extensive resources and considerable amount of time, but the evidence that this method provides is compelling. Moreover, conducting a multiple-case study implies extensive work that usually goes beyond the means of a single student or one research. Thus, secondary data analysis plays a decisive role in this research. Access to sets of data from public and private institutions would not only provide compelling support, but also would help to meet the study’s time-line.
I consider a multiple-case study method suitable for this project as this research will be explanatory, exploratory, descriptive, with an ultimate goal to predict potential future results within the settings. By analyzing sufficient evidence within the context of each site, this research will explain how significant local and regional events have affected coastal ecosystems within both settings. For the purpose of this research, multiple-case study method will better identify what data would be relevant, what data should be collected, and how to analyze the results to finally answer the research questions involved in this study. Thus this study includes a multiple-case design of two coastal communities. Although both cases will be approached under the same study strategy, the development patterns are expected to be different due to the divergence on regional and geographic characteristics. However, due to inconsistent planning, environmental degradation and the loss of open spaces and unique sites are likely to be the common consequences expected in both sites.

Single-case studies serve to either analyze a rare or unique event or represent an existing theory (Yin 1994). A single-case study method would not be appropriated for this research because of its intend. In addition, due to the overall scope of this research, the theory involved in this study may not be satisfied by a single-case study method.
Chapter 3: Literature Review

3.1.1. Background and literature selection

This literature review section includes several case studies, projects, and proposals on tourism impacts and sustainable development and how these affect coastal areas. These were categorized according to specific topics, such as coastal zone management, resource conservation, socioeconomic impacts, the use of GIS techniques, low-impact design criteria, ameliorating measures, government's role, and the political process of coastal development.

This section includes a number of studies, such as academic researches, journal publications, and related books that illustrate the impacts of tourism. During the fall and spring semesters of 2003 and 2004, four primary indexes were used to search for literature on coastal tourism and sustainability. These indexes included the Iowa State University database, the American Planning Association database, and diverse governmental agencies databases from Mexico and the United States\(^4\). The findings were overwhelming, moreover, compelling. Over the last three decades coastal tourism impacts has been a subject of research and interest among diverse disciplines, including academic, public, and private institutions.

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\(^4\) Secretariat of transportation and communication (SCT), Mexican census bureau (INEGI), Secretariat of environment and natural resources (SEMARNAT), Mexico Ministry of Tourism (SECTUR), City of Progreso and Administracion Portuaria Integral (API) databases, Jose Azueta Municipal Plan 2002-2005, National Oceanic and Atmospheric Administration (NOAA), Environmental Protection Agency (EPA), United Nations (UN), Organization for Economic Co-operation and Development (OECD), world Travel and Tourism Council (WTC), World Tourism Organization, United Nations Environment Program (UNEP).
3.1.2. Tourism impacts on coastal environments literature

Coastal tourism mainly relies on natural resources. Coastal resources are invaluable for their economic vitality and for supporting unique habitats. Because of this, the balance between tourism development and the natural environment is fragile. If not well planned, and depending of the intensity of site use, tourism activities can increase the number and severity of resource degradation (Hunter and Howard 1995).

Since the late 1970s, there have been an increasing number of studies on whether or not tourism development would produce negative environmental impacts and the severity of these impacts (Baud-Bovy and Lawson 1998). These early references mainly attempted to determine how to measure tourism impacts on coastal ecosystems; if tourism’s negative impacts can be ameliorate; what limits or carrying capacity are acceptable; and how long tourism impacts can be tolerated.

According to data provided by the WTTC (2003) tourism development is seen as one of the most promising approaches to economic development. The ESCAP (2001) also emphasizes that within tourism-based coastal communities, a balanced resource-use is of central importance because of the direct relationship between economic growth and the conservation of cultural and natural assets. But, eventually, tourism degrades the natural, built, and cultural environments.
The following are early studies that are relevant to sustainability and impacts of tourism on the coastal environment:

Hunter and Howard (1995) states that tourism pressures on natural resources and the subsequent detriment on the environment is likely to occur mostly where boom tourism growth occurs and in communities with insufficient or inadequate planning strategies. Furthermore, the lack of technical or financial capacity to provide adequate infrastructure and support can exacerbate negative impacts.

A comparison of six-case studies by Apostolopoulos and Gayle (2002) provided important lessons on sustainable tourism, which lead to the protection of quality of life, coastal environments, and human values. In their study, they recognized that tourism has been the cause of environmental loss to all six coastal communities.

In 2001, the U.N. ESCAP’s study stated that natural environments are vital to tourism success or failure for coastal communities. This study revealed that tourism activities might cause environmental degradation and created adverse impacts, such as exceeding the carrying-capacity and over-use of natural resources, which results in pressures on the environment, over-consumption and rapid ecological changes.
Harris and Leiper’s study (1995) states that in Australian coastal communities, natural environments have been degraded and polluted by tourism activities during the last three decades. Their study demonstrated increased levels of natural resource consumption, along with economic and population growth, threatened natural ecosystems, the very ecosystems which tourism development relied. Their study also indicates how wetland loss, deforestation, road construction, lagoon and runoff pollution, beachfront construction, and reef damage from diving, sand mining, and boat anchoring are all associated with increased tourism growth and are at the same time, the main causes of environmental degradation. Both authors determined that without sustainable practices, rapid tourism growth dramatically alters fragile terrestrial and marine ecosystems. They understand sustainable coastal tourism as seeking revenues by designing competitive destinations through adequate planning, without sacrificing the communities’ biodiversity and socio-cultural integrity; while at the same time, meeting tourist, developers, investors, and policy makers’ expectations. The authors consider Australian tourism developers, who have responded to the challenge of sustainability by linking community development and environmental protection, are gradually incorporating this concept into the decision-making process. This is the same conclusion found by the U.N. Department of Economic and Social Affairs,
Division for Sustainable Development (2003) who suggest that by adopting sustainable strategies, tourism can encourage community development, economic vitality, while protecting coastal ecosystems and cultural heritage.

Baud-Bovy and Lawson (1998) state that the first research concerning the tourism impacts within natural ecosystems appeared only after the late 1970s (Tangy 1977; Baud-Bovy and Lawson 1977), followed by more studies in the 1980s. Both authors consider that tourism is invasive because tourism activities can unintentionally disturb and damage unique habitats or cause severe changes in ecosystem composition and density. Sustainable tourism alone provides the basis for protecting, restoring, and better developing coastal resources. In order to accomplish this, natural resource-based tourism practices must establish carrying capacities to avoid physical detriment of the community. Overall, they believe that a comprehensive tourism planning approach would support rational tourism practices to protect vulnerable resources and ameliorate negative impacts.

Gunn (1994) establishes the following as clear examples of inadequate tourism management: Using non-renewable resources faster than renewable substitutes that are available; using renewable resources before they can be replenished; and releasing pollutants faster than ecosystems can process them to make them harmless. Gunn further states that developers, operators, and public
and non-profit organizations now recognize that a healthy environment is essential for the promotion of tourism. But, if not well planned, diversification and development of tourism activities can be a constant threat to the quality of the environment.

The 1995 ESCAP and 1997 UNEP reports not only illustrate tourism’s negative effects, but also possible remedial and preventive actions, and ways to measure tourism impacts. Both studies recognize that tourism has induced several benefits to coastal areas but its unplanned growth has also resulted in severe environmental costs. Similarly, both reports captured the following negative impacts on coastal environments caused by tourism development:

*Quality of-life values:*
- Health
- Unplanned urbanization
- Lack of participatory public involvement

*Human uses values:*
- Restricted public access to coastal and recreational areas
- Land uses (conflicting activities and unbalanced land-use)
- Landscape (visual pollution, non-compatible architecture, over-crowded beaches, degradation of scenic beauty, and loss of biodiversity)
- Loss of shoreline beauty (polluted near-shore water with sewage discharges)
Physical environmental impacts:
- Soil erosion
- Landslide
- Water quality degradation
- Coastline changes
- Waste and garbage pollution

Ecological Environment:
- Coral reef damage
- Loss of mangroves and forest
- Depletion of marine life
- Excessive wastewater discharge in coastal waters
- Rapid deforestation
- Habitat destruction and species loss

Both studies also highlighted that decision-makers must fully address the following management and evaluation stages or impact assessments for every tourism-related development:
- Identify current and future environmental impacts of tourism development
- Identify both adverse and/or beneficial effects and their significance
- Identify primary and secondary effects
- Identify unavoidable effects
- Immediate short-term effects
- Address the probability of correlated effects
- Whether or not any changes are irreversible or will consume irreplaceable resources
- If negative impacts are predicted, address feasible alternatives to reduce these impact
- How the effects would be monitored during and after implementation
- Identify all interested groups that must be included in the policy-making process

5 With available datasets, GIS techniques would be a suitable tool to perform these type of spatial analysis on this research's case studies.
3.1.3. Sustainable development and coastal tourism management literature

The literature review on coastal development reveals that coastal areas and its resources are still to some extent in many places, being exploited without any planned mechanisms for conservation (Dean 1999, Woodard 2000). Gradually, coastal communities are incorporating sustainable development guidelines into their planning process with the main purpose of preserving aesthetic qualities, and physical, social, economic, and cultural assets.

All the literature reviewed in the previous section illustrates the need for greater awareness of the environmental impact of tourism activities on coastal environments. The aim of literature review in this section is to stress the relevance of achieving a balance between sustainable development and tourism.

Hunter and Green (1995) state that the concept of sustainable development is of recent origin. But, it is also a concept that requires early awareness of the need for comprehensive management of natural resources. Actually, it provides basis for the management of the natural, built, and cultural environments. Sustainable development is an ongoing process that has to be constantly strengthened and improved. It is a process that encourages meeting the need for protecting and conserving the natural resources. The United Nations states that:

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6 Sustainable development was first used by the late 1980s.
“Sustainable development meets the needs of the present without compromising the ability of future generations to meet their own needs.”

According to the Office of Ocean and Coastal Resource Management\(^8\) [OCRM] (2004) and the UNEP (2001) coastal states and communities are increasingly implementing sustainable coastal management programs. Good examples of these are Waterfront Revitalization Programs\(^9\), Special Area Management Plans (SAMPs)\(^10\), Integrated Coastal Zone Management Programs (ICZM)\(^11\), and Conservation Development Design\(^12\).

Previous studies (ESCAP 2001; Harris and Leiper 1995; Hunter and Green 1995) have recognized that sustainable tourism provides the necessary tools to ensure that coastal communities are sustained. According to the NOAA (2003) the concept of sustainable development recognizes the relationship between economic growth, environmental protection, and social equity. The NOAA considers that the synergy of these goals promotes stronger economies, healthy ecosystems, and a constant citizen involvement.

\(^7\) United Nations World Commission of Environment and Development.

\(^8\) The Office of Ocean and Coastal Resource Management (OCRM) is an office within the National Ocean Service (NOS); NOS is part of the National Oceanic and Atmospheric Administration (NOAA).

\(^9\) Implemented by the City of Glen Cove, NY, the Waterfront Revitalization is a redevelopment initiative for brownfields clean up and to attract businesses to the center of the community. The city involved federal, state, and local players to provide financial and technical support on this program.

\(^10\) In Charleston metropolitan area in South Carolina, the SAMPs is a program oriented to protect coastal resources. This program also monitors impacts on water quality and the effects of development patterns on wetlands and critical habitat.

\(^11\) The ICZM is a widely implemented program that encompasses the concepts of integrated resource management and sustainable development, while balancing ecological, socio-cultural, and economic aspects through co-management.

\(^12\) Conservation Development Design is a state program in Mississippi, which emphasizes on building livable, sustainable communities surrounded by natural areas.
For the World Tourism Organization [WTO] (2000) sustainable tourism embraces the management of approaches and concepts that integrate tourism development, continuous economic growth, and the protection of environmental quality and aesthetic assets within tourism areas, thus ensuring a balanced growth.

The WTO defines sustainable tourism as:

Sustainable tourism development meets the needs of present tourists and host regions while protecting and enhancing opportunities for the future. It is envisaged as leading to management of all resources in such a way that economic, social and aesthetic needs can be fulfilled while maintaining cultural integrity, essential ecological processes, biological diversity and life support systems.

Hunter and Green (1995) consider sustainable tourism a crucial component of many local and regional economies. It is a potent force that can facilitate protection and enhancement of the natural, cultural, and built assets, while generating economic growth, enhancing the quality of life of local residents, and providing a quality experience to visitors. Decision-makers, operators, and agencies involved in the tourism industry should strive to achieve these goals. The main contribution of this research relies on their proposal: sustainable tourism represents a tremendous opportunity for the more environmentally conscious development of tourism, but it has to provide a conceptual framework to encourage a more holistic and multidisciplinary approach.
In Harrill and London (1995) study the concept of sustainable coastal development implies a holistic and integrated thinking towards coastal community development because it outlines guidelines for resource exploitation, tourism development, carrying capacity, and environmental management. Moreover, a sustainable coastal development approach offers an overview of the future direction of development of the coastal area.

In Mexico, the concept of sustainable development has just been recently raised. Modest initiatives have been taken among federal agencies such as the Mexico Ministry of Tourism (SECTUR) and the Secretariat of Environment and Natural Resources (SEMARNAT). Recent studies, such as the SEMARNAT National Program for Environment and Natural Resources 2001-2006 [PNMARN], have shown that within coastal areas rapid growth, land consumption, inadequate tourism practices, and urban growth patterns are the main source of pollution, loss of ecosystems, and habitat degradation. Overall, both agencies consider these factors the greatest threats on coastal environments.

The SEMARNAT PNMARN program outlines guidelines to balance and preserve natural resources along coastal communities. Its objectives are focused on

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14 The SEMARNAT PNMARN (2001) consider that solutions in the short term are not intended, but guidelines to stop and reverse the current trends in crucial environmental problems are considered in the 2001-2006 environmental program.
the conservation of biodiversity, environmental protection of natural resources, and promotion of sustainable development.

On the other side, the SECTUR recognizes that tourism-based coastal communities face environmental and social problems. Thus, the National Tourism Program 2001-2006 promoted by the SECTUR proposes sustainability to be implemented on tourism communities. The National Tourism Program 2001-2006 includes objectives and a modest time-line, but it does not specify specific procedures, guidelines, or sources of funding. Thus, leaving the responsibility to state and local governments to take the lead to promote and implement their own initiatives.

Another example of actions taken by the federal government to protect tourism-based coastal areas is the Mexico's Environmental Conservation Program. Launched in 2002 with the co participation of the U.S. Agency for International Development (USAID), this program helped to consolidate the implementation and development of basic management, to support the long-term conservation of 11 federally protected areas. These areas encompass more than 5.55 million acres.

Overall, the USAID's program, with the participation of the University of Rhode Island (URI), was designed to help the United States and Mexico to address shared problems. The purpose of this program was to promote environmental
protection, alternative energy practices, and sustainable tourism. It was intended to improve public administration and accountability, to broader local economies, and to promote competitiveness. This initiative sent a clear message to elected officials, planners, policy-makers, and citizens. Its intention was to encourage them to play a more active role in conserving, protecting, and managing coastal resources and unique sites.

In regard to sustainable coastal tourism, the goal of the USAID’s environmental program was to complete with the SEMARNAT and the URI, the consolidation of the community of Xcalak as an ecotourism-oriented community. A complete tourism strategy was established through a community plan to promote and regulate low-impact tourism development. The USAID-Mexico program also proposed Xcalak as the first community-designed, protected marine area in Mexico. The creation of the Xcalak National Reef Park in 2002 was considered the most relevant achievement of this initiative (USAID 2003).

The Xcalak project offers valuable lessons to promote public and intra-governmental, participatory planning. Expanding the Xcalak model to other coastal areas in Mexico will give more momentum to statewide-integrated coastal zone management initiatives mainly based on sustainability.
The community vision strategy and management plan implemented in Xcalak in 2002, are the first environmentally sound programs implemented in a small tourism-based coastal community in Mexico. The case studies presented in this research would replicate the main strategies of the Xcalak model to promote and implement similar initiatives, but such initiatives must be site-specific designed. The community profile of Zihuatanejo-Ixtapa and Puerto Progreso present the same circumstances like Xcalak, Quintana Roo. Both case studies have valuable environmental capital such as pristine beaches, unique open spaces, extensive natural resources, and important ecosystems that must be preserved (SEMARNAT 2003).
3.1.4. **Sustainable tourism, coastal ecosystem management, and the use of GIS literature**

The following section focuses on sustainable tourism and GIS applications. It analyzes how remote sensing technology and spatial analysis are used. The studies relied on the collection of interdisciplinary data such as ecology, geography, sociology, to identify areas for sustainable growth, to forecast environmental degradation, and to propose mitigation options.

After reading the literature related to sustainable tourism and the use of GIS applications within coastal communities, I found that in long-term studies, GIS is appropriate to anticipate environmental degradation and to analyze degradation in a retrospective manner. The literature also reveals that it is relevant to understand and determine the ecosystems' recovery capacity to plan mitigation and management activities.

It has been recognized that coastal regions are highly vulnerable to natural disasters and environmental problems (Dean 1999, Woodard 2000). GIS and the use of remote sensing technology are considered powerful tools that contribute in decision-making processes, sustainable development, disaster mitigation, and environmental protection (ESCAP 1998; Dahdouh-Guebas 2002; Molina, Rubinoff & Carranza 2001).
The most significant contribution of the seventh regional seminar on Earth Observation for Tropical Ecosystem Management (1998) was the broad knowledge given to policy-makers and users of spatial information technologies for natural resource management and environmental monitoring\textsuperscript{15}. Published in 1999 by the ESCAP, this report suggested that network communications, remote sensing, and GIS applications would not only contribute to monitoring environmental changes and natural disasters, but would also provide field data for sustainable ecosystem management, mitigation and recovery techniques in disaster areas, and satellite data to produce and update land-use maps.

Overall, the outcomes of this report focused on coastal environmental degradation and the accelerated use of natural resources, which cause physiographic and environmental changes. However, the 1999's ESCAP report found that the degree and extent of degradation on natural resources, as a result of increasing population pressure, is still largely unknown. GIS technology was considered not only capable of producing maps and field data to planners and decision-makers, but also for providing basic land use information on which policy-makers can base their decisions.

\textsuperscript{15} The National Space Development Agency of Japan, the Bangladesh Space Research and Remote Sensing Organization, and the ESCAP jointly organized in 1998 the 7th Regional Seminar on Earth Observation for Tropical Ecosystem Management in Dhaka, Bangladesh.
According to Dandouh-Guebas (2002) understanding the man-made impacts on coastal ecosystems leads to understanding how to manage them in a sustainable manner. The context of Dandouh-Guebas' study included coastal cities and islands in tropical developing countries in South-east Asia, Africa, and South-America. The observations focused on land-cover and land use patterns, vegetation structure, and coastal habitats. It focused primarily on two aspects: the first, on the aesthetic value and socio-economic importance of ecosystems, in their unique biodiversity, and the environmental role these represent. It also focused on how urban growth, agriculture, and tourism have caused their destruction and degradation. Second, it focused on how GIS techniques provide guidelines for the sustainable management of ecosystems. With remote sensing technology, combined with past and present environmental trends it is possible to predict future degradation caused by human impacts. Remote sensing is therefore, useful for sustainable tourism planning.

The central topic of the study relied on the use of spatial analysis to protect key ecosystems in order to guarantee its survival. For the spatial analysis, three basic characteristics were relevant: spatial resolution, temporal resolution, and spectral resolution. Spatial resolution was used to analyze natural resource composition, but interviews with residents helped to understand the underlying causes of land-use and tourism impacts and the extent of ecological degradation.
In this study, GIS applications were used to geocode ground data using global positioning system (GPS). To monitor ecosystems, aerial photographs and remote sensing were used, which revealed details on vegetation structure. Remote sensing was used to determine the dynamics of the ecosystem and its degradation degree.

In 2001, the University of Rhode Island Coastal Resources Center (URI-CRC), the Mexican University of Quintana Roo, and the NGO Amigos de Sian Ka’an published a five-year project (1998-2003) that sought to promote and support an integrated coastal management program in three different regions in Mexico: Xcalak Reef National Park, Chetumal Bay, and Bahía de Santa Maria. This project states that it is essential to understand the natural environment of tourism areas in order to achieve a social, ecological and tourism balance. The main objective of the project was to analyze critical ecosystems and resource conservation in order to promote coastal zone management as a legal tool for sustainable tourism and economic development. Its ultimate goal was to promote an integrated and participatory program for coastal development. With the use of GIS vegetation buffers, for mangrove conservation areas, were proposed. Databases with biological and physical characteristics helped to understand coastal dynamics. GIS not only provided key information, but also helped to identify and protect vulnerable ecosystems that were impacted by increasing coastal development.
3.1.5. *Synthesis of the literature review*

Tourism development in coastal communities is a sensitive topic. Tourism can complement local and regional plans for economic development because it generates revenues, which may lead to expand and improve existing infrastructure.

Coastal areas are of great economic and environmental significance but are under intense pressure. Factors such as rapid and increasing tourism, human habitation, natural hazards\(^\text{16}\), runoff pollution, excessive overuse of natural resources, and rapid economic growth affect coastal zones (Organization for economic co-operation and development [OECD] 1993). Within coastal areas, natural ecosystems are also being hampered not only because of these factors, but also because of policy-related conflicts due to short-term management plans and insufficient resource allocation. Fortunately, as the previous articles and studies shown, awareness of the need of integration of sustainable development and coastal zone management programs is increasing among researchers and interest groups.

After reading articles related to tourism practices in coastal communities, several key concerns were highlighted. The authors agreed that many communities with diverse natural resources have suffered from lack of protection and inadequate management strategies. Overall, the studies reviewed under this section coincide that a possible solution to offset the negative impacts of tourism development is for

\(^{16}\) Natural hazards within coastal areas include hurricanes, storms, beach erosion, and sea level changes.
planners to implement sustainable tourism strategies and integrated coastal zone management programs using GIS techniques at the local and regional levels.

The increase of tourism activities demand better planning responses. The literature revised above coincided that population, economic and tourism trends, and land-use patterns would help to design growth management and sustainable tourism development strategies to protect coastal areas. In regard to tourism development, the literature reviewed also suggests that the negative social and environmental impacts can be avoided or minimized if planning and monitoring strategies are in place. More visitors mean more people working within the tourism industry. As in any other industry, the idea of “win some, lose some” within tourism activities is inevitable. This idea of “win some, lose some” might lead one to link the concepts of economic growth and environmental degradation to sustainable tourism planning and preventing actions.

In regard to the management of coastal areas, it is essential to understand how ecosystems function in order to achieve their successful management (Dean 1999, Woodard 2000). Good examples of coastal management strategies would be: smart growth; clustered pattern development to preserve particularly natural open spaces; integrated coastal zone management, which must be oriented to ensure the endurance and sustainable development of coastal resources (where developers,
environmental groups, and governmental entities coordinate strategies of
governance, and community participation is essential); water pollution control;
sewage waste treatment; solid waste disposal; and minimum setback requirements
from shorelines. These efforts if managed in coordination and with co participation
would offer solutions to the coastal management challenge by meeting the
community needs while reducing pollution and habitat degradation.

Coastal resources and ecosystem preservation depends on adequate
management. Legal tools to be implemented would be: zoning and building codes,
impact fees, infrastructure planning, comprehensive land-use planning, purchase of
development rights, and open space conservation programs.
Chapter 4: Coastal development impacts

4.1.1. Dramatic growth in coastal communities: the challenge of balancing population growth, coastal threats, and sustainable development

Overall, coastal communities are under intense pressure from population growth, accelerated economic development, and increasing consumption of natural areas for urban expansion. In the United States, coastal areas are the most densely populated areas in the country (NOAA 1999). Over the next 15 years, 27 million people will move to the coast. Currently, more than 139 million people live along the coastal zone. This population is expected to increase by an average of 3,600 people per day, reaching 165 million by the year 2015 (NOAA 1998). Between 1960 and 1990, coastal population in the United States grew by more than 38 million people, slightly higher than the national growth rate.

According to Dean (1999) exploding population growth has resulted in rapid waterfront development, such as residential and tourism construction. In general, coastal real estate is among the most valuable development. Between 1970 and 1980, half of the coastal construction in the United States was allocated within coastal areas. Rather than retreating from the beach, communities are developing their coastline. The outrageous expansion of coastal areas has resulted not only in more
revenues, expanded tax base, construction, and economic growth, but also in large expenditures for maintenance and protection\textsuperscript{17}.

Coastal areas are very dynamic and have a high degree of instability, which results in uncertainty with respect to future conditions, forces, and effects. Thus, proposing or expecting sustainable situations for a substantial period of time is not always feasible (Dean 1999). Beach erosion and coastal hazards represent a constant threat for residents and coastal infrastructure. On the other side, managing coastal development also represents a difficult challenge for policy-makers and planners because there are more than buildings, industry, and ecosystems to protect along the coasts: there are the inhabitants (Dean 1999).

Demographic patterns show that there are more people living and working in the coast. Economic factors also place substantial pressure on the coast\textsuperscript{18}. When balancing population growth to sustainable development, policy-makers face diverse challenges, such as responding to housing demands, funding profitable tourism, recreational, and waterfront development, preserving open spaces, and designing coastal hazard prevention. But only if policy-makers understand the impacts of growth, they may design proper management strategies\textsuperscript{19} (Kurrus 2002).

\textsuperscript{17} Evacuation Plans, recovery disaster plans, and coastal hazard management plans are few examples.
\textsuperscript{18} Massive tourism projects, harbor and fishing facilities, and oil extraction to name a few.
\textsuperscript{19} As a part of growth management strategies, policy-makers must link economic growth to development and redevelopment projects with design principles and public and private inputs to funding programs.
4.1.2. Understanding and balancing the policy and politics of tourism impacts

Analyzing and understanding the impacts of tourism development in coastal areas enable planners, decision-makers, developers, and investors to design and implement strategies to protect tourism investment, while preserving coastal assets (Dean 1999). This understanding would help local governments to make important advances in their knowledge of coastal dynamics, to increase their ability to measure limitations and coastal changes, and to set maximum limits on development20. Also, it would help to design planning and regulatory tools to implement sustainable practices and designate suitable sites for future growth.

Overall, coastal environments are attractive areas for tourism development. But tourism is one of the most significant developments that cause remarkable changes along coastal zones. Tourism development implies changes. Tourism-related activities create economic prosperity, increased tax revenues, enhanced urban infrastructure, and job opportunities, but they also impact the cultural and natural assets (NOAA 1999).

In México, coastal tourism has increased rapidly. The value of coastal tourism extends beyond leisure pursuits. Since the last three decades, tourism represents one of the most important economic activities and source of revenues (SECTUR 2004).

20 Changes on natural coastal processes, set limits on carrying capacity, and measure consequences on land-use.
In Mexico, coastal management and tourism planning vary according to each state. In fact, each state outlines and implements management strategies that they consider most appropriate to their own local and regional planning needs (SEMARNAT 2001). This explains why in Guerrero tourism and environmental planning is managed differently from Yucatan. In both case studies, tourism and harbor development are the largest and fastest growing activities along their coasts.

Unfortunately, negative human impacts have grown as fast as population rates, while integrated approaches and policies to protect and enhance local assets have not. In order to mitigate cumulative negative effects on these ecosystems, local governments in Zihuatanejo-Ixtapa and Puerto Progreso should require environmental impact assessments to every tourism infrastructure and shoreline development, protect key resources, and implement financial incentives, such as tax abatement and purchase of development rights to preserve open spaces. Also, to avoid the disruption of coastal dynamics, when planning tourism growth, the protection of sensitive coastal areas, wetlands, and wildlife habitats, building setback regulations, and beachfront restriction should be considered. Planning should also consider long-term protection of unique coastal resources that are important to tourism development and to the quality of life of residents.
4.1.3. **Key concepts for coastal tourism development**

This research aims to analyze the impacts caused by tourism in order to determine adequate strategies for the development of coastal areas in a sustainable manner. The key concepts to be analyzed on this multiple-case study project are (i) sustainable tourism development; (ii) economic growth; (iii) integrated coastal zone management.

Sustainable tourism as aimed to be a collaborative process, where the parties involved work together to identify priorities. To accomplish goals, participation and co-management are necessary to design and implement strategies. A win-win situation may be achieved if coalition among policy-makers, developers, and investors exist. In such coalition, residents' involvement would play a decisive role.

Tourism growth constantly involves changing circumstances. Adopting sustainable practices would mitigate the detrimental impacts of tourism. Neglecting such growth may threaten local assets. If sustainability is aimed to be achieved, then it is essential to recognize how significant economic growth and cultural heritage are. Economic growth should support locally owned business, while cultural assets must be preserved. Integrated coastal zone management involves carrying capacity, tourism impact and environmental assessment, water quality monitoring, and natural resource conservation.
4.1.4. Impacts on the built and natural environments

Intense and rapid tourism development not only alters the cultural heritage of communities, but also the built and natural environments. Particularly within small coastal communities, it is essential to implement and enforce environmentally sensitive design and building regulations to preserve local identity and achieve environmental quality.

In the long run, if sustainability is intended to be accomplished, strict controls are necessary to avoid exceeding carrying capacity and over-building. Otherwise, negative impacts such as degradation of natural environments and flow away of potential investment for tourism expansion may happen. The result of understanding the impacts of tourism on the built and natural environments would be reflected on the implementation of sustainable practices to balance community growth, while protecting and enhancing the natural environment.

Policymakers may attract tourism investment if environmental quality is guaranteed. By designing tourism development in a sensitive way, blending it into the natural environment, avoiding disruption of public access to open spaces, incorporating water and energy conservation principles, and implementing regulations and environmental plans, policymakers would minimize the effects of negative impacts, improve their management performance, and boost growth.
4.2.1. Methods explored: Using GIS analysis to manage coastal zones

In tourism-oriented communities, the coastal zone is subject to intense and increasing pressure, with consequent economic and environmental implications for present and future generations. Using GIS techniques to map natural resources, based upon a comprehensive approach, may improve the management of coastal ecosystems; it would also help to assess integrated analysis. GIS can help to integrate and link geospatial data such as type and extension of natural resource and land use. Thus, GIS analysis would help Planners to visualize and display the condition of these ecosystems.

For researches related to coastal management, GIS techniques can be useful to analyze the condition of habitats, vegetation density, and water quality. GIS techniques can help to understand how land uses can impact nearby ecosystems. Promoting GIS analysis to map and project current and future environmental conditions on coastal areas would be of key relevance to design site-specific strategies, which would lead eventually to sustainability.

Examples of this can be the integration of alpha-numeric data with geographic features by using layers, which would help to design theme maps that may allow analysis of

![Integration of datasets by layers](Image)
features based on their attributes. Both image and feature data sets can be used.

The degree of the analysis can be compromised to some extent by the consistency and reliability of the data. That is why it is relevant to know how and when the data is collected to ensure validity.

4.2.2. Analyzing habitat loss

GIS can be an adequate tool for studying coastal ecosystems. Comparing theme maps of natural habitats, vegetation composition, and water quality from different time periods with as many monitoring points as possible can help to map vegetation density, determine habitat loss, delimit or propose buffer vegetation around recovery zones, and examine the relationship between nearby land uses and environmental degradation of ecosystems. Designing maps indicating the study areas with designated use information, such as those used by BASINS, with periodically updated information, the portrayed information would be displayed in more detail. Detailed maps can be presented as updated information comes available.

To perform habitat loss analysis it is necessary to determine the land use trends over time. At least three different data sets of the last three past decades can be used. Comparing datasets from three different periods, including natural
habitats and land use patterns, can make it possible to study land use trends and their relationship with habitat loss.

To perform spatial analysis it would be necessary to have three layers of information of the study area from three different periods of time, such as land use, vegetation, and water (this layer must include water bodies names and numeric water quality data). Each of them must be displayed on the map with different symbols, labels (indicating year and type of feature of habitat), and colors; the attribute table of each layer must include at least the following fields: shape (polygon), area and perimeter; and a fourth layer or theme with a proposed recovery zone with an attribute table including the same fields as the previous ones.

After performing the spatial relationship of the three habitat themes over time, a table must be created to record the new results. The fields included in this new table can be time period, acres of habitats, areas impacted, and non-impacted areas. There must be three records on this table, one per each time period. Then, changes in acres of habitat loss from the three different periods of time in the theme of the proposed recovery zone can be analyzed and the results recorded on the acres of habitat loss field.

Changes in acres of habitats within the acres of the recovery zone from the three different periods of time can be analyzed one at the time. With the habitat
theme of the first period of time active, then from the Theme menu, once chosen the Select by Theme option, the recovery zone field can be selected from the selected features of dropdown list and from the Selected features of active themes that dropdown list the Intersect option can be selected, then New Set. This analysis would provide habitat areas from that specific period of time that fall in the current recovery zone. Then, after calculating the total square meter area of habitat that intersects with the recovery zone, the statistical summary of the total acreage for each period of time can be computed and recorded on the table. The analysis results can be displayed using a chart. To better represent the chart data, the Chart Element Properties tool and the Chart Color tool can be used to display this information.

By using theme-on-theme selection and statistics, this specific analysis would lead to the analysis of the total are of habitat loss in a current recovery zone. The chart displaying the total habitat loss area over time would help to visualize first, when exactly and how intense this phenomena happened, and second, if the current proposal of the recovery zone would be effective based on the relationship between changes in the total habitat area and surrounding land uses.

4.2.3. Water quality analysis

Since 2003 in Mexico, the Ministry of Health in coordination with the Ministries of the Environment and Tourism and the Mexican Navy, implemented
the National System of Information on the Quality of Water at Mexican Beaches. The main tourism communities and seaports were monitored. In Zihuatanejo, 15 miles of beach were monitored at ten different points. Due to the extent of the study area, ten points were not sufficient to conduct this type of analysis for this research. Monitoring more than ten points could provide more accurate results.

Spatial analysis provides a comprehensive set of tools to explore and analyze spatial data, enabling to find solutions to spatial problems (Hutchison and Daniel 2000). The purpose of performing water quality analysis is to identify and map data of beach pollution levels using GIS techniques. A continuous beach water sampling can be used as part of a comprehensive beach-monitoring program. Collecting enough samples of shoreline water and also water samples near source-pollution points would provide enough information to create a database.

The objective of proposing this type of analysis for tourism-based coastal towns is based on the need for providing information about the quality of the water of local beaches, to detect possible land uses and source-pollution points, and to warn about health risks associated with polluted water. A proposal of this type would attempt to detect near-pollution sources and the presence of bacteria.

According to the Health Department in Florida (2000), the presence of enteric bacteria is an indication of fecal pollution, which may come from stormwater runoff,
pets and wildlife, and urban sewage. If present in high concentrations in recreational waters and ingested while swimming or allowed to enter the skin through a cut or sore, this type of bacteria may cause human disease, infection, or rashes. If bacteria levels are found high enough to cause illness, warning signs can be posted at the beaches. With this type of water quality analysis, decisions can be made based on the observations of water sample results from nearby source-pollution points. The water quality data would be presented in such way that the temporal and spatial nature of the problem could be presented in a single map.

The purpose of proposing the use of GIS analysis for tourism-based coastal towns is that maps can provide an added dimension on water quality studies. To perform water quality analysis, if available, a basic map layer from the study area can be obtained from remote sensing maps or a TIGER file with vector data. The integration of all data sets can be done through GIS, and the location of sampling sites can be based on the overlay analysis and theissen polygon proximity analysis. A buffer zone can be created to show the water pollution level and the extent of pollution. The interpolation of the results from the theissen polygons can be based on geostatistics. A delineation of safe zones, particularly on recreational beaches, can also be presented; the delimitation of safe zones can be based on interpolation.
GIS is an effective tool, but it requires consistent and detailed datasets. Obtaining, processing, and displaying data is time consuming and costly. Beach water pollution is a severe concern that implies consequences that can impact the economy and public health of tourism-based communities such as Puerto Progreso and Zihuatanejo-Ixtapa. Short-term risk can involve excessive water pollution during particular seasons through the year, while long-term risks can involve a decrease of tourist affluence and eminent health risk for visitors and residents.

4.2.4. Vegetation buffers for improving water quality in coastal areas

Vegetative filters can be implemented to prevent runoff pollution and absorb pesticides and nutrients before these get to stream waters, which would end up in lagoons and finally beach waters. Vegetation buffer zones are critical factors that can effectively control runoff pollution by acting as a bio-filter.

Streams receiving water from agricultural watersheds and other pollution-sources, carry sediment and nutrients that not only reduce drastically the quality of water for recreation, but also impact the productivity of coastal estuaries and wetland nurseries. Vegetation buffers can play an important part in cleaning toxins and excess nutrients from polluted water before it reaches the sea. Vegetation buffers can assimilate nutrients and agricultural and urban toxic waste efficiently. Protecting vegetation zones near water streams, lagoons and shorelines would help
to reduce pollution levels. The extent and type of vegetation buffers can be
determined according to the pollution threats from surrounding land-uses.

4.2.5. Planning, evaluation, and data display process

Data collection to perform GIS analysis would involve a series of sequential
stages, as shown in figure 22. The use and analysis of data sets would allow public
agencies generate valuable information. The ultimate outcome would be a series of
maps displaying geographic data. Although data collection is a time-consuming
and expensive task, yet it is the most important step to perform involved on GIS
analysis. Current problems that agencies in both case studies face is creating and
capturing geographic data. Such problems basically involve technical,
organizational, and strategic aspects. Such aspects are directly associated to
designing and maintaining datasets. If relying and converting secondary data
derived from other sources, then agencies should carefully review these datasets.

Figure 5. GIS planning, evaluation, and data display process
4.2.6. Steps to produce, analyze, and display data to find suitable places for conservation areas

Combining and reclassifying datasets to find suitable areas with valuable, negatively impacted, or endangered ecosystems for conservation purposes obtained from both case studies, would involve the following four basic steps:

1. **Step 1: Input data set**
   - Decide which datasets would be needed as inputs.

2. **Step 2: Derive data sets**
   - Derive datasets. It would be necessary to create new data from existing data sets to derive new information.

3. **Step 3: Reclassify Datasets**
   - Reclassify each data set to the same common scale.

4. **Step 4: Weight and Combine Datasets**
   - Weight datasets that can have more influence in the suitability model, then these would be combined to find suitable locations for the project of study or proposal.

Figure 6. Model to produce, analyze and display GIS data

Note: Model based from the text *Using ArcGIS Spatial Analyst, 2001*
4.2.7. GIS techniques: important characteristics and limitations

The understanding of tourism impacts on the coastal zone leads to better manage these areas. For small tourism-based coastal communities like Zihuatanejo-Ixtapa and Puerto Progreso the use of GIS would provide key data that would support a better decision-making process because integrated policies and programs can be designed with information that is based on past, current, and future trends.

GIS techniques are valuable to manage coastal sprawl, to identify and preserve open spaces, and to allocate apt land for future development. The use of GIS for the case studies presented in this research were considered useful to provide reliable basis for governmental agencies to propose mitigation measures and to find potential areas for conservation and future development. It was also considered that GIS analysis would help to manage natural resources to achieve a sustained growth.

Planning, gathering, processing, and displaying GIS information are tasks that governmental agencies in Zihuatanejo-Ixtapa and Puerto Progreso have not been able to afford and achieve. The lack of funding, technical capacity, but mainly, intergovernmental cooperation has not been achieved.

Through the department of Community and Regional Planning, data to perform GIS analysis for both case studies was formally requested. Information was requested to federal, state, and local agencies such as Secretariat of Environment and
Natural Resources (SEMARNAT), the Mexico National Commission for the Knowledge and Use of Biodiversity (CONABIO) the State Universities of Yucatan and Guerrero, the Integrated Port Administration Office (API) in Yucatan, the National Trust Fund for Tourism Development (FONATUR Ixtapa) and the Advance Studies and Research Center of the National Politechnical Institute of Mexico (CINVESTAV) in Puerto Progreso. Additionally, digital datasets and aerial imagery were bought from the Mexico's National Institute for Statistics, Geography, and Informatics (INEGI) and the National Geographic Satellite Maps center. The information acquired was insufficient to forecast or assess impacts caused by urban and tourism growth. Therefore, complete GIS analyses were not completed.

GIS tools, such as spatial analysis, mapping technology, and satellite imagery would be of great importance for government agencies in Zihuatanejo-Ixtapa and Puerto Progreso because these tools would allow these communities to create and inventory of their built and natural resources. Detecting detrimental use of resources would be possible through spatial analysis. Mapping resources and its conditions would help to provide key information to implement land-use policies that will steer development to suitable locations, thereby protecting key resources and ecosystems. Satellite imagery would provide information on land development patterns and three dimension data on building densities and mass vegetation.
Chapter 5: Site context

5.1.1. General context and early environmental initiatives

The coastal region in Mexico includes diverse and productive ecosystems that have become major contributors to the economy in the country. Maritime transports and sea trade, aquaculture, and coastal tourism are the major economic activities along Mexican coasts.

Additionally, Mexico, is ranked worldwide as the second country with most ecosystems and as the fourth country in the world with most biological species, largely because of its coastal ecosystems such as mangroves, wetlands, lagoons, and coral reefs (CONABIO, 2000). But, like in everywhere else, as people move to coastal areas and tourism development increases, the function of coastal ecosystems is in jeopardy.

The case studies included in this analysis were selected due to the significant local and regional impacts that harbor and tourism activities have caused in both communities; also because within both communities, unique natural sites and coastal resources have triggered a development boom along their coasts (National Trust Fund for Tourism Development [FONATUR, Ixtapa] 2003; Integrated Port Administration Office [API] 2004). Unfortunately, tourism and harbor activities have inevitably transformed both communities.
5.1.2. Zihuatanejo-Ixtapa: regional context

Guerrero state is located on the
southern Pacific coast; it is linked with the rest
of the country by interstate roads, airports and
maritime transportation. Guerrero’s total
surface is almost 24,820 sq miles, which has
extensive natural resources. The coastal
area in Guerrero is about 311 miles long.

5.1.3. Site context

Zihuatanejo-Ixtapa was considered a potential case study due to the
relevance of the regional impact of tourism growth and the complex urban
development that has drastically changed its 15-miles long coastal area.

Ixtapa and Zihuatanejo are sister destinations
located in the State of Guerrero, on the Pacific
coast on the Mexican Rivera. Zihuatanejo
and Ixtapa are Located in an urban area of
76.7 acres. Located on Zihuatanejo’s bay,
Zihuatanejo has 1.9 miles of sandy beaches, while Ixtapa, located on Bahia del
Palmar, only 3.6 miles Northwest from Zihuatanejo, has 4.04 miles of beach (fig. 8).
Located at the Jose Azueta County, Zihuatanejo-Ixtapa is 362.27 miles away from Mexico City and 144 miles from Acapulco (Figure 9).

Zihuatanejo is located three miles Southeast from Ixtapa. The Jose Azueta international airport, which serves the entire Costa Grande region, is located four miles Southeast from Zihuatanejo. The surrounding region that is directly affected by the influence of Zihuatanejo-Ixtapa’s urban area is almost 2,136,686 acres.

Zihuatanejo-Ixtapa is located in a small bay that teen years ago still had five sandy beaches, but due to tourism development, currently, it has only four beaches.

In the mid 1980s, El Almacen (The Warehouse), a public beach was privatized and destroyed to build a gated tourism-nautical development (Puerto Mio) and a small marina with 16 docking positions, owned by the Inmobiliaria Punta del Mar, S.A. de C.V. Back in the 1980s, the original area privatized to build Puerto Mio was 13.8 acres; currently, this nautical development owns 30 acres (Fig. 10).
Almost simultaneously planned with Can Cun, Zihuatanejo-Ixtapa followed the expanding era of tourism resorts in Mexico that included the development of Acapulco in the 1940s and Puerto Vallarta in 1960s. Zihuatanejo-Ixtapa was planned with the intention of attracting tourism from the North American market, foreign revenues, and to alleviate the excessive tourism affluence of Acapulco. Zihuatanejo-Ixtapa was the first tourism project totally funded by the World Bank\textsuperscript{21}.

Until 1973, Both Zihuatanejo and Ixtapa had extensive groves of palm trees and mangroves that were cleared to make way for urban and tourism development. This project was the second totally planned tourism city in Mexico in the early 1970s by FONATUR (FONATUR 2003).

![Figure 11. Ixtapa 1970](image1.png) ![Figure 12. Ixtapa 2000](image2.png)

By the mid 1970s, a remarkable shift occurred in the region. From being a small fishing villa with some agricultural and livestock activities, Zihuatanejo-Ixtapa became a tourism city with diverse services and commercial activities. Currently, a

\textsuperscript{21} FONATUR, 2003.
marina, exclusive resorts and residential complexes, restaurants, shopping malls, and golf courses are located in Ixtapa, while housing, commercial, low-scale tourism, and light industrial uses are predominant in Zihuatanejo. Unfortunately, growth was not parallel with the urban planning proposals. Public infrastructure was not expanded, thus it did not meet land-use development, population growth, and tourism expansion needs (Jose Azueta County Development Plan 2002).

5.1.4. Statutory controls on land uses in Zihuatanejo-Ixtapa

In order to increase the quality of community life, to allocate development into specific areas, to control rapid subdivision and land speculation, and direct private market growth pressures, statewide, the state-planning agency, mandates local governments to implement growth management strategies. This legislation intends to achieve balance between land development and resource conservation. The urban development legislation requires: i) physical planning strategies, ii) comprehensive development of urban centers, iii) basic classification of land uses and land potential analysis. Such regulations are outlined on the 1985 State Development Plan of Guerrero (Zihuatanejo’s Urban Development Master Plan 2000).

At the federal level, by 1970s the federal government implemented a twenty-year long master plan for Zihuatanejo-Ixtapa. This plan was updated in 1985 and in
1992. This master plan included land-use zoning specifications and contemplated future land-use requirements for the urban area. This project was considered at the forefront of comprehensive planning in Mexico because it had a well thought out tourism plan in compliance with local and regional development needs (FONATUR).

The master plan of Zihuatanejo-Ixtapa took into consideration housing, workplaces, recreation spaces, environmental impact controls, public transportation, urban infrastructure, zoning, and a mixed-land use development. Unfortunately, coordination was not accomplished within local, state, and federal governments.

By the mid 1980s, the overall economic situation in Mexico caused in Zihuatanejo a dramatic increase on population and unplanned urban growth, which affected that comprehensively, planned effort. Thus, the timed and sequential growth contemplated in the master plan, and all projections on housing, land-uses, densities, public infrastructure capacities, and environmental controls were exceeded.

Perhaps the lack of zoning district programs did make the Zihuatanejo master plan to fail. In regard to land uses, comprehensive planning of the different zones, special-use areas and neighborhoods in Zihuatanejo-Ixtapa was essential to better
manage city growth, prevent sprawl, and to direct or redirect activities. But zoning programs were not implemented, even conceived by any of the planning agencies.

After two decades of urban growth, the master plan of Zihuatanejo was never substantially updated until 1992. Zihuatanejo’s master plan did not address strategies to manage massive population growth, to rapidly respond the demand of urban infrastructure and public services, to prevent the emergence of substandard housing units, and to manage environmental conflicts.

The most rapid population growth and its unplanned consequences occurred just within a decade, from 1980 to 1990. The need of infrastructure and public services, the complexity of sprawl, and rapid tourism growth, provoked substantial physical and environmental changes along the coast and the entire region of Zihuatanejo.
5.2.1. Puerto Progreso: site context

The second case study, Puerto Progreso, founded in 1872 as a fishing village, was selected because of its ecological biodiversity and its regional economic importance in the Yucatán peninsula.

Additionally, comprehensive planning and coastal zone management programs have not been specifically implemented (City of Progreso 2004; SEMARNAT 2001), which provides a challenge to be explored in this research. At the local level, Puerto Progreso does not have an enforced environmental legislation, or any community planning of any sort. The relationship between economic development and resources conservation has apparently been ignored. It is self-evident that at the long-term, without comprehensive planning in place the ecological and environmental results may be negative in Puerto Progreso.

Puerto Progreso’s geographical location is its strongest advantage, making of this, the main seaport in the Yucatan Peninsula (Secretariat of Transportation and Communication, [SCT] 2002). Because of its sea trade and harbor activities, Puerto Progreso has one of the strongest economies within the string of coastal towns along the Gulf of Mexico. Despite its important harbor infrastructure, Puerto Progreso still has the atmosphere of a small community (City of Progreso 2004).
5.2.2. *Community development and economic growth*

In 1873, the maritime customhouse was located in this port because of the high production and demand for exportation of sisal to the United States and South America. By 1936, two 320-foot long wharfs were built as part of the modern harbor infrastructure.

By 1950, people mainly from the city of Mérida, started building summerhouses along the coast to move away from the city.

In the late 1960s, foreign and domestic tourist started visiting this area. Since 1986, harbor activities provide employment to a large number of residents and play a critical role to the local, state, and regional economies in the trade and transportation of goods and tourism-related activities (City of Progreso 2004).

Puerto Progreso has diverse port activities such as cargo and cruise ship traffic that have created a substantial tourism, commercial, and industrial sea trade with Cuba, Guatemala, United States, Panama, Jamaica, Colombia, Aruba, and Brazil (Integrated Port Administration Office [API] 2003). Cargo such as grains, oil, minerals, petroleum products, cement, fluids, seafood, wood, textiles, and automobiles are mainly exported and imported at this port.
Harbor infrastructure includes a cargo terminal with a large warehouse and storage facilities with about 2,962,103 square foot, and 4,889-foot long commercial terminal. There are also cruise ship terminal facilities with immediate ocean access. Since 1996, 297 cruise ships carried 351,219 tourists (see fig. 20) to Progreso’s 2,180-foot long terminal facilities (SCT 2002). The impact of cruise ship activities, in both economic and environmental terms, is significant (SECTUR 2004).

Currently, the only legally adopted regulation in Puerto Progreso is the County Plan. This plan has a range of three-year period, but, long-term comprehensive planning, however, has not yet been adopted. Only until recently, local, state, and federal authorities, including also the private sector, have recognized the biological and economic benefits of Progreso’s extensive coastal resources. Until now, there have been only proposals to design a wide range of planning strategies, but there has not been a consensus among authorities of how and when such strategies would be adopted and its sources of funding.

The benefits of legally adopting planning strategies to protect coastal resources in the region would be countless. Through comprehensive planning, authorities could better design strategies to control land-uses, implement zoning codes, manage urban growth and tourism development; protect sensitive ecosystems; monitor the environmental impacts of harbor development and other
water-dependent industries; design economic development programs; implement coastal hazard protection plans; forecast business opportunities; and not only enable but also encourage public participation.

In addition, of the implementation of a comprehensive plan in Progreso, the implementation of an integrated coastal zone management program is also essential to ensure that coastal resources can support, in a sustainable manner, the growing seatrede and cruise ship activities in the community. Both, a comprehensive plan and an integrated coastal zone management program would regulate the impacts of community growth and tourism development.

Local and state governments have not explicitly designed a comprehensive plan, a coastal zone management program, or environmental regulations. Currently, because of the economic relevance of the seatrede, only harbor regulations have been established through the Harbor Development Master Plan of Progreso 2000-2005.

This is the only criterion that regulates environmental impacts of harbor-related activities and monitors economic and tourism impact within this area, but the Harbor Development Master Plan of Progreso does not contemplate urban development strategies (API 2003).
5.3.1. Case Studies Community Indicators

In order to understand where communities presently are, which direction they are going, and how far they are from where they want to be indicators are necessary for community planning. Indicators alert planners of potential problems and indicate what is needed to fix the problem.

The indicators presented in this section, include population trends, land uses, education trends, tourism revenues, visitor trends, and water quality analysis, and cruise ship activities. These indicators will help determine how the effects of increases in population, tourism activities, and increasing demand of land to accommodate community growth affect the social and natural environments of Puerto Progreso and Zihuatanejo-Ixtapa.

The following section presents a series of charts, tables, comparatives, and projections to illustrate how indicators provide a clear picture of the needs and issues of both case studies. Where indicated, data was available only at the national and county level.

5.3.2. Zihuatanejo-Ixtapa: trends in population growth

Currently, the total population within the urban area of Zihuatanejo is 98,500 inhabitants\(^\text{22}\). Four decades ago, the population was only 4,400 inhabitants\(^\text{23}\); most of

---

\(^{22}\) Source: INEGI

\(^{23}\) Source: Zihuatanejo’s Urban Development Master Plan 2000-2015
the families were fishermen and farmers. Nowadays, the majority of the population work on tourism-related services, and the commercial sector. Tourism has caused rapid population growth, as shown by population trends, (see chart 2).

According to the following population projection, by 2020 population rates may reach 186,529 inhabitants. This projection is based on regression analysis. The total population of the last four decades was used to estimate the population growth for the next forty-five years. This population growth may exacerbate current patterns of sprawl, social inequity, and environmental degradation.

<table>
<thead>
<tr>
<th>Year</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>1960</td>
<td>4,400</td>
</tr>
<tr>
<td>1970</td>
<td>8,100</td>
</tr>
<tr>
<td>1980</td>
<td>11,600</td>
</tr>
<tr>
<td>1990</td>
<td>54,800</td>
</tr>
<tr>
<td>1995</td>
<td>79,100</td>
</tr>
<tr>
<td>2000</td>
<td>98,500</td>
</tr>
<tr>
<td>2010</td>
<td>142,669</td>
</tr>
<tr>
<td>2020</td>
<td>186,529</td>
</tr>
<tr>
<td>2030</td>
<td>230,389</td>
</tr>
<tr>
<td>2040</td>
<td>274,249</td>
</tr>
<tr>
<td>2050</td>
<td>318,109</td>
</tr>
</tbody>
</table>

Note: Chart 2 corresponds to the population trends of table 1
5.3.3. *Puerto Progreso: trends in population growth*

Puerto Progreso constitutes the most rapidly growing community in the state of Yucatan. Although the local economy is considered to be emerging, Puerto Progreso has been substantially influenced by the Merida's metropolitan region. The new jobs that have been created by the port development and the increasing tourism industry are in general low-skill and low-pay occupation. Puerto Progreso has seen significant job creation in the last decade through the harbor and tourism industry, but this has not been accompanied by an increase in real income.

The rapid and growing population trends in Puerto Progreso, economic challenges, and urban concentration near the wetlands, along with associated industrial and harbor development, has put considerable pressure on the natural resources of the region and has resulted in an increasing number and intensity of environmental problems. The environmental problems in Puerto Progreso are linked directly to the deficit of urban infrastructure, rapid population growth, and intense harbor activities.

![Chart 3. Puerto Progreso population change 1960-2000](image-url)
The following population forecast is presented as input to modeling that will be the basis for Puerto Progreso’s comprehensive planning. The intention of providing a population projection from the present to the year 2050 is for environmental purposes, such as wetlands and agricultural land, and water resource conservation. Also, to regulate and plan a balanced economic growth, and better accommodate urban development. Present planning initiatives would be based on the set of projections of the regression analysis model, but the results will be reflected in the long term.

Table 2. Population trends 1960-2050 Puerto Progreso

<table>
<thead>
<tr>
<th>Year</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>1960</td>
<td>13,694</td>
</tr>
<tr>
<td>1970</td>
<td>17,518</td>
</tr>
<tr>
<td>1980</td>
<td>24,257</td>
</tr>
<tr>
<td>1990</td>
<td>35,280</td>
</tr>
<tr>
<td>1995</td>
<td>40,005</td>
</tr>
<tr>
<td>2000</td>
<td>44,354</td>
</tr>
<tr>
<td>2010</td>
<td>51,257</td>
</tr>
<tr>
<td>2020</td>
<td>59,283</td>
</tr>
<tr>
<td>2030</td>
<td>67,309</td>
</tr>
<tr>
<td>2040</td>
<td>75,335</td>
</tr>
<tr>
<td>2050</td>
<td>83,362</td>
</tr>
</tbody>
</table>

Note: chart 4 corresponds to the regression analysis of table 2
Within the region, Puerto Progreso is uniquely dynamic, with increasing tourism, a growing economy, and harbor-related industries. According to population trends, community growth will continue. Without planning strategies, population growth pressures may produce severe environmental conflicts, such as water pollution, contamination from improper disposal of hazardous and solid wastes, and negative impacts caused by land use development around critical ecosystems and wetlands.

In order to improve the quality of life and preserve healthy natural environments, the local government must have the ability to control development nearby and around critical areas with valuable natural assets. It must also increase its capacity to promote co-planned efforts with other planning agencies at the state and federal level.
5.4.1. Land consumption

Population statistics are commonly used as a proxy to describe the magnitude of human impacts to local environments. However, environmental impacts within Zihuatanejo and Puerto Progreso’s region have been determined by the use and intensity of the land and the population’s activities (how they live, how they get around, intensity and uses of land, urban and coastal development).

5.4.2. Zihuatanejo-Ixtapa: urban development 1979-2004

Over the last twenty-five years, population and urban expansion have experienced remarkable changes. Originally, 123.5 acres were purchased to develop Ixtapa. Thirty years later, the total areas that FONATUR owns are 4,282 acres.

Combined, the total Zihuatanejo-Ixtapa’s urban area is 7,780 acres (Jose Azueta County Development Plan, 2002). This area was zoned with four different categories as follow: Urban development 40%, open space conservation 9.3%, and especial uses 50.5% (FONATUR Master Plan 2000-2015, figure 17).
Figure 17. Land Use, Zihuatanejo-Ixtapa Master Plan 2000-2015
Source: FONATUR Ixtapa
5.4.3. *Puerto Progreso urban development 1978-2004*

Recently, authorities and the private sector have recognized the biological and economic benefits of Progreso’s extensive coastal resources. The only legally adopted land use regulation is the County Plan, which has a range of three-years but a comprehensive plan to protect local and regional assets, has not yet been implemented.

Through a comprehensive plan, the local government could better design strategies to direct and regulate land-uses, such as zoning codes, urban growth and tourism potential; protect sensitive ecosystems; manage harbor development and other water-dependent industries; design economic policies and coastal hazard protection; forecast business opportunities; and enable and encourage public participation.

![Figure 18. Urban area expansion 1978](image1)

![Figure 19. Urban area expansion 2004](image2)

The implementation of an integrated coastal zone management program is also essential in Puerto Progreso in order to ensure that coastal resources can support in a sustainable manner the growing seattle, while promoting and
regulating the impacts of tourism development. Local and state governments have not explicitly proposed comprehensive plans or environmental planning regulations. Currently, because of the economic relevance of seatrade, harbor regulations were established through the Harbor Development Master Plan of Progreso 2000-2005. This is the only criterion that regulates maritime infrastructure and monitor its economic and tourism impacts within this area (API 2003).

Community-based management within the Puerto Progreso context can be understood as an example of an adaptive management approach in the absence of long-established government management practices. Urban planning is proposed and established by the city major in turn. State-mandate planning has not been implemented; community-based management is based primarily on local planning.

Although state agencies such as the Department of Natural Resources in Yucatan (SEMARNAT) and the Administración Portuaria Integral (API) officially manage coastal resources and harbor activities, in reality, the state government in Yucatan has paid little attention to the fact that the local government lacks the capacity to design and implement comprehensive planning because of technical and economic capacity issues. Therefore, in Puerto Progreso, local planning approach tends not to be cohesive with other regional and state initiatives because its technical and economic capacity is limited.
5.5.1. **Education data**

The next indicator presented in this section is the level of education, which is of critical importance to the community. This type of indicator provides understand and measure progress in education in both counties.

Both, the 1990 and the 2000 census data presented in this section were available at the county level only. Early census datasets were not used because were available at the state level.

Although Jose Azueta County presents population patterns higher than Progreso County, their percentages on the levels of education are similar.

5.5.2. **Zihuatanejo-Ixtapa: 1990 County education data**

Of the 63,366 total residents in Jose Azueta County over 18 years of age, 35.63% attained some high school education, 42.54% attained some college education, and only 3.50% attained a BA degree. 10.26% of the residents had less than 9 years of education and 10.26% had 9 to 12 years of education (see chart 5).
5.5.3. Puerto Progreso: 1990 County education data

Of the 43,283 residents in Progreso County over 18 years of age, 36.20% attained some high school education, 43.89% attained some college education, and only 2.6% attained a bachelor degree. 10.21% of the residents had less than 9 years of education and 7.10% had 9 to 12 years of education (see chart 6).
The 2000 census data presents increases on the level of education of 18 years and older residents. Overall, the number of residents that attained a bachelor degree in Progreso County increased 420%, while in Jose Azueta County the number of resident that attained a bachelor degree increased 325%; the rest of the percentages on the chart present discrete variances.

5.6.1. Tourism revenues in Mexico

According to the Ministry of Tourism in Mexico (2004), tourism represents the third largest source of foreign revenues. Since 1980, the tourism industry has generated approximately 32.2 billion dollars in revenues. By 2025, the economic revenues are expected to be about 35,459 million dollars (a 6.7 percent of increase). In Mexico, during the last decade, the tourism industry provided 1.9 million jobs and a total private investment of 35 billion dollars (SECTUR 2004). By 2006, the annual growth rate is expected to be around 1.83, percent and by 2025, 4.10 percent.

Source: SECTUR 2004
In order to reduce the environmental and social impacts associated with tourism and promote sustainable tourism in the host destination, the National Tourism Program 2001-2006 considers cooperation of the interest sectors of key importance. Investing part of the revenues on conservations programs is not only essential, but also necessary.

5.6.2. Comparative of tourists that traveled by air and number of flights 1996-2003


Puerto Progreso does not have its own airport. The nearest airport is the International Airport in Mérida. Data from the Mérida's airport cannot be considered as an indicator because most of the tourists are attracted by the Mayan ruins located at the Yucatan Peninsula and not necessarily because of Progreso as the main tourism attraction.
5.6.3. **Tourism projections: Zihuatanejo-Ixtapa 2005-2050**

Zihuatanejo-Ixtapa, with its extensive tourism infrastructure, receives an average of over 711,000 tourists per year\(^{24}\). The results of the following regression analysis suggest that the tourism industry in Zihuatanejo-Ixtapa will continue attracting visitors (see chart 10).

Tourism infrastructure development will be necessary to accommodate the demands of the tourism market. Local governments efforts must focus on revenues, but also they must plan ahead to better accommodate the rising workforce and the pressures that it will cause to the built and natural environments.

\(^{24}\) SECTUR, National System of Tourism Information (SNIT), and the State Tourism Information System (SITE) 2004.
5.6.4. **Tourism projection: Puerto Progreso 2005-2050**

Table 4. Tourism projection 2005-2050 Puerto Progreso

<table>
<thead>
<tr>
<th>Year</th>
<th>Visitors</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>160,004</td>
</tr>
<tr>
<td>2010</td>
<td>265,552</td>
</tr>
<tr>
<td>2015</td>
<td>371,100</td>
</tr>
<tr>
<td>2020</td>
<td>478,647</td>
</tr>
<tr>
<td>2025</td>
<td>582,195</td>
</tr>
<tr>
<td>2030</td>
<td>687,743</td>
</tr>
<tr>
<td>2035</td>
<td>793,290</td>
</tr>
<tr>
<td>2040</td>
<td>898,838</td>
</tr>
<tr>
<td>2045</td>
<td>1,004,386</td>
</tr>
<tr>
<td>2050</td>
<td>1,109,933</td>
</tr>
</tbody>
</table>

Chart 11. Puerto Progreso tourism projections 2005-2050
Note: Chart 11 corresponds to the regression analysis of table 4.
5.7.1. Monitoring the water quality at recreational beaches in Zihuatanejo-Ixtapa and Puerto Progreso

Up to and including 2002, the SEMARNAT did not require state and local governments to monitor ocean and bay coastal waters. In April of 2003, the federal government through, the SEMARNAT, the SECTUR, the State Health Laboratory of 17 coastal Mexican states, and the Mexican Navy implemented the National System of Information on the Quality of Water at Mexican Beaches. According to the SEMARNAT (2004), the objectives of this monitoring system were to increase awareness of locals and visitors about environmental risks involved with water quality, and to reduce the risk of illness to users of the nation’s recreational waters. Both, the states of Guerrero and Yucatan are part of this initiative (SEMARNAT 2004).

The State Health Department in each state carried out the sampling and analysis of sea water of twelve beaches in Zihuatanejo-Ixtapa and seven beaches in and nearby Puerto Progreso. In Zihuatanejo, the sample monitoring varied depending on the month of the year (see table 5). The SEMARNAT recommended swimming advisories to be issued when enterococcus and fecal coliform levels exceed regular standards, and warnings when monitoring samples exceed the parameters recommended by the American Public Health Association (APHA) for seawater (>500 enterococcus/100ml).
The following table shows the results of twelve monitored beaches along Zihuatanejo-Ixtapa’s coast from January to December 2004. Only one warning was issued in January of 2004.

<table>
<thead>
<tr>
<th><em>SP</em></th>
<th>Location</th>
<th>Beach</th>
<th>Jan</th>
<th>Feb</th>
<th>March</th>
<th>Apr</th>
<th>May</th>
<th>Jul</th>
<th>Aug</th>
<th>Oct</th>
<th>Dec</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Las Gatas</td>
<td>&lt;10</td>
<td>&lt;10</td>
<td>&lt;10</td>
<td>10</td>
<td>16</td>
<td>17</td>
<td>15</td>
<td>10</td>
<td>89</td>
<td>20</td>
</tr>
<tr>
<td>2</td>
<td>La Ropa I</td>
<td>&lt;10</td>
<td>200</td>
<td>&lt;10</td>
<td>&lt;10</td>
<td>25</td>
<td>23</td>
<td>38</td>
<td>23</td>
<td>10</td>
<td>14</td>
</tr>
<tr>
<td>3</td>
<td>La Ropa II</td>
<td>&lt;10</td>
<td>&lt;10</td>
<td>&lt;10</td>
<td>&lt;10</td>
<td>23</td>
<td>14</td>
<td>17</td>
<td>30</td>
<td>46</td>
<td>14</td>
</tr>
<tr>
<td>4</td>
<td>La Madera</td>
<td>10</td>
<td>&lt;10</td>
<td>10</td>
<td>&lt;10</td>
<td>19</td>
<td>26</td>
<td>100</td>
<td>89</td>
<td>N/D</td>
<td>25</td>
</tr>
<tr>
<td>5</td>
<td>Zihuatanejo</td>
<td>158</td>
<td>1108</td>
<td>10</td>
<td>8</td>
<td>65</td>
<td>88</td>
<td>252</td>
<td>198</td>
<td>125</td>
<td>163</td>
</tr>
<tr>
<td>6</td>
<td>El Almacen</td>
<td>10</td>
<td>200</td>
<td>&lt;10</td>
<td>&lt;10</td>
<td>10</td>
<td>10</td>
<td>20</td>
<td>62</td>
<td>53</td>
<td>45</td>
</tr>
<tr>
<td>7</td>
<td>Palmar I</td>
<td>&lt;10</td>
<td>&lt;10</td>
<td>&lt;10</td>
<td>&lt;10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>8</td>
<td>Palmar II</td>
<td>&lt;10</td>
<td>&lt;10</td>
<td>&lt;10</td>
<td>&lt;10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>9</td>
<td>Palmar III</td>
<td>&lt;10</td>
<td>&lt;10</td>
<td>&lt;10</td>
<td>&lt;10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>10</td>
<td>Quieta</td>
<td>&lt;10</td>
<td>&lt;10</td>
<td>&lt;10</td>
<td>&lt;10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>11</td>
<td>Linda</td>
<td>&lt;10</td>
<td>&lt;10</td>
<td>&lt;10</td>
<td>&lt;10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>12</td>
<td>Ixtapa Island</td>
<td>&lt;10</td>
<td>&lt;10</td>
<td>&lt;10</td>
<td>&lt;10</td>
<td>10</td>
<td>10</td>
<td>N/D</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>

Table 5. Zihuatanejo-Ixtapa beach water sampling results from January-December 2004
Source: SEMARNAT

Sanitary risk (>500 enterococcus/100 ml of marine water)

Figure 20. Monitored beaches during 2004
Source: SEMARNAT

<table>
<thead>
<tr>
<th>Enterococcus Results Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Good</strong></td>
</tr>
<tr>
<td>0-34 <em>Enterococcus sp</em> per 100 ml of marine water</td>
</tr>
</tbody>
</table>

Table 6. Monitoring parameters recommended by the American Public Health Association (APHA)
The coastal beach water samples collected by the State Health Department in Yucatan were analyzed, by the same method used in Zihuatanejo: for enterococci and fecal coliform bacteria. High concentrations of these bacteria may indicate the presence of microorganisms that can cause disease, infections, or rashes. According to table 7 and 8, if these conditions are confirmed, the State Health Departments can issue swimming advisories or warnings. The following table shows the results of 4 monitored beaches along Puerto Progreso’s coast from January to December 2004.

<table>
<thead>
<tr>
<th>*SP</th>
<th>Location Beach</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>August</th>
<th>October</th>
<th>Dec</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Chichulub</td>
<td>20</td>
<td>N/D</td>
<td>20</td>
<td>&lt;10</td>
<td>&lt;10</td>
<td>N/D</td>
</tr>
<tr>
<td>2</td>
<td>Progreso</td>
<td>41</td>
<td>N/D</td>
<td>10</td>
<td>&lt;10</td>
<td>&lt;10</td>
<td>N/D</td>
</tr>
<tr>
<td>3</td>
<td>Chuburna</td>
<td>&lt;10</td>
<td>N/D</td>
<td>&lt;10</td>
<td>&lt;10</td>
<td>&lt;10</td>
<td>N/D</td>
</tr>
<tr>
<td>4</td>
<td>Celestún</td>
<td>30</td>
<td>N/D</td>
<td>&lt;10</td>
<td>&lt;10</td>
<td>148</td>
<td>N/D</td>
</tr>
</tbody>
</table>

Table 7. Puerto Progreso beach water sampling results from January – December 2004
Source: SEMARNAT

Sanitary risk (>500 enterococcus/100 ml of marine water)

<table>
<thead>
<tr>
<th>Enterococcus Results Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good</td>
</tr>
<tr>
<td>0-34 Enterococcus sp per 100 ml of marine water</td>
</tr>
<tr>
<td>Moderate</td>
</tr>
<tr>
<td>35-103 Enterococcus sp per 100 ml of marine water</td>
</tr>
<tr>
<td>Poor</td>
</tr>
<tr>
<td>104 or greater Enterococcus sp per 100 ml of marine water</td>
</tr>
</tbody>
</table>

Table 8. Monitoring parameters recommended by the American Public Health Association (APHA)
5.8.1. **Cruise ships activity: how cruise ships affect the coastal area**

Worldwide, the cruise ship industry has been growing 10 percent annually over the past five years and almost 17 percent in 2000. Just in 1998, 223 cruise ships carried almost 10 million passengers worldwide. In 2000, the cruise ship industry generated more than 257,000 jobs. Both, the economic and environmental impacts that cruise ships cause to coastal sensitive ecosystems is considerable (The Ocean Conservancy 2002).

Since 1996, Puerto Progreso, the largest cruise port in the state of Yucatan and the second largest cruise port at the Yucatan Peninsula handled approximately 351,219 passengers, while Zihuatanejo-Ixtapa received only 290,781 passengers during the same period of time (SECTUR 2004).

Since 2002, cruise ship activities have increased dramatically in Puerto Progreso. Its modern terminal facility has encouraged this growth. Cruise ship activity may continue expanding due to the modern port facilities and the diverse shore excursions, such as cultural and natural attractions located near Puerto Progreso. These attractions include Mayan archeological sites, reef and marine protected areas, natural parks, and pristine beaches.

The following comparative chart presents data of cruise ship activity of both, Zihuatanejo-Ixtapa and Puerto Progreso:
Cruise ships activities will definitely generate port revenues but those revenues may not be reflected directly in the local economy because terminal development and operations are administered by the state’s port authorities and not by local authorities. The local and the regional economy will only be affected by visitors’ expenditures.

Zihuatanejo-Ixtapa is a port of call for various cruise ships lines that visit the Mexican Riviera from October to April. In Zihuatanejo-Ixtapa, cruise ships activities are managed by the Capitania del Puerto. Zihuatanejo’s bay is shallow, thus cruise ships cannot pull up directly to the dock. Passengers are shuttled to shore via smaller tender boats. Zihuatanejo-Ixtapa does not represents a profitable port of call among cruise ships lines due to the lack of port facilities, which creates limited cruise ships activity.
5.8.2. **Cruise ships negative impacts**

Cruise ships are like floating cities. Their activities can cause significant impacts to coastal environments. According to the Ocean Conservancy’s report on Cruise Control (2002), cruise ships may affect coastal environments because:

- Cruise ships are permitted to discharge raw sewage and waste into the ocean beyond three miles from shore, which increases nutrients and bacteria that affect marine environments such as sensitive habitats, protected areas, marine sanctuaries, refuges and parks.
- Cruise ships’ illegal disposal of solid waste can cause physical degradation, threats to marine fauna, problems for commercial and recreational fishing, and human health.
- Cruise ships generate toxic waste such as photo processing chemicals and cleaning solvents.
- Cruise ships incinerate waste at sea, thus ash pollution is deposited on the ocean through rain.
- Cruise ships cause air pollution emitted from the ships’ engine.
- Cruise ships generate oil waste and hazardous substance pollution.
- Cruise ships cause invasive species transfer\(^{25}\) caused by ballast water\(^{26}\), which impacts native species and causes major ecological changes.

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\(^{25}\) Invasive specie transfer occurs due to oceangoing tankers and container ships (Woodard 2002).

\(^{26}\) When light on cargo, most ships have to pump water into their holds to maintain their seaworthiness. This ballast water contains dozens of plants and animals, some as adults, but most of them in their forms of eggs or juveniles. When reaching their destination, ships discharge the ballast water and its alien species to the surrounding marine ecosystem.
Chapter 6: Conclusions

6.1.1. Findings

Among small coastal communities, tourism is mainly based on natural attractions and unique sites. However, tourism creates severe stresses in the same natural ecosystems on which it depends. Over use of resources, degradation of natural assets, the increasing and constant conversion of the natural landscape to built tourism-related project such as marinas, airports, hotels, and sand mining, have created imbalances on coastal areas. These imbalances are reflected on the loss of habitats, deterioration of water quality, physical changes on the natural landscape, and erosion of beaches, just to name a few.

This study suggests that coastal tourism and environmental degradation are related. The findings suggest that the coastal zone in both case studies is becoming densely developed, which had cause drastic changes. During the last two decades, these changes have affected the way these coastal zones work and look.

Developers, investors, planners, and decision-makers are aware of the permanent changes caused by rapid growth and inadequate tourism practices, but that knowledge does little good as long as most of these people’s awareness stops only on knowledge. Adopting sustainable practices may mitigate environmental degradation and sociocultural problems associated with tourism development. Residents, developers, and governments must comply with their responsibilities.
6.2.1. Balancing the outcomes in Zihuatanejo-Ixtapa

According to the interviews included in this study, some residents consider that tourism practices have caused overuse and misuses of natural resources, damage on natural ecosystems in and around Zihuatanejo Bay, rapid and increased conversion of land uses around the coastal area, severe decadency of their cultural and social identity. All these factors together have contributed to social inequity and have created social tensions among residents, authorities, and developers.27

Concerning the negative impacts caused by tourism on the natural environment, with the development of exclusive tourism complexes and gated residential areas. Within the public sector, influential figures have allowed investors to make profits without requiring environmental impact assessments.

Tourism development has negatively impacted local residents’ rights to use coastal land and its natural resources. Local residents have been illegally displaced from public beaches. Public access to what were used to be open spaces is now restricted. Nowadays, residents only have access onto certain beaches, while other beaches such as El Almacen, Contramar, La Majahua, Las Cuatas, Don Juan, San Juan de Dios, Don Rodrigo, and Vista Hermosa, and open spaces along the cliff, areas with scenic vistas on the west side of Ixtapa were privatized.

27 While considerable investment has been made on beachfront development and tourism-related infrastructure, low-income neighborhoods in Zihuatanejo lack the basic municipal services and urban infrastructure.
Planners and governmental entities recently allowed participation of non-governmental groups and residents in the decision-making process; this has mostly been done due to residents' dissent. In the past, rarely local people have been involved in the planning process or the proposal of new tourism development. They have not taken part in the decisions on whether a project should be approved, such as the expansion of Puerto Mio, the privatization of public beaches, the allocation or improvement of urban infrastructure, or the distribution of economic resources.

Concerning the impacts on the economic environment, tourism has undermined in certain degree the economic autonomy of local residents by increasing their dependence on outside revenues, thus eroding local capacity to achieve economic growth and self-economic reliance. Large-scale retailers such as multinational corporations like Wal-Mart and Costco, national and international tourism-related companies, fish and frozen seafood sellers, and chains of restaurants are displacing small locally owned business, which cannot compete with larger retailers in size, degree of specialization, technical capacity, and capital.28

Concerning the impacts on the social environment caused by tourism, behavioral changes among youth population are evident. These side effects include loss of traditional values, increase promiscuity that has lead to prostitution and the spread of diseases such as AIDS.

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28 Interview with a prominent official. The name of the participant cannot be disclosed to protect the participant's identity.
Overall, current tourism approaches in Zihuatanejo-Ixtapa are not sustainable. If negative impacts continue, and sustainable policies are not implemented, tourism may decline in the near future. Then, as a tourism-dependent economy, Zihuatanejo-Ixtapa will face severe social issues.

6.2.2. Balancing the outcomes in Puerto Progreso

Regionally, Puerto Progreso is extremely dynamic, with an expanding economy, increasing tourism activities, and a growing harbor industry. Puerto Progreso’s development in regards to business and population growth has been rapid due to its proximity to the City of Mérida. Harbor activities originated the boom development in Progreso, but the lack of a comprehensive planning may increase vulnerability in the region. Pollution from inappropriate disposal of hazardous and solid waste, and unregulated urban and tourism development near to critical habitats may create stress. The outcomes such as air and water pollution from tourism, harbor, and cruise ship activities will be reflected on the environment.

Overall, Puerto Progreso presents a slightly different situation from Zihuatanejo-Ixtapa. In Puerto Progreso, awareness of the quality of the environment and the concern of adopting sustainable practices is increasing among local authorities. The result is reflected on low-impact coastal tourism. Current tourism activity is minimal, but tourism potential is great, due to the still pristine condition
of some of the beaches, natural protected areas, and conservation programs proposed by the state government of Yucatan to preserve those areas.  

6.3.1. Hypotheses, research questions, and findings

The hypotheses involved in this research form a rational explanation of a particular event or phenomena: how tourism development can negatively affect small coastal communities and how sustainable practices can protect local assets.

The core idea of this project is based on sustainability. The model developed for this study (figure 2, p. 18) suggests that sustainability is of key importance to protect the environment, local assets, and the quality of life, while encourages tourism and economic growth. Following this concept, two hypotheses were proposed. Hypotheses one and two provided two different views of how unplanned tourism and sustainable development practices would either negatively impact or boost development within small tourism-based coastal communities.

Development patterns in Zihuatanejo-Ixtapa corresponded to hypothesis one: increases in tourism development directly cause a decrease in the quality of local assets. Puerto Progreso’s development patterns were partially described by hypothesis two: adequate tourism planning and sustainable practices may minimize tourism’s negative impacts and boost tourism’s benefits. Based upon field

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observations, interviews with local authorities, surveying, and the findings derived from the research in both case studies, I have concluded that both hypotheses can be supported as it is shown in the following section.

Table 9 represents the analysis framework and key findings of Zihuatanejo-Ixtapa. It summarizes the criteria and findings involved on research questions 1 and 2, and hypothesis one.

- Research question 1. What is the current planning process being followed within coastal communities?
- Research Question 2. What is the impact of tourism activities on coastal communities?
- Hypothesis one: An increase in tourism activities directly causes a decrease in the quality of the local assets.

<table>
<thead>
<tr>
<th>Tourism development principle</th>
<th>Sustainable development emphasis</th>
<th>Criteria</th>
<th>Key findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coastal tourism is mainly based on sustainability to protect local assets</td>
<td>Unplanned tourism directly affects local assets, thus it results in negative impacts such as decrease of the cultural, social, natural, economic, physical and environments</td>
<td>Analysis of: - Primary data, - Secondary data, - Field research, - Interviews</td>
<td>Unsustainable practices cause overuse and misuse of natural resources, degradation of key habitats, and rapid development of the coastal zone. The more environmental degradation, the greater loss of natural resources and unique sites. State and local agencies implemented the Master Plan 2000-2015 and the Municipal Development Plan 2005-2005 to control tourism development and direct growth. Both agencies did not implement monitoring programs, thus these policies did not respond to the demands of rapid growth and environmental conflicts caused by tourism.</td>
</tr>
</tbody>
</table>

Table 9. Analysis framework and key findings of Zihuatanejo-Ixtapa
Table 10 summarizes the criteria and key findings involved on research question 3, and hypothesis two.

- Research question 3. How can adverse tourism impacts be mitigated and what process can reduce these impacts?
- Hypothesis two: Adequate tourism planning and sustainable practices can lead to effectively protect the natural environment and cultural heritage from development, thus minimizing tourism's negative impacts and boosting its benefits.

<table>
<thead>
<tr>
<th>Tourism planning principle</th>
<th>Sustainable development emphasis</th>
<th>Criteria</th>
<th>Key findings</th>
</tr>
</thead>
</table>
| Comprehensive tourism planning leads to competitive forms of sustainable tourism | - Planned tourism  
- Efficient management of tourism, economic, and community growth | Analysis of:  
- Primary data  
- Secondary data  
- Field research  
- Interviews | Sustainability is the link between the protection of the natural environment, tourism, and economic growth  
Environmentally-sound development such as low-impact tourism strategies protect coastal resources  
Natural protected areas and conservation programs implemented by the Yucatan state government protect valuable ecological areas, thus attracting more visitors and investment. |

Table 10. Analysis framework and key findings of Puerto Progreso

Hypothesis one suggested that coastal tourism development constantly creates a direct and remarkable stress on the social, built, and natural environments on which it depends. Only hypothesis two relied on the concept that sustainable practices may prevent detrimental impacts.
It was clear from hypothesis two that implementing sustainable practices would allow small coastal communities like Puerto Progreso and Zihuatanejo-Ixtapa to enhance tourism opportunities and protect their local assets. Currently, in both case studies, the economic and environmental relevance of protecting local assets has not been fully measured; neither conservation programs have been adopted.

After examining background information, secondary data sources, and the sites context, I consider that coastal growth within both case studies have shown a moderate degree of non-sustainable patterns. In order to achieve sustainability, coastal development guidelines for both case studies could be based primarily on comparative observations taken from similar communities that have achieved sustainable tourism development like Xcalak, but designed on site-specific basis.

Although tourism and harbor activities, which are the dominant activities in both localities, have created economic benefits, they have represented serious threats and have also caused negative impacts on habitats. These impacts represent the biggest challenge for local authorities, tourism developers, and residents. If current growth patterns continue with poor planning programs, little advance in sustainable growth and ecological damages are likely to occur along both coasts. For these reasons, one of the greatest concerns in this research is to increase awareness of how costly it would be to ameliorate negative impacts without conservation practices.
Current environmental disruption of coastal ecosystems within Zihuatanejo-Ixtapa and Puerto Progreso may generate other problems such as pollution, loss of habitats, and brakes to economic growth. Within both case studies, the implementation of sustainable practices is essential to safeguard their unique natural environments and cultural assets. Thus far, negative impacts have been somehow tolerable for short intervals because in both communities, tourism reaches high levels and intense demand only during holidays and peak seasons (SECTUR 2004).

In both communities, the degradation of the built and natural environments has been increased as a result of inadequate cooperation among local and state governments. Although the federal government had decentralized environmental planning by shifting decision-making from the national to state level\(^30\), it did not provided specific guidelines to protect coastal assets. Neither has enforced clear performance standards, nor imposed clearer minimum levels of coastal management on state governments. I can state that in Zihuatanejo-Ixtapa, the lack of political will, a regional planning perspective, and inadequate and not always scrupulous policy and planning processes have not been unusual. Such policy practices have created the current coastal situation: a substantial degree of environmental degradation and land use benefits for just a few property owners.

This research attempted to call attention towards the dramatic situation that both case studies, as well as most coastal areas, face. Overall, the findings of this research call for immediate reform of coastal tourism practices and environmental policies. Such reforms would help to preserve coastal ecosystems and preserve the ecological, economic, and social benefits that coastal zones provide.

Tourism communities that promote and manage economic growth, increase environmental awareness among their habitants, developers, and visitors, and preserve healthy environments will succeed. Those that remain mired, without solving their economic, environmental, and social problems, will fail. State and especially local governments in Guerrero and Yucatan must not decrease their capacity to enforce protection to minimize the continuous degradation that rapid urban and tourism growth cause to the natural assets. Governmental agencies in both case studies must improve their ability to control the persistent population spread and their current inefficient development patterns. The social and economic consequences of letting the natural environment and the community character deteriorate are too great to be ignored. It is time for both communities to recognize that a different vision of their future is necessary and possible, not tomorrow but today. It would perhaps be prudent for both communities to pursue a regional approach, which would lead to plan on a larger and more improved scale.
6.4.1. **Recommendations**

This research does not suggest the abandonment of coastal areas, nor does it attempt to discourage developers from building tourism-related facilities around beachfronts, but it does propose a sustainable approach for current and future development. In both communities, Zihuatanejo-Ixtapa and Puerto Progreso, tourism has contributed to the deterioration of the socioeconomic and natural environments with different levels of impacts. Habitats degradation, privatization of beaches, and the negative impact on the local economy will definitely result in loss of jobs, reduction in private sector and government revenues, and increasing social problems. It is imperative that groups of interest involved (the private sector, governmental agencies, environmental groups, and local residents) take steps to protect not only the natural resources on which tourism depends, but also the local character of the community, the economy, and the cultural heritage. Maintaining the balance between resource uses, adequate environmental protection, economic development, and protection of local identity requires political commitment to design and implement policy intervention, policy monitoring strategies, and feasible management approaches.

Protecting local assets in Puerto Progreso and Zihuatanejo-Ixtapa requires action on local, regional, and national scales. Both communities may balance uses of
resources and manage population growth by designing and monitoring better regional policies, a sustainable approach, and a coastal zone management program.

It is also essential for both communities to monitor public programs to achieve consistency among local, state, and federal plans. Monitoring public programs would be the right strategy to alert local governments on what they may be doing well, and what they may need to do better. This approach should be closely connected to both, the programs' goals that it monitors, and the strategic planning that can be implemented to achieve community goals. The diagram below is a suggestion of how local governments may envision, implement, and monitor their management programs:

Figure 22. Strategic planning to monitor public policy and programs outcome
Within both case studies, local governments must include cooperative, regional, economic, and environmental programs in their own planning process. The role of the federal government in the local planning process should be to emphasize and enforce environmental controls. State governments in Guerrero and Yucatan must improve cooperation and bring a regional perspective to the economic development process and environmental protection that local governments lack. Local governments' role as the main land-use regulators must be reinforced to promote comprehensive development opportunities to encompass local solutions to local needs.

6.4.2. Proposal of Coastal Zone Management Program

The concept of sustainable development emphasizes that a greater knowledge and preservation of natural resources is essential. Tourism-based coastal communities must minimize environmental degradation and implement strategies for the sustainable use of land, water, and biological resources. By implementing integrated coastal zone management strategies, coastal communities would balance economic development and protect the environment.

Implementing coastal zone management programs would assist local governments to balance community and economic growth, while protecting ecosystems, natural resources, and open spaces. An integrated coastal zone
management program will provide long-term benefits while minimizing erosive
development practices and enhancing natural habitats.

The proposal of a coastal management program will be different from other single purpose programs, because it will focuses specifically: i) on natural resource management of the coast; ii) a comprehensive approach to problem solving such as natural hazards mitigation and public participation; iii) designing suitable sites for coastal growth, while minimizing the negative impacts of development; iv) preserving historic, cultural, open spaces, aesthetic coastal assets, and unique sites.

Figure 23. Chart of Coastal Zone Management Program
Adopting an integrated coastal zone management program would provide the adequate framework to design guidelines for coastal zone planning. Zihuatanejo-Ixtapa and Puerto Progreso have not designed this type of initiative yet, but rapid development along both coasts and detrimental impacts attributed to tourism and harbor activities make evident that in order to provide a comprehensive planning approach, identify, and minimize negative impacts the coastal zone and its ecosystems could be accomplished by adopting this type of initiative.

In summary, this research suggest that both communities, Puerto Progreso and Zihuatanejo-Ixtapa should implement the following actions to protect and develop the coastal area in a sustainable manner:

• Establish urban growth boundaries to protect agricultural land and natural coastal resources from sprawl, while providing sufficient land for residential, commercial, and tourism development needs for the next twenty years.
• Protect open spaces and unique sites: In the specific case of Zihuatanejo-Ixtapa, preserving open spaced and creeks around the bay would help to slow the rainwater runoff to the channel and streams that flow directly to the lagoon and the bay. This would prevent sediments from nearby hills washing away. Open spaces would also filter land-based contaminants by reducing the input of nitrogen and
pollution from golf courses and surrounding agricultural land into wetlands, lagoons, and the ocean.

- Implement coastal zone management programs that encompass the concept of integrated resource management, GIS applications, and sustainable tourism development.
- Maintain consistency with state and federal programs in coastal initiatives.
- Protect wetlands and restore mangrove forests as much as possible.
- Enforce minimum design criteria such as low-impact tourism and setback requirements for every beachfront project to protect coastal dynamics.
- Encourage public awareness and citizen participation to protect coastal resources, improve tourism-related services, and preserve the community local character.
- Update, review, and monitor policies and programs.

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Annexes: Analysis and collection of data

Appendix A: Research protocol

I. Procedures:
- Initial scheduling of site visit (direct observation of site and participants).
- Review of preliminary information (previous studies, literature review).
- Verification of access procedures (requesting ISBR consent to contact individuals and official approval to access to governmental and private databases).
- Special documents (letters of reference, requesting official information of the settings).

II. Determination of people to be interviewed and other sources of data:
- City major, city historian, environmental groups, chamber of commerce, tourism bureau, planning director, representative elected officials, and groups of citizens.

III. Collecting the evidence of multiple sources of data:
- Conducting structured interviews (Chamber of commerce, City major, environmental groups, city historian, tourism bureau, planning director).
- Cartographic analysis (Previous and current land-use maps, population density, and aerial photography analysis. Data source: INEGI).
- Census data analysis (Data source: INEGI).
Case study database analysis and review of archival records (data source: local, state, and federal governmental database)

IV. Analysis plan and case study reports:
- Descriptive information (secondary data analysis of archival records, and governmental database). Exploratory information (primary data analysis).
- Cross-case study (Triangulation method: analyzing the perspectives on the same data set and findings). Because this research involves several methods and data resources, the triangulation method would bring a better understanding of how socioeconomic complexity and tourism development, in the rapidly changing built environment of my case studies, has affected the community over time (see fig. 19).

Figure 24. Triangulation method model
V. Creating the case study database:
- Keeping files of the data or evidentiary information, researcher’s notes, observation of document analysis, tabular materials, and interviews).

VI. Definition of terms to be included in this research:
- Tourism impacts, sustainable tourism, environmental degradation, social and cultural assets, environmental planning, integrated coastal zone management, and coastal ecosystems.

VII. Planning for implementation:
- Cooperation among policymakers, environmental and civil groups, planners, and business representatives. At the local level, citizen input is relevant to achieve sustainable growth patterns. Community support is an essential ingredient to the success of sustainable tourism programs, but consensus among interest groups is crucial.
Appendix B: Secondary data sources

The following sources provided secondary data to be used in this study:

- Mexico Ministry of Tourism:
  - Tourism Development Plan 2000-2015
  - History of tourism trends, annual tourism arrivals, competitiveness indicators
- Bureau of Tourism in Zihuatanejo-Ixtapa and Puerto Progreso:
  - Tourism’s importance in the local and regional economy, revenues, seasonality, correlation of tourism activities with other activities, analysis of environmental and social problems related with tourism activities.
- Secretariat of Environment and Natural Resources in Mexico:
  - Mexico Environmental Law, environmental policy background, current environmental policy, sustainable development programs, strategic plans implemented within the research sites; if available, shapefiles and datasets of water quality to produce a layer to show levels of water quality within surrounding beaches.
- Department of Natural Resources in Guerrero and Yucatan:
  - Environmental regulations, natural resource inventory, regulations, and management of protected natural areas in Guerrero and Yucatan.
- Mexico’s National Institute for Statistics, Geography, and Informatics (INEGI):
  - Population growth and business trends, infrastructure trends, land-use inventory, natural resources inventory, and housing conditions.
- City of Puerto Progreso and Zihuatanejo-Ixtapa’s data base:
  - Land-use maps, zoning ordinances, building codes, current and previous comprehensive plans, seafare, cruise ship arrivals, natural resources inventory, and environmental mitigation plans and programs.
- FONATUR (AutoCAD files)
- Newspaper articles:
  - Local newsletters and articles related to environmental issues, tourism impact, economic, social, and cultural issues related with tourism activities.
- U.S. Agency for International Development (USAID)
- Mexico National Commission for the Knowledge and Use of Biodiversity (CONABIO).
  - National System of Biodiversity Information (SNIB)
- National Geographic Satellite Maps
  - Purchase of aerial imagery of Zihuatanejo-Ixtapa and Puerto Progreso.
Appendix C: Planning time-line

After defining the study’s protocol, the next steps will be to contact via e-mail and phone the participants involved to schedule interviews, primary data collection, analysis of secondary data available and site observation. These tasks would be completed within three weeks. The collection and review of information from the case studies is not going to be simultaneous. For both case studies, the total amount of time for this process is expected to be five weeks. Data analysis of information collected from the site, interview translation, imagery capture and analysis, and other evidence collected will be compiled and drafted separately. Past and potential future trends will be completed and mapped in this stage, which will take approximately six weeks. After analyzing the data of each case study of the last twenty years, identifying evident changes, collecting information from interviews and site-visit, structuring and writing the finding and conclusions in the report takes four weeks. This last step include two weeks to write the final report, a week for preliminary revisions and a week to make final corrections and submit the report.
Appendix D: Approval letter from the Institutional Review Board (IRB)

To:    Elsa Adiana Perez Lopez

From: Ginny Austin, IRB Administrator

Re: IRB ID # 04-166

Date reviewed: March 22, 2004

The project, "The Effects of Tourism Development on the Environment within Small Coastal Communities", has been declared exempt from Federal regulations as described in 45 CFR 46.101(b)(2) according to the review and decision made by the IRB Committee.

(2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: (i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

To be in compliance with ISU's Federal Wide Assurance through the Office of Human Research Protections (OHRP) all projects involving human subjects, must be reviewed by the Institutional Review Board (IRB). Only the IRB may determine if the project must follow the requirements of 45 CFR 46 or is exempt from the requirements specified in this law. Therefore, all human subject projects must be submitted and reviewed by the IRB.

Because this project is exempt it does not require further IRB review and is exempt from the Department of Health and Human Service (DHHS) regulations for the protection of human subjects.

We do, however, urge you to protect the rights of your participants in the same ways that you would if IRB approval were required. This includes providing relevant information about the research to the participants. Although this project is exempt, you must carry out the research as proposed in the IRB application, including obtaining and documenting (signed) informed consent, if applicable to your project.

Any modification of this research should be submitted to the IRB on a Continuation and/or Modification form to determine if the project still meets the Federal criteria for exemption. If it is determined that exemption is no longer warranted, then an IRB proposal will need to be submitted and approved before proceeding with data collection.

Cc: Community and Regional Planning
Tim Borich

HSRO/OCR 9/02
Appendix E: Interviews

Interview with the Chamber of Commerce, CANACO-SERVITUR, Zihuatanejo-Ixtapa; Guerrero

1) Please describe your present responsibilities and duties as President of the chamber of commerce in Ixtapa-Zihuatanejo?

1. As President of the Chamber of Commerce, I look after my members’ interests and serve as the Point of Contact between them and government authorities. Part of the linkage work we do at the Chamber of Commerce involves making recommendations for initiatives that offer growth opportunities to businesses. The Chamber of Commerce also serves as an advocate for actualization and training programs for small business.

2) I would like to know what your opinion is about how do tourism activities influence in the local commercial sector?

2. Tourism represents the largest economic force in Zihuatanejo Ixtapa. When Zihuatanejo-Ixtapa became a tourist attraction, the population and commerce increased. Much of this increase in population was due to migration flows. Prior to the development, approximately 20 years ago, Zihuatanejo was a fishing community of less than three thousand inhabitants. Today, the numbers exceed 100 thousand inhabitants.

3) How do retailers feel about the influence of tourism activities to the local economy and why?

3. There is a strong relationship and dependence among businesses, services and hotel activities. Commerce strives to capture tourist revenue in a way that benefits all sectors of the local economy, not only the hotel and transportation industries. One point of concern expressed by businesses and service providers is the “All-inclusive” hotel package that monopolizes tourists to the hotel premises and impedes visitor spending to reach other sectors of the local economy.

4) Given this situation, what do you think will happen with the retail sector as a result of tourism development in Zihuatanejo-Ixtapa?

4. The commercial sector is composed of two very different entities. On one side, are the two Mega-stores Wal-mart and Comercial Mexicana, which offer a modern operation and a huge variety of products. On the other side, there
are a plethora of small businesses, mostly family-run, with traditional obsolete operational methods that resist change. Since their establishment, the two Mega-stores have generated some benefits, but have also caused difficulties. On a positive note, the Mega-stores have lowered prices, expanded product offerings, and used exemplary marketing and organization techniques. However, the Mega-stores absorb the majority of the local economy leaving small businesses in jeopardy.

5) What facts and generalizations support your ideas?
5. The hotel industry primarily uses food suppliers that are not in Zihuatanejo-Ixtapa. Most of the goods come from Mexico City. Hotels use the local markets marginally as a source for local produce such as coconuts, mangoes, bananas, avocados, etc. National tourists, mostly from Mexico City or Guadalajara, are used to making most of their purchases at the Mega-stores and very few shop at the main market, which is limited in goods and meets lower standards for cleanliness and comfort. Both national and foreign tourists visit handcrafts, jewelry, and clothing stores.

6) What other situations may happen as a result of the increase of tourism activities?
6. Tourist activity growth, defined by the number of visitors, may benefit small businesses if these become actualized and expand their product offerings. On the contrary, if these small businesses resist change, the growth in tourism will only benefit Mega-stores and will increase the marginalization of them. It is very likely that a large number of these small businesses will disappear.

7) If the predicted results occur, what would happen next?
7. If small business would dwindle, unemployment would rise. Unemployment is already a major regional and country-wide problem. More than 50% of the population is under age 25. This section of the population represents the highest unemployment rate.

8) Based on your predictions, what are the probable consequences you now see?
8. The local economy fluctuates in concert with the waves of tourism. In the high season, there are a lot of employment opportunities and a surplus of resources, which are beneficial to all sectors of the economy. However, when tourism decreases there are more lay-offs and the economic crisis affects
everyone. Catering to tourism also affects other important economic forces, such as farming, stockbreeding, and fishing. There is also a lack of forestry planning and criminal activity that may seriously damage the ecosystem. Agricultural management is hardly existent. Nonetheless, if applied, even in insipient measures, may lead to the creation of more jobs.

9) What are their goals and motives of the chamber of commerce and its members to when seeking benefits from the tourism impacts?
9. In order to reach excellence in customer service and relations, the Chamber of Commerce provides its members with both legal and fiscal laws and regulations with the hope that this will lead to better business and prosperity. However scarce, we strive to deliver information pertaining to opportunities for credit, and business training and development. We also encourage actualization and improvement of operations.

10) How are retailers interacting with tourism activities and what do you think about their interaction?
10. Interaction among the hotel industry and tourist services, such as travel agencies, happens via product exchange, and later on par with citizen advocacy groups. The interaction among both sectors is amicable; however, the goals and interests are different. The large hotel chains belong to major international corporations with no vested interest in local problems. The leadership in these corporations works toward meeting world-wide goals. If these goals are not met, they are simply removed and sent to other areas. Vendors and service providers are all locals, who are closer to their businesses; and therefore, more worried about public policy and government efficiency.

11) Could you describe the most difficult challenge that the chamber of commerce have been faced with tourism development impacts and what the group did about it?
11. The Chamber of Commerce has endured many challenges in relation to tourist activity. One of these challenges was due to the arrival of Cruise liners, to Zihuatanejo-Ixtapa. This issue has become a controversy, because many people see the cruise-ships as a threat to the ecological health of the bay and are completely opposed to them. Downtown business owners, who usually benefit from tourists that arrive on the ships, to visit the city, opposed the intentions of a group of private investors to have cruise-ships arrive at,
“Puerto Mío” pier, as opposed to the Municipal pier, which is the usual place for ship arrival. The investors argued that the proposed new place of arrival met international security measures, which are now required post September 11. The Canaco was now between a rock and a hard spot. The private investors, associates of the Chamber, demanded that the Chamber support their intentions to take over the arrival of the ships. This proposal represented an important financial gain for the investors. On the other hand, small business owners from the downtown area, asked for the Chamber’s support in preventing the private investors to organize the arrival of the ships. The Chamber of Commerce took a poll among its members to learn where the majority opinion rested. The results favored the downtown business owners. Consequently, government authorities decided against the private investors’ proposal. The ships will arrive at the “Muelle Principal”.

12) Regarding to tourism development, which specific situation is the chamber of commerce interested in and why?
12. Canaco is interested in continued tourist activity, visitor increases, and employment opportunity growth. Specifically, the Chamber of Commerce hopes that the hotel industry will expand their business with local merchants.

13) Regarding to tourism development, what the chamber of commerce would like to accomplish in the next effort that it is not getting now?
13. We would like to see the hotel industry’s marketing budget include local business and service offerings. Due to their economic weakness, small businesses do not have the marketing power that larger hotel corporations exercise.

14) Could you mention what kinds of work pressures do the chamber of commerce have found the most difficult to deal with when working with tourism impacts in the local economy?
14. The pressure is both internal and from the public services administration. Due to the vast number of national visitors that arrive by land (lower-income visitors), the Chamber’s challenge is to maintain a variety of quality products, at affordable costs. The lack of financing options and high interest rates make it difficult for merchants to maintain an adequate inventory that adapts to the fluctuating demand. External affairs are also affected when large quantities of visitors arrive at peak times, rendering public services incapable of meeting the increase need. Water supplies are exhausted, trash collection
fails and security needs rise. These failures affect business and the tourist industry, in general.

15) **Could you mention the failure in the chamber of commerce’s work when dealing with local tourism and retail and why it occurred?**

15. The Chamber’s principal weakness lies in its members’ passivity and indifference. The members expect the Chamber to provide services and to support them, yet are unlikely to participate in issues of general interest and in training and professional development programs. The indifference may be due to a lack of business culture and a resistance to deviate from traditional operations. Furthermore, Ixtapa has not been able to grow with the necessary structure and momentum to create a stable, forceful economy.

16) **Is there anything that you would like to add that has not been covered above or anything else I should ask?**

16. Zihuatanejo-Ixtapa was born 25 years ago, at about the same time as Cancún. However, Ixtapa only has 8,000 guest rooms, while the Mexican Caribbean has over 50,000. Zihuatanejo-Ixtapa has a small and weak economy, subjected to erratic tourism waves. Zihuatanejo’s marketing resources are comparatively reduced and it is relatively unknown as a travel destination. Business and service reflect the economic weakness, where the challenge is surviving the low seasons, which are May, June, September, October, and November, when tourists practically disappear. Everyone anticipates December business, when national and international visitors return. This “fattening” of the economy lasts, at most, to the end of April. The euphoria ends soon after, until the wave returns in mid July for summer vacations. This lasts about a month, until around August 20, when the rain season begins, the tourists leave, and Zihuatanejo-Ixtapa becomes a ghost town.
Interview with Public Official at the Tourism Bureau, Zihuatanejo-Ixtapa; Guerrero

1) Please describe your present responsibilities and duties as executive director of the tourism bureau in Zihuatanejo-Ixtapa?
1. - Coordinate the administrative part that corresponds to the appropriate direction.
- Planning, organizing, programming and executing the operative plans that the appropriate direction has to complete.
- Supervise the information stands (depots), which we have installed around the city for tourist information.
- Assist in promotional activities that the Convention & Visitor Offices has to carry.
- Participate in the meetings that are connected to tourist activities.
- Advise tourism-related business associates of what they require.
- Develop additional projects that increment the promotion of tourism in the community
- Participate in courses and seminars that the Federal and State Bureau of Tourism offer.
- Participate in activities that the City Mayor assigns.
- Represent the Mayor in activities he deems necessary.

2) How do you think this office contribute to the overall tourism development in Zihuatanejo?
2. By leading, combining, and coordinating organizations and institutions whose have tourism vocation and objectives related to this industry. By doing so, they will clearly and adequately inform either domestic or international tourist who visit or desire to visit Ixtapa-Zihuatanejo; and also, to advertise all of the existing products and services which undoubtedly contribute positively to the tourist influx in our community.

3) How tourism development contributed to the overall cultural and environmental changes in Zihuatanejo?
3. Undoubtedly yes! Not only in Ixtapa-Zihuatanejo, but also in other tourism destinations in our country and all over the world.
4) As a result of the increment of tourism activities, what do you think that would happen with the natural and cultural environments?
4. By analyzing the current situation of Ixtapa-Zihuatanejo, both environments would change positively or negatively if they go uncontrolled or unmonitored.

5) What facts and generalizations support your ideas?
5. Studies and Projects that have been implemented in both Ixtapa and Zihuatanejo, such as: the Sustainable Indicator Systems for the Mexican Tourism Agency 21 of the Federal Tourism Bureau and currently the Re launching Project of Ixtapa-Zihuatanejo and the Project of Grand Vision 2003-2025.

6) If the predicted results occur, what would happen next?
6. Those studies and projects were completed with the purpose of having a means that would allow us to measure and monitor the conditions of our community, with the objective of planning and executing short, medium, and long term goals and actions that will help the decision-making process. Consequently this will result in a comprehensive development in the county.

7) Could you mention if the tourism bureau is implementing campaigns to create awareness among tourist about the relevance of protecting coastal natural resources?
7. The Direction of Tourism has not implemented any campaign but it has participated in awareness campaigns, of cleaning and sanitizing the bay, of protection of the turtles and crocodiles. Ixtapa-Zihuatanejo already has crocodile sanctuaries in conjunction with other organizations and offices such as: the County Direction of Ecology, the Direction of Public Municipal Services, and the Visitor and Convention Office among others.

8) What are the goals and motives of the tourism bureau to create awareness among governmental agencies, residents and tourist about the impacts that tourism activities cause on the natural and cultural environments within the community?
8. We attempt to guide our actions towards environmental education and awareness of the general public and tourists to protect and preserve a healthy natural environment and our traditions.
9) Could you describe the most difficult challenge that the tourism bureau have been faced related with tourism development impacts and environmental and cultural protection within the community and what decisions did it take?

9. Public participation and public awareness have been one of the most difficult challenges for this office; because of this, we have invited companies, other governmental entities, service-related agencies, and the general public to participate in the improvement of our natural and socio-cultural environments with the purpose of increasing competitiveness of our community within the market.

10) Regarding to tourism development, what the tourism bureau would like to accomplish in the next effort that it is not getting now?

10. That future projects have sustainability as priority, which would lead to preserve the environment in general.

11) Could you mention what kinds of work pressures do the tourism bureau has found the most difficult to deal with when working with tourism impacts in the local environment?

11. The current pressures that we have are the lack of conservation of the natural, social and economic environments, but overall of the ecological aspect.

12) Could you mention the failure in the tourism bureau’s work when dealing with issues related to tourism planning, environmental protection and cultural promotion and why it occurred?

12. The lack of sustainable, integrated, and sustained development plan, and the lack of participation and awareness from investors and administrators has been the biggest concern of this Direction, which would lead to achieve a successful tourism development, progressive, sustained and sustainable.

13) Is there anything that you would like to add that has not been covered above or anything else I should ask? What are the purposes of this study, and of course, we would like to know about its outcome.
Interview with Mr. Palencia; Hotel Owner; Zihuatanejo-Ixtapa, Guerrero

1) How long have you been living in Zihuatanejo?
1. I was born in Zihuatanejo and I have lived here my whole life.

2) Please describe your economic activity in Ixtapa-Zihuatanejo?
2. I own a small hotel in the downtown area and I also lease office and retail space for small businesses and service-related activities.

3) I would like to know what your opinion is about how tourism development contributed to the overall economic changes in Zihuatanejo-Ixtapa?
3. Tourism development in this area has contributed to develop the local economy among other activities such as services and retail. The economic benefits of tourism development affect personal income, directly and indirectly, for every family and resident in this area. It also affects other activities such as art and craft making, restaurants, liquor stores, and large-scale retailers that provide services and products to small retail and businesses within the area.

4) Give this situation, what do you think will happen with the commercial activity as a result of tourism development in Ixtapa Zihuatanejo?
4. I believe some sectors and economic activities will disappear such as small retail, for instance, drugstores and convenient stores because they will not be able to compete with large-scale retailers, while other economic activities will get reinforced.

5) What facts and generalizations support your opinion?
5. My conversations with other entrepreneurs in the area. They consider that their sales have been gradually diminished after large-scale retailers came to the area.

6) What do you think could be done to prevent such situation?
6. I consider hotels and tourism-related enterprise should buy goods and products from small retailers in the area. By doing so, they would benefit the local economy, which would eventually improve the overall social situation. There have to be improvements to agricultural, fishing and farming activities. Also, governmental and financial institutions could design programs and
provide loans to small producers and entrepreneurs. If better financial opportunities were provided to farmers to increase productivity, this would renew the economy; actually farmers would get their dignity back.

7) What do you consider the results are due of the increase of tourism activities?
7. There have been both positive and negative outcomes. In the positive aspect, additional employment has been generated and revenues have increased. In the negative aspect, tourism-related jobs are low-skill; besides, farmers do not want to continue working on the field, which directly affects the agricultural and farming production in the region.

8) What other situations may happen as a result of the increase of tourism activities?
8. Negative results would result in little attention to farming activities, which would affect, overall, other aspects of the economy. The positive aspect of an increase of tourism activities would result in tourism infrastructure construction and better tourism-related services. Additionally, workers in the tourism field would demand better services and better living conditions.

9) What do you think could be accomplished in order to improve the overall condition in the community that is not occurring now?
9. Authorities must provide services such as municipal utilities and basic health and educational services. If tourism services and infrastructure increase, community services must increase as well.

10) Could you mention the failure in the planners' work when dealing with local tourism and retail and why it occurred?
10. In general, tourism infrastructure is inadequate, which results in constrains. This is reflected in low demand for this tourist destination.

11) Is there anything that you would like to add that has not been covered above or anything that I should ask?
11. Yes. I believe that our taxes should be invested in infrastructure. Not only in tourism-related uses, but also to improve services within the community, otherwise, social and living conditions of residents will get worst, which will be reflected in the quality of services that are delivered to tourists.
Interview with Mrs. Rodriguez; Entrepreneur and Environmental Activist; Zihuatanejo-Ixtapa, Guerrero

1) Please describe your activities within the community.
   1. I am an active member of the S.O.S. environmental group, and co-founder of the Animal Protection Society.

2) What determined your choice to work with the environmental group S.O.S. Bahía?
   2. Due to the construction of the jetty in the bay, which I consider will deteriorate the environment.

3) Which specific environmental impacts are you interested in and why?
   3. I am interested in every negative impact that may affect the bay.

4) I would like to know what your opinion is about how tourism development contributed to the overall environmental situation in Zihuatanejo-Ixtapa.
   4. Tourism development has brought more people. There has been more changes in the community, most of them due to tourism activities, which has helped the economy, but the community has been grown extensively.

5) What do you think will happen with the natural environment as a result of tourism development in Zihuatanejo-Ixtapa?
   5. More depredation of natural resources such as trees that are used as construction material in expensive houses, is likely to happen. Until now, rapid consumption of natural resources within the region has been brutal.

6) What facts and generalizations support your ideas?
   6. Because I believe people within the community have developed greed.

7) As a member of an environmental group, what would you like to accomplish that you are not getting now?
   7. I wish people would stop thinking that they are going to make a living out of tourism activities only. I wish we could have more safety within the community. There are a lot of problems with abduction, either of tourist, locals, or investors. This may pose a threat to tourists, making them feel scared about this destination. I believe law must be implemented more
strictly and impartially.

8) How do environmentalists try to influence the relationship between tourism and the community?

8. We have organized bazaars in five star hotels to collect funds that are used to help local schools in low-income neighborhoods, especially kindergarten and elementary schools. These funds are used to buy basic school supplies. We also invite sailboat owners, who come to Zihuatanejo every year from November to April, to participate in fundraising activities. Funds are also used to support low-income children.

9) What would S.O.S. Bahía group like to accomplish in the next environmental effort, that it is not happening now?

9. We would like to preserve our unique natural resources for future generations. We also want the government to do their job better. Low-income neighborhoods that illegally use the land must legally own the land and receive municipal services. Uses on federal zones should be better controlled, open space conservation should be considered, and shoreline development should be controlled. There have been a lot of changes in the community in the past thirty years; we have to think about the long-term. Governments without long-term plans are governments without a vision of the future. I would like the society to become more involved. Currently, the government does not involve citizens in the decision-making process.

10) Could you mention what kind of work pressures has the S.O.S. Bahía group found the most difficult to deal with, when working with issues related with tourism impact in the local environment?

10. We have had pressure from tourism developers.

12) Could you mention what failures the S.O.S. Bahía group has experienced, when dealing with environmental protection, and why these came about?

11. There has been a lack of organization and public participation because all of us are volunteers.

13) Is there anything else that you would like to add that has not been covered above or anything else I should ask?

13. Yes. What I do in the group gives me a lot of personal satisfaction. What I seek is the well being of the ecosystem and species preservation. What I also want to accomplish is a better environment for all of us.
Interview with Mr. Aguayo; Operator of scuba diving excursions and Diving Shop Owner; Puerto Progreso, Yucatan

1) How long have you been living in Progreso?
   1. I have been a resident since 1994.

2) What is your economic activity or job within the community?
   2. I am a scuba diving instructor. I also own a diving shop. I offer diving tours and shoreline excursions in this area. I do not consider the activity that I do a job because I like what I do.

3) I would like to know what your opinion is about how tourism activities affect the natural environment in Puerto Progreso.
   3. I think it is obvious that tourism has affected the community’s environment; both, in a positive and a negative way. In the negative way, tourism activity generates a considerable amount of solid waste, which receives inappropriate treatment. Wastewater plants are non-existent, therefore wastewater is inadequate. There has been a shift on workforces; also, agricultural fields are being abandoned. Small rural towns are becoming depopulated and population is concentrating in the urban area.

4) What facts and generalizations support your ideas?
   4. 2000 years ago, the Mayan culture, in the Yucatan Peninsula, devastated the forests, due to the way they lived. Then, during the Colony, the Spaniards did a complete extraction of valuable natural resources. Culture and resources were completely destroyed. Then, the haciendas and their extensive sisal plantation overused the soil; this intensive activity degraded the soil’s quality. This activity became no longer productive. Then, coconut plantations replaced sisal production, which introduced a new environmental problem- a tropical plant disease: Amarillamiento letal. Harbor activities became the main economic activity and now, tourism is considered an alternative that would drive the economy. There has been overuse and rapid exploitation of resources in the name of “development”, but the price paid is a high environmental cost.

5) What made you work as a scuba diving instructor and tour operator?
   5. First, my passion for this activity. I consider what I do an eco-educative activity. I like to share my knowledge. I like to amaze visitors. I enjoy giving
them a perspective of the things that I have learned after ten years of experience. I want tourists to learn about the Mayan culture and who they were, and learn about our history.

6) **Could you describe the challenges that you face when working with tourism?**

6. These are not exactly challenges, but I would like to develop the ability to offer a good service. I believe there is a symbiotic relationship between making a profit from the economic activity that I develop and protecting the natural environment at the same time.

7) **Is there any environmental effort that you would like to accomplish that you are not getting now?**

7. Yes, there are many. I would like to develop a complete fish guide of all the species that can be found in this area to educate visitors about native species. I would like to produce a video for tourists to show them the wide variety of marine ecosystems that we have in the area, and show them how and what type of tourism activities impact marine ecosystems. For instance, this video could be shown during flights.

I would also like to organize a non-governmental group to collect funds from tourists and research institutions to develop conservation and education programs, and to promote activities to clean beaches.

8) **Could you mention what kind of pressures you have found most difficult when dealing with environmental issues?**

8. My only pressure would be to be capable of doing what I do in the right manner and to see the truth and the responsibility that I have as a resident of this community. Avoiding negative impacts on the environment and preserving and respecting marine ecosystems are also big pressures.

9) **Could you mention any failure in your work, if there is any?**

9. Yes, after all, any activity related with scuba diving that I do will impact marine ecosystems, no matter how careful I attempt to be. Another failure could be that I am attempting to develop many projects at the same time. Unfortunately, lack of funds is the barrier to developing my ideas and projects.
10) Is there anything that you would like to add that has not been covered above or anything else that I should ask?

10. Yes, I would like to know if there are people or research institutions that could help me do better-develop my projects and ideas. I need advice on logistics, and extensive and advanced marine biology knowledge. I also need advice on how to protect and restore coral reefs.
Interview with Mr. Rodriguez; arts and crafts shop owner; Zihuatanejo-Ixtapa, Guerrero

1) How long have you been living in Zihuatanejo?
   1. I have lived in Zihuatanejo since 1965.

2) What is your economic activity or job within the community?
   2. Retail. I own a shop in the downtown area; we offer typical clothing and craft products. Besides my entrepreneur activity, I am also an active environmentalist and advocate.

3) I would like to know what your opinion is about how tourism development has affected the natural environment in Zihuatanejo.
   3. In 1973, there was a considerable investment in tourism infrastructure in Zihuatanejo. Tourism development made Zihuatanejo-Ixtapa a good place to live. Construction workers who came mainly from Oaxaca and other states decided to settle in Zihuatanejo. They demanded housing and municipal services. The increasing need of land, running water and municipal infrastructure created pressure. Rapidly, the shortage of services impacted natural resources within the region, but mainly in the bay. Due to the lack of and inefficiency of the sewer system, solid waste has been deposited in the bay.

4) What other situations do you think may happen as a result of the rapid increase of tourism activities?
   4. If the current forms of politics and policies do not change, a mayor ecological disaster will occur in the bay. In regard to the main source of water supply in the community, the Ixtapa river basin can be negatively impacted if construction material continues to be extracted without any control. Also rapid deforestation has affected and will continue to affect the weather overall.

   Additionally, suburban communities such as Barrio Viejo, El Coacoyul and Pantla have grown so rapidly, that raw sewer and solid waste has deposited on streams and finally on the beach and shorelines. There will be severe problems to the community’s fresh water supply. Currently, there is a shortage on water.
5) How do environmentalists like you try to influence in the relationship between tourism-activities and the environmental changes in Zihuatanejo-Ixtapa?

5. Through groups as S.O.S. Bahía and Collectivo Costa Libre, a periodical publication. Trough this publication we attempt to increase environmental awareness and other social issues among residents and visitors.

6) What do you think are the main failures in the community and planning process?

6. I believe there is a need for a global analysis, a comprehensive diagnosis of the current social and environmental situation in the locality. Policy-makers have to prioritize problems and needs. The S.O.S. Bahía environmental group is very opinionated, but we also propose alternatives.

I also believe that there is a lack of willingness from local authorities and lack of resources, but mainly lack of vision. Zihuatanejo needs long-term community plans- perhaps community plans that span ten, twenty, and even thirty years. Zihuatanejo definitely needs different community plans, different from the current municipal and state master plans.

My ideas may be pretty ambitious. I believe that we can criticize the policy-making process, but we also have to present alternative proposals.

Finally, I believe that politicians lack expertise. Most of them do not have knowledge of the current issues in the region. They do not even have the adequate background or professional profile to do their duties. This dramatically affects the decision-making process.

7) What does the S.O.S. Bahía group want to accomplish in the net environmental effort that is not happening now?

7. To achieve that municipal plans become legally adopted. This would prevent inadequate land use and even abuse of power from authorities and affluent politicians. There have to be stricter land use regulations. We consider that zoning should be reinforced, and where necessary, rezoning of land uses should be applied.
8) Could you talk about the kind of work pressures that the S.O.S. Bahía group has found more challenging that involve tourism impacts in the environment?

8. We have several limitations. First of all, we do not have a constant source of funding to develop activities and support our projects. Tourism developers, authorities, and influent politicians whose interests have been affected by our efforts to protect Zihuatanejo’s natural environment and the bay have publicly attacked us. We have continued our environmental tasks because we consider Zihuatanejo bay to be our main, most distinctive, and most important tourism attraction.

9) Could you mention the failures in the S.O.S. Bahia group’s work when dealing with environmental protection and why it occurred?

9. We develop many proposals that have a good beginning, with considerable public participation, but there is a lot of division within the group because ours is a diverse and plural group. There is a lot of incompatibility and division due to our personal views and interest. We also lack continual resources to develop our projects.

10) Is there anything else that you would like to add that has not been covered above or anything else I should ask you?

10. No. I just want to mention that there are several long-term residents in Zihuatanejo-Ixtapa who are very opinionated and have extensive knowledge of the current environmental situation not only in Zihuatanejo but also within the region. Some of them are members of our environmental group. Others are members of other environmental groups and diverse non-governmental organizations. Some of them are also citizen and social advocates. They would provide valuable information to your research.
Interview with Mr. Sanchez; Public Elected Official; Office of Environmental Affairs, Puerto Progreso, Yucatan

1) As elected representative, in which specific environmental impacts are you interested in and why?
1. I am interested in solid waste treatment, water supply, and wetland conservation. After an external audit, the local government received recommendations for both, adequate wastewater treatment and solid waste disposal.

Currently, in regard to solid waste disposal, we have severe problems in the community. The municipal landfill has reached its total capacity. Shortly, it will be officially closed and it will be replaced by a recycling center.

2) I would like to know what your opinion is about how tourism development and harbor activities have affected the natural environment in the community.
2. During high tourism season such as spring break, the summer and other holiday seasons, the number of visitors increases dramatically and so does the water supply demand. Additionally, cruise ships, massive fishing and cargo activity affect the natural environment due to a lack of adequate planning. All together, these create severe and increasing pollution spots along the coast.

3) What other consequences could happen as a result of increasing tourism and harbor activities?
3. Last June, extensive research took place in Progreso. PEMEX proposed to build oil extraction platforms in the ocean. This first proposal was rejected not only by local authorities but also by residents because this proposal did not have the proper environmental impact assessments. Local authorities are seeking that PEMEX meet the required environmental standards. Such project must be legally compatible with norms and environmental requirements.

4) Does the environmental affairs office have records of the total acreages of wetlands or the total loss of wetlands due to development?
4. No. We do not have that type of information. But we are seeking to have an inventory of this type of information.
5) Does the environmental affairs office conduct projects with other departments, non-governmental groups, or research institutions to protect the natural environment?
5. Yes, but not with governmental offices. Currently, we are working directly with the State University of Yucatan (UADY). Researchers and graduate students are conducting projects on solid waste recycling, water quality, and beach erosion.

6) What are the goals and reasons of the office of Environmental Affairs to mitigate the negative environmental impacts of development within the community?
6. We want to give a definitive solution to the solid waste issue in our community. Adequate waste disposal is a priority for us. The Mexican recycling company VANTAGE and this office have conducted a feasibility study to open a recycling center in Progreso. The cost of disposing solid waste into the landfill is expensive and may generate pollution into groundwater and wetlands. With this type of project, the recycling center, we intend is to reuse municipal garbage and waste to transform it into building material, fences, and asphalt to pave streets. There are previous studies from Russia that have shown successful results in this matter.

7) Could you talk about the most difficult challenge the Environmental Affairs Office has been faced with in conducting its duties?
7. The lack of norms and regulations. It is also difficult to involve the different players. Another big challenge is having the state congress approve the resources to conduct projects to take care of the severe beach erosion problems that we currently have in Progreso. Another great challenge has been the water quality initiatives that we have conducted since we started working in this administration.

8) Could you talk about what kind of work pressures the Environmental Affairs Office has found most difficult to deal with when working in environmental initiatives within the community?
8. When we try to protect the environment there are several interests involved, even economic interests, from different people such as politicians and land owners. These have been the most difficult pressures that we had faced.
9) Could you talk about the failure in the Environmental Affairs Office's work when dealing with environmental protection and why this has occurred?

9. We have faced several limitations, mainly economic limitations. But we have to deal with scarcity of personnel even in the field and the office, vehicles to monitor the different areas in the community, technical capacity, and insufficient personnel with adequate training.

Additionally, we have to operate with a budget that was stipulated by others. Such resources are insufficient, but we are doing the best we can.

10) Is there anything that you would like to add that has not been covered above or anything else that I should ask?

10. No. I just want to say that environmentally related issues and even recycling practices have been always controversial. Effective results will depend on effective public education, regulations, and incentives. We are working to implement our incentives and projects and we expect positive results from them.
Interview with Mr. Contreras; Public Elected Representative; Office of Ecology, Puerto Progreso, Yucatan

1) As an elected representative, in which specific environmental impacts are you most interested in and why?
1. I am interested in solid waste disposal issues that affect this community and the entire region. I am also interested in diminishing the impacts that wild flora and fauna suffer in this region.

2) I would like to know what your opinion is about how tourism development and harbor activities have affected the natural environment in the community.
2. I do not consider that tourism impacts this region because tourism projects rely on the ecotourism concept. Harbor activities have not impacted this area either.

3) As a result of both tourism and harbor activities, what do you think would happen with the natural environment in Progreso?
3. Currently, the majority of the activities in Progreso are industrial. If we protect the environment, I think we will achieve sustainability and balance in the long run, specially if we develop ecologically oriented projects and if we continue pursuing ecotourism.

4) Can you give your opinion about how marinas, urban and tourism development affect shorelines and wetlands?
4. Marinas do not affect the environment, but massive fishing activities do affect the coastal zone. We had environmental audits that suggested this statement. The Fishing Federation had a big concern about the reduction of or unsustainability of fishing productivity. Because of this, COPREMIA Corporation was requested to audit and screen 120 finish ships to determine if current fishing controls were destructive. Also, because Progreso is a deepwater port, it offers cargo services of industrial and hazardous materials; this type of cargo represents a threat to the environment.

5) Does the Office of Ecology have records of the total acreages of wetlands or the total loss of wetlands due to development?
5. No. We only have official data of total beach erosion and other shoreline data.
6) Does the Office of Ecology conduct projects with other departments, non-governmental groups, or research institutions to protect the natural environment?

6. We have been responsible of the current administration since July 1, 2004. Currently, we, the Municipal government, are not carrying any projects yet. Our office has recently begun to propose studies. However, the state government, through the SEMARNAT, is developing the Ecological Zoning Plan of the Territory. This plan intends to generate new regional development patterns suitable for this region with sustainability objectives.

7) What are the goals and reasons of the Office of Ecology to mitigate the negative environmental impacts of development within the community?

7. My personal reasons rely on the fact that I am a resident of this area. My professional and moral ethics are also involved. The goals of this office include, among others, to provide basic management and environmental guidelines to clean, protect and preserve the environment and natural spring water.

8) Can you talk about the most difficult challenge the Office of Ecology has been faced with in its duties?

8. Our most difficult challenge has been to end old unethical policy practices that have only restricted development. But the Mayor’s purpose is to change the policy-making process, and I trust in time, we will. We will propose programs and norms to improve the environmental quality; we will also propose better environmental standards, and inventories to better manage our natural resources.

9) Can you talk about what kind of work pressures the Office of Ecology has found most difficult in dealing with environmental initiatives within the community?

9. We do not have specific pressures of any sort. We focus our efforts to keep clean beaches, to pursue sustainable fishing practices, to achieve environmental balance, and also to work closely with federal and state governments, and groups of citizens and fishermen.

10) Can you talk about the limitations in the Office of Ecology's work when dealing with environmental protection and why this occurred?

10. We have faced limitations in reorganizing personnel and in hiring trained
supervisors due to the lack of resources, which were designated to this administration previously and I do consider were inadequately distributed. We are working with old debts and problems. We have to overcome this situation. We have to design mechanisms to propose projects that rely in continuity and longevity.

11) Regarding environmental protection, what would the Office of Ecology like to accomplish in the next environmental effort that is not happening now?

11. I believe that Progreso's geographical location is a natural advantage because the natural boundaries are natural limits that control development. To the East we have the beach; to the west, we have the wetlands. If PEMEX builds the oil wells in the ocean and extraction operations begin, it would negatively impact the marine and inland natural environment because drilling operations, massive construction of feeder pipelines, large machinery, the construction of collection tanks, and other oil-extraction related infrastructure will be necessary for this type of activity. For these reasons, we are proposing to legally adopt stricter environmental laws.

12) Is there anything that you would like to add that has not been covered above or anything else that I should ask?

12. No. But, I would like to thank you and the institution that represents you for being interested, as so do other research institutions in the past, in our community.
Interview with Mr. Calderon, Public Official, Social Development Office, City of Zihuatanejo-Ixtapa, Guerrero

1) How long have you been living in Zihuatanejo?
   1. I lived in Zihuatanejo for 27 years.

2) Please describe your present responsibilities and duties as Director of the Social Development Office.
   2. I am responsible for the social development office in the Jose Azueta County.

3) How do you think tourism development has impacted the social, cultural, and natural environment in Zihuatanejo-Ixtapa?
   3. I believe tourism has impacted the community social environment in a positive and negative way. In the positive aspect, I would say that 90 percent of the local economy depends on tourism. Tourism has encouraged development that has attracted domestic and foreign investment. But this type of job market creates low-income employment; therefore, low-income householders are the majority in the community.

   Tourism represents an economic incentive for the community. It has generated employment, encouraged the construction of urban infrastructure and municipal services, housing, highways, and has increased the activity at the international airport. Overall, tourism has detonated development in the community. For instance, the new highway that connects Guerrero and Michoacan also connects other states of the central part of Mexico with this part of the Mexican Riviera. As a result, we have seen an increase of visitors to this port.

   Unfortunately, urban infrastructure and municipal services have not been provided as fast and efficiently as residents require them. On the other side, high rates of migration have been experienced in the region. Particularly men and women from rural communities seeking employment opportunities for better paying jobs in the tourism industry. They move to Zihuatanejo seeking better jobs and educational opportunities, but this phenomena increases poverty in their communities and the countryside. Rural communities in the region are deteriorating to the point of abandonment, where only elders—and in most cases children—are left.
Federal and state governments do not invest enough resources in rural areas; the majority of economic resources are designated in urban areas. People from rural communities demanding employment opportunities migrate to Zihuatanejo. This situation creates substandard housing units and even entire neighborhoods without basic municipal services. Up to now, there are 42 illegally established neighborhoods in this situation.

This is a severe situation that our administration currently faces. Poverty, delinquency, crime, lack of regulations, social and urban anarchy, lack of basic municipal services, pollution, deterioration of the natural environment are the main problems that we have to take care of. It seems that no public institution is taking care of this situation; there is a total abandonment of public responsibilities. This situation is chaotic and no one is offering any alternative.

The state government, through FIBAZI and the State Planning Office in Zihuatanejo, has not taken action to alleviate this situation. The county does not have a realistic, integral, and comprehensive development plan.

4) If this situation continues, what will happen next?

4. The urban environment will become chaotic and perhaps social movements may rise. Growing crime rates, a decadent urban environment, confrontation between public representatives, political, social, and other competing forces, are likely to happen. This will affect future investment and will discourage investors' interest in this area. This is a considerable risk that we cannot let it happen.

I believe there is a need for more political will at the different government levels. Fortunately, there are positive conditions to achieve consensus because this administration has the will to establish a political dialogue with other state and federal agencies.

5) What are the social programs that this office promotes to improve the social conditions in the community?

5. We work with minority and elderly groups, and low-income families. We provide 6000 scholarships for students, single mothers, and senior citizens. We are aware that the allowance provided to these groups is not enough, but it helps them to cover minimal basic needs. These scholarships also help low-
income families to keep their children in school. Such scholarships help to assist, balance, and improve the social conditions in the community. The subsidy provided students varies from $1,500 to $3,000 pesos every two months per grantee. Subsidy provided to senior citizens is about $400 pesos per senior per month. We also provide stipends to low-income families of $216 pesos per month.

Our office also provides loans to low-income handicap citizens, entrepreneurs, and farmers. We also provide free advice on legal issues through our office, where rural immigrants can obtain identification cards and other legal papers that help them to apply for jobs. Our intend is to help immigrant workers to get integrated into the job market and the economic sector.

6) Could you describe the most difficult challenge that the Social Development Office faces to complete its duties?

6. This office seeks other alternatives of economic development, such as fishing and farming activities, besides tourism. In Zihuatanejo’s urban area, there is no more land available that is suitable for development. Our challenge is to encourage development in other nearby suburban areas. The excessive number of people that migrate to nearby suburban areas demand land.

Annexation would be an alternative. This administration should annex suburban communities to the city to obtain additional property taxes, because this municipality can no longer subsidize the nearly 15,000 inhabitants that live in the fringe and suburban communities. Such alternative may alleviate the inefficient capacity that this administration has to provide basic municipal services. With additional property tax revenues, the volume of municipal services provided would increase significantly. For instance, due to the lack of funds to build and enhance municipal infrastructure, during high season this administration has to prioritize tourism-related infrastructure to provide them running water. The rest of the population has to wait sometimes three or four days to receive this service. This creates social discomfort among residents.

On the other hand, I believe this administration does not have the capacity to prevent or even minimize the environmental degradation on natural ecosystems.
7) **What are the goals and reasons for the Social Development Office to mitigate the negative environmental impacts of development within the community?**

7. Our goal is to encourage public participation. We consider human capital is a key component for economic, social, and political issues. We want the public to understand that the local government cannot resolve every situation alone. Citizen involvement is vital to better accomplish goals. They have a role to play; they should play a proactive role in the policy-making process.

In the rest of the country, when society participates, it had been widely demonstrated that they could accomplish so much. Many times, societies have even overtaken authorities’ capacity to solve crisis. I believe that with public participation, real changes can happen.

8) **Could you mention what kind of work pressures the Social Development Office has found most difficult to deal with when working on environmental initiatives within the community?**

8. One of the most recurrent pressures that we have to deal with is that many programs and projects cannot be finished or accomplished due to the lack of support from the state and federal governments. Both the federal and state governments feel that Zihuatanejo’s local government already receives high revenues from tourism-related activities.

This administration also has to deal with political issues. Local, state, and federal governments belong to different political parties, therefore municipal projects and programs do not receive support and funding from state and federal governments. Sometimes, both governments ostracize municipal initiatives.

9) **Could you mention the failures in the Social Development Office’s work, and why these occurred?**

9. The most significant failures that we had dealt with had to do with the FIBAZI, which is the state’s land trust fund, because this state entity does not support the municipal initiatives, proposals, and programs. It is inconceivable that they can spend 140 million in political campaigns when there are considerable social and economic needs. Needs like municipal services and education.
10) Is there anything that you would like to add that has not been covered above or anything else that I should ask?

10. Yes. I believe that overall we have to improve the social conditions in rural and urban areas. Not only should we provide free goods, but we also must train people to be productive through loans. We have to support economic development in every sector, such as fishing, agricultural, farming, and retail. We should also provide legal and financial advice and training, to help producers to seek new markets and business opportunities. We could link producers to new economic development opportunities. I feel that a strong economic development to be vital to support families' income. So families' involvement in the local economy is essential.

Another important task that this administration should do is a community profile to prioritize needs and identify the most relevant issues. This administration has to outline a long-range master plan, perhaps a 20-year long proposal, and projects with the participation of interdisciplinary groups. These proposals and plans ought to include public land conservation strategies, urban renewal, and stronger environmental planning strategies.

As the population and social needs expand, the challenge of managing such growth and its consequential results requires a detailed analysis to select and implement adequate development strategies. This administration ought to plan for future growth, which will provide the required levels of public services and avoid the current leapfrog development patterns that we currently have. It would also diminish rapid land conversion. Without planning strategies, the resulting growth of tourism and economic activities would have considerable social and economic costs.

Once ready, every plan, project, and proposal must be legally implemented to avoid individual interpretation or misinterpretation. This process also will require planners and policymakers to seek community support. I consider such plans must be the result of consensus from all the different interest groups involved.
Interview with Mr. Pineda: Tourist Guide, Zihuatanejo-Ixtapa, Guerrero

1) How long have you been living in Zihuatanejo?
1. I was born and raised in Zihuatanejo.

2) Please describe your economic activity in Zihuatanejo-Ixtapa?
2. I work as a tourist guide. My work involves taking fieldtrips, tours, and excursions to the nearby attractions such as small rural towns, beaches, and the most relevant sites and natural attractions in this area.

3) What determined your choice to work in tourism-related activities?
3. Working as a tourist guide was the first job opportunity I had. From the beginning, I liked this type of activity very much, so I decided to work hard to succeed in this sector. I have been working in this enterprise for 20 years.

4) I would like to know what your opinion is about how tourism development contributed to the overall environmental situation in Zihuatanejo-Ixtapa?
4. I do not consider that tourism has impacted the natural environment in Zihuatanejo. I believe that community development has occurred as it was originally planned by the FONATUR. I personally believe they have done a good job.

5) What do you think will happen with the natural environment as a result of increasing tourism development in Zihuatanejo-Ixtapa?
5. If tourism development occurs without planning, natural and unique sites will disappear and a similar situation like what occurred in Acapulco will happen in Zihuatanejo. Over construction and excessive beachfront development, wetlands destruction, pollution on water bodies such lagoons, streams, and the ocean, and rapid construction of marinas can happen in Zihuatanejo. I think tourists do not come here to see a polluted natural environment, nor the marine pollution caused by oil leaks from engine boats.

6) What other situations may happen as a result of the increase of tourism activities in Zihuatanejo?
6. I believe more people would come to Zihuatanejo seeking job opportunities. If such rapid increase of population occurs, then there may not be enough
resources to support and provide services for new residents. I am afraid there may not be enough employment for everyone.

7) **Is there anything you want to change or improve in the relationship between tourism activities and the natural environment in Zihuatanejo?**

7. Yes. Through my job, I would like to educate and better inform not only tourists, but also my coworkers and myself about how we can contribute toward taking care of the natural environment. I know there are important initiatives to protect the natural environment in Mexico. So by sharing this knowledge with outsiders, I want visitors to understand that Zihuatanejo’s natural environment is a priority for its residents.

8) **Is there any environmental effort that you would like to accomplish that you are not getting now?**

8. Yes, I would like to help to increase environmental awareness on our youth generations and returning visitors. I want them to have the opportunity to enjoy in the future Zihuatanejo’s natural attractions.

9) **What do you think are the main failures in the community and tourism planning processes?**

9. I am not sure if there are specific failures in the tourism planning. But in regard of community planning, I think we could do better. I would like to see more visitors coming to Zihuatanejo, which would increase work opportunities. The number of visitors we receive every season are not enough to create jobs for everyone. In the last twenty years, Zihuatanejo’s population has grown so extensively that there are so many people unemployed. As a result, crime rates have grown drastically. If we could receive more tourist, tourism revenues would increase, which would help to reduce poverty, and therefore, crime rates.

10) **If your work involves contact with the natural environment, could you mention what kind of work pressures your job involves?**

10. None. My work involves a lot of contact with the natural environment. But, working with tourism and taking them to visit local natural assets does not involve pressures of any kind. Travel agency operators have a lot of freedom to do their jobs. We just have to make sure that visitors will not alter, damage, or pollute the sites we take them to visit.
11) In regard to the natural environment, what is the most frequent feedback you receive from tourists?

11. Most of tourists show a good deal of interest for the natural environment in Zihuatanejo. They feel that the coastal zone in this area is a real treasure.

12) Is there anything that you would like to add that has not been covered above or anything else that I should ask?

12. I just want to mention that I am proud to have what others do not have. Many times, tourists have tell me that I live in paradise. I think they are not only being kind, I think they really mean it. Most of tourists appreciate the natural assets in this region, and so we should too. We have to appreciate our natural environment if we want to preserve it.
Interview with Mrs. Banderas, Retired Professor and Environmental Activist, Zihuatanejo-Ixtapa, Guerrero

1) How long have you lived in Zihuatanejo?
1. I live in Zihuatanejo since 1950.

2) Please describe your economic activity in Ixtapa-Zihuatanejo or any other activity that may keep you actively involved in the community?
2. Since 1969, I owned and managed a small hostel. It is located in downtown area, right on the beach. I am also a member of the S.O.S. Bahía environmental group. S.O.S. Bahía is non-governmental group in Zihuatanejo. It is basically a network formed by approximately twenty civil associations.

3) What determined your choice to work with the environmental group S.O.S. Bahía?
3. I was concerned about what the future may involve, not only for my family but also for the generations to come. I thought that I should do something to protect the natural environment in the community since we have no sustainable practices in Zihuatanejo.

4) Which specific environmental impacts are you interested and why?
4. I am interested in protecting the rich biodiversity of the bay. The natural circulation of the sea current has been changed due to the construction of the jetty. It is known by everyone that fishing grounds, and also oyster and clam banks, have been destroyed due to the increasing pollution that the jetty construction has caused. The pollution on the ocean floor has formed mud that coated the bottom. There is no longer sand on the bottom of the bay but mud. This mud has choked all the vegetation and corals, which killed most of the species. There were several native species that gave fame to Zihuatanejo’s bay. Now the fish, oysters, and mollusks are gone.

Not only has the construction of the jetty caused pollution in the bay, there are several illegal settlements around the bay that have no basic municipal services such as a sewer line. Also, the discharge of raw sewer waters from the treatment plant to the bay is in large measure responsible of the pollution on the bay.

5) What facts and generalizations support your ideas of what you
5. Early studies and environmental impact assessments carried out by scientists from the UNAM (the Mexico National University), and researchers from the State University of Baja California and other well know marine biologists who have gave us their professional opinion. Concerned residents become aware of the changes on the bay. Our group, the S.O.S. Bahia group, sought advice from experts to determine the reasons of the color change of the water and the decrease of population of marine species.

6) As a member of the S.O.S. Bahia environmental group, what would you like to accomplish in your next effort that you are not getting now?

6. I would like real changes to happen in our governing system. It was the tourism development of Puerto Mio that resulted in the building of the jetty that has caused so many troubles in the bay’s marine ecosystem. They also proposed the construction of a cruise ship terminal. We believe such a project would extensively affect what is left on the bay. Our social fight is to stop such projects from happening. We have publicly denounced them. We have enough evidence that state and federal environmental agencies arbitrary decisions would result in building a cruise ship terminal in the bay. Unfortunately, the project has been only postponed, but it has not been cancelled yet. There is a traffic of influences involved in this project due to its economic significance.

Another important effort that we would like to accomplish is to stop wetland destruction within the region. Extensive destruction of wetlands has reduced crocodiles and other native species habitat. This is one of the main reasons why crocodiles have been seen on roads, beaches, and even swimming on the ocean. We have been reducing their habitat, therefore, their source of food, so they have to leave wetlands and mangroves to seek food somewhere else.

7) What do you think that would happen with the natural environment in Zihuatanejo-Ixtapa if current development patterns continue the same way they have been?

7. Well, if irregular settlements on the hills continue, this will result in a severe deforestation, which eventually will result in mudslides. Such pollution will end up on the bottom of the bay. Decreasing native vegetation of surrounding hills would also result in climate changes. Wetlands destruction
would result in negative consequences because wetlands serve as a natural filter for mud.

Zihuatanejo bay is a small body of water. If current development patterns continue, we may end up destroying its natural ecosystem. Consequently, tourists would not visit our community. We may lose our main way of living.

8) **What do you think are the main failures in the community and planning process?**

8. Zihuatanejo has grown so fast that there is no more suitable land for development. Despite this situation, the state government through its Land Development Agency, the FIBAZI, continues subdividing parcels, which are sold without basic municipal services. What I see in our government system is a perspective of a governmental system full of indifference. I do not believe they care about ending these problems.

9) **What do you think governmental entities, environmentalists, and developers can do better to protect the natural environment in Zihuatanejo?**

9. First, illegal settlements must be stop from happening. We need to preserve and enhance green belts and open spaces. The jetty has to be removed, which would allow the ocean currents to clean to bay bottom. The treatment system on water plants has to be upgraded. Also, treated water should not longer be dumped to the ocean or the lagoon. It should be reused to water public green areas and parks. Nowadays, there is an increasing shortage of water, that it is a crime to dump treated water.

On the other side, developers must be required by law to meet environmental impact assessments and minimum environmental standards. They should also be required to build their own water treatment plants, especially for large projects. I think we must also protect wetlands, mangroves, and lagoons.

10) **Could you mention what kind of pressures you find most difficult when dealing with environmental issues?**

10. There are many. For instance, the corruption and the lack of environmental awareness, which I could feel somehow is ignorance. We have not fully understood that we are damaging our natural environment.
Also, the opposition of investors and developers to meet environmental standards. They only seek profits and revenues. They do not care about bribes and corruption. The lack of long term planning is another difficult issue that we have to deal with.

11) Could you mention the most difficult challenge that the S.O.S. Bahia environmental group has faced to do its duties?

11. All of us in our group are volunteers. We do not have economic interest of any sort, but the interest in protecting the natural environment. We have our own economic and work activities, but we need more time to work in our group. We also lack of funding. Even though we have accomplished so much with so little resources. People have increasingly become more environmentally aware. We consider this a partial success.

We have promoted cleaning and recycling campaigns. In some neighborhoods, residents have started separating organic and inorganic waste. Also, car shops have started recycling engine oil.

We are promoting the protection of wildlife and native fauna. One of our main proposals is to build a regional zoo for native and endangered species. But once again, we are facing difficulties due to the lack of funding.

Most of all, I consider the main challenge we face is the lack of environmental awareness and ignorance. And these both largely affect our community.

12) Is there anything that you would like to mention that has not been covered above or anything else that I should ask?

12. Yes. I believe what is happening in Zihuatanejo is not inherent to this region only. There are other tourism destinations that face the same challenges and present the same problems that Zihuatanejo faces. Similar tourism destinations' natural environments have been degraded. A good example would be Acapulco, which thirty years ago was considered a natural paradise, and now its natural attractions are completely depleted.

Also, I would like to see a different governmental structure where environmental laws are followed. I think we already have acceptable environmental policies, laws, and programs structured, such the Ecology
Law and the Mexico Environmental Law. Unfortunately, many times such laws have not been followed.
Interview with Mr. Dzib Chaan: Tourist Guide; Progreso, Yucatan

1) How long have you been living in Progreso?
1. I am originally from a rural town in the Southern part of Yucatan, but I migrated to Progreso sixteen years ago.

2) Please describe your economic activity in Progreso?
2. I work as a tourist guide in this area.

3) What determined your choice to work in tourism-related activities?
3. Since I was in middle school, I have a keen interest in history, especially in Mayan history. But I was also interested in foreign languages such as English and French. So, I decide to increase my knowledge in both and years later I decide to do this type of activity as a way of living.

4) I would like to know what your opinion is about how tourism development contributed to the overall environmental situation in Progreso?
4. Definitely, tourism alters the overall community. There are changes due to the increase of transit of vehicles, population, visitors, and noises. Changes in population and visitors have increased the wastewater that is being dumped in the ocean. This situation affects the long-term damage to the lagoons, the ocean, native flora, and exotic fauna, and all the diverse ecosystems in the area. I remember I used to take long walks along the unspoiled beach, and the lush jungle next to it was denser than it is nowadays. There were countless species of plants and trees, which have been deforested for construction. I believe that has directly affected native species.

5) What do you think will happen with the natural environment as a result of increasing tourism development in Progreso?
5. If tourism development increase, it would logically continue affecting the natural environment up to a certain degree where marine and inland species could not longer migrate or would become endangered. The ocean and lagoons would become polluted, and deposits of underground fresh water that are vital for the community would be at risk of being contaminated.
6) What other situations may happen as a result of the increase of tourism activities in Progreso?

6. I believe as a community we have rapidly changed. We have experienced explosive population rates, many people have migrated to this area, people without high job skills decided to try their fortune in the tourism sector only to end up unemployed. This has lead to raising rates of insecurity.

Something else that truly concerns me is to see how our cultural heritage has been commercialized. The authorities have sublease parks and archeological sites to private companies, which in my opinion should not happen under any circumstances. There are many examples around this area and it seems that this situation may rise. There are archeological sites with cultural attractions that have made up their “own” version of how certain representative fauna within the region has certain meanings. For instance, the red guacamaya, a native exotic bird has been named, according to their “own” version of the Mayan heritage, the air’s guardian; the iguana, the earth’s guardian; and the blue parrot, an exotic fish, was named the ocean’s guardian. None of it is true. My knowledge on Mayan culture is large and it truly disappoints me that our cultural heritage is being altered, distorted, and degraded. This is a phenomenon that sadly but increasingly is happening not only in Progreso, but also in other nearby attractions.

7) Is there anything you want to change or improve in the relationship between tourism activities and the natural environment in Zihuatanejo?

7. Such a thing would be my greatest dream come true. If I could, I would standardize all the information that is given to tourists and visitors, by providing real facts about our culture, the cenotes or underground caverns, about the native flora and fauna. In other words, things with commonsense, and not fantastic or invented stories. I know by fact that there are other people who do the same type of work that I do who give to tourists altered versions on our cultural heritage and Mayan history. If I could, I would change that by legally regulating these practices. Veracity and honesty would provide commonsense to the information given to visitors.

8) Is there any environmental effort that you would like to accomplish that you are not getting now?

8. I would like to see solid waste recycled up to a hundred percent. That would be excellent. A small community like Progreso does not have the technical capacity to achieve this type of initiative. My concern is that tourism creates
high volume of waste. I cannot blame them but tourist bring too much waste and if we could transform and reuse such solid waste, that would be much better. Nowadays, I know there are so many things that can be done with recycled urban waste. Even small houses or construction materials can be produced out of recycled trash.

9) What do you think are the main failures in the community and tourism planning processes?
9. I believe politicians—terrible decision makers—and public officials, who are in key positions, have not done much but be a part of dishonest practices such as authorizing certain land uses or construction permits near critical habitats without requiring environmental impact assessments. I do not think they are doing their job the way they ought to.

10) If your work involves contact with the natural environment, could you mention what kind of work pressures your job involves?
10. Yes. There is an increasing number of informal vendors around beaches and near the areas where visitors and tourists from cruise ships are. Even though tourists are very understanding about this situation, I do not think they enjoy their stay.

On the other side, there are bird and turtle sanctuaries where there is no public access. I understand that public access to these sanctuaries may alter or even destroy these habitats but it would be great if through my job I could increase awareness and even educate visitors.

11) In regard to the natural environment, what is the most frequent feedback you receive from tourists?
11. Overall, tourist enjoy the local attractions. They think we are not fully modernized as other beach towns. I believe the local character of the community still represents our cultural heritage and traditions.

12) Is there anything that you would like to add that has not been covered above or anything else that I should ask?
12. Yes. I hope the transportation and vehicular circulation system would be better planned and updated because within the near future it will be obsolete. Progreso is experiencing traffic jam problems, especially during tourism high season. There are many actions that could be adopted to avoid potential
traffic problems. Public parking lots around the downtown area and the wharf are also scarce. Increasing parking lots would also help to ameliorate vehicular circulation problems.

There is something else that is increasingly affecting the local economy and at the long-term may affect the environment in Progreso. The growing number of cruise ship arrivals and the number of visitors are not creating a considerable economic benefit for the community. Tourism from cruise ships brings their own food, even their own bottled water. Shoreline excursions are previously arranged in the cruise ship and the percentage of the commission that we receive as tourist agents per fieldtrip is very low.

I also have the impression that tourist are manipulated by the cruise ship operators because they are taken to specific retailers, shopping areas, snorkeling and scuba diving rentals, leaving the rest of the business out of any possibility to sell their goods. I believe the cruise ship industry is growing and its growth will continues, so changes in current management of commercial activities would benefit a larger sector of the local economy.
Interview with Dr. Quintal, Head of the Research Division Department, Yucatan State University (UADY); Yucatan, Mexico

1) In regards to your research experience at UADY concerning the coastal zone in Progreso, I would like to know what specific environmental impacts you are most concerned about and why?

1. I am very concerned about a current issue; there is a considerable discharge of wastewater to the ocean. Due to rapid community growth, I am also concerned about the significant water extraction of underground deposits.

2) Have other researchers like yourself at UADY studied the relationship between community development and the environmental changes in Progreso?

2. Yes, there are several researchers who are working on community development and environmental issues in Progreso.

3) What is your opinion on how tourism and harbor development have affected the natural environment?

3. It is important to understand how impacted the natural environment is and much degradation has been done to it. We ought to be more conscious of how relevant the natural environment is.

4) Have the benefits of economic, cultural, and community changes in Progreso affected the natural environment?

4. Of course, these changes have impacted the environment; especially if we consider the high rates of coastal pollution we have nowadays, which is greater than past years.

5) Can you give your opinion on how the construction of marinas, urban and harbor development, and tourism has affected shorelines and wetlands?

5. Changes in land uses near the coastal zone affect the natural dynamics of nearshore processes. Water quality is also being affected by rapid coastal construction. Although these types of infrastructure promote opportunities for commerce, support transportation, and recreational and tourism activities coastal waters and wetlands and their ecosystems are being impacted.

6) If this growth continues, what would be the overall impact on the natural environment?
6. As I previously mentioned above, we ought to consider that a healthy coastal natural environment means development, jobs, and growing economic opportunities for the community and even the region. If shorelines are not developed with innovative environmental designs, and cost-effective policies to balance competing demands for recreation, tourism, development, commercial growth, invaluable natural resources would be lost.

7) If any, what do you think the main failures are concerning the planning process in regards to community and harbor development in Progreso?

7. In regard to harbor development I would consider the lack of environmental impact assessments are the main failure. In regard of community planning, neither planning nor sustainable programs have been implemented in Progreso by planning authorities yet.

8) What should local, state, and federal agencies, along with other research institutions, do to protect the environment and other key coastal ecosystems?

8. It is very simple. They must protect and enhance habitat and coastal ecosystems. It would be highly desirable to design and implement a regional network of monitoring programs that detect, analyze, and forecast impacts on ecosystems, and environmental quality on the coastal zone. I consider coordination among institutions would be of key importance.

9) What kind of pressures would a community like Progreso experience negatively concerning the environment because of tourism and harbor growth?

9. There are two types of negative pressures that Progreso will experience due to tourism and harbor expansion. Irreversible and remarkable changes on vegetation and considerable wastewater discharge on the coastal zone.

10) Is there anything else that you would like to add that has not been covered in the questions above?

10. Yes. It is very important to know and understand the extent of human impact on the environment. This would help to ameliorate and if possible avoid future impacts.
Interview with Dr. Hernandez, Head Researcher at the CINVESTAV Mérida;
Puerto Progreso, Yucatan

1) In regards to your research experience at CINVESTAV Mérida which is concerned with the coastal zone in Progreso, I would like to know what specific environmental impacts you are most concerned about and why?
I am interested in several issues, but mainly on issues related to:
1. Water quality and the negative impacts that the port has in the quality of the water. I am also interested in issues related to coastal hydrodynamics.
2. The inlet mouth of Yucalpeten and sand dunes cause negative effects on the water quality of the ocean as in mangroves and the Chelem lagoon.
3. The municipal landfill, which has negative impacts on mangroves and underground water deposits.
4. The lack of a waste water treatment system. Urban and industrial wastewater that are discharged to wetlands end up on coastal water, which cause negative effects on the water quality of this region.
5. The change of land uses and the increasing urban growth on sand dunes, beaches, wetlands, and mangrove areas have diminished the quality of these ecosystems and it have limited their natural processes.
6. Concerning tourism, the most relevant issues I am interested in are beach erosion and the decrease of water quality, which may affect tourists’ health.
7. Coastal roads are built with inadequate construction techniques. They have no water bypassing systems where needed, impacting the hydrology on mangroves; therefore, their water quality.

2) Have other researchers at CINVESTAV Mérida studied the relationship between community development and the environmental changes in Progreso?
2. Yes. Dr. Jorge Euan Avila has done that type of research in his Doctoral thesis.

3) What is your opinion on how tourism and harbor development have affected the natural environment?
3. Both activities have caused negative impacts due to the lack of a consistent base of long-term planning; mitigation and preservation approaches;
monitoring systems to measure negative and positive impacts; and management programs.

4) **Have the benefits of economic, cultural, and community changes in Progreso affected the natural environment?**

Definitely yes!

4. 1. There is evidence of considerable impact on coastal waters, which would limit expansion of tourism activities that are directly related with coastal waters.

2. There is evidence of considerable impact on mangroves and sand dunes, which has made Progreso to be more vulnerable to the impacts of hurricanes and tropical storms.

3. On the other hand, even though it has yet to be evaluated, there is a possibility that the damaged caused to mangroves has affected fish nurseries that have a relevant impacts on commerce and the biodiversity.

5) **Can you give your opinion on how the construction of marinas, urban and harbor development, and tourism has affected shorelines and wetlands?**

5. The increase of coastal activities and the construction of marinas and other harbor infrastructure are not the problem. The main problems are:

1. The type of construction, which have incorrect engineering designs. This type of construction is inadequate for the coastal area in Yucatan. This problem is mainly caused because developers are more concern about reducing economic cost and time constraints than building an environmentally sound design.

2. The construction of harbor infrastructure does not involve effective programs to compensate for ecological impacts, rehabilitation programs for damaged ecosystems, nor environmental prevention programs, among others.

6) **If this growth continues, what would be the overall impact on the natural environment?**

6. A larger environmental impact: degradation and total loss of ecosystems. This would limit any other possibilities for economic development but would only leave for Progreso to be a harbor port. The effect on the society would be very negatives because Progreso is a very important recreational center for
residents in Yucatan. This would create social and political issues, and coastal residents would not have any economic benefits of any sort.

7) If any, what do you think the main failures are concerning the planning process in regards to community and harbor development in Progreso?
7. The political interests involved in this situation. Federal, state, and local authorities can not reach common work or reach consensus on common goals. Each of them apply “social” and “development programs without any coordination, and sometimes these programs overlap on their objectives. There are no specific monitoring programs that carry updated environmental data or any community indicators that would help to propose measures for community, tourism, and harbor planning. In regard to tourism development, it is evident that the effects of negative future impacts would affect this region as it happened in Can Cun and the Rivera Maya.

8) What should local, state, and federal agencies, along with other research institutions, do to protect the environment and other key coastal ecosystems?
8. They ought to develop and implement an integrated coastal zone management program. Such initiative must carry an effective monitoring system to develop environmental indicators. A program of this nature would be best lead by research institutions. This type of initiative has begun already. It is coordinated by the CINVESTAV, and research institutions, state and federal governments are also involved.

9) What kind of pressures would a community like Progreso experience negatively concerning the environment because of tourism and harbor growth?
1. Progreso may experience a reduction in water quality, which would directly affect locals and visitors health, and also it would affect ocean swimmers. This may be happening now and pollution sources may be undetected.
2. Reduction and damage to key ecosystems such as mangroves, lagoons, beaches, sand dunes, and seagrass, which have specific ecological processes and are also useful for tourism and local residents.

10) Is there anything else that you would like to add that has not been covered in the questions above?
10. The real source of pressure for the development of Progreso as a tourism and industrial port has not been analyzed. These pressures come from external interests that want to take advantage of the natural resources and the harbor facilities that Progreso has. Tourism developers, tourist, cruise ship passengers, the federal government, and the governments of the United States and Canada are receiving the real benefits of the harbor facilities and marinas. Current infrastructure is enough to provide local services. The increase of visitors and coastal development would put more pressure on ecosystems.

I also think if there are sanctions for the death of turtles and dolphins on tuna fishing, the governments of Mexico and the United States should implement restrictions and regulations on tourism and harbor development, especially if environmental programs are not previously implemented. This would create concern among developers. Unfortunately, this probably will not happen because substantial economic impacts are not considered to be involved.
Interview with Mr. Martinez, Head of the Environmental Impacts Department; Integrated Port Administration Office
Puerto Progreso, Yucatan

1) In regards to your research experience at the Integral Port Administration Office (API) concerning the coastal zone in Progreso, I would like to know what specific environmental impacts you are most concerned about and why?

1. I am interested in two major issues: water quality and urban solid waste. In regard to urban solid waste, the lack of recycling methods and infrastructure to manage solid waste directly impact the water quality in the area.

2) Do you know if the Port Safety Division at the API conducts surveys, mitigation, wildlife protection, or environmental assessment programs in Progreso to monitor the impacts of harbor activities?

2. Yes. There have been surveys and reports on the quality of coastal ecosystems. These studies have been conducted by federal agencies, which have turned these reports to this office.

3) What is your opinion on how tourism and harbor development have affected the natural environment in Progreso?

3. Both activities create economic revenues on taxes for the county, the state and even the country. They also create additional jobs in the community. Additionally, the recently expanded harbor infrastructure creates more domestic and foreign cargo activities.

4) Have the benefits of economic, cultural, and community changes in Progreso affected the natural environment?

4. Yes. These changes are largely reflected in the increase of wastewater, especially on constructions along the coastline. There is not an adequate recollection system for wastewater from the city and even the county, such wastewater has not an adequate treatment. Filtration to underground water deposits is likely to happen. Due to the lack of a net of recollection system to treat them, wastewater ends up being dumped into the ocean. Maybe the negative impacts of this actions are not too evident yet, but in the long term, this would be the main problem local authorities will face.
5) Can you give your opinion on how the construction of marinas, urban and harbor development, and tourism has affected shorelines and wetlands?

5. I believe urban, tourism, and harbor activities may be affecting the coastal zone in the region. Harbor impacts are contemplated among the responsibilities and environmental policies of the API. Local authorities are responsible for taking actions to reduce urban and tourism impacts on coastal ecosystems.

6) If this growth continues, what would be the overall impact on the natural environment?

6. I consider the impact on the natural environment would end up being beneficial because currently, there are programs and actions proposed by state agencies to encourage sustainable initiatives in the community and the county. These initiatives include: a coastal zone management program, the proposal of a comprehensive plan for the county, water quality monitoring actions, renourishment of the sand dune, monitoring activities, and the protection of marine species such as turtles.

7) If any, what do you think the main failures are concerning the planning process in regards to community and harbor development in Progreso?

7. Lack of environmental law enforcement and municipal initiatives. Also the lack of coordination between state agencies and “red tape” bureaucracy among federal institutions.

8) What should local, state, and federal agencies, along with other research institutions, do to protect the environment and other key coastal ecosystems?

8. Achieve cohesion among local, state, and federal authorities. The involvement of research institutions would be relevant. They should work together to put together proposals and to plan the normative and timelines of programs. They should also constantly monitor progress and continuity of programs, even during and after the transitional face from one government to another. This would guarantee a sustained development of the community and a sustainable protection of the environment.

9) What kind of pressures would a community like Progreso experience negatively concerning the environment because of tourism and harbor growth?
9. There are many pressures a community like Progreso may face. First of all, I would say that in the near future there may be an insufficient supply of water. Currently, the main source of water supply comes from two cenotes or sinkholes, but the quality and quantity of water supply of this source may be insufficient to cope with future urban growth.

Second, I consider that pollution on the ocean water would be greater than it is now. Urban development, tourism activities, and the lack of adequate municipal services would stress the coastal zone.

Negative environmental impacts would be increased due to the natural soil composition in this area and along the coastal zone. Limestone soil and sandy ground rapidly absorbs rainwater, as well as run-off pollution.

10) Is there anything else that you would like to add that has not been covered in the questions above?
10. No. I just want to appreciate your invitation to take part in this interview.
References


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• National Geographic Satellite Maps. Purchase of customized aerial imagery of Zihuatanejo Ixtapa and Puerto Progreso. Available at: www.nationalgeographic.com


