Spring 5-2013

Waves of Change: Tourism and Vulnerability in San Juan Del Sur, Nicaragua

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WAVES OF CHANGE:

TOURISM AND VULNERABILITY IN SAN JUAN DEL SUR, NICARAGUA

by

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A Thesis
Submitted to the Graduate School
of The University of Southern Mississippi
in Partial Fulfillment of the Requirements
for the Degree of Master of Science

Approved:

Dean of the Graduate School

May 2013

ABSTRACT

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Tourism is increasingly viewed and promoted as a viable and sustainable option for economic growth in developing countries. However, despite the rise of tourism and the growing popularity of hazard-prone destinations, little research has been done to assess the vulnerability of many tourism communities. What work has been done has focused primarily on post-shock management and planning without identifying underlying factors of vulnerability such plans would ideally mitigate. The goal of this thesis is to develop a methodology for assessing vulnerability in tourism communities in the developing world by assessing the vulnerability of the Nicaraguan community of San Juan del Sur. In 1992, the community was heavily damaged by a large tsunami. Since that event, the community has rebuilt and is now experiencing a boom in tourism. Field work conducted in the community suggests San Juan del Sur is highly exposed to future tsunami events and has heightened sensitivity to the effects of a event due to its heavy reliance on tourism activity.

ACKNOWLEDGMENTS

I would like to thank my thesis director, Dr. David Cochran, and the committee members - Dr. Bandana Kar and Dr. Mark Miller - for their advice and assistance throughout this project. I am especially grateful to Dr. Cochran, and Geography and Geology Secretary Shannon Davis for encouraging me and helping me through the bureaucratic hurtles leading up to my fieldwork and beyond. I would also like to thank Don Pedro Solic of SINAPRED, Comunidad Connect Executive Director Dariel Castro-Potoy and Sustainable Tourism Program Manager Mara Jacobsohn, CANTUR President Randall Granja-Fajardo, Jean Brugger, and the other interviewees for their time and insight.

Special thanks to Mara Jacobsohn for her logistical assistance in San Juan del Sur, Elieth Muñoz-Ramos and her family for opening their home, keeping me fed, in clean clothes, and providing me with friendship in a country not my own; to Jeiner Chavez-Fonseca who served by my side for six weeks as my translator and friend, and without whom the success of project would have been in question; to Jeiner's family who also opened their home and let me be part of their community, if only for a short while; and last, but most importantly, to my wife Melissa, who had the understanding and patience to allow her husband to run off to Nicaragua. I thank you all.

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LIST OF ABBREVIATIONS

BOSAI ..... Joint Japanese/Central American Disaster Risk Reduction Project

BRIBAR/COBARPREDE ..... Barrio Level Citizen Groups Project

BRIMUR ..... Action Arm of the COMUPRED

COMUPRED ..... Municipal Emergency Management Committee

CANTUR ..... Tourism Trade Union in San Juan del Sur

ENABAS ..... Committee Within SINAPRED Responsible for Distributing Aid

ESRI ..... Environmental Systems Research Institute

GDP ..... Gross Domestic Product

GFDRR ..... Global Facility for Disaster Reduction and Recovery

GIS ..... Geographic Information System

HOP ..... Hazard of Place

INETER ..... Nicaraguan Institute for Territorial Studies

INIDE ..... Nicaraguan Development Institute

INTUR ..... Nicaraguan Tourism Institute

MAT ..... Mid-American Trench

NGO ..... Non-Governmental Organization

NNA ..... Nearest Neighbor Analysis

NOAA ..... National Oceanic and Atmospheric Administration

SINAPRED ..... Nicaragua Emergency Management Agency

SVF ..... Sustainability Vulnerability Framework

UNWTO ..... United Nations World Tourism Organization

USAID ..... United States Agency of International Development

WDC ..... World Data Center

WTO ..... World Trade Organization

CHAPTER I

INTRODUCTION

In 2011, the number of international tourism arrivals reached 980 million worldwide, representing an international movement equal to 14 percent of the global population (UNWTO 2012). While the historical origins of tourism are debated, most scholars agree that in the last 100 years the industry has exploded (Mill 1990; Goeldner and Richie 2011). This boom is largely the result of advances in transportation and production technology. From steamships and railroads, to automobiles and airplanes; and from the industrial revolution to the information age, these advancements have reduced the cost of travel in terms of money and time, and have opened up the possibility of travel to ever larger proportions of the global population (Mill 1990; Goeldner and Richie 2011). The rise of international banking systems since the 1950s and the greater stability and security that has arisen from globalization have benefited tourism and facilitated its growth, especially in the developing world (Mill 1990; Goeldner and Richie 2011).

Between 1950 and 2005, international arrivals grew annually by an average of 6.5 percent and tourism-related income increased by 11.1 percent (UNWTO 2006). Tourism is now widely considered to be one of the largest, if not the largest, sectors in the global economy and it accounts for approximately 6 to 10 percent of world GDP, 30 percent of world export services (services provided to foreign clientele by local providers), and 45 percent of total export services in developing countries (Crouch and Ritchie 1999; USAID 2005; UNWTO 2006). As the world becomes increasingly connected by globalization, tourism is seen by governmental and nongovernmental development organizations as a viable and sustainable option for economic growth in developing countries (USAID 2005; Hawkins and Mann 2007; Mitchell and Ashley 2010).

In addition to its impressive growth rate, tourism has been lauded for the *natural advantages* that the industry brings to developing nations. First, tourism by nature is labor intensive and diversified and it provides a wide range of opportunities for entrepreneurs, women, and skilled and unskilled workers, (Crouch and Ritchie 1999; Mitchell and Ashley 2010; Villiers, 2001; USAID 2005). Second, because tourism brings consumers to the producer, the host country has the ability to earn foreign exchange income without exporting resources (Brohman 1996; Mitchell and Ashley 2010; Villiers 2001). This advantage is lauded by Crouch and Richie (1999), who point out that agricultural and extractive resource activities that focus on export commodities are often viewed as economic liabilities due to the fact they do not add value to exported products and thus, any income is essentially offset by depletion of the natural resource. Tourism on the other hand, if developed sustainably, is almost all added value, as the natural and cultural attractions are not depleted and tourists pay only for the experience.

Third, developing countries often lack the financial resources to develop heavy industry, but with tourism, natural and cultural capital that make up a large part of its appeal (i.e., beaches, warm climates, wildlife, and cultural heritage sites) already exist in the host nations (Brohman 1996; Mitchell and Ashley 2010; Villiers 2001). Lastly, the diverse nature of the tourism sector can lead to what Hawkins and Mann (2004) refer to as value-chains: economic relationships that can stimulate other sectors of the economy, diversify existing economies, and generate local demand for tourism activities (Brohman 1996; Mitchell and Ashley 2010; Villiers 2001).

While tourism has the potential to offer the benefits described above, some researchers and policy makers have documented its potential negative impacts to host communities as well. Florence Babb (2010) points out that tourism brings together – in the

host community – people of vastly different cultural and economic backgrounds. Such encounters have the potential to create negative socioeconomic impacts (Archer and Cooper 1998; Mitchell and Ashley 2010; Babb 2010). These impacts vary by location and by the nature of the local tourism industry, but can include economic dependency on tourism income and foreign marketing operators; loss of control over local development and planning; socioeconomic inequality and exclusion, environmental degradation, and cultural alienation, among other consequences (Brohman 1996; Crouch and Richie 1999; Bascomb and Taylor 2008; Castellanos 2010; Logar 2010; Babb 2010). These negative effects can be especially problematic for communities located in hazardous areas that routinely experience extreme events, or what the tourism literature refers to as *shocks*.

Despite the rise of tourism in developing regions with historically high probabilities of shocks, there is a dearth of research dealing with hazards and tourism, and specifically on the vulnerability of tourism communities to hazards in these regions (Quarantelli 1988; Faulkner 2001; Bowonder and Kasperson 2005). Most existing research has taken a reactive approach to disaster planning rather than proactive steps towards mitigation and prevention (Richie 2008). In addition, while numerous researchers emphasize the importance of identifying factors of vulnerability during disaster planning (e.g., Arbel and Bargur 1980; Drabek 1995; Faulkner 2001; Richie, 2004), few actually discuss how to assess vulnerability, which is arguably the basis for disaster planning (e.g., Calgaro and Lloyd 2008).

The goal of this thesis research is to demonstrate a methodology based on the Sustainability Vulnerability Framework (SVF) (Turner et al. 2003) that takes into account the special contexts of a tourism community and current literature on social capital. It is my hope that by integrating and operationalizing these strands of academic thought that a

low cost methodology can be demonstrated that can be replicated by tourism developers, governmental and non-governmental agencies, and grassroots community organizations to assess the vulnerability of tourism communities before disaster strikes. The study area for this thesis is the Nicaraguan community of San Juan del Sur. As discussed in the following chapters, San Juan del Sur is an excellent case study for this type of research. Like many other coastal communities in Central America, it has experienced a boom in tourism development over the last decade; development that not only has shifted the nature of the local economy but has transformed its social dynamics as well (Honey and Krantz 2007; Honey et al. 2010; Babb 2010).

San Juan del Sur lies along the Pacific Coast of Nicaragua, adjacent to the Mid-American Trench, one of the most tectonically active regions in the world. In 1992, the community was struck by a large tsunami that left it severely damaged. While the 1992 event was the largest recorded tsunami in the area, the Pacific Coast of Central America has a history of tsunamis and it is virtually certain that similar events will occur in the future (Farreras and Sanchez 1991; Fernandez et al. 2000; 2004; 2005). To address the goal of this thesis, three main questions are asked in relation to the vulnerability of San Juan del Sur that reflect the main components of vulnerability indentified in the SVF. First, is the community at risk for future tsunami events and if so, is the community exposed to the effects of such an event? Second, tourism, as will be discussed in Chapter Three, is highly sensitive to disasters and subsequent reputational disasters which can affect business long after physical damage is cleaned up. In regard to San Juan del Sur, does the community have a high sensitivity to a tsunami event due to the nature of its economy? Last, do the social dynamics and disaster preparation in the community indicate resilience? Is it likely that San Juan del Sur would recover quickly after an event, or would it languish? The

literature and factors used to address these questions, including an introduction to the SVF and the concept of social capital, are discussed in depth in Chapter III.

The following chapter further introduces San Juan del Sur and the tectonic and socioeconomic forces that have shaped it. Chapter IV discusses the methodological framework that is used to assess the physical and social vulnerability of the community. Chapters V and VI present the results of this study and discuss them in terms of San Juan del Sur's exposure to tsunami events, its sensitivity to the impacts of a tsunami, and its resilience, or ability to recover from disasters.

CHAPTER II

BACKGROUND

Introduction

Vulnerability is a dynamic condition that results from unsustainable relationships among the social, physical, and political environments of a location. To understand the vulnerability of a place, it is important to understand the social and natural contexts in which it developed. Central America, Nicaragua, and San Juan del Sur are dynamic in terms of their physical environments, as well as their histories. This chapter discusses both in order to build an environmental and social context upon which to base later discussion about vulnerability.

The first section discusses the region's geologic history, why it has been prone to tsunami events in the past, and why these events are likely to recur in the future. The second section discusses the social and economic development of Central America since World War II with the goal to illustrate a history marred by oppression, intervention, violence, and dependency, and to explain why countries like Nicaragua are seeking to promote tourism in communities like San Juan del Sur. The last section introduces the community of San Juan del Sur, its economic history as a fishing and shipping port, and how it has developed into the nationally recognized tourism destination it is today.

The Tectonic Nature of the Region

The plate tectonics of Central America tells the story of the region's complex geologic history. Anthony Coates (1997) describes Central America as a land-bridge between the continents of North and South America; a connotation that expresses a sentiment of impermanence or transience. In terms of geologic history, this expression is understandable. While some areas of Central America are geologically old, such as the

highlands of Guatemala, Honduras, and northern Nicaragua, the isthmus from southern Nicaragua to Costa Rica and Panama is of much more recent origin. The Darién region of eastern Panama, for example, the final link between North and South America, emerged through tectonic uplift only about 3 million years ago (Coates 1997).

The overall development of the region has been influenced by the interplay of five tectonic plates; North and South America, Caribbean, Cocos, and Nazca (Figure 1) (Rojas et al. 1993; Coates 1997). Together, these plates form a portion of the uppermost zone of the Earth's crust (lithosphere) and, according to the theory of continental drift, are moving together and colliding with one another as a result of convection currents in the magma that makes up the upper mantle (asthenosphere) of the Earth's molten interior.

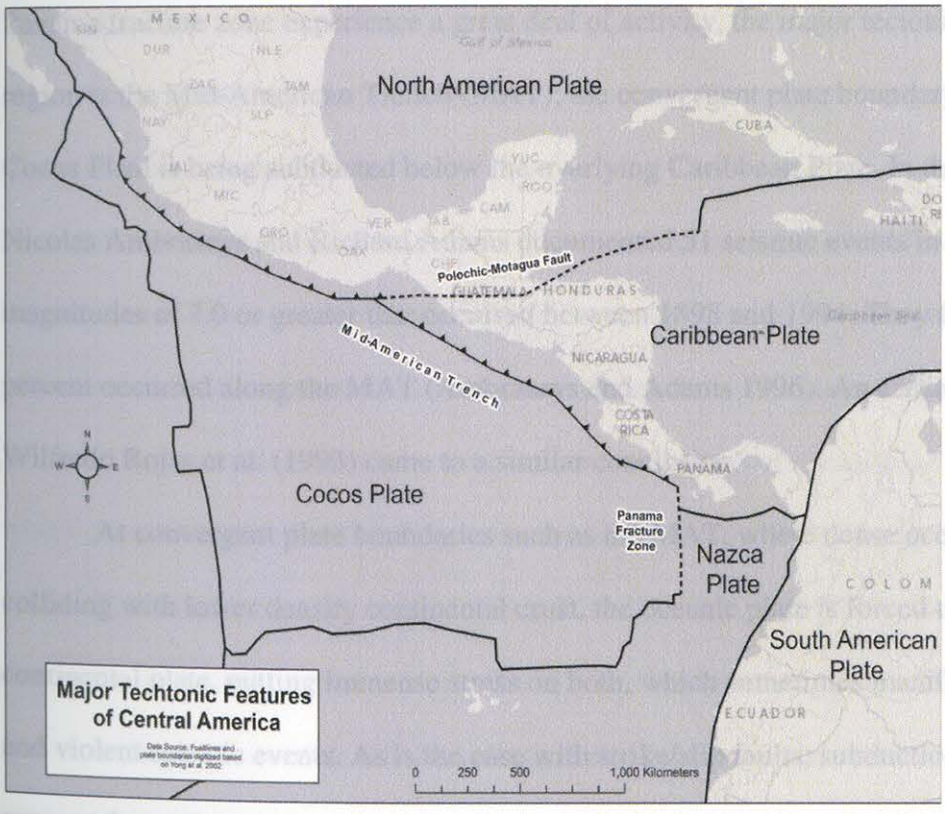

Figure 1. Major Tectonic Features of Central America. Five tectonic plates and three tectonic plate boundaries account for Central America's many volcanoes, earthquakes, and tsunamis.

In terms of seismic events in Central America, three fault lines play the most important roles. The Polochic-Motagua fault marks the boundary between the North American and Caribbean plates and the Panama fracture zone corresponds to that of the Cocos and Nazca plates (Rojas et al. 1993; Coates 1997). Both features are transform margins or strike/slip faults, which means that they are moving parallel to each other. This movement, however, is not continuous. Friction between the plates causes them to become bound up for periods of time, until enough pressure builds that they rupture and release stored energy in the form of earthquakes.

Strike/slip faults have the potential to generate large earthquakes, such as with the San Andreas fault in California (Arbogast 2007). While the Polochic-Motagua fault and Panama fracture zone experience a great deal of activity, the major tectonic feature of the region is the Mid-American Trench (MAT); the convergent plate boundary where the Cocos Plate is being subducted below the overlying Caribbean Plate. In their 1996 study, Nicolas Ambraseys and Richard Adams documented 51 seismic events in the region with magnitudes of 7.0 or greater that occurred between 1898 and 1994. They found that 93 percent occurred along the MAT (Ambraseys and Adams 1996). An earlier study by Wilfredo Rojas et al. (1993) came to a similar conclusion.

At convergent plate boundaries such as the MAT, where dense oceanic crust is colliding with lower density continental crust, the oceanic plate is forced under the continental plate, putting immense stress on both, which sometimes manifests in strong and violent seismic events. As is the case with strike/slip faults, subduction is not a smooth process, but rather occurs in starts and stops as the oceanic plate tries to thrust the continental plate up and away and the continental plate forces the oceanic plate under. Friction binds the plates together while convective forces inside the earth periodically

rupture these bonds, resulting in deep and strong earthquakes. In some cases, a geologic feature called an accretionary prism or wedge can form from material scraped from the descending plate.

Alan Arbogast (2007) offers the analogy of forcing a piece of wood into a space that is too small. The wood will fit, but it takes a lot of force and the loss of some of the wood. In a subduction zone, the result is an area of multiple thrust faults formed from the scraped material (Reynolds et al. 2008). A thrust fault is an area where a mass of rock is forced at a steep angle above another mass, resulting in the buildup of immense stress and the occurrence of large seismic events when a slip occurs. Prisms, however, can also help insulate the surface from deeper seismic events. In subduction zones such as the MAT, which do not have well developed accretionary prisms, it is thought that deep ruptures are able to propagate all the way to the surface, deforming the ocean floor and generating tsunamis (Kanamori and Kikuchi 1993).

A tsunami is a sea wave capable of inundating low-lying coastal areas. One of the best documented tsunamis in Central America occurred in 1992 in Nicaragua. The event offers an excellent case study to explain the mechanics of a tsunami. On September 2, 1992, a 7.6 magnitude earthquake struck off the west coast of Nicaragua. The earthquake, which occurred within the MAT, generated a tsunami that affected coastal areas from eastern El Salvador through northern Costa Rica (Baptista et al. 1993). In general, after a tsunami is generated, its wave travels through the deep ocean at speeds of between 370 and 500 mph (Reynolds et al. 2008). Despite the amazing speed at which the wave propagates, its amplitude (height) is small and may not even be noticeable at sea (Thurman, 1993, Reynolds et al. 2008). In the case of the Nicaraguan tsunami, the wave-height in the open ocean only ranged from 10 centimeters to 1 meter (Satake et al. 1993).

The disjunction between what is commonly thought of as a tsunami and the nature of its wave in the deep ocean is a function of the distribution of the wave's energy. In the deep ocean, the energy of the wave is distributed throughout the entire depth, however, as the wave reaches shallow water the friction between the water and the sea floor slows it down, causing the water to pile up and the wave to increase in height. In the Nicaraguan tsunami the wave reached heights of up to 9.9 meters (32.5 feet) in affected areas and caused extensive damage, killing 170 people and leaving approximately 13,000 homeless in Nicaragua alone (Baptista 1993; Satake et al. 1993). Although the 1992 event was the largest in Central America's recorded history, it is not the only tsunami event to strike the region, but one of many over the last century. As will be discussed later, it is likely that similar events will strike the region in the future.

Socioeconomic Development in Nicaragua

Historically, the economies of Central America since colonial times have been based predominantly on export commodity production (Foster 1997; Chasteen 2006). In Nicaragua after World War II, for example, coffee and cotton production dominated the economy and accounted for 75 percent of all exports (Kalijarvi 1962). To foster this production, Central American nations historically relied on the *hacienda* system, a post-colonial political and economic system whose main goal was to concentrate productive land into large estates owned by a few who could maximize the efficiency of production. Indirectly, the system generated a large pool of laboring *peones* who were displaced from their land and made dependent on local hacienda owners and *caudillos* (strongmen) for their livelihoods (Booth et al. 2010; Clawson 2006). After World War II, pressure to change this social contract mounted and the resulting conflict plunged the economies of

Nicaragua and other Central American nations into civil war and chaos. In the end, these changes led to the emergence of new development strategies, including tourism.

After World War II, Central America experienced a boom in capitalist investment and economic expansion (Bulmer-Thomas 1983; Robinson 2001). This rapid growth fostered the expansion of middle-class populations and the rise of capitalist hierarchies that challenged the existing social structure in Central America (Robinson 2001). In addition to economic expansion, the latter half of the 20th century saw pushes for social reforms. These included social security, labor law, and workers' rights, as well as political reforms such as an increased emphasis on constitutional rule, suffrage, and a nationalist push to challenge multinational companies operating in the region (Perez-Brignoli 1989). Despite these advancements, imports exceeded exports in many countries, including Nicaragua, which fed foreign debts. In addition, the expansion of export crops such as cotton led to further displacement of small food producers, increasingly unequal wealth distributions, stagnation in local food production, and aggravated rural poverty, all of which left the region ripe for revolution (Kalijarvi 1962, Biderman 1983).

With the exception of Costa Rica, which exhibited remarkable stability in the years after World War II, Central America plunged into what author James Cockcroft refers to as the "long dark night" – a period of United States imperialism and interventionism when U.S.-supported dictatorships, rampant resource exploitation, and egregious human rights violations, not to mention soaring national debts were commonplace (Cockcroft 1996, p. 3). While such repressive politics dated back to the 1800s, the Cold War, especially after the Cuban Revolution, was particularly difficult as the United States sought to prevent a communist regime from forming on the American mainland (Booth et al. 2010). Intervention focused primarily on bolstering the region's right-wing governments and

militaries, promoting economic unification, and at the same time, undermining organized labor and political reform (Booth et al. 2010).

While the United States was tightening the screws on left-wing dissent, rampant inflation between 1968 and 1976 and global recession in the late 1970s and early 1980s plunged Central America into economic crisis (Foster 1997; Booth et al. 2010). In an effort to promote capitalist development, increase growth rates, and undermine socialist movements, the nations of Central America had united economically in 1960 to form the Central American Common Market, but by the early 1980s, economic upheaval had destroyed the union (Bulmer-Thomas 1983; Perez-Brignoli 1989; Robinson 2001). During this period of economic disruption, Marxist Sandinista forces in Nicaragua overthrew U.S.-backed strongman, Anastasio Somoza in 1979, creating the mainland communist beachhead the U.S had feared and worked so diligently to prevent (Pastor 2001; Kinzer 2007).

Following the victory of the Sandinistas, American policy, while cautiously optimistic under President Carter, turn outwardly hostile under President Reagan as the United States trained and funded remnants of Somoza's National Guard from bases in Honduras and eastern Nicaragua to fight the Sandinistas (Pastor 2001; Chasteen 2006). In addition to open war in Nicaragua, the Reagan administration substantially increased funding to right-wing regimes in Guatemala, El Salvador, and Honduras in an effort to crush Marxist political and social movements, plunging much of the region into political and economic turmoil (Cockcroft 1996; Pastor 2001). Conflict continued in Nicaragua and Honduras until peace accords were brokered and the Sandinistas were voted out of office in 1990. The civil wars in El Salvador and Guatemala caused by brutal oppression at the

hands of their right-wing governments lasted until 1992 and 1996, respectively (Babb, 2010; Booth 2010).

As a result of this economic and political turmoil, the region's gross domestic product (GDP) shrank and its foreign debts exploded (Foster 1997; Chasteen 2006). Unable to service their debts, most Central American nations turned to the International Monetary Fund (IMF) for relief (Chasteen 2006, Robinson 2001; Babb 2010). In return for debt restructuring, the IMF required them to implement neoliberal reforms. These reforms emphasized export-oriented development, such as *maquiladora* manufacturing, non-traditional agricultural exports such as exotic fruits, flowers, and winter vegetables, and transnational services, including tourism (Robinson 2001). In practice however, these reforms coincided with devastating cuts to social programs, the elimination of protective tariffs, and the erosion of production power as once inefficient, but protected, industries were out-competed in the global market by larger and more efficient transnational corporations (Foster 1997, 209; Chasteen 1996; Cockcroft 1996, 13; Babb 2010). One area where governments found they could achieve a competitive advantage was tourism.

While solidarity tourists, including engineers, artists, writers, and journalists were attracted to revolutionary Nicaragua, the cessation of conflict and implementation of neo-liberal reforms in the early 1990s marked the beginning of mass tourism in the country (Babb 2010). In the wake of the 1990 election, Nicaragua was hit by a triple disaster when the IMF demanded stiff cuts to social programs and increases in outward-oriented development, the United States offered less financial assistance than had been expected, and the world price of coffee declined dramatically, handicapping one of the main export industries (Babb 2010). Tourism was seen as a potential savior and by the mid-1990s, the government was actively collaborating with national universities and foundations to

promote tourism as a key area for professional training (Figure 3). Students meanwhile began to be advised that tourism was their best hope for future employment (Babb 2010).

Figure 2. Flyer for a Tourism Training and Certification Program. Programs such as this advertised in San Juan del Sur and throughout the country have been part of the government's push to promote tourism as a strategy to lower unemployment and boost economic development.

While Nicaragua is still among the poorest nations in the western hemisphere and is less developed for tourism than other nations in Central America, tourism arrivals saw a nearly tenfold increase between 1990 and 2010 (Figure 4). San Juan del Sur, the site of this study, has been a major beneficiary of this promotion of tourism.

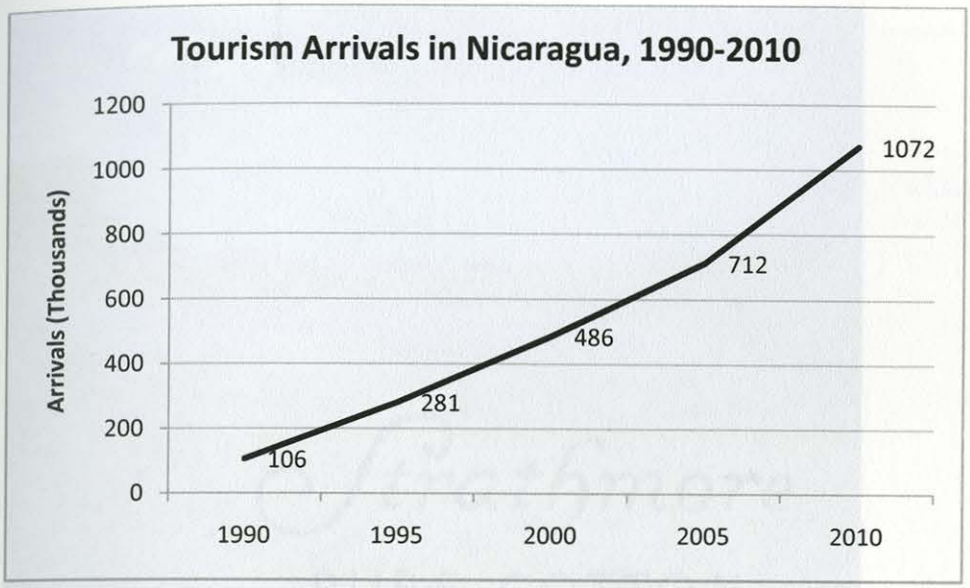

Figure 3. Tourism Arrivals in Nicaragua, 1990-2010. During this 20 year period tourism exploded from just over 100 thousand in 1990 to over 1 million. Source, UNWTO.

The Community of San Juan del Sur

San Juan del Sur is a small port community that lies on a shallow bay surrounded by coastal hills on the southwestern Pacific Coast of Nicaragua (Figures 5 -7). The community is divided into 16 neighborhoods (barrios) and had a 2005 population of approximately 7,000 residents (INIDE 2008). Over the last two decades, the community has seen dramatic change with the rise of tourism as Nicaragua has battled to reduce public debt and unemployment and attract foreign capital and investment (Babb 2010).

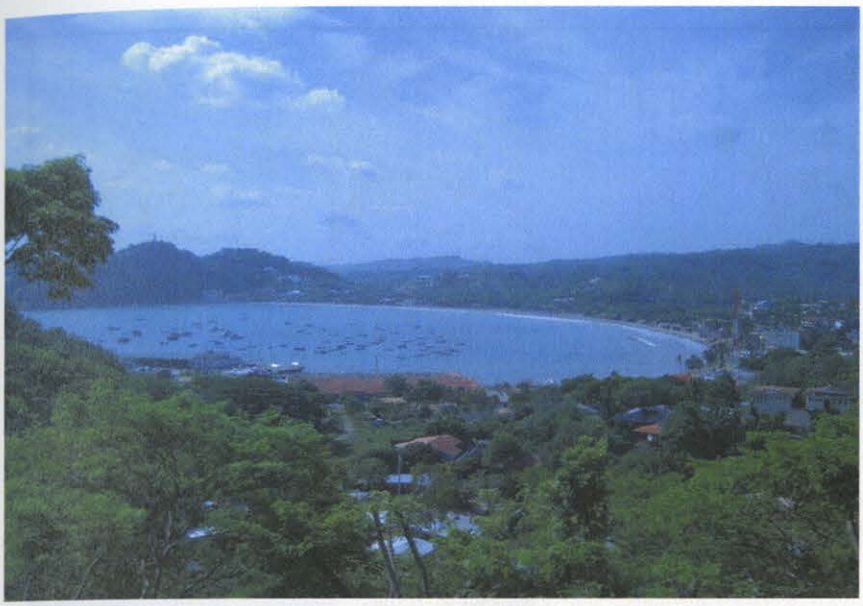

Figure 4. San Juan del Sur-North Across the Bay. The community's well protected location encouraged early fishing and shipping activity. However, the shallow bay restricts the size of ships that can dock at the port; a limitation that devastated the local economy in the mid 1990s.

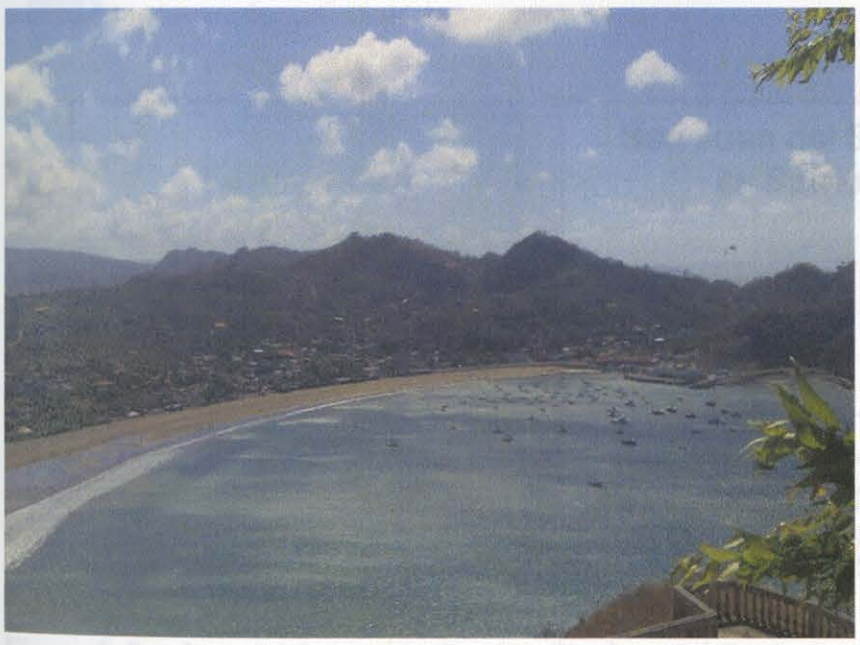

Figure 5. San Juan del Sur-South Across the Bay. Despite the relocation of shipping operations, the community and surrounding beaches are endowed with great natural beauty; a fact not lost on the national government, which has designated San Juan del Sur an official tourism port and city.

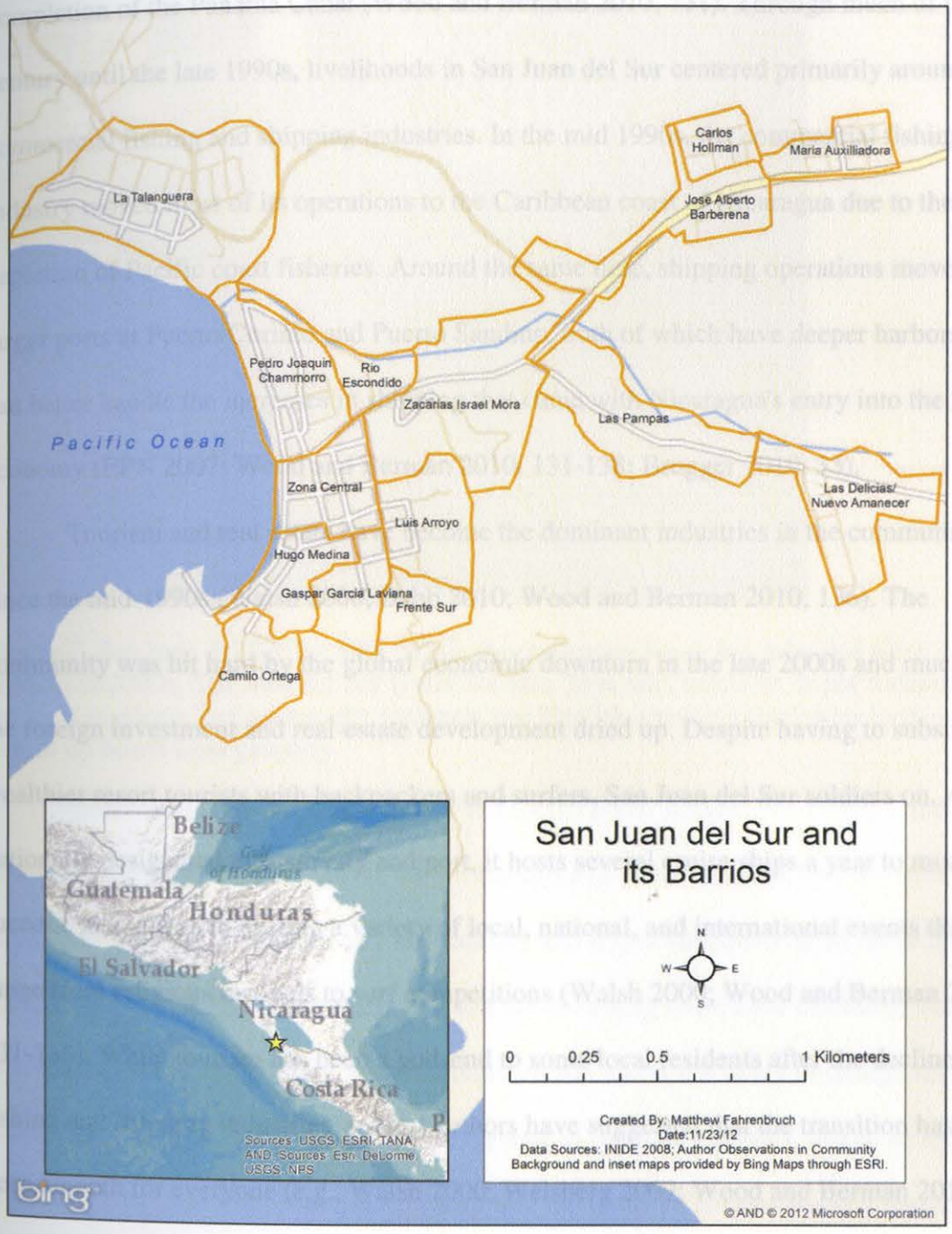

Figure 6. San Juan del Sur and its Barrios. San Juan del Sur is the seat of the greater Municipality of San Juan del Sur. The city itself is composed of 16 barrios (Barrio Raphael el Valle is not shown).

Although San Juan del Sur enjoyed prestige as a hub for transoceanic travel during the California gold rush of the 19th century, its role as a transportation hub ended with the

completion of the Panama Canal (Wood and Berman 2010, 131). Through much of the 20th century until the late 1990s, livelihoods in San Juan del Sur centered primarily around the commercial fishing and shipping industries. In the mid 1990s, the commercial fishing industry moved most of its operations to the Caribbean coast of Nicaragua due to the depletion of Pacific coast fisheries. Around the same time, shipping operations moved to larger ports at Puerto Corinto and Puerto Sandino, both of which have deeper harbors that can better handle the increases in shipping that came with Nicaragua's entry into the global economy (EPN 2007; Wood and Berman 2010, 131-138; Brugger 2010, 33).

Tourism and real estate have become the dominant industries in the community since the mid-1990s (Walsh 2000; Babb 2010; Wood and Berman 2010, 136). The community was hit hard by the global economic downturn in the late 2000s and much of the foreign investment and real-estate development dried up. Despite having to substitute wealthier resort tourists with backpackers and surfers, San Juan del Sur soldiers on. As a nationally designated tourism city and port, it hosts several cruise ships a year to mixed success, in addition to hosting a variety of local, national, and international events that range from religious festivals to surf competitions (Walsh 2000; Wood and Berman 2010, 131-136). While tourism has been a godsend to some local residents after the decline of the fishing and shipping industries, several authors have suggested that the transition has not been smooth for everyone (e.g., Walsh 2000; Weisberg 2009; Wood and Berman 2010; Babb 2010).

Figure 7. San Juan del Sur for Sale. While the real-estate boom has subsided since its peak in the mid-2000s, San Juan del Sur is still for sale. This sale, however, is not focused on the local residents, but on wealthy nationals and English-speaking foreigners looking to snatch-up beach front property.

Observations by Babb (2010) and Weisberg (2009) suggest that property inflation caused by the influx of speculators, the privatization of public beaches by real-estate developers, and the emergence of a sex industry and *hippie* subculture have had negative socioeconomic affects in the community and are alienating some local residents. Tourism nevertheless plays a major role in the community and this is not likely to change anytime soon. How then does San Juan del Sur's exposure to periodic tsunamis, due to its location adjacent to the Mid-American trench, factor into the future of tourism in the community?

As told in the first section of this chapter, early in the evening of September 2, 1992, San Juan del Sur, along with many other communities along Nicaragua's Pacific Coast, were devastated by a large tsunami. The wave reached a height of approximately 5 meters (16 feet) in the community. United Nations situation reports made in the days after the event estimated that 60 percent of all homes in San Juan del Sur were destroyed and

more than 800 people displaced (UNDHA 1992). The dramatic changes in the local economy and the likelihood of future tsunamis make this community an interesting case study. In the next chapter the literature that forms the methodological background for this study is discussed.

CHAPTER III

LITERATURE REVIEW

Vulnerability in the Literature

The concept of vulnerability has been widely addressed in the hazards literature. Cutter (1996) identifies three main research themes. The main dichotomy in hazards research, from a historical standpoint, is between those who define vulnerability as a product of physical exposure and a hazard as something for humans to adjust to (Gabor and Griffith 1980; Burton at al. 1993; Mejía-Navarro et al. 1994), and those who define vulnerability and hazards as social constructs rooted in societal ills such as inequality, poverty, and corruption (Downing 1991; Watts and Bohle 1993). While both of these themes offer general insight into vulnerability, they are biased in terms of what creates a vulnerable system. To concentrate specifically on physical exposure is to ignore the fact that societies and individuals are dynamic and thus respond to disasters in different ways. On the other hand, to consider a disaster as a purely social construct is to ignore the fact that some places are more prone to hazardous events than others.

The third research theme, led largely by geographers, takes a more comprehensive approach, incorporating both physical and social factors to provide a more well-rounded assessment of vulnerability that recognizes the complexity of human and environmental systems (e.g., Dibben and Chester 1999; Turner et al. 2003, Cutter et al. 2000, 2003). Arguably the two best known models associated with this theme are Hazards-of-Place (HOP) by Susan Cutter (2000, 2003) and the Sustainability Vulnerability Framework (SVF) of B. L. Turner (2003).

Cutter et al. (2000) use the HOP model in an assessment of Georgetown County, South Carolina. The authors assess physical exposure by identifying hazards that could

reasonably affect the county and then mapping their spatial distributions. To address social vulnerability, the authors identify several indicators from the 1990 U. S. Census that can be reasonably assumed to indicate vulnerable populations (i.e., home value, minorities, number of children and elderly). Using these data sets, the authors generate standardized index scores for each variable and an index score for overall social vulnerability.

While this study is relatively simple and cost effective, such methods have been heavily criticized due to their reliance on standardized vulnerability indices. Barnett et al. (2008) point out that vulnerability indices, due to their reliance on standardized data, tend to focus on spatial and temporal scales that do not adequately capture the complexity of human and environmental systems and thus misrepresent reality. Barnett et al. (2008) argue that vulnerability is site and time specific, and arises out of specific social and environmental conditions. Second, to be socially relevant, these studies not only need to identify who is vulnerable, but explain how and why they are vulnerable. Such research, according to the authors, is best conducted via in-depth empirical study rather than with indexed data (Barnett et al. 2008).

The second model, the Sustainability Vulnerability Framework (SVF) of B. L. Turner, has been widely viewed as an improvement over the HOP model because of its use of three main measures of vulnerability. In terms of a community such as San Juan del Sur, this framework, like the HOP, seeks to assess the exposure of the community based on the physical location of infrastructure and populations that would be impacted by a shock. Second, the framework assesses the sensitivity of the community, or the likelihood that a shock will negatively affect community dynamics, such as social networks and the local economy. Third, the framework assesses community resilience- the community's capacity to cope with and recover from the effects of a shock.

While this model does consider both physical and social factors similar to HOP, it is a departure from HOP because it is inherently scaleless. While HOP uses aggregated data, the SVF is dynamic and seeks to identify factors at all scales and the interactions between each factor - data not readily available from aggregated sources. The result is a model that is more sensitive to the complexities of human/environmental relationships, but is also more time and labor intensive. Given the limitations of time and resources, it is beyond the scope of this thesis to conduct an exhaustive, multi-scale analysis using SVF. Simpler methods, however, have been suggested in the literature that strike a balance between the efficiency of the Hazards of Place model and the rigor of the Sustainability Vulnerability Framework.

Dibben and Chester (1999) offer such an approach in their assessment of the vulnerability of the community of Furnas in the Azores to volcanic hazards. The authors describe the community as predominantly agricultural with some tourism and second home activity related to the community's geothermal spas. To assess the community's physical exposure, the authors use the last known eruption (1630 AD) as a model to identify and map several hazards related to volcanic activity, including pyroclastic flows, seismic activity, and CO_2 seepage. To assess social vulnerability, the authors conduct 50 in-depth interviews with residents to understand the demographic makeup of the community, general attitudes about the community, and their views of natural hazards, disaster preparation, and hazard mitigation.

The authors conclude that if an eruption similar to the 1630 event were to occur again, the community would be completely destroyed. Permanent residents stand to lose the most because, unlike tourists, non-local workers, and second-home owners, they maintain most of their assets locally. Due to the apocalyptic nature of such a hazard as a

volcanic eruption, the authors focus on community preparation rather than recovery. They take issue with the low-resilience rubble masonry construction of many structures in the community, which would collapse in the event of pre-eruption seismic activity, trapping or killing people inside and hindering evacuation efforts. The authors also show concern about the general lack of knowledge, preparation, and concern in the community about volcanic hazards. During interviews, many residents expressed dismissive or even fatalistic views towards volcanic hazards. In the case of CO_2 seepage, the authors found that not one interviewee was aware of the hazards posed to low lying areas.

Overall, the authors conclude that the main factors affecting the vulnerability of Furnas are high physical exposure to volcanic hazards, low resilience construction, lack of preparation or mitigation on the part of individuals, and a culture of denial that hinders efforts to make the community more resilient. Mapping past eruptions helped the researchers identify areas that might be exposed in future events. In-depth interviews shed light on social factors that potentially increased the sensitivity of Furnas and reduced its resilience. As pointed out by Barnett et al. (2008) it is unlikely that social factors such as denial and hazard-specific ignorance would have been identified with aggregated data. The following sections discuss two other factors not mentioned by Chester and Dibben (1999) that are relevant to the study of tourism-based economies: sensitivity of the tourism industry to shocks and the importance of social capital in terms of community resilience.

Sensitivity of the Tourism Industry

The tourism literature identifies several factors that help to explain why tourism communities are sensitive to shock. These factors include the place-specific nature of tourism activity (Richter and Waugh 1986; Sönmez et al. 1999); host-community dependence on tourism as a primary source of livelihood (Richie 2004); high levels of

seasonality (Logar 2010); reliance on foreign marketing operators (Cavlek 2002); and negative tourist perceptions for various reasons, including natural hazards (Faulkner and Vikulov 2001; Huan et al. 2004; Ichinosawa 2006); and political and social unrest (Sönmez and Graefe 1998; Sönmez et al. 1999; Mowforth and Munt 2003). The main theme that links these factors and makes them sources of vulnerability is the host community's dependence on tourism for economic activity. Tourism is a place-specific phenomena and host communities are immobile. If one is damaged by a hazard, either natural or anthropogenic, tourists will go elsewhere and the community will lose its economic base.

This is exactly what Calgaro and Lloyd (2008) found in their study of the tourism community of Khao Lak in Thailand after the 2004 Indonesian Tsunami. Through interviews with local residents, the researchers found that prior to the late 1980's the community's economy was based on commercial rubber and fruit plantations, as well as subsistence farming, which was broadly similar to San Juan de Sur at the same time. In the late 1980's, tourism began to develop in the community and over the next 20 years became the dominant economic activity, drawing labor resources away from the more traditional industries. Following the 2004 tsunami, the government tourism agency rerouted tourism traffic away from the devastated area in an attempt to save the image of the national industry at the expense of the local. The result was that the local economy collapsed at the moment when it most needed tourism income for recovery. As Ichinosawa (2006) puts it, the area was hit by a secondary "reputational disaster" that continued to affect that area long after the tsunami damage was cleaned up (Ichinosawa 2006, 112).

Importance of Social Capital

A growing source of interest among vulnerability researchers is the concept of social capital. The crux of social capital theory is the idea that social networks and relationships have a value and can be harnessed, like other types of capital, to affect the productivity of a group, population, or society (Putnam 2000, 19; Falk and Kilpatrick 2000). In a simpler sense, social capital is a representation of the willingness of a majority of participants in society to work together for a common goal, or in the case of a disaster, emergency response, and recovery. The foundations of this cooperation are community involvement, trust, and reciprocity (Putnam 2000, 21; Falk and Kilpatrick 2000). Societies where citizens are engaged, institutions are trusted, and actions are reciprocated are generally more productive than those where these traits are absent (Putnam 2000; Falk and Kilpatrick 2000).

Applied to vulnerability, Nakagawa and Shaw (2004) analyzed recovery efforts following the 2001 Gujarat Earthquake in Western India. To determine how social capital affected the recovery of different communities in the area, the authors collected data from interviews with governmental and non-governmental organizations, and community representatives, and they administered a social capital survey to the general population.

Overall, communities that were more socially organized recovered faster and more successfully than communities with less social organization. In the community of Soni, the authors found extensive social organization prior to the 2001 earthquake. Following the earthquake, community members were a primary source of relief for affected families which included financial support, temporary shelter, livelihood kits, and medical assistance (Nakagawa and Shaw 2004).

Despite being an area of low income, Soni experienced robust recovery compared to wealthier communities. The authors attribute this vigor to its high level of social capital. Of the four communities examined, Soni was found to have the highest levels of confidence in community members and leaders, highest level of community involvement, and one of the highest levels of community and government collaboration. In all, the authors argue that high levels of social capital both among residents and between the community and government helped mitigate the effects of disaster and hasten recovery.

The importance of discussing social capital in this study is not only because it is potentially linked to community resilience, but also because the development of tourism and introduction into the community of visitors of drastically different cultural and economic backgrounds has the potential to affect the social dynamics of a host community (Archer and Cooper 1998; Babb 2010). Jim MacBeth et al. (2004) points out that the existence of social capital can have a strong impact on the success of tourism development when it is geared towards the community's goals (i.e., it generates employment, improves city services, and expresses local culture). However, to function in this manner, these networks need to be outwardly oriented towards cooperation between diverse groups, as opposed to being inwardly oriented and exclusionary of other groups (MacBeth et al. 2004).

As tourism develops, it can affect outwardly oriented social capital in positive and negative ways. As Samantha Jones (2005) found in her study of an ecotourism community in Gambia, if tourism is developed in a way that satisfies community goals, it can increase participation and cooperation because residents are motivated to improve their community. On the other hand, tourism development that does not reflect resident values can generate misunderstanding and hostility between local residents and visitors (Crouch and Richie

1999; Babb 2010). The negative socioeconomic effects of tourism, such as price inflation and cultural transformations, can also alienate local residents and create a type of socioeconomic and cultural apartheid (Castellanos 2010; Babb 2010). This alienation can, in turn, erode the outward oriented networks of a community, which can result in increased resentment of tourism activity by lower classes, elitism on the part of tourists and upper classes, and increased stratification of the community (MacBeth 2004; Castillanos 2010; Babb 2010).

These negative impacts on social capital, in turn, have the potential to hamper recovery as Babu George (2008) found in his investigation of two Indian communities (one agricultural; the other tourism based) devastated by the 2004 Indonesian Tsunami. During a preliminary review, the author found that despite similar extents of damage, the agricultural community recovered faster than the tourism-based community. He surveyed residents of the two communities and found that the level of social capital within the two communities was strong, but that prior to the tsunami, local residents in the tourism community had felt alienated by tourism. Residents, in turn, did not support, and in some cases, worked against the industry's recovery, which in turn affected the recovery of the community as a whole. In this case, the social networks of the alienated population were turned inward, resulting in a reluctance to cooperate with recovery efforts. San Juan del Sur itself has recently experienced a boom in tourism development, which might affect the community's social capital similar to Babu George's Indian tourism community.

While the methods of George (2008) were restricted to qualitative data derived from focus groups, Nunkoo and Ramkissoon (2011) attempt to quantify the underlying factors that affect host attitudes towards tourism activity in their study of the community of Grand-Baie, Mauritius. The authors conducted surveys of 559 households questioning

respondents on the perceived benefits and costs of tourism activity, their trust in the tourism industry, perceived influence in tourism decisions, and their overall satisfaction with the condition of their community. The authors found a strong correlation between perceived benefits and negatives of tourism and host support for tourism activity, and between host support and community satisfaction (including host trust of the tourism industry, and indirectly, host influence in tourism decision making). Overall, these results concur with the findings of MacBeth et al. (2004) and Jones (2005), who suggest that residents will support tourism activity if they see it as a benefit to their community and if they feel they have a voice in its development. In the following section I draw upon lessons learned from this body of research to formulate the research questions of this thesis.

Summary and Statement of Research Questions

The main goal of this thesis is to demonstrate a methodology for assessing the vulnerability of tourism communities using the community of San Juan del Sur, Nicaragua as a model. To achieve this goal, I will assess the community's exposure to tsunamis, its sensitivity to the effects of such events; and its ability to recover and continue to function, as a tourism destination.

In terms of the physical exposure of the community, both Cutter (2000) and Dibben and Chester (1999) emphasize the importance of understanding the nature and mapping the distribution of hazardous events to understand their likelihood, as well as who and what might be affected. In terms of San Juan del Sur, the first factor to investigate concerns the nature of tsunami hazards in the region. Is it likely the community will experience an event similar to the 1992 tsunami in the future? Is the community, its residents and economy physically exposed to such an event?

In terms of socioeconomic sensitivity and resilience, the literature identifies several factors that might be assessed. Calgaro and Lloyd (2008) and Ichinosawa (2006) stress the sensitivity of the tourism industry to reputational disasters, which apply to the community as a whole if it is dependent on tourism. They also highlight the importance of recovery plans that not only rebuild but also help counteract reputational disasters. Dibben and Chester (1999) point out the potentially detrimental effects of ignorance and denial of risk, as well as logistical hazards such as collapsed buildings that hamper evacuation. For San Juan del Sur, is the community dependent on tourism activity? Is the community and the tourism industry prepared for a tsunami? In other words, do residents understand the risks and have authorities made emergency response and recovery plans that would adequately mitigate the impacts of a tsunami?

Lastly, the literature points out the importance of social capital to community resilience. Nakagawa and Shaw (2004) found that throughout their study region, the community that recovered the quickest – Soni – also had the highest levels of confidence in community members and leaders, the highest level of community involvement, and one of the highest levels of community and government collaboration. Macbeth (2004) and Jones (2005) identify the link between tourism development and social capital, and the importance of outwardly oriented social networks. George (2008) and Nunkoo and Ramkissoon (2011) explore the connection between host perception and host support for tourism activity. George (2008) pointed out that the lack of host support was directly related to a similar lack of community resilience.

Are social networks in San Juan del Sur distributed throughout the community or are they inwardly focused and concentrated within individual barrios? Do residents have confidence in their neighbors, their government, and community organizations to respond

appropriately during emergencies and recovery? Do strong social ties exist between the coastal barrios that will be heavily impacted and the inland barrios that might serve as refuge areas? Lastly, do residents of San Juan del Sur support tourism activity in their community? The vulnerability factors discussed above are shown in the Table 1 alongside the research question they seek to address. In the next chapter I identify variables and methods that I will use to address each factor and answer these overarching questions.

Table 1

Research Questions and Factors of Vulnerability

1. Exposure: Is the community at risk for future tsunamis and if so, is the community exposed to the effects of such an event?
Source Area and Historical Event Frequency and Magnitude
Distribution of Population
Distribution of Social and Employment Networks
Location of Tourism Services
2. Sensitivity: Does the community have high sensitivity to a tsunami event due to the nature of its economy?
Role of Tourism in the Local Economy
3. Resilience: Do social dynamics and disaster preparation in the community indicate resilience to tsunamis?
Participation in and Distribution of Social Involvement Within the Community
Resident Confidence in Fellow Residents, Government Agencies, and Community Institutions in terms of Disaster Response and Recovery
Support for Tourism Activity
Community and Tourism Industry Disaster Preparation

CHAPTER IV

METHODOLOGY

Introduction

The data for this thesis is derived from four sources: (1) field data collected in the community, which includes household surveys, interviews, field observations, and GPS-verified waypoints of the locations of tourism facilities; (2) historical tsunami records from the NOAA/WDC Global Historical Tsunami Database; (3) barrio population data from the 2005 Nicaraguan Census (INIDE 2008); and (4) relevant secondary literature. In this project, all statistical results are reported to a 95 percent confidence level.

The main source of data for this thesis is the household survey. The first section of this survey focuses on social data, including awareness of tsunami risk; participation in community activities; barrio of residence; and travel patterns associated with visiting friends and family, working, and participating in community activities. This first section also relies on four-tier Likert scales to gauge the levels of confidence local residents have in their families, neighbors, and governmental and non-governmental organizations in terms of disaster response and recovery.

The second section of the survey queries respondents on their perceptions of tourism activity in the community based on a five-tiered Likert scale and asks them to respond to several statements on the benefits and negative effects of tourism activity in the community. Additionally, respondents were encouraged to include write-in comments to augment their responses in Sections One and Two of the survey. The last section asks respondents to identify all livelihood activities of their household and to specify the top three.

I used a clustered random sampling design to collect surveys from 146 households in the community. To administer the survey, I worked with a local translator, arranged by the local NGO, Comunidad Connect, and went door-to-door throughout the community. Respondents were identified as anyone willing to complete a survey, but care was taken to not sample the same household more than once. My goal was to administer surveys to 10 percent of households in each barrio based on household estimates from the 2005 Nicaraguan Census (INIDE 2008). Table 2 compares the number of surveys I collected in each barrio versus the number of surveys I had hoped to collect. Only two barrios – Zacarias Israel Mora and Las Pampas – were underrepresented while Las Delicias/Nuevo Amanecer was slightly overrepresented. Due to time limitations and the fact that Barrio Rafael El Valle was only mentioned twice in the 146 surveys collected, no surveys were collected from that outlier barrio.

Table 2

Surveys Collected in Each Barrio versus Project Goals

Barrio Name	Households	10%	Completed
Camilo Ortega	103	10	10
Carlos Hollman	118	12	12
Frente Sur	47	5	5
Gaspar Garcia Laviana	105	11	11
Hugo Medina	63	6	6
José Alberto Barberena	99	10	10
La Talanguera	119	12	12
Luis Arroyo	107	11	11
Maria Auxilladora	103	10	10
Pedro Joaquin Chamorro	86	9	9
Rio Escondido/El Pantanal	42	4	4
Zona Central	178	18	18
Las Delicias/ Nuevo Amanecer	111	11	14
Zacarias Israel Mora	122	12	9

Table 2 (continued).

Barrio Name	Households	10%	Completed
Las Pampas	76	8	5
Community Total	1479	149	146

Tsunami Risk and Physical Exposure

Research Questions 1 seeks to answer whether the community is at risk for future tsunami events and if so, whether the community and its economy are potentially exposed. This question will be addressed using four variables –historical occurrence of tsunamis in the region, distribution of the population of San Juan del Sur, distribution of employment and community involvement networks, and locations of tourism services. Due to the lack of a sufficiently detailed digital elevation model for the community, the work of ERN (2009) and field observations made in the community are used to identify those barrios that will be most affected by a tsunami due to their coastal or low-lying setting versus those located on high ground or sufficiently inland so as not to be adversely affected (Figure 4). All comparisons between data collected in the community and the potential inundation zone are done within Arc Map 10.1.

First, to determine tsunami risk, records available from the NOAA/WDC Global Historical Tsunami Database are used to calculate the annual probability and return time of tsunamis of any size, and specifically events exceeding 5 meters in height. According to these data, all documented tsunamis were generated by earthquakes of 6 or greater magnitude with focal depths of between 5 and 138 kilometers. Using these parameters,

data from the NOAA/National Geophysical Data Center are used to calculate the return time of potential tsunami events in the region.

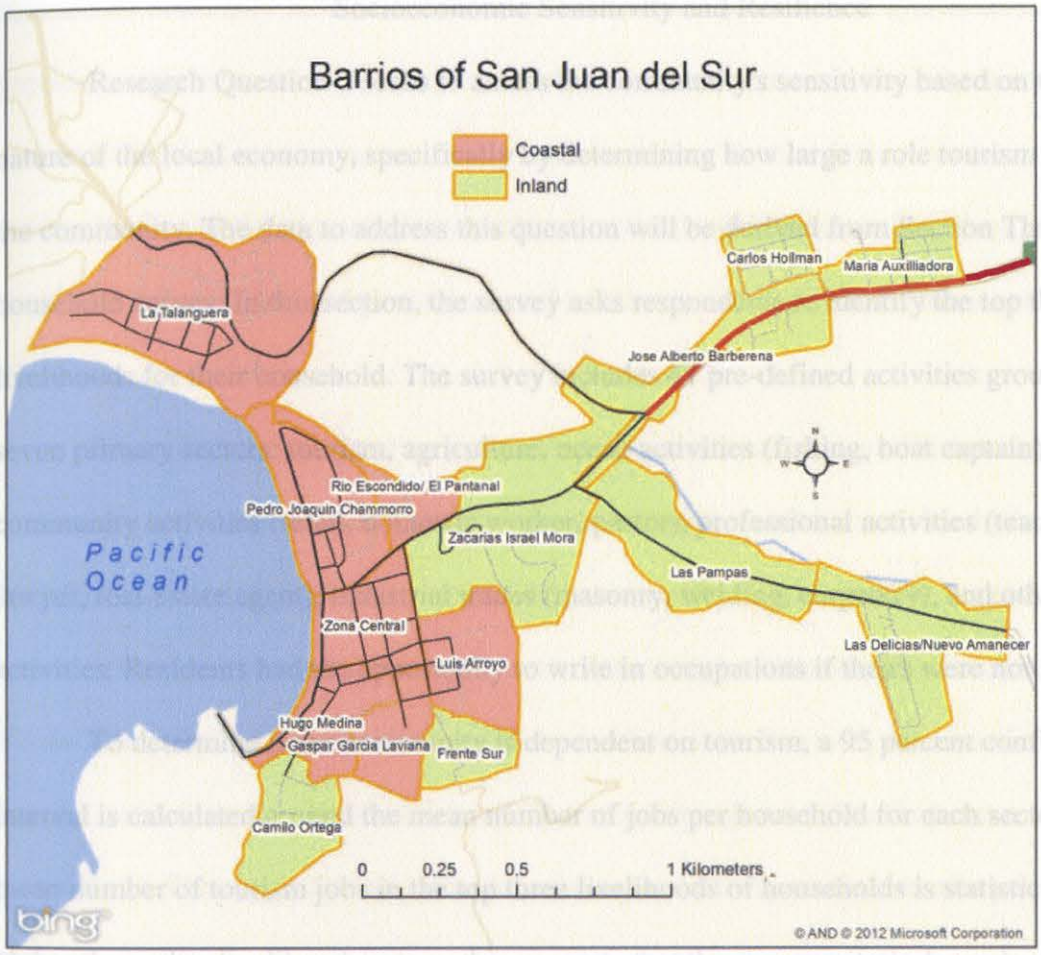

Figure 8. Coastal and Inland Barrios.

To address the exposure of the community to a potential tsunami, barrio-level data from the 2005 Nicaragua Census (INIDE 2008) are used to determine population distribution. In addition, network data from Section One of the household survey regarding work and community activities are used to determine the distribution of these activities. Together these data are mapped in relation to the coastal barrios to estimate the number of residents that might be affected and potential impacts on employment and social networks.

GPS waypoint data of tourism service locations collected in the community are plotted in relation to the coastal barrios to determine the exposure of the industry to future events.

Socioeconomic Sensitivity and Resilience

Research Question 2 seeks to assess the community's sensitivity based on the nature of the local economy, specifically by determining how large a role tourism plays in the community. The data to address this question will be derived from Section Three of the household survey. In this section, the survey asks respondents to identify the top three livelihoods for their household. The survey includes 41 pre-defined activities grouped into seven primary sectors: tourism, agriculture, ocean activities (fishing, boat captain), community activities (retail, domestic worker, pastor), professional activities (teacher, lawyer, real-estate agent), industrial trades (masonry, welding, carpentry), and other activities. Residents had the opportunity to write in occupations if theirs were not listed.

To determine if the community is dependent on tourism, a 95 percent confidence interval is calculated around the mean number of jobs per household for each sector. If the mean number of tourism jobs in the top three livelihoods of households is statistically higher than other livelihood sectors, this suggests that the community is dependent on the tourism industry. If the average number of tourism jobs in the top three livelihoods for households is not statistically higher than other sectors, this suggests that the economy of the community is diversified. In addition to this test, comments made during interviews and material from the secondary literature are also cited to provide further context.

Research Question 3 seeks to address to community's resilience based on social capital theory and community and tourism industry preparedness. A key component of social capital is resident participation in community activities. Of particular interest is the type of community activities people participate in and the distribution of these activities

throughout the community. Are the activities in which residents participate inclusive or exclusive of other groups? Do people tend to participate in activities all over the community or do they remain in their home barrio? The goal of these questions is to provide insight into whether the community's social networks are outwardly or inwardly oriented. The data used to answer them are derived from Section One of the household survey. Respondents were asked to identify community activities in which they, or members of their household participate, and to identify in which barrios these activities take place.

These data are analyzed by using a two-step statistical process. First, weighted mean centers of community activity participation are generated for each barrio in Arc Map 10.1. The X-Y coordinates are represented by the barrio centroids and are weighted by the number of connections with the target barrio. For example, if the weighted mean center for Barrio A is calculated and Barrio A has 5 connections with Barrio B, 2 connections with Barrio C, and 6 connections within itself, Barrio A is weighted 6, Barrio B has a weight of 5, and Barrio C has a weight of 2. Barrios with heavy activity exert more of a pull on the target barrio's mean weighted center than do those with less activity. Second, the resulting weighted mean centers for the barrios, 15 in total, are analyzed in Arc Map 10.1 using Nearest Neighbor Analysis (NNA) to determine if the mean centers are clustered, random, or dispersed. If the resulting Z-score is less than -1.96, the mean weighted centers are clustered and activity is more distributed throughout the community than confined to individual barrios, which suggests that social networks are outwardly oriented.

Another factor of social capital, within the context of this thesis, is trust and confidence in the ability of family and friends, neighbors, and governmental and non-governmental institutions to assist in the event of a tsunami. The data for this factor come

from Section One of the household survey. Respondents were asked to rank, based on a four-tier Likert scale (high, moderate, low and none), their confidence in several institutions including, family and friends, other residents, political parties; local, state, national, and international governments and nongovernmental organizations.

To address this factor, the skewness of the responses and a Chi-Square analysis are used to determine if the responses are uniformly distributed across the four tiers or skewed either to the moderate-high or low-none ends of the spectrum. Institutions with a Chi-Square p-value equal or greater than .05 are considered uniform, suggesting there is a wide variety of opinions throughout the community. In the case of uniform institutions, a contingency analysis is run to determine if these opinions vary by barrio. A contingency analysis generates a p-value test statistic. Based on a 95 percent confidence level, a p-value of less than .05 suggests that opinions differ between barrios. A p-value of greater than .05 suggests no relationship between barrio and opinion meaning that confidence varies more between respondents than it does between barrios. When discussing the relationship between people and governmental and non-governmental institutions it is expected that there will always be supporters and critics, as no institution can make everybody happy. However, if confidence varies at the scale of an entire neighborhood it may signal that the institution in question is not evenly distributing their services to the community, and that large sections of the community are being neglected. In addition to these tests, interview transcripts, write-in comments from the households survey, and commentary from secondary sources are used to provide additional context.

Another factor of resilience is host support of tourism activity. To assess this factor, data are drawn from Section Two of the household survey where respondents responded to four statements using a five-tiered Likert scale (strongly agree, agree, neutral, disagree, and

strongly disagree) to determine perceived benefits of tourism in the community, benefits to the respondent and their families, support for future tourism development, and local influence on tourism development. Similar to the assessment of confidence above, these responses are graphed to determine whether opinions are skewed more towards agreement or disagreement. In addition, respondents were presented with several statements related to potential benefits and negative effects of tourism and they were asked to acknowledge whether the statement applies to their community. Respondents also had the option to write comments about their responses. These responses and write-in comments are used to provide additional context for the Likert responses.

The last factor of resilience, the preparation of the community and the tourism industry to a tsunami, takes two main approaches. The first addresses whether there are a significant number of social networks, specifically family and friend networks, that exist between coastal and inland barrios. The assumption is that coastal barrios will be impacted most by a tsunami and inland barrios will serve as refuge areas where displaced residents can flee, regroup, and rebuild. The strength of social networks between these two areas does not necessarily imply conscious preparation, but it nonetheless might be an indicator of the success of an overall disaster management plan. People who have inland connections may fare better and be less of a impediment on the recovery system than those who do not.

Family and friend networks will be analyzed using the join-count statistic. Join-count statistic assesses social connections within and between two distinct groups and generates a Z-score to represent the significance of the connection. In general, the higher the Z-score, the more dispersed the social networks are between groups. The lower the Z-score, the more concentrated the networks are within the groups (i.e., fewer connections

between the coastal and inland barrios). At a confidence level of 95 percent, only a Z-score of greater than 1.96 will be considered significant. If the resulting Z-score is less than 1.96, it will suggest that no significant connection exists between coastal and inland barrios. If the resulting Z-score is greater than 1.96, significant networks can be assumed to exist.

The second approach addresses organized preparation. Interviews conducted with the community's officer from the Nicaraguan emergency response agency (SINAPRED) are referenced to describe national and community preparedness. Over the course of two interviews the officer described the community's emergency response plan and how it fits into the nation's overall strategy. In addition, the officer described the flow of information and resources during an emergency event. This information, combined with comments made during interviews with the community's national tourism institute officer (INTUR), and the President of the local tourism trade union (CANTUR), and commentary from a 2011 Global Facility for Disaster Reduction and Recovery (GFDRR) report, are used to assess the preparedness of the community and tourism industry.

CHAPTER V

RESULTS AND DISCUSSION

Tsunami Risk and Physical Exposure

In this section I discuss the likelihood of a future tsunami striking San Juan del Sur and the potential exposure of the community, notably its population, socioeconomic networks, and the local tourism industry to such an event. According to NOAA, 43 earthquakes affected the Pacific Coast of Central America between 1900 and 2012 and measured greater than 6 on the Richter Scale. For this same period, 22 tsunamis struck the area. Of these,18 had recorded wave heights and they ranged from 0.03 meters (0.1 feet) to 9.9 meters (32.5 feet). Frequency statistics for these events are listed in Table 3 below for both the region and San Juan del Sur.

Table 3

Probability and Return-Time Statistics for Tectonic Events

Event Magnitude & Location	# of Events	% Chance/Year	Return Time
Regional Earthquakes 6+	43	39%	1:3 Years
Region Tsunami Events (all)	22	20%	1:5 Years
Region 5+ meters	1	1%	1:100 Years
San Juan del Sur Total	4	4%	1:25 Years
San Juan del Sur 5+ meters	1	1%	1:100 Years

As can be seen in Table 3, large earthquakes and tsunami events in the region are a common occurrence with an earthquake of magnitude 6 or greater occurring on average every 3 years and a tsunami every 5 years. Tsunamis on the scale of the 1992 Nicaraguan Tsunami, however, are much more rare as the 1992 event was the only one of its size to

strike the region between 1900 and 2012. In San Juan del Sur, tsunami risk appears to be much lower than the region as a whole. Since 1900, only 4 recorded tsunamis have struck the area and of these, only the 1992 event produced waves 5 meters or higher. According to the NOAA data, San Juan del Sur can expect to experience one tsunami every 25 years and an event of 5 meters or higher every 100 years, but it is important to note that these figure are based on data since 1900. With only 1 event during this period, it is difficult to calculate the exact return time for catastrophic tsunamis. Nonetheless, the region has a history of tsunami events, several of which have impacted San Juan del Sur, and the community will almost certainly experience them in the future.

In terms of the community's physical, economic, and social exposure, the results suggest a mixed story. Table 4 shows the distribution of population, employment, and community involvement networks by barrio. As can be seen, approximately 2,958 residents or 41 percent of the population, live in the coastal barrios. In addition to these full-time residents, of the 189 employment and 248 community involvement networks recorded, 71 percent and 50.4 percent respectively, exist in the coastal barrios. These findings suggest that in the event of a tsunami, at least 41 percent of the population could experience physical loss of life and property while nearly two-thirds of the population could lose their livelihoods and half could be negatively affected in terms of their social networks, at least temporarily. In terms of livelihoods, the existing literature suggests that tourism plays a major role in the community's economic activity, an assumption that will be tested in the next section. For now, I will assess the exposure of tourism to tsunami risk to provide further insight into the overall exposure of the community.

Table 4

Distribution of Population, Employment, and Community Involvement

Barrio Name	Location	Population (2005)	Employment Networks (%)	Com. Act. Networks (%)
Camilo Ortega	Inland	519	5.6	5.6
Carlos Hollman	Inland	578	2.5	8.1
Frente Sur	Inland	194	3.1	3.2
José Alberto Barberena	Inland	455	6.6	7.7
Las Delicias/ Nuevo Amanecer	Inland	520	4.6	10.5
Las Pampas	Inland	314	0.5	3.2
Maria Auxilladora	Inland	475	2.0	6
Zacarias Israel Mora	Inland	642	4.1	5.2
Inland Total		4262	29	49.6
Gaspar Garcia Laviana	Coastal	438	3.1	6.5
Hugo Medina	Coastal	265	4.1	6.0
La Talanguera	Coastal	439	11.2	5.6
Luis Arroyo	Coastal	455	7.6	11.3
Pedro Joaquin Chamorro	Coastal	339	5.1	5.6
Rio Escondido/El Pantanal	Coastal	228	0.5	1.6
Zona Central	Coastal	794	35.5	13.7
Coastal Total		2958	71	50.4
Community Total		7220	100	100

The map in Figure 9 shows the distribution of tourism locations as identified in the community. Based on Figure 9, only 3 of the 99 observed tourism locations exist outside the coastal barrios, meaning that approximately 97 percent of tourism locations would potentially be affected by a large tsunami. Of these locations, 35 (35 percent) lie along the *Malecón* adjacent to beach. Several of the structures lie so close to the ocean that they must be on stilts to prevent flooding during normal high tide (Figure 10). Many similar structures were heavily damaged by the 1992 tsunami, and it is likely that in the event of a

5-meter event, or even a smaller tsunami, that these locations and others along the Malecón would be heavily affected.

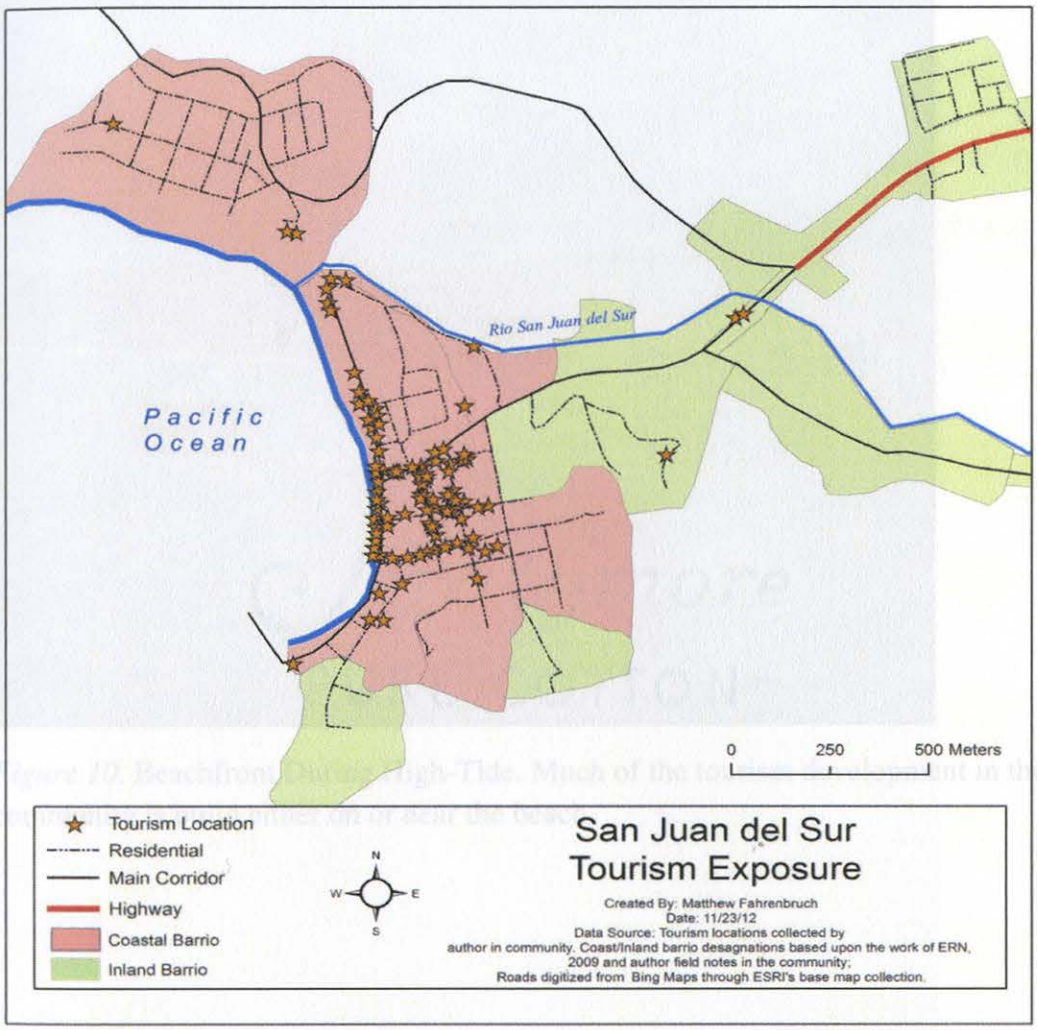

Figure 9. San Juan del Sur Tourism Exposure. As is common with tourism destinations that sell sand, sun, sea, the majority of tourism activity in San Juan del Sur is concentrated close to the beach.

Of the 1.75 km of beach front, only about 200 meters near the port is protected by a seawall (Figure 11). The remainder has no barrier between development and the ocean (Figure 12). This suggests that most tourism service locations in the coastal barrios are potentially exposed to a future tsunami similar to the 1992 event. In the next section I

investigate the community's dependence on tourism activity to determine the effect of this exposure on the overall economy.

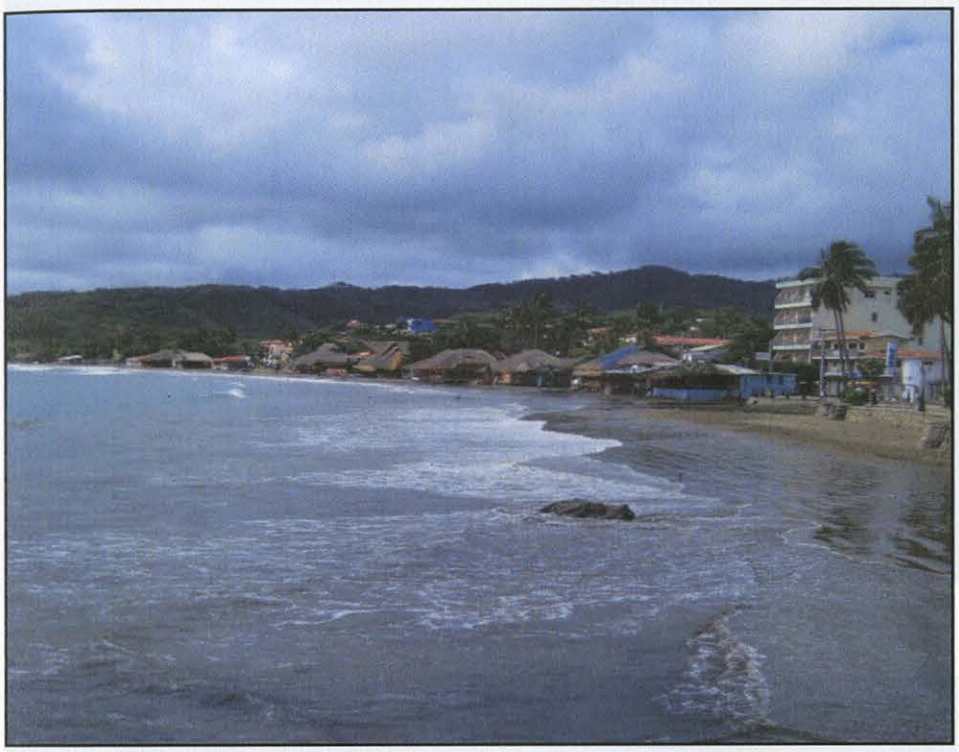

Figure 10. Beachfront During High-Tide. Much of the tourism development in the community is build either on or near the beach.

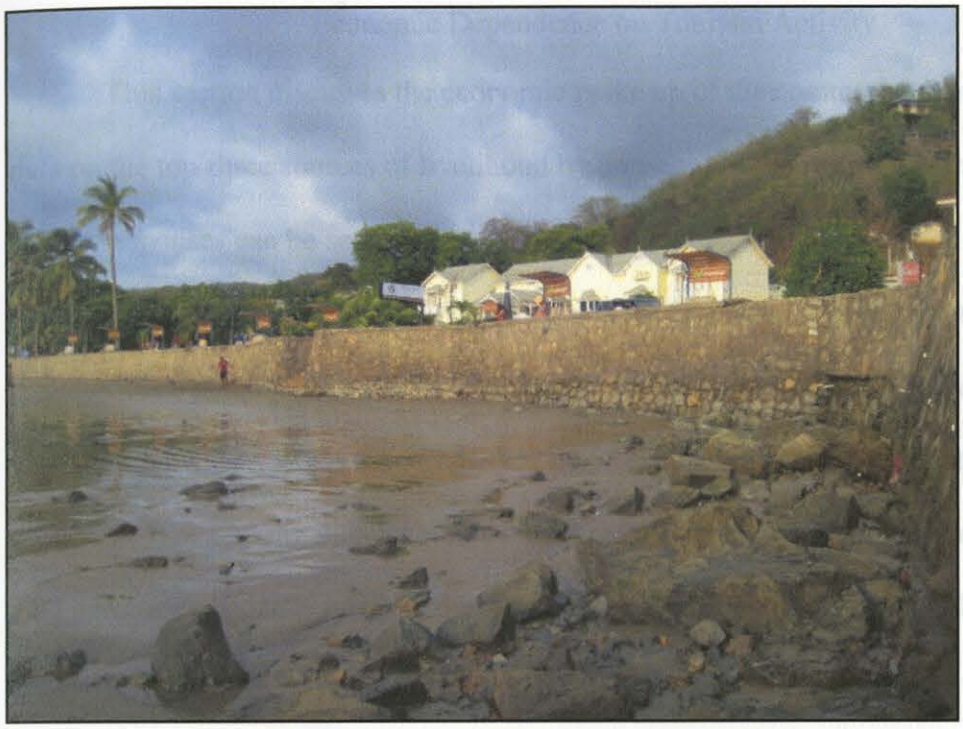

Figure 11. Seawall Near the Port.

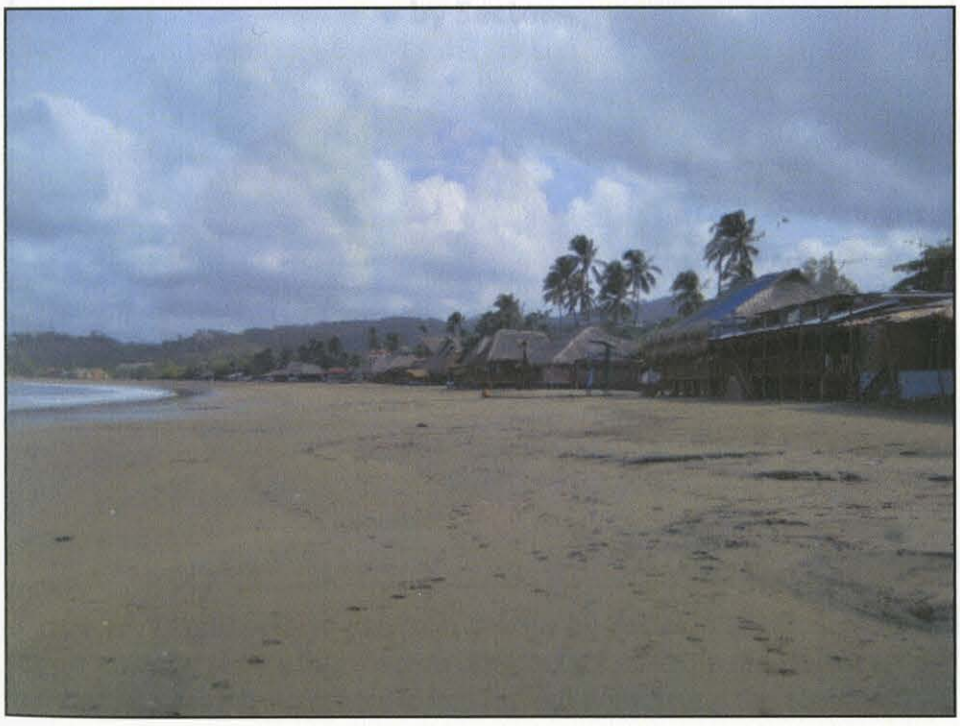

Figure 12. Businesses Along the *Malecón.* Of the approximately 1.75 km of beach front, only about 200 meters is protected in any way from potential tsunamis.

Economic Dependence on Tourism Activity

This section discusses the economic make up of the community based upon survey data on the top-three sources of livelihood by household. The results of the household survey responses can be seen in Figure 13. Based on this figure, it appears that tourism is the largest sector in the community. It accounts for 28 percent of the reported top-three livelihoods; 9 percent higher than the two next-closest sectors, *trades* and *community activities*. However, while tourism is the largest sector, it does not appear to dominate the economy. When taking into account the average number of tourism jobs per household and a 95 percent confidence interval, the average number of tourism livelihoods is not significantly greater than that of community activities and trades (Figure 14).

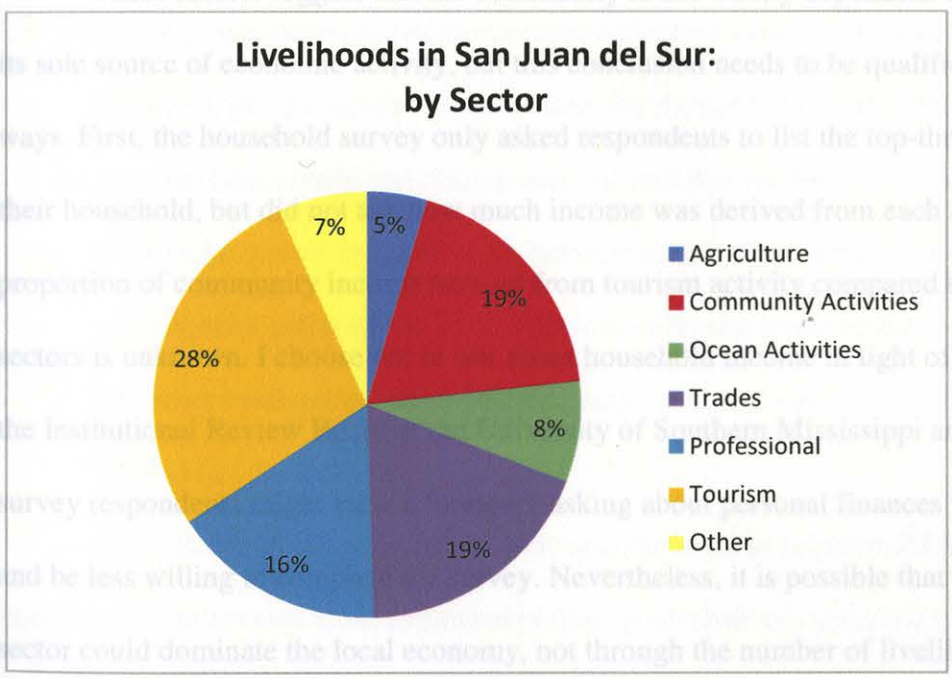

Figure 13. Livelihoods in San Juan del Sur by Sector. The distribution of livelihoods in the community shows that tourism does in fact make up the largest sector based on number of jobs, but it appears to be far from dominating the economy.

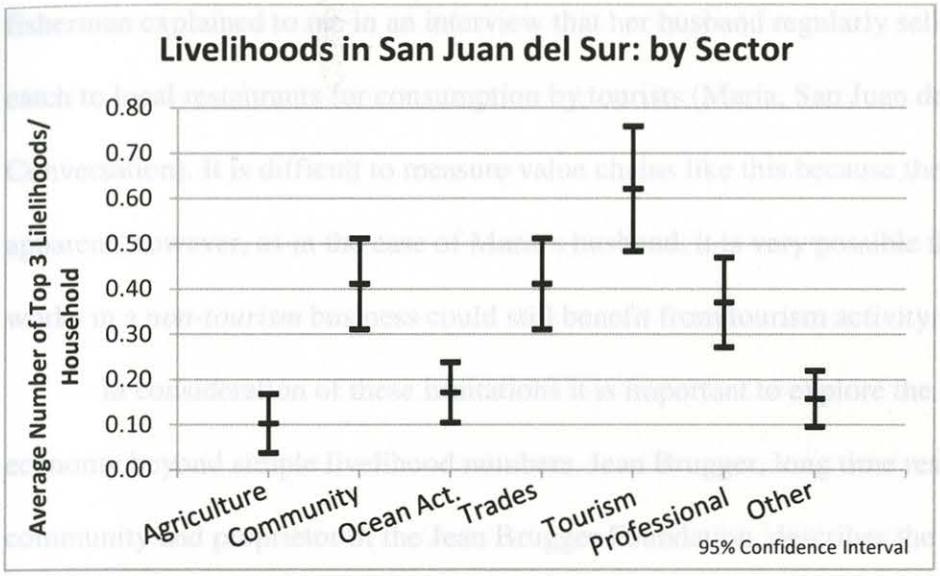

Figure 14. Livelihoods in San Juan del Sur by Sector - Confidence Intervals. The distribution of livelihoods in the community based on 95 percent confidence intervals.

These results suggest that the community is not wholly dependent upon tourism as its sole source of economic activity, but this conclusion needs to be qualified in several ways. First, the household survey only asked respondents to list the top-three livelihoods in their household, but did not ask how much income was derived from each source, so the proportion of community income derived from tourism activity compared to the other sectors is unknown. I choose not to ask about household income in light of concerns from the Institutional Review Board at the University of Southern Mississippi and because survey respondents might view a foreigner asking about personal finances with suspicion and be less willing to complete the survey. Nevertheless, it is possible that the tourism sector could dominate the local economy, not through the number of livelihoods, but through the total income derived from those livelihoods.

Second, as Villiers (2001) and Hawkins and Mann (2004) point out, tourism tends to develop connections, or value chains, with other sectors. For example, the livelihoods of local fishermen would be classified as *ocean activities,* however, Maria, the wife of a local

fisherman explained to me in an interview that her husband regularly sells a portion of his catch to local restaurants for consumption by tourists (Maria, San Juan del Sur Resident, Conversation). It is difficult to measure value chains like this because they are not readily apparent, however, as in the case of Maria's husband, it is very possible that a person who works in a *non-tourism* business could still benefit from tourism activity.

In consideration of these limitations it is important to explore the nature of the local economy beyond simple livelihood numbers. Jean Brugger, long time resident of the community and proprietor of the Jean Brugger Foundation, describes the nature of the local economy in her book, *Sunset on the Pacific: Retirement Adventures in Nicaragua*:

> Fishing had been the major source of income here for many years. At one time the port was used for loading and unloading cargo from other countries, providing jobs for local men. By the time I arrived, [1998] the port had been closed and fishing was less and less productive. Many people were making their living through the service industry - restaurants/bars, small variety stores in the front of their houses, and working for the wealthier residents as housecleaners, gardeners, and watchmen. (Brugger, 2010, 33)

Since Brugger's experience in 1998, and particularly between 2003 and 2008, the community was witness to an explosion in foreign tourism and investment, (Wood and Berman, 2010). The community was subsequently declared by the national government as a *tourism city/port*; a declaration that, according to the local tourism trade organization CANTUR, requires "all inhabitants of the port, government and especially local authorities to promote and cultivate a tourist vocation, and to work in developing opportunities to promote, contribute and strengthen business [tourism] ventures that benefit, and enhance

local economic development" (CANTUR 2011, p.1). Both Jean Brugger and Kelvin Marshall, editor of the local bilingual newsletter, *Del Sur News*, elaborated on the boom and its subsequent bust during interviews:

> Many foreigners came down looking to invest in property…The boom took the community by surprise and the police were not equipped to handle the influx of people and the growth in illegal activity… After the world economic collapse the boom dried up and the community returned to what it was before, essentially a backpacker and surfer destination. (Jean Brugger, Jean Brugger Foundation, Conversation).

> Before this time [the bust in 2008/2009], the industry was more fast-paced with property speculators, people from the US and Canada looking for property, and a more traditional resort type tourism. People would come here for a week, two weeks, a month, shopping for land to built a house. At this time, Pelican Eyes resort was employing around 400 people; now it is closer to 100… Since the bust, the tourism industry has transformed into more of a backpacker crowd who are not looking for nice restaurants and resort hotels, but cheap eateries and hostels… Where people before the bust would spend $90 or so day, the new crowd is more like $20 or less a day. (Kevin Marshall, The Del Sur News, Conversation)

While these comments suggest that tourism activity in the community has suffered since the beginning of the recent global economic crisis, the combination of tourism value chains such as those between Maria's husband and local restaurants, the city's designation and promotion as a tourism city/port at the local and national levels, and the existence of a market for backpacker and surfer traffic suggests that tourism may contribute to more than

28 percent of the economic activity and that the community would be negatively affected if this activity were disrupted by a natural or reputational disaster.

Social Capital - Community Involvement

The previous section briefly discussed community involvement networks. This section further examines them by looking at common types of community involvement and the distribution of these activities. The goal is to determine if social networks in general are focused within barrios or whether these networks are outwardly oriented, which would suggest interaction and collaboration between people throughout the community. Table 5 below shows the types of activities identified by the household surveys.

Table 5

Community Involvement by Activity Type

Activity Type	Number of Networks	Percentage of Networks
Sports Team or Club	72	22%
Agricultural Coop	8	2%
Fishing Coop	9	3%
Women's Group	6	2%
Community Develop. Group	5	2%
City or Barrio Council	38	11%
Political Party	17	5%
Dance or Art Group	2	1%
Local Church	135	41%
Church or Prayer Group	19	6%
Parents Group	17	5%
Public Health Group	5	2%
Total Networks	333	
Ave. Per Household	2.28	

As can be seen in Table 5, each household that participated in the survey was affiliated on average with just over 2 community groups. Church and religious groups

accounted for the largest portion of this activity (47 percent) while sports organizations accounted for another quarter. The popularity of community activities is not surprising given the long history of religiosity in the region and the popularity of baseball, a legacy of U.S. interventionism in the early 20th century. As for civic-oriented activities that might promote interaction between residents and the government, about 20 percent of the networks included activities such as political parties, city and barrio councils, and public health and development groups. Once again this participation is no surprise considering the recent socialist government of Nicaragua. Upon taking control after their overthrow of the Somoza Regime in 1979, the Sandinista Government promoted socialist policies, including the creation of citizen community action groups and agricultural and fishing coops at the local and national levels (Kinzer 2007). While the Sandinistas were voted out of office in 1991, they regained power in 2006. Although the policies of their second term in power are different from the 1980s, it is likely that the high level of community and government collaboration is a legacy and continuation of their revolutionary policies.

In terms of the distribution of these activities I generated weighted mean centers for all barrios based on the number of social connections they have with other barrios in the community (Figure 15). Next, I conducted a nearest neighbor analysis to determine if the weighted mean centers were clustered, which would signify that people tend to leave their home barrio to participate in activities and that the community's social networks are outwardly oriented. The nearest neighbor test resulted in a Z-score of -2.92, much lower than the -1.96 test statistic at a 95 percent confidence level, suggesting the distribution of the weighted mean centers is clustered. These results suggest that people participate in activities throughout the community rather than remaining in their own barrio. However,

before a conclusion can be made, the nature of the organizations in which people participate needs to be discussed.

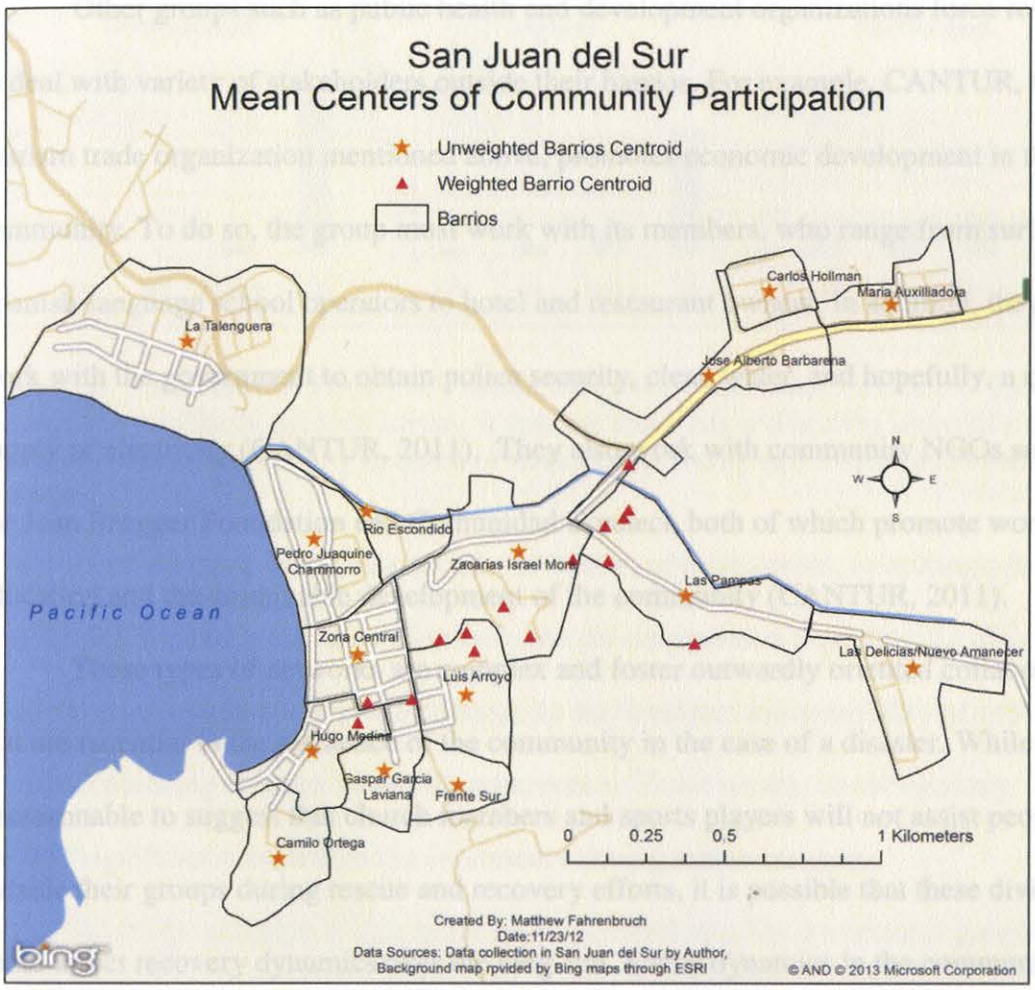

Figure 15. Mean Centers of Community Participation. Participation is community involvement activities is statistically distributed throughout the community as opposed to being concentrated in individual barrios.

In terms of general social capital theory, Robert Putnam (2000), identifies competitive groups, such as churches and other religious communities, sports teams, and political parties as essentially inwardly oriented organizations due to the exclusivity of their membership and the fact that members share many of the same general beliefs and objectives. These homogenous internal dynamics lead to a sense of competition with other

groups, i.e., our church members are more pious than yours, our team needs to beat your team, or our candidate's political views are better than yours.

Other groups such as public health and development organizations force residents to deal with variety of stakeholders outside their barrios. For example, CANTUR, the local tourism trade organization mentioned above, promotes economic development in the community. To do so, the group must work with its members, who range from surfing and Spanish-language school operators to hotel and restaurant owners. In addition, they need to work with the government to obtain police security, clean water, and hopefully, a constant supply of electricity (CANTUR, 2011). They also work with community NGOs such as the Jean Brugger Foundation and Comunidad Connect, both of which promote worker education and the sustainable development of the community (CANTUR, 2011).

These types of networks are complex and foster outwardly oriented collaborations that are essential to the resilience of the community in the case of a disaster. While it is unreasonable to suggest that church members and sports players will not assist people outside their groups during rescue and recovery efforts, it is possible that these divisions could affect recovery dynamics over the long-run. Social dynamics in the community will be discussed later, but at this point the findings suggest there are significant interactions and involvement among different barrios, but that the type of activities being engaged in might be more inwardly than outwardly oriented.

Social Capital - Confidence in People and Institutions

This section examines the social vulnerability of San Juan del Sur with regard to social capital. While social networks were discussed previously, this section approaches the topic from the standpoint of how much trust and confidence residents have in each

other and in formal institutions for assistance in disaster response and recovery. Figures 16 to 18 show the results of the Likert data collected in the household survey.

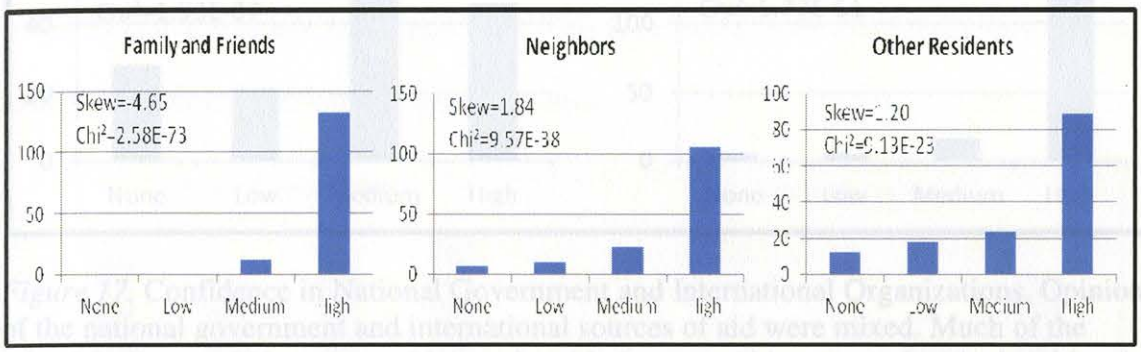

Figure 16. Confidence in Family & Friends, Neighbors, and Other Residents. Based on the responses to the household survey, it appears that there is a healthy sense of trust and confidence in the community in terms of respondents family and friends and even other residents.

Confidence in family and friends, as well as other residents, is strikingly high (Figure 16). This supports the results from the previous section regarding the distribution of social networks throughout the community and it refutes any possibility of community activities fostering division within the community. These results, on the contrary, suggest there is significant trust within the community among fellow residents.

A similar situation is seen in the trust and confidence in the national government and international aid sources (Figure 17). Confidence in the national government is not nearly as positive as the international sources, but is still skewed towards the positive end of the spectrum. There were few write-in comments that help to explain why residents felt as they did about the national government, but there was a great deal of discussion about foreign aid.

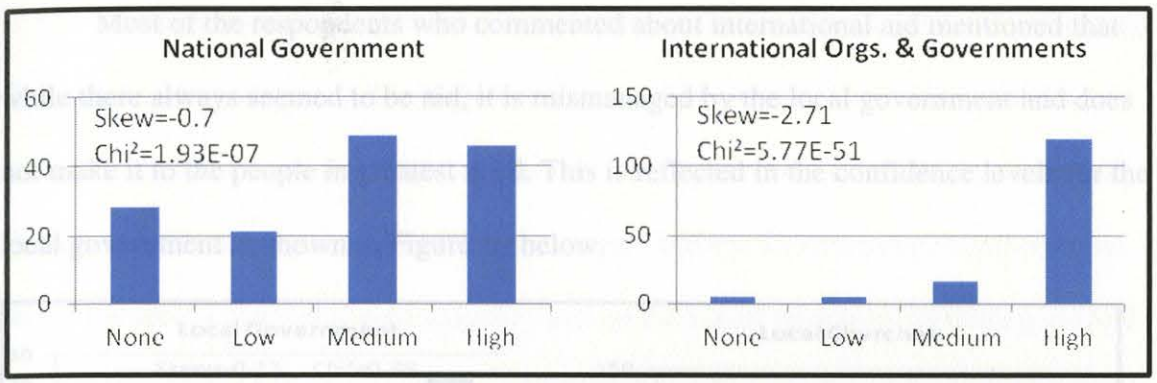

Figure 17. Confidence in National Government and International Organizations. Opinions of the national government and international sources of aid were mixed. Much of the mixed feeling could have something to do with the way aid is managed at the local level.

Most of the comments related to international NGOs that visit the community, and the visit of the USS Comfort, a US Navy hospital ship, in 2011 on a humanitarian mission (Figure 18). Several respondents mentioned that they or their family members received medical assistance from the Comfort and her crew. Many residents received medical assistance, including surgical procedures that would not have been available to them otherwise. Based on these comments, it is clear that the visit of the USS Comfort left a positive and lasting impression on local residents.

Figure 18. USS Comfort Docked in San Juan del Sur. Source: Community information sign in San Juan del Sur.

Most of the respondents who commented about international aid mentioned that while there always seemed to be aid, it is mismanaged by the local government and does not make it to the people in greatest need. This is reflected in the confidence levels for the local government as shown in Figure 19 below.

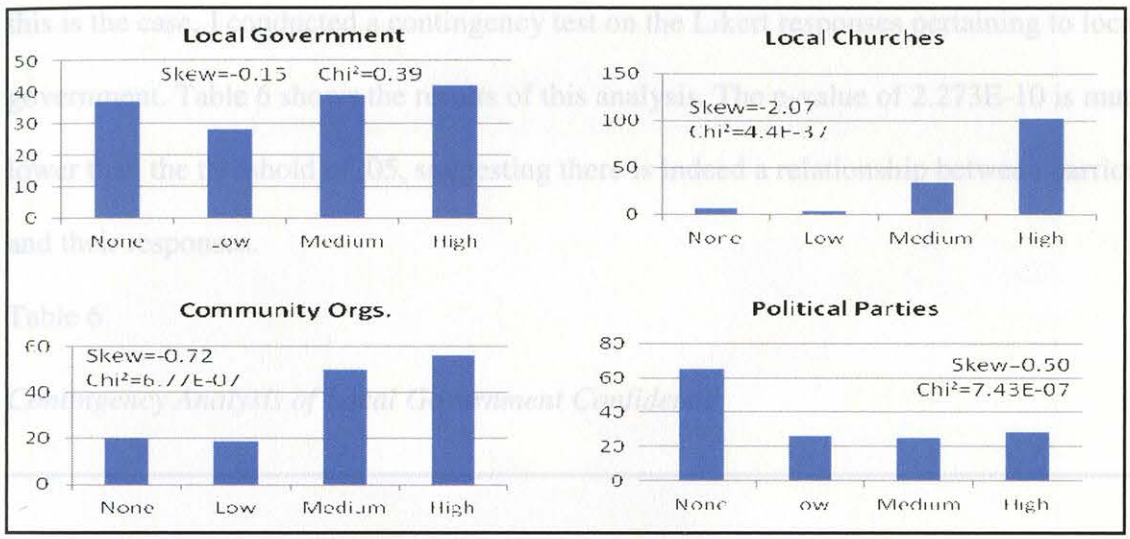

Figure 19. Confidence in Local Government and Community Organizations.

The results in Figure 19 show there are strong opinions about most institutions that work in the community. There is a high level of confidence in local churches, which is understandable given the popularity of religion in Latin America as a whole. Most of the respondents at least attend church services and many are active in their congregations. Respondents also have medium to high confidence in community organizations, although not as strongly as with churches. Confidence in political parties on the other hand were, skewed significantly to the lower end of the scale. Many comments were made in the household surveys that political parties make promises to get elected, then do little to keep their promises once in office. The only organization where there appears to be significant variation in confidence is the local government.

Local government is the main channel through which federal and international aid flows during an emergency. It is therefore important to understand whether confidence varies by barrio because this might indicate that the government treats barrios differently. Such a scenario might potentially hamper recovery efforts. To determine whether or not this is the case, I conducted a contingency test on the Likert responses pertaining to local government. Table 6 shows the results of this analysis. The p-value of 2.273E-10 is much lower than the threshold of .05, suggesting there is indeed a relationship between barrios and their responses.

Table 6

Contingency Analysis of Local Government Confidence

Barrio Name	Likert Responses (Expected)				
	1(Ex)	2(Ex)	3(Ex)	4(Ex)	Row Totals
Camilo Ortega	3(3)	3(2)	2(3)	2(3)	10
Carlos Hollman	8(3)	2(2)	1(3)	1(3)	12
Frente Sur	0(1)	3(1)	1(1)	1(1)	5
Gaspar Garcia Laviana	1(3)	3(2)	4(3)	3(3)	11
Hugo Medina	0(2)	1(1)	1(2)	4(2)	6
José Alberto Barberena	5(3)	0(2)	2(3)	3(3)	10
La Talanguera	2(3)	2(2)	4(3)	4(3)	12
Las Delicias/ Nuevo Amanecer	4(4)	3(3)	4(4)	3(4)	14
Las Pampas	1(1)	0(1)	2(1)	2(1)	5
Luis Arroyo	1(3)	2(2)	5(3)	3(3)	11
Maria Auxiliadora	2(3)	1(2)	3(3)	4(3)	10
Pedro Joaquin Chamorro	1(2)	2(2)	2(2)	4(3)	9
Rio Escondido/El Pantanal	2(1)	1(1)	0(1)	1(1)	4
Zacarias Israel Mora	5(2)	2(2)	2(2)	0(3)	9
Zona Central	2(5)	3(3)	6(5)	7(5)	18
Column Total	37	28	39	42	146

$Chi^2 = 47.87$ P-Value = 2.273E-10

The spatial distribution of this variation can be seen in Figure 20. In short, the amount of confidence barrios have in local government varies throughout the community. This suggests that cooperation between local government and residents might not always be smooth, which could hamper recovery efforts in some barrios.

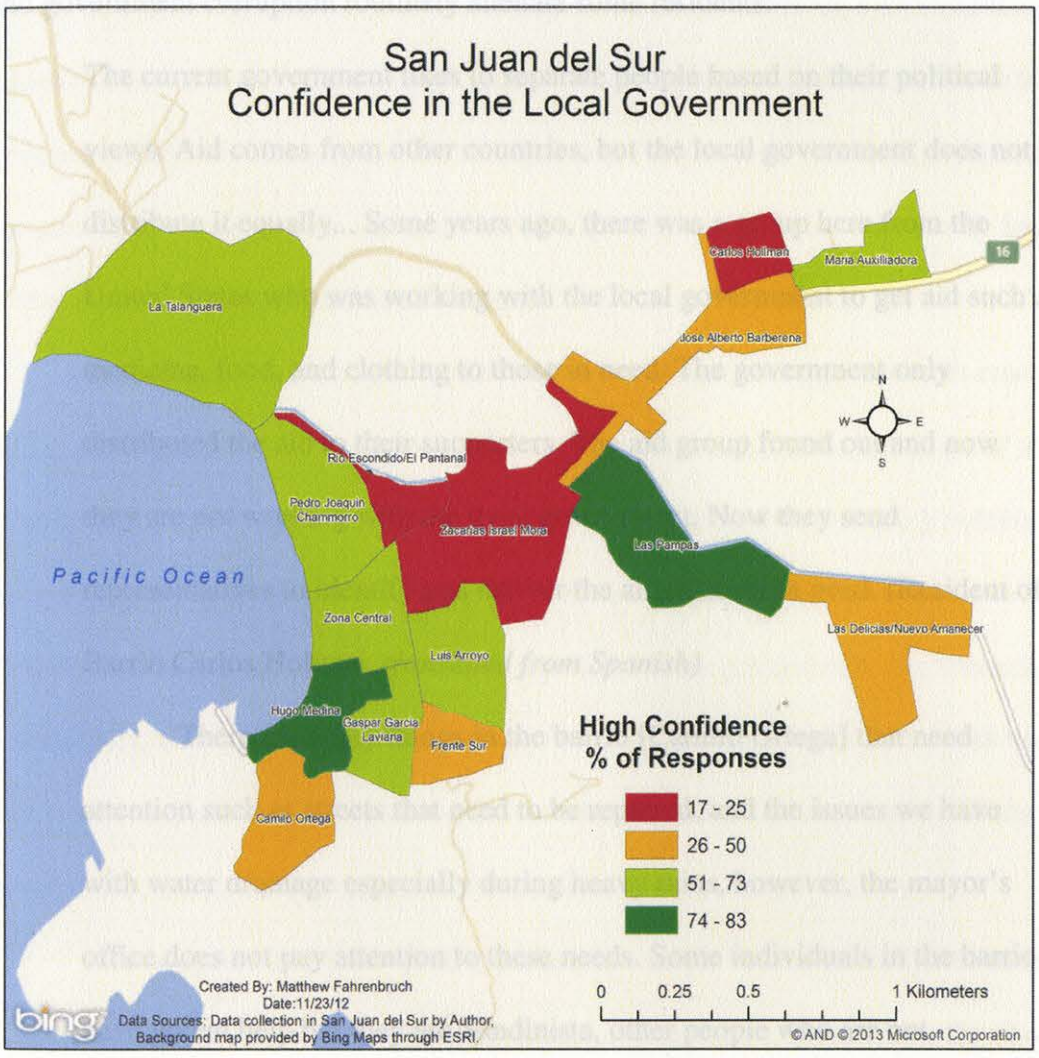

Figure 20. Confidence in Local Government Throughout the Community. The distribution of high confidence in the local government appears to be predominantly in the coastal barrios with lower confidence in the inland barrios.

The distribution of high confidence is primarily located along the coast - the main areas of tourism activity and the areas that will be affected most by a tsunami event. In the case of a tsunami, government concentration on the coastal barrios may be a good thing,

however if this attention results in neglect of inland barrios during non-emergency times, it could potentially alienate residents of those barrios who might prove to be less cooperative during emergencies and recovery as a result. Several write-in comments were made on household surveys that suggest this might be occurring and that partisan politics and government corruption routinely alienate some residents:

> The current government likes to separate people based on their political views. Aid comes from other countries, but the local government does not distribute it equally... Some years ago, there was a group here from the United States who was working with the local government to get aid such as medicine, food, and clothing to those in need. The government only distributed the aid to their supporters. The aid group found out and now they are not working with the local government. Now they send representatives to identify and deliver the aid to those in need. (Resident of Barrio Carlos Holman, *translated from Spanish)*

> There are many things in the barrio [Camilo Ortega] that need attention such as streets that need to be repaired, and the issues we have with water drainage especially during heavy rains, however, the mayor's office does not pay attention to these needs. Some individuals in the barrio have gotten help but they are Sandinista, other people who are not Sandinista have received nothing." (Resident of Barrio Camilo Ortego, *translated from Spanish)*

> There are some people here in my barrio [Maria Auxiliadora], they really need roof panels. They have holes and all that, and they wrote a letter to the Mayor. There was a project to give people roofing panels; panels

> coming from the President. They were supposed to give the panels to the poor people, but the guy who wrote the letter didn't get anything because he was not in the meeting, he's not Sandinista. (Resident of Barrio Maria Auxiliadora, Conversation)

The meeting mentioned in this last quote refers to BRIBAR-COBARPREDE, which are barrio-level citizen groups tasked with relaying needs of the barrio to the local government and distributing aid, including disaster relief, from the local government to the people. Unfortunately, as is eluded to in these quotes, these groups are heavily Sandinista, to the detriment of non-Sandinista residents.

Several other respondents made similar comments about government cronyism, unjust distribution of aid, and general government disinterest in the problems of the community. Some respondent justified their low confidence by presenting evidence of government mismanagement of existing improvement projects. For example, in Jose Alberto Barbarena, residents showed me where the local government dug a trench to install a sewer line, but then abandoned the project (Figure 21). The trench filled with water in the wet season and attracted mosquitoes. The residents tried to communicate with the government, but in the end filled the trench back up themselves.

As Nacagawa and Shaw (2004) point out, a major source of resilience in their study community was strong community/government collaboration. In this case, the above criticisms raise serious doubts as to the health of holistic (across party and class boundaries) community/government collaboration and suggest that in the event of a tsunami it remains in doubt whether the aid and recovery efforts would be equitably distributed. In addition, mismanaged and unfinished projects such as the sewer line have

no doubt affected resident confidence in local government and raise questions about its ability to manage rebuilding efforts following a disaster.

Figure 21. Unfinished Sewer Project in Jose Alberto Barbarena.

Community Support for Tourism Activity

This section seeks to explore the relationship between residents and the tourism industry. Residents were asked to respond, using a five-tier Likert scale, to four questions regarding the benefit of tourism to the community and their family, and their influence in and support of future tourism development (Figure 22). Respondents were also asked to

agree or disagree with several statements regarding general benefits and negative effects of tourism as identified by the tourism literature (e.g., Brohman 1996; Crouch and Richie 1999; Bascomb and Taylor 2008; Castellanos 2010; Logar 2010; Babb 2010). These questions and responses can be seen in Table 7.

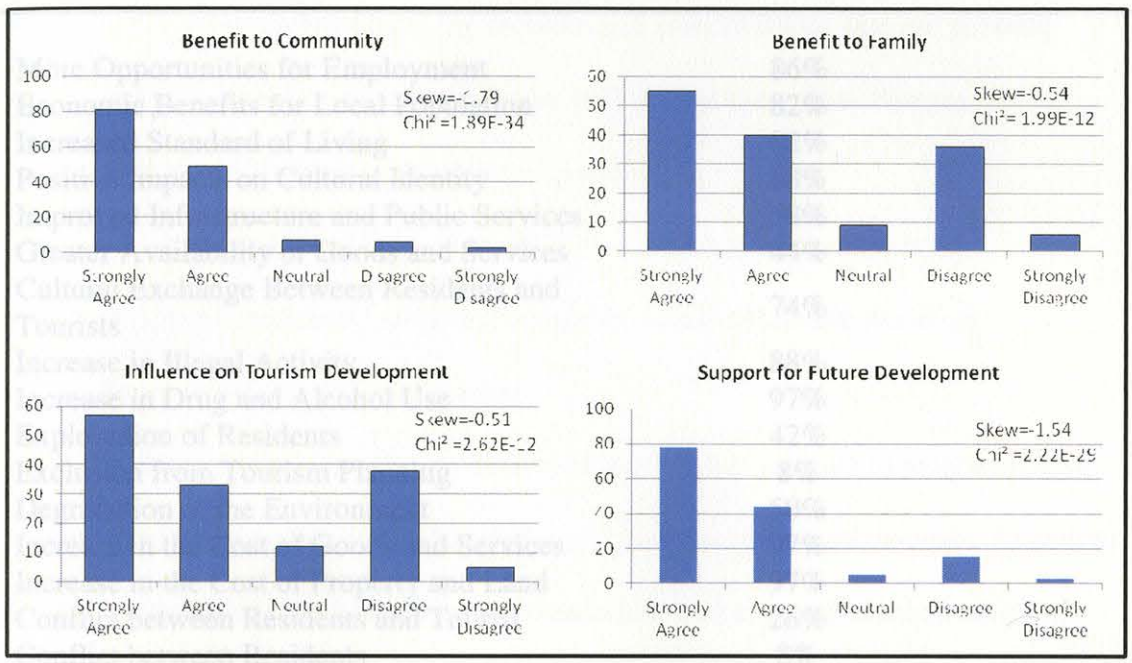

Figure 22. Respondent Attitudes Towards Tourism Activity. Overall, the Likert responses suggest that tourism enjoys widespread support in the community, however, not all aspects of it are considered sustainable or desirable, and not everybody's boat is rising with the tide.

As can be seen in Figure 22 attitudes towards tourism in the community are predominantly positive. The majority of respondents strongly agree that tourism benefits the community and should be supported in the future, however there is more division when it comes to direct family benefits and perceived influence on tourism development. While overall these results show support for tourism activity, they do not tell the whole story. While the industry produces benefits, it also causes upheaval in the community that could sway opinions against the industry in the future if not checked.

Table 7

Benefits and Negative Effects of Tourism in the Community

Benefits and Negative Effects of Tourism	Percent Agree
More Opportunities for Employment	86%
Economic Benefits for Local Population	82%
Increased Standard of Living	82%
Positive Impacts on Cultural Identity	88%
Improved Infrastructure and Public Services	58%
Greater Availability of Goods and Services	44%
Cultural Exchange Between Residents and Tourists	74%
Increase in Illegal Activity	88%
Increase in Drug and Alcohol Use	97%
Exploitation of Residents	42%
Exclusion from Tourism Planning	8%
Degradation of the Environment	50%
Increase in the Cost of Goods and Services	97%
Increase in the Cost of Property and Land	97%
Conflict between Residents and Tourist	26%
Conflict between Residents	8%
Exclusion of Residents from Areas of Recreation.	10%

As can be seen in Table 7, the vast majority of respondents agree that the industry has had positive economic and cultural impacts in San Juan del Sur. These results are also backed up by several write-in comments:

> Tourism has been a major benefit to the town because it has generated a lot of opportunities not just in jobs but in programs that help improve the community. These programs, in turn, promote cultural interaction between locals and foreigners. (Resident of Barrio Camilo Ortega, *translated from Spanish)*

> Foreigners have supported English classes for children and folkdance shows for the elderly…the local government does not seem to be interested in [promoting] these types of activities. (Resident of Barrio Camilo Ortega, *translated from Spanish)*

> I'm old, but I have my children and grandchildren who are growing and I think that tourism in the future will benefit them. (Las Pampas Resident, Survey, *translated from Spanish)*

> Tourism has been a benefit for the community because it has attracted investment from other countries. (Carlos Hollman Resident, Survey, *translated from Spanish)*

As these comments suggest, the rise of tourism has resulted in more economic opportunities and positive cultural exchanges between residents and tourists. Examples of these benefits include the Jean Brugger Foundation, which provides scholarships to promising young students so they can attend college and hosts monthly socials for the elderly residents (Brugger, 2010, 73-75; 110-112). Another organization is Comunidad Connect, a local sustainable development organization that organizes and manages several projects in the community including *voluntourism* which connects potential vacationers/volunteers with local families; a municipal recycling/sanitation program that works with the local government to keep the community clean and provide employment (Figures 23 and 24); and a sports program that sponsors local youth and adult sports teams and brings teams from abroad to compete against local teams (Figure 25).

Figure 23. Street Cleaner in San Juan del Sur. Thanks to the efforts of Comunidad Connect, the city is able to hire workers such as this man to keep the streets clean and free of litter.

Figure 24. San Juan del Sur Recycling Bins. In addition to street sweepers, the community has instituted a limited recycling program.

Figure 25. Volleyball Match Between Colorado and Nicaragua. Comunidad Connect helps recruit foreign teams to come to San Juan del Sur to engage in friendly scrimmages with local teams.

Despite these and other positive initiatives, leaders and residents are concerned about the direction of tourism development in the community and this is reflected by the negative responses to some of the statements in Table 7. Major areas of concern appear to be increases in illegal activity, drug and alcohol use, and rises in the prices of goods, services, and property. While interviewing Comunidad Connect Director Dariel Castro-Potoy and Sustainable Tourism Program Manager Mara Jocobsohn, they touched upon some of these issues while discussing the nature of tourism and its future prospects in the community.

> Tourism is definitely good for the community. It offers many opportunities for many families and for community development. However, the way that tourism is being developed now is not the best and needs to be improved....

San Juan del Sur has many natural resources, but there are not many types of tourism in the community. The majority of the activity revolves around surfing, fishing and bars. There is no variety… In my opinion, the people like tourism. However, due to tourism, the cost to live in San Juan de Sur is very high. The people who own the businesses, think that the local people have the same money as the people who come from another country, so the local people have to pay the same price as the [tourists]… For example, one plate of food in a restaurant in Rivas is 130-150 Cordobas; in San Juan del Sur the price is 180, 200, or 250 Cordobas…if there is not more of a focus on sustainable tourism, tourism will not function in the community. San Juan del Sur will become a mini-Cancun, a *gringolandia*; no community development or betterment, only tourism businesses; no support for the people in the community. It depends on the type of tourism. If we continue to grow tourism just as a place to come and drink and party, this is the type of tourism that has no future. (Dariel Castro-Potoy, Comunidad Connect, Conversation)

Prostitution is different here now. Prostitution used to be the place at the end of the street were the dudes went; they'd give you a towel and a condom and off you went. Now it's in the bars, and not just the super sneaky roncho [sic] bars, its everywhere. It's in foreign owned businesses and they're even more ok with it than locals… I don't know if alcohol use has increased. Now there are foreigners who will buy you drinks, but there were drunks before and there will be drunks after. The use of cocaine has definitely become a far more insidious beast in the last few years. When I

> came here weed was very, on the *down low* and the cocaine use existed, but it was minimal; mostly fisherman used it to keep themselves up at night. The whole trafficking [of drugs] has come with tourism. In addition, crack is here and a little bit of methamphetamine. (Mara Jocobsohn, Comunidad Connect, Conversation)

CANTUR President, Randall Granja-Fajardo offers additional comments with regard to uncontrolled development, environmental degradation, and the exclusion of local residents that tourism development has brought (Granja-Fajardo 2008).

> [The] mountains surrounding San Juan del Sur all have been devastated, altering completely and forever the magnificent sculptures chiseled by nature. Material taken from the mountains has been thrown into the sea. Without a doubt – in the future – due to erosion, our beautiful and lovely sand coast will become at stony beach… The face of the Indian; this unique natural rock formation that resembles the profile of a man and that symbolizes and characterizes our destination, has been tarnished to the point that there is now a house built in the area that we can point to as the neck. Surely if they could build a house on the nose of the Indian, today we would have lost one of our most representative geological formations… [In Las Peñas Beach] many will remember that this site used to be the ultimate family outing on Sunday to enjoy the beach. Currently they are building a resort unfriendly to the environment. We must reflect, appreciate and contemplate the possibility that when this complex is running, we may not have the same freedom we have today to access Las Peñas, the site where

many prefer to go fishing or just to walk on the rocks. (Granja-Fajardo 2008, *Translated from Spanish*)

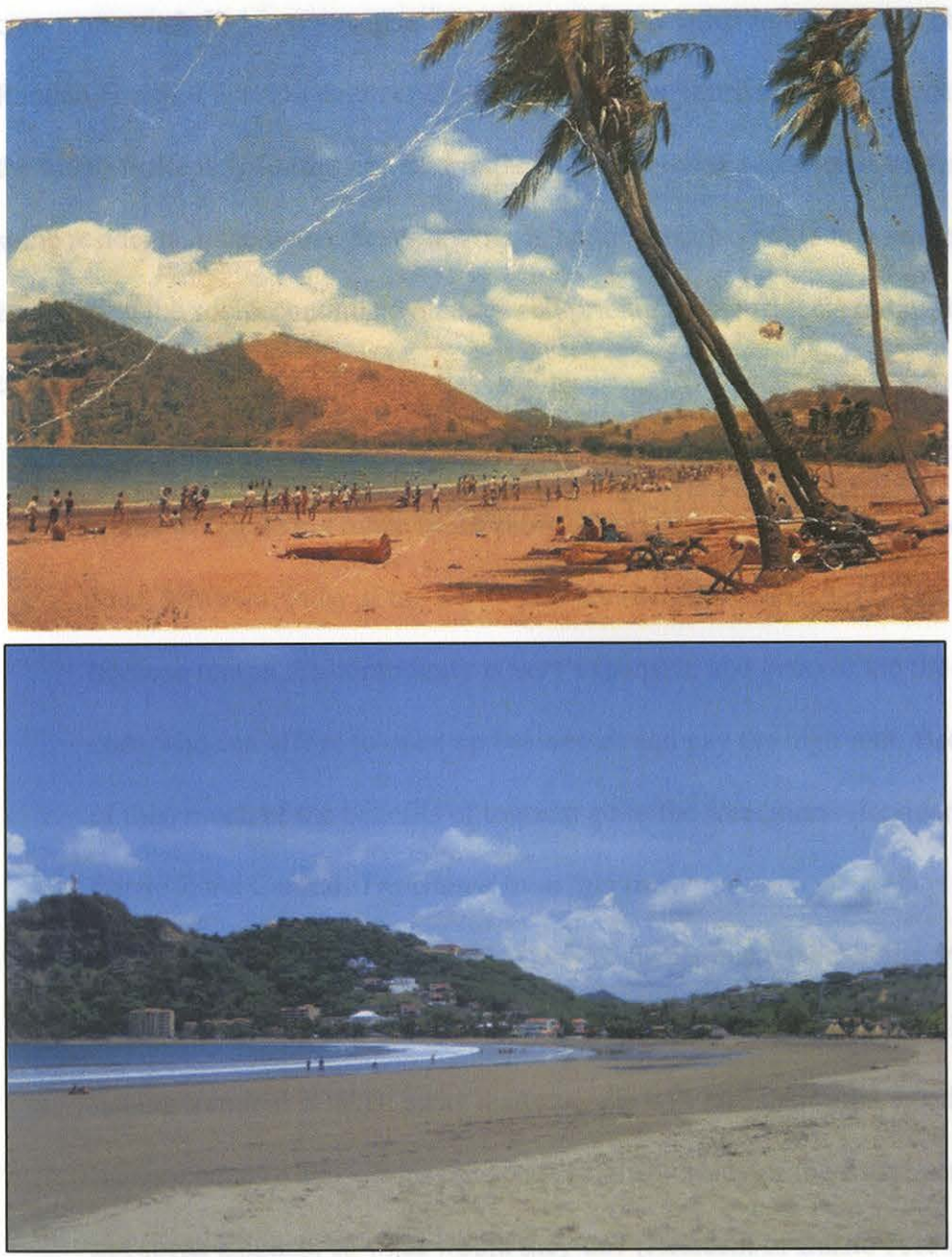

Figure 26. Developments in the Surrounding Mountains 1964 and 2012. These before and after photos show the level of development in the surrounding mountains that Randall Granja-Fajardo spoke about in the previous quote. Source: www.eltimonsanjuandelsur.com (top) and Author (bottom).

These statements echo observations made in the existing literature about San Juan del Sur (e.g., Walsh 2000; Babb 2010; Wood and Berman 2010, 136;138), and the write-in comments made by survey respondents. In addition to price inflation and substance abuse, Randall Granja-Fajardo's comments relate a sense that tourism development is paving over the old to make way for the new and in the process leaving some local values and even some residents in the wake. Several write-in comments also relate to a new economy that is changing the socioeconomic dynamics and pricing local residents out of their own community.

> Most of the businesses in town that are owned by Nicaraguans are grocery stores which do not make much profit. Tourism is growing every day in San Juan, however, most of the businesses are owned by foreigners. This is because rent in the community is very expensive and *gringos* are the only ones who can afford to open up businesses and pay the high rent. Because of this, much of the benefits of tourism go to the foreigners. (Resident of Barrio Zona Central, *Translated from Spanish*)

> Tourism here is seasonal. Many residents make their living from fishing but the government wants to make the port only for tourism. If the fishing terminal is taken away many people will lose their jobs. In addition, tourism benefits those who can speak English. Many of the fishermen do not speak English, so what would they do? (Resident of Barrio Jose Alberto Barbarena *Translated from Spanish*)

> The standard of living is worse now because things are so expensive and tourism jobs pay poorly. Some hotels only employ foreigners so they do not have to pay locals. These businesses are not here to benefit San Juan,

but only to enrich themselves. (Resident of Barrio Las Delicias, Survey, *Translated from Spanish*)

Nunkoo and Ramkissoon (2011) found that residents will support tourism if they view it as a benefit to their community and family. While the above comments suggest that for some this is not the case, Likert responses suggest these views have not gained enough support to turn the residents against the industry. However, if the community does not heed the advice of leaders such as Dariel Castro-Potoy of Comunidad Connect and Randall Granja-Fajardo of CANTUR and address the concerns of residents, it is plausible that San Juan del Sur might see the growth of the same type of resentment that was encountered by George (2008) that could potentially affect the community's overall resilience.

Community and Tourism Industry Preparation

This section attempts to assess the level of preparation in the community as it relates to a tsunami hazard. As Dibben and Chester (1999), Calgaro and Lloyd (2008), and Ichinosawa (2006) found in their study communities, preparation is a strong indicator of community resilience. This section approaches preparation from three angles. The first is the measurement of family and friend networks that exist between coastal barrios that will be most affected by a tsunami and the inland barrios that might serve as refuges for displaced residents and staging grounds for recovery efforts. Second, vulnerable infrastructure points (logistical bottlenecks) are identified that could impact the flow of evacuees out of and the flow of relief supplies into the coastal barrios. Third, the results of interviews with the community's emergency management officer (SINAPRED), Tourism officer (INTUR), and President of CANTUR Randall Granja-Fajardo are discussed in terms of emergency management and recovery preparation.

Table 8 shows the results of the join-count statistical analysis used to measure the family and friend connections between coastal and inland barrios. As can be seen, the resulting Z-score is -5.06, much lower than the 1.96 test statistic. This suggests that family and friend networks are weak between the coastal and inland barrios, and furthermore, that these networks are significantly clustered. If a tsunami were to occur, the displaced people from the coastal barrios may not have inland social networks from which to draw upon for refuge.

Table 8

Results of Join-Count Statistical Analysis

Barrio & Type	Similar Connections	Different Connections	Links	Joins
Coastal				
Gaspar Garcia Laviana	22	24	46	12
Hugo Medina	12	10	22	11
Luis Arroyo	30	28	58	29
La Talenguera	20	12	32	16
Pedro Juaquine Chammorro	16	24	40	20
Rio Escondido	8	4	12	6
Zona Central	50	42	92	46
Inland				
Camilo Ortega	36	12	48	24
Frente Sur	12	6	18	9
Jose Alberto Barbarena	36	2	38	19
Las Pampas	24	8	32	16
Maria Auxilliadora	32	10	42	21
Zacharias Israel Mora	20	4	24	12
Carlos Hollman	44	4	48	24
Las Delicias/Nuevo Amanecer	48	12	60	30

Table 8 (continued)

Barrio & Type	Similar Connections	Different Connections	Links	Joins
Inland-Inland			252	126
Coastal-Coastal			158	79
Inland-Coastal			202	101
Expected Inland-Coastal				152
Standard Error				10.17
Z-Score = -5.06				

In addition, several logistical 'bottlenecks' could potentially affect the networks that do exist. These bottlenecks are illustrated in Figure 27 and the supplemental photos in Figures 28-30.

Figure 27. Potential Logistical Bottlenecks. Despite strong connections between the coastal and inland barrios, there are several logistical bottlenecks that may impede the physical evacuation of coastal residents and the delivery of relief supplies.

In terms of the coastal barrios centered around Zona Central, there are two potential bottlenecks that would affect travel to and from inland locations. First, there is only one main road into these lower barrios (Figures 27A and 28). This road is paved and in good condition, however, due to debris and general evacuation traffic it might become clogged,

especially if the event occurred during high season when population levels in and around Zona Central are substantially higher than other times of the year (Wood and Berman 2010, 137). This road is connected to several inland barrios and the departmental and national capitals by a bridge over the Rio San Juan del Sur (Figure 27B). The bridge is made of steel and concrete, but it is possible that a tsunamis wave rushing up the river channel might damage or clog it with debris, hampering river crossings, especially if the event were to occur in the wet season (May-October) when river levels are already high.

There are two bottlenecks that might affect the coastal barrio of La Talenguera. First, La Talenguera is separated from the main community by the Rio San Juan del Sur. It is connected to the other coastal barrios by a footbridge (Figures 26C and 29) and to the inland barrios and highway by a paved road that runs inland through the countryside (Figure 27D and 30). In the event of a tsunami, the footbridge likely would be heavily damaged, and if the wave were high enough, damage might extend to the main road connecting La Talenguera to the other barrios.

While it is possible to travel along the beach during the dry season without the use of the footbridge, loss of the bridge for a long period of time could disrupt foot traffic between the coastal barrios, affecting the movement of workers from La Talenguera into Zona Central and tourists from the main bus stop in Zona Central into the few tourism businesses in La Talenguera. More serious however, would be the loss of the main road connecting the barrio to the highway which could impede the evacuation of residents and the flow of recovery aid into the area; similar to what might happen in Zona Central.

Figure 28. Main Road into Zona Central. The coastal barrios around Zona Cental are surrounded by coastal mountains to the east and south, Rio San Juan del Sur to the north, and the Pacific Ocean to the west. Access to this area is limited to a single two-lane road. (Photo courtesy of Google Earth and the contributor 'luissamundio')

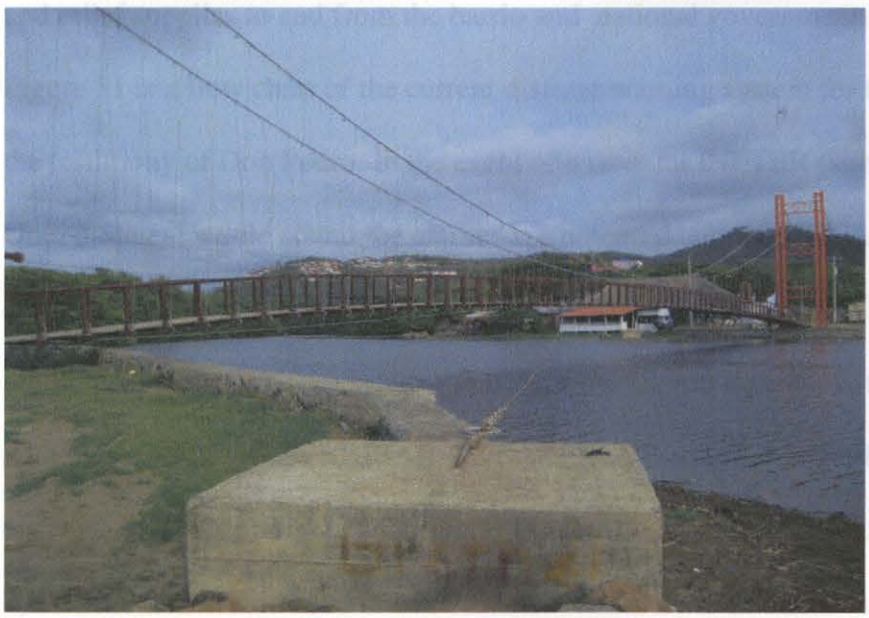

Figure 29. Footbridge Between Zona Central and La Talenguera.

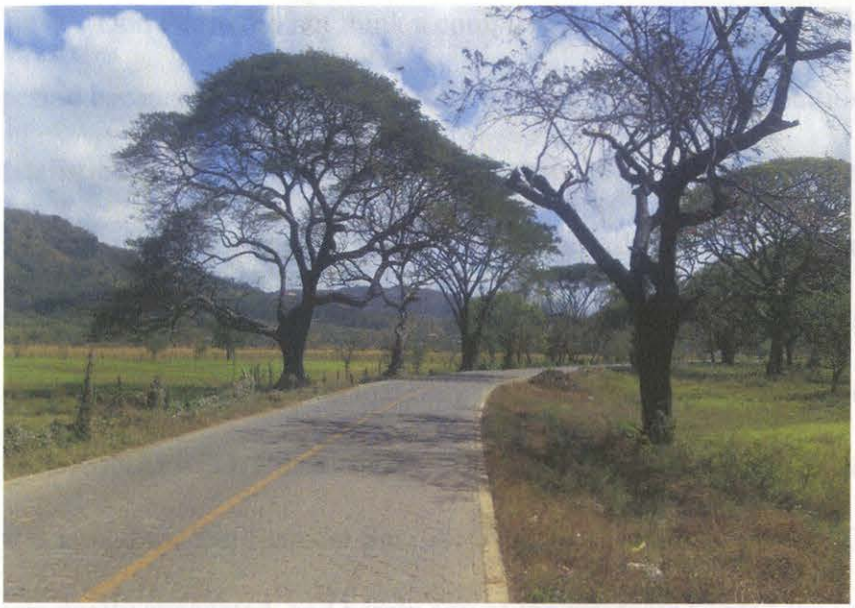

Figure 30. The La Talenguera Road.

The assessment of community preparation is based on two interviews with the SINAPRED officer for the community, Don Pedro Solic, during which he explained the emergency warning system in Nicaragua and the community, and the flow of information and relief supplies to and from the barrio and national government levels during a crisis. Figure 31 is a flow chart of the current disaster warning system for the country based on the testimony of Don Pedro. In the event of a tsunami INETER (similar to the USGS in the United States) would sound the alarm for a potential tsunami. SINAPRED, would communicate this to the municipalities. Within each municipality, COMUPRED, the municipal emergency response committee, would come together at the city hall, and work with barrio-level groups BRIBAR-COBARPREDE and Municipal Brigades (BRIMUR) to evacuate low-lying areas. According to Don Pedro, in San Juan del Sur approximately 2,500 residents would need to be evacuated within 20 to 25 minutes depending on the source area of the tsunami. In the tourist season, this population could be as high as 13,000 (Pedro Solic, SINAPRED, Conversation)

Don Pedro did not think a complete evacuation was realistic during either time period because the warning system was much too slow. In addition, he described the fatalistic attitudes of many in the community about a tsunamis. In the household survey 145 out of 146 respondents were aware of the risk of tsunami, but nonetheless Don Pedro said people have called him crazy for saying that there could be a tsunami and people have made the comments to him that only God knows when there will be a tsunami (Pedro Solic, SINAPRED, Conversation). During the 2011 Japanese Tsunami, an evacuation alert was issued for San Juan del Sur. According to Don Pedro about 80 percent of the tourists reluctantly evacuated, and barely any of the residents heeded the warning. In this case, no tsunami hit which unfortunately may have only reinforced resident denial. If this were a local tsunami similar to the 1992 event, the wave would have hit within an hour. It is arguable as to whether the warning would have made it into the community in time to evacuate, but evacuation plans are of little use if the population is unwilling to evacuate.

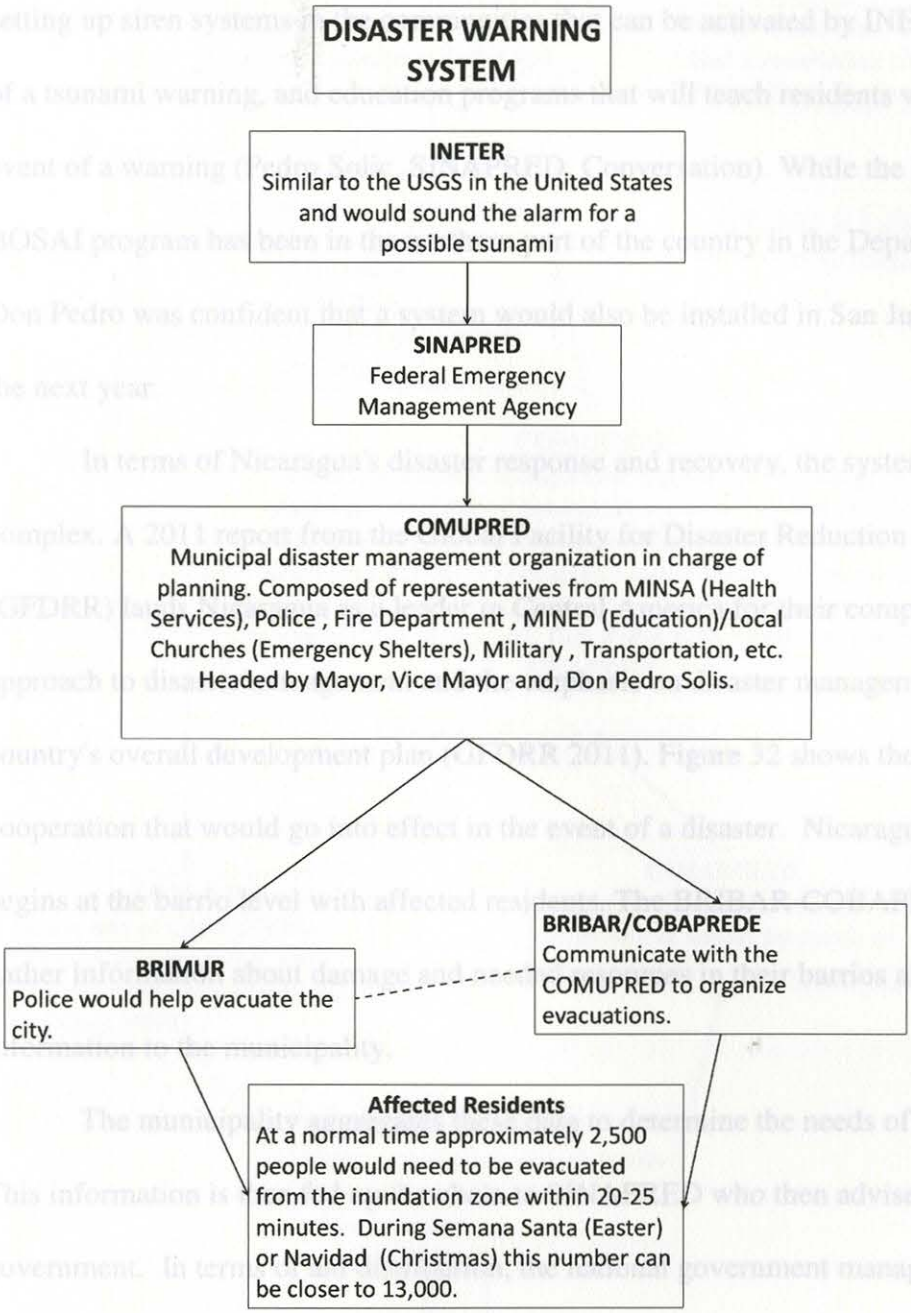

Figure 31. Flowchart of the Emergency Warning System.

In terms of increasing the speed of warning, Nicaragua is currently working with the Japanese International Cooperation Agency (JICA) on the *BOSAI* project, whose purpose is to build emergency management capacity in Central America (Pedro Solic, SINAPRED, Conversation). One goal of the project is to increase the speed in which tsunami warnings reach the municipalities and evacuation occurs. These measures include

setting up siren systems in the communities that can be activated by INETER in the event of a tsunami warning, and education programs that will teach residents what to do in the event of a warning (Pedro Solic, SINAPRED, Conversation). While the focus of the BOSAI program has been in the northern part of the country in the Department of Leon, Don Pedro was confident that a system would also be installed in San Juan del Sur within the next year.

In terms of Nicaragua's disaster response and recovery, the system is much more complex. A 2011 report from the Global Facility for Disaster Reduction and Recovery (GFDRR) lauds Nicaragua as a leader in Central America for their comprehensive approach to disaster management and the emphasis on disaster management as a part of the country's overall development plan (GFDRR 2011). Figure 32 shows the framework of cooperation that would go into effect in the event of a disaster. Nicaragua's disaster plan begins at the barrio level with affected residents. The BRIBAR-COBAPREDE groups gather information about damage and needed resources in their barrios and provide this information to the municipality.

The municipality aggregates these data to determine the needs of the municipality. This information is then fed up the chain to SINAPRED who then advises the national government. In terms of aid distribution, the national government manages internal resources and aid received from abroad and approves the distribution of these resources. Within SINAPRED, a specialized committee, ENABAS, coordinates the distribution of aid to the municipalities via the Municipal Brigades (BRIMURs) and to the affected residents either through the BRIMURs or via the BRIBAR/COBAPREDE groups.

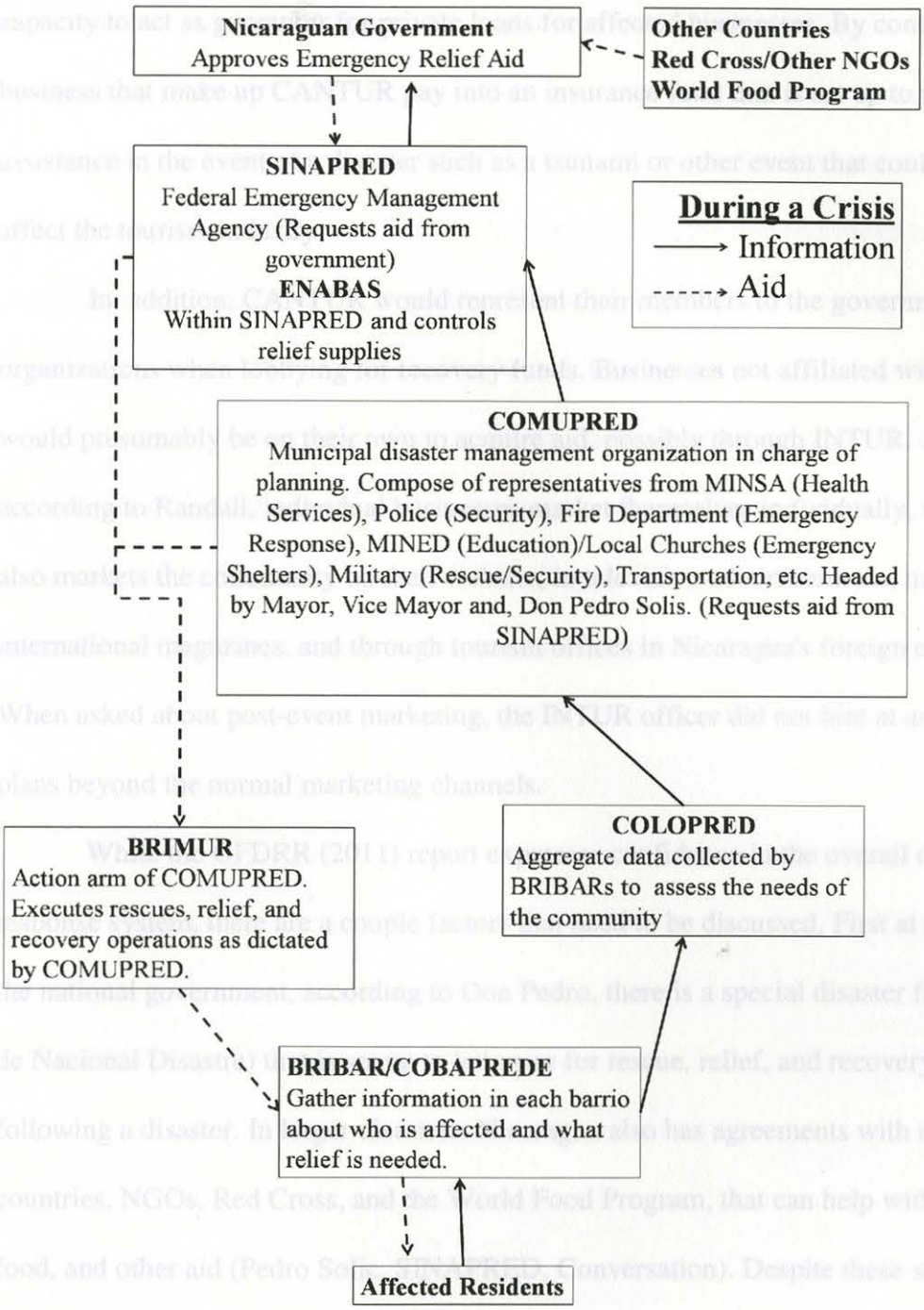

Figure 32. Flowchart of the Emergency Response and Recovery System.

In terms of tourism, interviews with the community's INTUR officer and Randall Granja-Fajardo of CANTUR shed little light on industry-specific preparations. The INTUR officer explained that in the event of a disaster he would represent the local industry as a part of SINAPRED when lobbying for recovery funds. In addition, INTUR would have the

capacity to act as guarantor for private loans for affected businesses. By contrast, the 42 business that make up CANTUR pay into an insurance fund that is set up to provide assistance in the event of a disaster such as a tsunami or other event that could adversely affect the tourism industry.

In addition, CANTUR would represent their members to the government and other organizations when lobbying for recovery funds. Businesses not affiliated with CANTUR would presumably be on their own to acquire aid, possibly through INTUR. Additionally, according to Randall, individual businesses market themselves individually, while INTUR also markets the community on their website, in television advertisements, national and international magazines, and through tourism offices in Nicaragua's foreign embassies. When asked about post-event marketing, the INTUR officer did not hint at any special plans beyond the normal marketing channels.

While the GFDRR (2011) report expresses confidence in the overall disaster response system, there are a couple factors that need to be discussed. First at the level of the national government, according to Don Pedro, there is a special disaster fund (Fondo de Nacional Disastre) that is set up to help pay for rescue, relief, and recovery efforts following a disaster. In larger disasters, Nicaragua also has agreements with other countries, NGOs, Red Cross, and the World Food Program, that can help with clothing, food, and other aid (Pedro Solic, SINAPRED, Conversation). Despite these sources, the GFDRR report states that a major shortcoming in the disaster management plan is a developed financial strategy. While the focus of this thesis is local vulnerability, as the GFDRR report points out, local municipalities will likely be overwhelmed by the financial burden of a disaster and will need to turn to the national government. If there is weakness

in the national government's plans, these will be passed along, resulting in reduced resilience at the local level.

While national-level corruption is beyond the scope of this project, it is a critical factor that needs to be discussed locally because both corruption and mismanagement were identified by several survey respondents. While the above disaster management framework is lauded internationally, if party politics dictate who receives aid during non-crisis times, what will happen in the event of a disaster? For this plan to work, it must get aid to those in need in a timely fashion regardless of social status or political affiliation. Regardless, if the issue is at the top with funding or at the bottom with cronyism, if those in need do not get the resources it will result in reduced resilience in the community.

CHAPTER VI

CONCLUSIONS

This thesis has attempted not only to assess the vulnerability of San Juan del Sur, Nicaragua but also to demonstrate a methodology that can be used to assess the vulnerability of similar communities throughout the world. To do so, this thesis has used the Sustainability Vulnerability Framework (Turner et al. 2003), a model that seeks to assess vulnerability based on exposure, sensitivity, and resilience. Though this project falls short of a true multi-scale comprehensive vulnerability analysis as modeled by the SVF, it has nonetheless identified several factors that might potentially influence San Juan del Sur's vulnerability to a future tsunami event. These factors, discussed in depth in the previous chapter, are aggregated and displayed below in Figure 33.

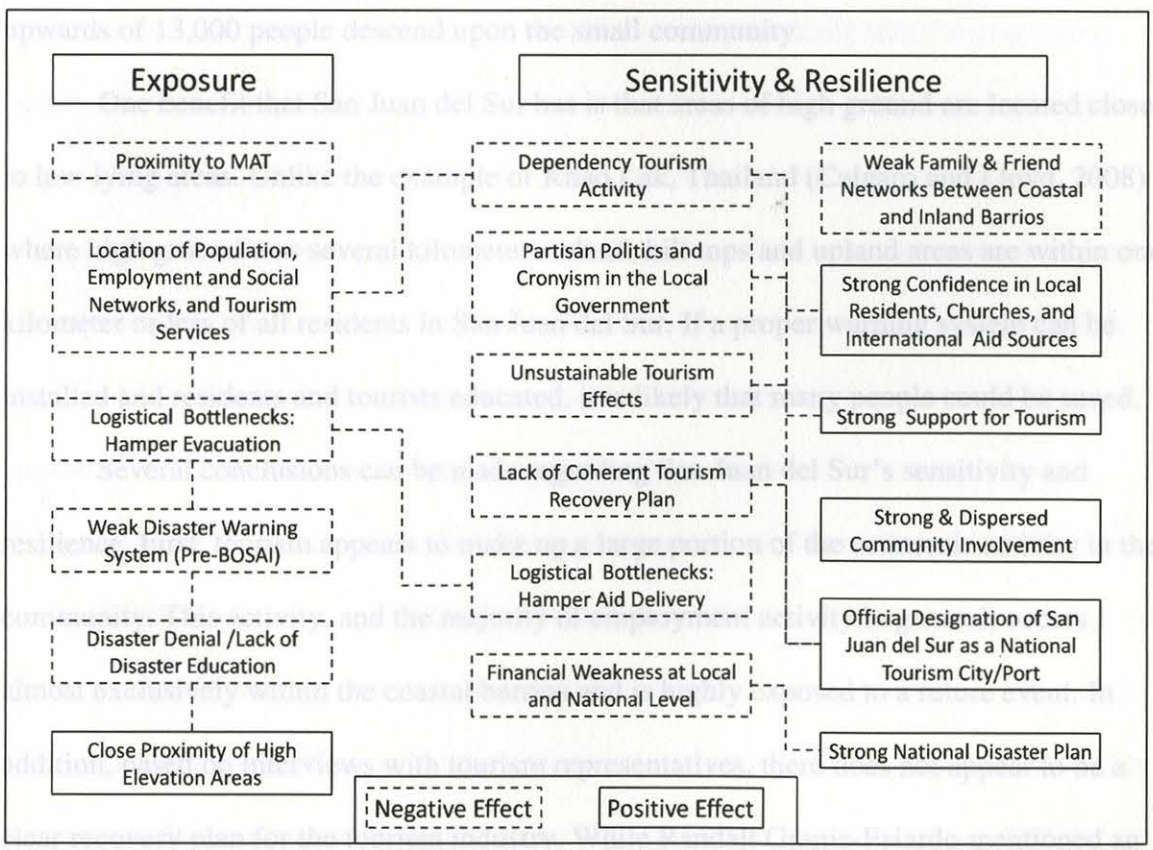

Figure 33. Factors of Vulnerability in San Juan del Sur.

In terms of Research Question 1, it does appear that San Juan del Sur is at risk of a future tsunami event and is highly exposed to the effects of a tsunami. First, while large events such as the 1992 Nicaraguan Tsunami are rare in the area, based on the data from the last 111 years, it is almost certain that the community will experience a similar event in the future based on its proximity to the MAT subduction zone. Second, a large section of the population resides in low-lying barrios that most likely will be inundated. The weak disaster warning system, as of the writing of this thesis, means that San Juan del Sur might very likely be caught off guard by a nearby tsunami. Even in the event that the community has sufficient warning, an attitude of denial among the population combined with logistical bottlenecks will likely slow evacuation and leave many within the path of the wave. Evacuations could be further hampered if the event occurs during the high season when upwards of 13,000 people descend upon the small community.

One benefit that San Juan del Sur has is that areas of high ground are located close to low-lying areas. Unlike the example of Khao Lak, Thailand (Calgaro and Lloyd, 2008) where high ground was several kilometers inland, hill tops and upland areas are within one kilometer or less of all residents in San Juan del Sur. If a proper warning system can be installed and residents and tourists educated, it is likely that many people could be saved.

Several conclusions can be made regarding San Juan del Sur's sensitivity and resilience. First, tourism appears to make up a large portion of the economic activity in the community. This activity, and the majority of employment activity in general, occurs almost exclusively within the coastal barrios and is highly exposed to a future event. In addition, based on interviews with tourism representatives, there does not appear to be a clear recovery plan for the tourism industry. While Randall Granja-Fajardo mentioned an insurance fund for the 42 members of CANTUR, this organization only represents about

half of tourism businesses and it is unclear what the strategy would be for non-members. On the other hand, San Juan del Sur is in the spotlight of the national government in terms of tourism development. The community has been formally declared a national tourism port and it is not likely the government will abandon one of its main tourism destinations. Despite this, the answer to Research Question 2 is that the important role tourism plays in San Juan del Sur's economy increases the sensitivity of the community to tsunami events.

As for Research Question 3, which deals with community resilience, the results are not as clear. Support for tourism activity for the time being, appears strong. It seems less likely that rebuilding efforts will meet any meaningful protest on the part of residents as was observed by George (2008). Positive benefits of tourism, including employment opportunities and positive cultural exchanges, all contribute to the positive feelings held by local residents. However, several issues exist that could potentially turn the population against tourism if they are not resolved. First, the inflation rate is outpacing any increase in wages and is pricing local residents and entrepreneurs out of their own community. In addition, the rise of substance abuse and other illegal activities are making some residents question tourism development. These were the same types of issues that George (2008) found in his Indian tourism community and which ultimately led to reduced resilience. It appears that a similar potential might exist in San Juan del Sur.

In terms of the community's social capital, community involvement appears to be strong. While the types of activities that households tend to be affiliated are somewhat exclusionary of outside groups, the dispersed distribution of participation and high levels of confidence between residents suggest social networks are more outward than inward in orientation. This suggests that, similar to the findings of Nakagawa and Shaw (2004), community members may be more willing to come together to rebuild their community. In

addition, despite weak connections between the coastal and inland barrios, high confidence in local church and community organizations, a strong national recovery plan, and a track record of international support, suggests community members will not be on their own during recovery.

On the other hand, several issues might act against community resilience. First, in the short term, logistical bottlenecks such as the washing out of the La Talenguera road and the Rio San Juan del Sur bridge, and a debris littered road into Zona Central will likely hamper the delivery of recovery aid. Financial weakness at the local and national levels may also slow and reduce the amount of aid that enters the community. While the community is a premier national tourism destination, the 1992 tsunami affected areas from eastern El Salvador through northern Costa Rica; San Juan del Sur will not be the only community calling for aid and there may not be enough to go around, at least initially.

The most serious challenge to community resilience revealed by this investigation is allegations of corruption and cronyism in the local government. As was discussed in the last chapter, the local government is the linchpin that connects the affected residents to resources at the national and international levels. In the event of a tsunami, San Juan del Sur will not be the only community affected. It is likely that aid organizations will not be able to monitor aid distribution in every community, but will rather have to rely on the municipal and barrio-level governments. If the statements made by some respondents are true and these groups cannot judiciously distribute aid in non-crisis times without reference to social and political affiliation, how will they distribute aid when half the community has been washed out to sea?

Aid-for-patronage governance is an inheritance from the post-colonial *hacienda* systems, and it is foolish to think that this type of political system will change overnight.

However, as Steven Kinzer points out in his book, *Blood of Brothers: Life and war in Nicaragua,* hopes were high following the Sandinista Revolution, that Nicaragua could shed these antiquated social system. Land tenure was reformed and human rights were championed. However, in San Juan del Sur it appears that in terms of governance, these ideals have fallen short. With the arrival of tourism and a growing expatriate population, the community has a new opportunity to enact change. Tourism has encouraged the development of new recycling and sanitation systems and new recreation and cultural programs. It is possible this cultural shift could also influence governance as foreigners who did not grow up under a patronage system begin to stake their claim in the community. The key question is can this cultural shift occur without alienating the local population? Can it be done in a way that reduces the vulnerability of the community?

Overall, San Juan del Sur is exposed to tsunamis and other coastal hazards, and given the type of sand, sea, surf tourism it promotes, this is unlikely to change. Instead of physically protecting the community, focus should be on increasing the capability of the warning system and educating residents on evacuation procedures to minimize loss of life. Due to the decline of the shipping and fishing industries and the community's status as national tourism destination, it is likely that the community's dependence on tourism activity will only increase. While some form of economic diversification may occur in the future, the community should concentrate on enhancing its resilience to offset its sensitivity. Local residents generally have a positive attitude towards tourism, but effort needs to be made to make sure such support continues. The national government has a strong emergency response program, but there needs to be more clarity as to where the tourism industry fits within this plan, and local governmental and cultural reforms are needed to make sure that resources get those who need them.

Tourism is a relatively new phenomena in a country that has been ravaged by war and internal violence for much of the last century. San Juan del Sur is by no means unique in dealing with these issues and thus might be a model for other communities of the developing world that are experimenting with tourism. From Kao Lak, Thailand to Grand-Baie, Mauritius, and from an Indian resort destination to an Gambian eco-village, nearly 1 billion people a year flock to destinations around the world, and increasingly, in the developing world. Just like San Juan del Sur, many of these destinations are exposed to natural and human disasters, as well as the socioeconomic impacts arising from the influx of money and foreign cultures.

Despite the increasing popularity of such destinations, little work is being done to analyze the specific contexts of their vulnerability. In light of recent disasters like the 2004 Indonesian Earthquake and Tsunami, the 2010 Haitian Earthquake, and the 2011 Japanese Earthquake and Tsunami, the results of this thesis provide a timely contribution to a much needed area of academic and applied knowledge. By providing information on the potential vulnerability of the community of San Juan del Sur, including data on social capital and host support of the tourism industry, this study serves to operationalize the SVF model in a way that anticipates future disasters and provided information to communities in time initiate mitigation measures.

Beyond San Juan del Sur, this research is applicable to tourism developers and governmental and non-governmental personnel around the world who are interested in promoting tourism as a strategy of economic development. It is in the best interest of the developers' *bottom line* to have a well rounded view of the vulnerability of both their developments and the host communities in which they exist. In the event of disaster a cooperative local population can be a valuable asset. As such, this methodology can be

used by tourism operators to assess their impact in the community and mitigate any *bad blood* between the industry and the community before disaster strikes.

Governmental and non-governmental personnel can also use this methodology to help create tourism strategies that take into account both the physical and socioeconomic contexts unique to their communities. While tourism developers may have deep pockets, many host communities do not. This study was conducted over the course of six weeks and consisted largely of talking to people in the community. Unlike models such as the Hazard of Place which rely on aggregated data that may be costly, unreliable, or simply nonexistent in the developing world, the method demonstrated here consists of engaging the local population, showing interest in their comments and opinions, and then nesting them within the context of a community-level vulnerability study.

If a Masters student working through a translator on a very limited budget over a period of six weeks can accomplish the research upon which this thesis is based, a local community planner or NGO worker should have no problem implementing this method with little cost and even better results.

Although tourism is not always the savior it has been lauded to be, it does not have to lead to cultural alienation and vulnerability. It is my hope that this thesis has revealed factors of vulnerability in San Juan del Sur that can assist in future disaster planning and that these lessons can be used in similar communities around the world. At least, this approach might help save time and expense for government agencies, tourism operators, and individual citizens, and create a more sustainable relationship between the tourism industry and host communities. Such outcomes would go a long way towards mitigating the vulnerability of such communities before disaster strikes.

APPENDIX

INSTUTUTIONAL REVIEW BOARD APPROVAL

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NOTICE OF COMMITTEE ACTION

The project has been reviewed by The University of Southern Mississippi Institutional Review Board in accordance with Federal Drug Administration regulations (21 CFR 26, 111), Department of Health and Human Services (45 CFR Part 46), and university guidelines to ensure adherence to the following criteria:

- The risks to subjects are minimized.
- The risks to subjects are reasonable in relation to the anticipated benefits.
- The selection of subjects is equitable.
- Informed consent is adequate and appropriately documented.
- Where appropriate, the research plan makes adequate provisions for monitoring the data collected to ensure the safety of the subjects.
- Where appropriate, there are adequate provisions to protect the privacy of subjects and to maintain the confidentiality of all data.
- Appropriate additional safeguards have been included to protect vulnerable subjects.
- Any unanticipated, serious, or continuing problems encountered regarding risks to subjects must be reported immediately, but not later than 10 days following the event. This should be reported to the IRB Office via the "Adverse Effect Report Form".
- If approved, the maximum period of approval is limited to twelve months. Projects that exceed this period must submit an application for renewal or continuation.

PROTOCOL NUMBER: **12032003**
PROJECT TITLE: **Assessing the Vulnerability of Tourism in the Developing World: A Case Study From San Juan del Sur, Nicaragua**
PROJECT TYPE: **Thesis**
RESEARCHER/S: **Matthew L. Fahrenbruch**
COLLEGE/DIVISION: **College of Science & Technology**
DEPARTMENT: **Geography and Geology**
FUNDING AGENCY: **N/A**
IRB COMMITTEE ACTION: **Expedited Review Approval**
PERIOD OF PROJECT APPROVAL: **10/04/2012 to 10/03/2013**

Lawrence A. Hosman, Ph.D.
Institutional Review Board Chair

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