

BEHAVIORAL RESPONSE OF HOTEL EMPLOYEES
TO HURRICANE WARNINGS ON GRAND CAYMAN,
THE CAYMAN ISLANDS

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ABSTRACT

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Whether a person has had experience with a tropical cyclone or not has been proven to be an indicator of the likelihood to evacuate in a future event. The bulk of these studies cover members of the community and disregard characteristics unique to a migratory expatriate community, particularly on a small island where hurricane impacts are experienced acutely and in ways other than on the mainland. Grand Cayman, the largest of the three Cayman Islands, thrives on its financial and tourism industries. The Grand Cayman Marriott Beach Resort and The Ritz-Carlton, Grand Cayman employ workers drawn from The Cayman Islands and a multitude of other countries.

A survey conducted with employees of the two resorts sought to determine the circumstances under which employees would evacuate their homes to another shelter on-island and under which conditions employees would evacuate the island to seek shelter in another country. The two resorts were chosen because each resort markets itself to different clientele, and the resorts employ markedly different numbers of workers with diverse backgrounds. The three-page survey included questions to collect demographic information, the employee's exposure to hurricanes in Grand Cayman and previous places of residence, and what the employee would do given certain scenarios of a hurricane impacting Grand Cayman. Employees were also asked how much they would be willing to pay to evacuate off-island and if they left, to what location would they go and why. Findings indicate that employees of the resort are aware of the dangers associated with hurricanes and change the magnitude of their preparations in relation to the forecasted intensity of the approaching hurricane. This study contributes to the literature on hurricane preparedness, how experience influences future protective actions, and whether being local gives one an added edge for being prepared for local hazards, particularly in the tourism sector where research is currently behind the prevalence of resorts in hazardous locations for hurricanes and other geophysical hazards.

CHAPTER I

INTRODUCTION

“As small places, all events in islands, exogenous and indigenous, interact in ways not experienced elsewhere.” –J. Lewis (2009, p. 3)

On a summer day in the Caribbean, a vacationer and his family leave their hotel room and head for the beach as they have done for the first three mornings of their seven-night stay at the resort. On this fourth morning, however, the beach looks different. Waves pulse across the surface of the water unlike the glassy surface of the previous mornings' ocean. Hotel employees are removing lounge chairs from the beach and relocating water sports equipment. The vacationer remembers a letter his daughter found this morning that had been slipped under their door during the night. He retrieves it from the family's beach bag where he had hurriedly stuffed it in the excitement to get to the beach. Upon reading the letter from the hotel's management, the changes on the beach suddenly make sense: a hurricane has formed in the Atlantic Basin and its path will take it over the island resort in three days.

Each year, tropical cyclones form because of climatic and oceanic conditions in the tropical regions of the Atlantic, Pacific, and Indian Oceans. These powerful storms are recognized by numerous names including typhoon, cyclone, and hurricane.

In the Atlantic Basin, the area of focus for this research, tropical storms are known as hurricanes once they pass sustained wind speeds of 33 m/s (74 mph) (NHC 2007). Under the auspices of the National Weather Service (NWS), the Climate Prediction Center (CPC) issues a forecast in May for the upcoming hurricane season, an updated forecast mid-way through hurricane season in August, and a hurricane season summary after the season has ended (NHC 2008). In 2005, the Atlantic Basin experienced a record-breaking season with twenty-eight named storms, fifteen of which became major hurricanes, setting the record for named storms since reliable record-keeping began in 1851. Among the 1994 – 2006 hurricane seasons, seven seasons experienced fourteen or more named storms (Blake et al. 2007).

Even with the possibility of a hurricane strike, tourists frequent the Caribbean island nations throughout May – November, the most likely months for a hurricane to form in the Atlantic Basin. Vacationers are in search of the idyllic Caribbean vacation (Figure 1.1): sandy white beaches, crystalline turquoise waters, a hammock stretched between two palm trees, and steel drum music floating on the breeze. The hospitality industry of the Caribbean nations employs native workers as well as expatriates who make the island their home on a seasonal or long-term basis. The employees of Caribbean beach resorts and hotels foster an environment in which their guests can experience whatever element of the tropics they choose.

When a hurricane threatens to interrupt a dream vacation, tourists can choose to remain on the island and take their chances that the hurricane will miss the island or not be as bad as forecast, or they can end their vacation early and return home. The hospitality employees face a more difficult decision. While continuing to care for their

guests, preparing the hotel for an imminent hurricane strike, and preparing individually for the hurricane, employees must make personal choices on whether to shelter in their home on the island, to evacuate on-island to a more suitable shelter, or to leave the island in search of a safer location for the duration of the storm. The purpose of this research is to understand the decision process hospitality industry employees utilize in order to decide whether to evacuate on-island or leave in the face of an approaching hurricane and the importance of different factors used to make the decision.

Research Questions

When a hurricane looms, people react in different ways. This research examines the response of hotel employees, living and working on Grand Cayman in The Cayman Islands, who are a mixture of locals and expatriates. Three research questions guide this investigation:

- 1) Under which circumstances do hotel employees evacuate to elsewhere on the island?**
- 2) Under which circumstances do hotel employees evacuate off-island in search of safety elsewhere?**
- 3) Does previous experience with hurricanes influence the types of appropriate protective actions taken by hotel employees?**

Significance of the Study

In order to maintain its position as a Caribbean leader in attracting tourists and maintaining a strong tourism-based economy, The Cayman Islands, particularly Grand Cayman, needs to provide physical facilities covering all aspects of the tourism industry: hotels, restaurants, airports and cruise ship terminals, utilities, and, most importantly, the

natural environment, especially the marine environment, upon which The Cayman Islands established its tourism trade (H. John Heinz III Center 2000; Tompkins and Hurlston 2003). This research examines how hotel employees prepare for and respond to hurricane warnings. The continued functioning of beach resorts and hotels on Grand Cayman in large part dictates the strength of the Caymanian economy, and the sense of security and preparedness its employees have is a vital part of the equation. If the public perceives a resort location as having been “blown off the face of the map” (H. John Heinz III Center 2000, 66) by a hurricane, recovery of the resort as a tourist destination can take years (Figure 1.2). If the employees of the resort leave because of their perceptions of future hazardous events, the resort may never recover to its full reputation before the hurricane.



Figure 1.1: Seven Mile Beach, Grand Cayman **Source: The Ritz-Carlton, Grand Cayman**



Figure 1.2: Derelict sign at the Hyatt Regency Hotel 6 years after Hurricane Ivan
Source: Lost Resorts

CHAPTER II

REVIEW OF LITERATURE

Research in Natural Hazards

In 1978, Helmut Landsberg observed the dichotomy of humankind's relationship with the environment, "The good earth not only sustains life; it is also the greatest killer" (710). In Geography, hazards research is considered to start with one man, Gilbert F. White, who is known by many descriptors: the father of modern natural hazards research and mitigation (Mileti 1999), shepherd of an interdisciplinary flock (Sims and Baumann, 1974), the father of floodplain management (Kates 2001) and "both the Thomas Jefferson, the conceptualizer, and the George Washington, the implementer, of the field of natural hazards" (Hinshaw 2006, 278). Initially, by White's (1974, 4) definition, a natural hazard was "an interaction of people and nature governed by the coexistent state of adjustment in the human use system and the state of nature in the natural events systems." White felt "little (was) to be gained by critically pointing fingers at white faces in textbooks, at vapid generalities about world power, or at observations about resources and man that are perfectly true, perfectly general, and perfectly useless" (White 1972, 104).

In the early 1950s, with increased understanding of human/environment relationships and more studies of floods, other hazards geographers expanded investigations of the interactions of natural and social systems in relation to different hazards including tornadoes, hurricanes, and mass movement events (White 1974). As with other natural hazards, hurricanes are a part of the cycles of nature that control the heat budget and help maintain a functional level of biodiversity (Reice 2006). Regardless of the hazardous event, people behave based on decisions made from a spectrum of factors, often acting against what researcher and professionals define as the appropriate protective actions people “should” and “ought” to take (Sims and Bauman 1985). When it comes down to a person’s response, “(o)ne may fail to floodproof the house, go down in the cellar, or evacuate to higher ground because of loyalty to the land, or a belief that God will protect one, or the defensive need to deny that one feels fear” (Sims and Bauman 1985, 359). Research that disregards these cultural factors may be unsuccessful at reducing risk because of their omission of the factors delineating the bounded rationality of the residents of the area at risk (Schipper 2009). This concept of bounded rationality incorporates the limitations of a decision maker’s capabilities to perceive and comprehend the situation at hand and the possible ramifications of different decisions and examines the simplified version of reality that a decision maker creates based on cognitive limitations (Slovic et al. 2000).

While researchers call for better and more timely warnings, the reality is that even with adequate lead time, hazardous events such as hurricanes, floods, tornados, and tsunamis will still cause some loss of life and limb as well as destruction of property (Landsberg 1978). White’s stated goal for the hazards community was to “commit

ourselves to a continuing and persistent questioning of our own teaching and research in relation to its definition and reduction of social problems” (White 1972, 103).

Unfortunately, given the interdisciplinary nature of hazards research, for many researchers “one’s own disciplinary interests are considered critical while the interests of others are interesting but marginal” (Rodriguez et al. 2007, xiii). As researchers are more able to work across discipline boundaries and view hazards from multiple perspectives, a more cohesive research agenda will congeal, creating a new approach to the social problems associated with hazards.

In order to understand how individuals process hazards information, an understanding of the risk perception process is necessary. Though often cited as a response, “(i)t is hard to envisage situations where the ‘do nothing’ strategy provides a viable alternative” (Faulkner 2001, 139). Slovic et al. (2000) found that individuals tend to reduce uncertainty by minimizing the potential risk in various forms including: the law of averages, trusting in new technology to keep them completely safe, redefining the event i.e. high water, instead of a flood, and denying the risk from the natural hazard can defined and mitigated by an individual i.e. a higher authority, government or God, will deal with the uncertainty for them.

Current research aims to determine why people do what they do rather than what the researchers recommend. Risk perception is an area of study that investigates what factors people use to determine which actions to take in the face of a natural hazard. In this context, perception includes the different attitudes, judgments, and mindsets people have when deciding how to react (Slovic 2000). These perceptions are considered to be “the product of intuitive biases and economic interests and reflect cultural values more

generally” (Kasperson et al. 2000). In general, the public will accept greater voluntary risks (~1000X) than involuntary risks with the acceptability of a risk being roughly proportional to the benefits, both perceived and actual (Slovic et al. 2000). When diluted to its most basic essence, Sims and Bauman (1985) sum up the goal of natural hazards research across the disciplines to find out why “people do not behave the way [researchers think] they should” (358).

Natural Hazards as Disastrous Events

The study of natural hazards offers an opportunity to study geophysical events with human, social, and economic implications (Landsberg 1978). Depending on the researcher’s discipline, an event can be described as being a natural hazard (geography, geology, meteorology, etc.) or a natural disaster (sociology, psychology, political science, etc.). The difference between the two terms is largely semantics. As defined by Lindell and Prater (2003) in *Natural Hazards Review*, “a natural disaster occurs when an extreme geological, meteorological, or hydrological event exceeds the ability of a community to cope with that event” (176). Tierney et al. (2001) propose that hazards research focuses on the pre-impact activities of hazard vulnerability, hazard mitigation, and emergency preparedness. By contrast, disaster research has focused on the trans-impact and post-impact activities of emergency response and disaster recovery, although some disaster studies do address emergency preparedness. From an economic standpoint, a disaster is defined as “the realization of risk (the potential for significant loss), requiring the presence of a hazard, and the vulnerability of physical and human capital to that hazard” (Cashin and Dyczewski 2006). In this definition, the hazard is not differentiated as

natural or technological. The interdisciplinary nature of current natural hazards research is aligned with Landsberg's (1978) recommendation that interaction amongst researchers will improve predictions and understanding of the occurrence of these events rather than specializing into niches and operating without integrating pertinent knowledge from other disciplines.

The study of natural hazards is ultimately an examination of the "interrelationship of the natural with the human, of the physical with the social" (Bankoff 2009). This environmental perspective takes into consideration that human constructs, whether physical or social, interact with the natural patterns occurring. This natural cycle shows the dynamism of ecosystems and maintains biodiversity within them (Reice 2006). One of the main findings of the research community is that the independent occurrence of a natural hazard is not inherently disastrous; rather, it is the introduction of human constructs and activities in hazard-prone areas that creates a natural disaster (Tompkins et al. 2009b). As humans inject themselves further into natural systems and alter natural processes in more significant ways, humans and their constructs are vulnerable to a new level of the variability and uncertainty that accompany natural hazards events (Slovic et al. 2000).

Natural hazards are events that threaten and can cause "damage to the physical and social space where they take place not only at the moment of their occurrence, but on a long-term basis because of their associated consequences" (Novelo-Casanova and Suarez 2010). Following the creative nature of Chaos Theory, the destruction of a system can lead to its restoration as it was before the event or in a new and more efficient arrangement (Faulkner 2001). Thus, natural hazards cannot be classified as entirely

disastrous as a new, sometimes more advantageous, environment can rise from the debris of a tornado, hurricane, or fire such as the regeneration of forests and the propagation of fire-dependent species. The probabilistic nature of natural hazards requires vigilance at all times that human systems, whether social or physical, are developed with resilience to the hazard in mind. However, “(i)n coping with the hazard of natural events, man enlarges the social costs of those events and tends to make himself more vulnerable to the consequences of the great extremes” (Slovic et al. 2000, 30). This tendency to establish human constructs in areas subject to natural hazards suggests that the realm of extreme events lies beyond the bounded rationality of many decision makers.

While natural hazards are not considered self-induced the way technological hazards are, humans living in hazard-prone areas can take steps to mitigate the impacts of the occurrence of an unpredictable natural hazard. The disastrous aspect of a natural hazard occurring is generally partially or fully attributable to human action (Faulkner 2001). Though science cannot reduce the size of a hurricane, appropriate preparation and construction can mitigate and minimize the consequences of the natural hazard on human constructs (Tompkins and Hurlston 2005). Regardless of the type of hazard, whether natural or technological, no amount of planning or preparation can completely predict the outcome of a particular occurrence (Faulkner 2001). Ultimately, to minimize the exposure to hazards by humans, all involved parties, government, academia, the public, and the planners, need to agree on a comprehensive plan that “is capable of integrating the technical analysis of risk and the cultural, social and individual response structures that shape the public experience of risk” (Kasperson et al. 2000, 234).

Tourism and Natural Hazards

As a natural disturbance, “the devastation of hurricanes cannot be prevented, but hurricanes can at least be predicted” (Higgins 2005). From this viewpoint, hurricanes will occur, but societies can take measures to avoid having a natural event turn into a disaster if they develop communities with a hazards-conscious approach. Part of the issue with what makes a natural event a hazard is that often areas of high natural hazard and access to desirable ecosystems and resources overlap (Kates 2001). Ocean-front views and beach access are in high demand, which encourages development in areas prone to storm surge, winds, and wave action, making them at high to extreme risk for damage from hurricanes (Bush et al. 2006). This research is validated by the continuous vulnerability of the hospitality and tourism industry that operates year-round in some of the most idyllic and hazard-prone areas on the planet (Malhotra and Venkatesh 2009). The necessary long-term management of high-demand, low-supply land, human capital, and environmental resources for tourism requires consideration of the consequences of natural hazards and their impact on the structure of not only the tourism sector, but also the resources and amenities upon which it capitalizes (Feick and Hall 2000).

When researching human responses, both qualitative and quantitative data are necessary to capture as close to the whole picture as possible. Forming the basis for this research is Drabek’s (1995; 1999; 2001) extensive research into disaster planning and response by members of the tourism industry using surveys to collect both types of data. Drabek’s (2001) research involves surveying tourist business managers, executives, and employees after a natural hazard has occurred e.g. hurricanes and floods. This research examines hurricane evacuation preparedness from a bottom-up approach as opposed to

the top-down approach used by Drabek (1995) in which the decision process of executives was examined. Drabek (2001) did engage in a survey of all levels of employees, however, these employees were not specifically in the tourism industry. Findings from this survey showed that five factors influenced the variation in response by private business employees: 1) emergent perceptions of risk; 2) time of evacuation from work; 3) time of evacuation from home; 4) multiple evacuations; and 5) tension between work and family commitments (Drabek 2001). Prior to this article, “no comparative studies of employee evacuations from their work sites had been conducted” (Drabek 2001, 78). This research, conducted with hotels in Grand Cayman, provides more research to fill the gap identified by Burby and Wagner (1996) who stated, “virtually nothing has been written about natural hazards and the tourist industry” (51). Lilly et al. (2009) update this statement to focus on an element of hazards research that is missing from the academic literature, “the ability or willingness of business organizations to assist employees in coping with the hurricane” (110).

A proactive stance in planning and preparing for a hazardous event and its accompanying unforeseen circumstances allows companies and organizations to prevent some damage to their operations and to return to normal operation in a timely manner following the event (Malhotra and Venkatesh 2009). Treating all employees as valuable resources also contributes to the ability of a company to rebound following a natural hazard such as a hurricane (Lilly et al. 2008). In the years since Burby and Wagner (1996) wrote in *Disasters*, research into the relationship between natural hazards and tourism has increased across disciplinary lines.

Socially Situated Research

When studying people and their behavioral processes, pure quantitative or qualitative methods often fail to represent the full scope of the issue at hand. Using a mixture of qualitative and quantitative methods allows for research that “springs from real-world problems and a preoccupation with the implications of our findings for real life” (Jensen and Glasmeier 2010, 90). A mixed methods approach enables researchers to use multiple types of data, analysis techniques, and other ways of obtaining information in different combinations to each other in order to achieve various intellectual and analytical goals (Elwood 2010, 95). Particularly in natural hazards research, mixed methods approaches provide a perspective on how cultures and social groups have adapted to the repeating environmental threats (Bankoff 2009). Though mixed methods are being used more often, the methodology is viewed as more artistic, less rigorous, nonsystematic, and “softer” than purely quantitative work (Gerring 2007). In order to successfully accomplish mixed methods research from a socially situated perspective, the researcher needs to be familiar with the history, culture, and social issues of a specific place and to conduct fieldwork (Jensen and Glasmeier 2010). A case study is often performed to combine the quantitative and qualitative aspects of a particular social situation even though it can be difficult to extrapolate cross-case implications when making inferences to a different social situation (Gerring 2007).

In order to understand the dynamics at work within a population, researchers often examine a sample or subset of the population and infer larger implications based on the sample findings. A case study is a way to examine small groups of people in order to explain the actions of a larger population. Gerring (2003) defines a case study as “an

intensive study of a single unit or a small number of units (the cases), for the purpose of understanding a larger class of similar units (a population of cases)” (37). Butler (1987) used a similar approach to ascertain the preparedness of residents of the small, seasonally isolated community of East Glacier Park, Montana for avalanche threats. This approach incorporates the qualitative factors that are ignored in quantitative studies that focus on the total fatalities, damages, and households evacuated (Faulkner 2001). The qualitative results describe the ability and drive of respondents to protect themselves from a natural hazard, in this case a hurricane, based on their perceptions, preparations, and previous experiences with a hurricane (Kusenbach et al. 2010). Reducing hazard-associated risk involves assessing the physical event itself as well as the level of the hazard and its implications on economical, social, and environmental constructs within a community (Novelo-Casanova and Suarez 2010).

On small islands, all events that impact the small area of the island, whether internal or external in origin, interact with the social and physical constructs of the island in ways unique to other locations of larger area (Lewis 2009). With its diminutive size, Grand Cayman is an example of an island community where an action can have unforeseen ripple effects throughout the community in ways more akin to a small town than a country. Sims and Bauman (1985) state, “most people under high risk already know all they want or need to know about hurricanes and how to ‘properly’ respond to them” (360). The knowledge of what happens when a hurricane occurs in a particular location will dictate the actions taken to protect life and property in advance of the storm (Landsberg 1978). However, in the case of places with a high expatriate population, new

residents may be relocating from areas where the threat of a hurricane is minimal or nonexistent, leaving them without the accumulated knowledge of a local.

Experience and Perception in Hurricane Zones

Research regarding risk perception and response in relation to hurricanes finds that previous experiences and perceived risk from a storm are major indicators in how people will respond when faced with an approaching hurricane or other tropical system (Tompkins et al. 2009a). Even if a person has experienced the hazard before, the initial response is one of denial and disbelief, leading people to hesitate or fail to take appropriate protective actions (Drabek 1999). Combined with the actions involved in psychological and logistical preparation, the delay between the receipt of the warning by an individual and the initiation of appropriate preventative actions can be significant (Lindell et al. 2007). When households or businesses create and maintain a disaster management plan, responses to a natural hazards event can be timelier, avoiding or diminishing the impacts of the event (Faulkner 2001). Businesses play a role in the information dissemination process by relaying warnings to those who may not have otherwise heard them, and increases the rate by which information of the warning spreads in the risk zone (Lindell et al. 2007).

Social constructs and influences are important in the decision-making process, but, ultimately, an individual is responsible for making the decision to evacuate or not in the face of an advancing hurricane (Riad et al. 1999). In evacuation situations, individuals with higher education levels are more able to understand complex information and make an informed decision to evacuate an area (Riad et al. 1999). On Grand Cayman, new

expatriates are the most vulnerable to hurricanes as they often live on waterfronts with high exposure to hurricane events, are in the demographic that is least likely to properly prepare for a hurricane, and interact more with other expatriates as opposed to Caymanians with local experience with hurricanes (Tompkins et al. 2009a; Tompkins et al. 2009b). Expatriates may be unable to create relationships with Caymanians because of some of the prevailing attitudes towards expatriates, such as expatriates have their own interests in mind and not those of the island as a whole, as evidenced by the “exodus of such people (expatriates) before and immediately after hurricane (*sic*) Ivan is indicative of their loyalty to the jurisdiction” (Bodden 2007, 206). The disconnect between Caymanians and expatriates hinders all stages of management for hurricane threats on Grand Cayman because of the interconnectedness of tourism, expatriate employees, and the nation’s economy.

CHAPTER III

STUDY SITE LOCATION

Study Site

Originally considered by Columbus as an outlying island of Cuba, the Cayman Islands were populated by people and turtles as of 1496 (Sauer 1966). Located 268 kilometers northwest of Jamaica and 240 kilometers south of Cuba at 19° 30' N, 80° 30' W (Figure 3.1), the Cayman Islands (Grand Cayman, Cayman Brac, and Little Cayman) are an island group disconnected from their nearest neighbors, offering sun, sand, and sea to tourists seeking an island sanctuary (Weaver 1990; CIA World Factbook 2008). Perched on the edge of the North American plate near its boundary with the Caribbean plate (Figure 3.2), the three islands, Grand Cayman (197 km²), Little Cayman (28 km²), and Cayman Brac (38 km²), are the tips of an underwater extension of the Sierra Madre mountain range (Brunt and Davies 1994). Their position on the edge of the Cayman Trough (~7000m deep) and their composition of limestone derived from marine deposits make them an ideal location for scuba diving, deep water fishing, and escapism (Douglas 1940; Brunt and Davies 1994; Tratalos and Austin 2001).

This natural environment supports the tourism industry of the Cayman Islands, allowing the nation to lead the Caribbean basin nations in attracting tourists (George and Clark 1998; Tompkins and Hurlston 2003). With a 250 kilometer radius around the

islands from any large land mass, the climate of the Cayman Islands is moderated by the sea which restricts the air temperature range and results in high relative humidity (Burton 1994). Grand Cayman (Figure 3.3), the largest of the three islands, is a low-lying island with a maximum elevation of 18m above sea level. The limestone island has no natural rivers to add sediment to the clear waters off the white sand beaches and is protected by fringing reefs and areas of mangrove vegetation (Government of the Cayman Islands 2005b). Given its low-lying topography and collection of mangrove forests, sounds, and canals, Grand Cayman contains many locations where the division between water and land in the coastal zone is indistinct (Walker 1990). This lack of distinction increases the island's susceptibility to impacts from passing storms: tropical systems in the summer and continental cold fronts in the winter (Blanchon et al. 1997).

Historically, the Cayman Islands have been under the rule of the United Kingdom as a part of the British West Indies. The British established settlements in the Cayman Islands, considered unofficial dependencies of Jamaica (Platt 1926). While the Cayman Islands were under the auspices of the Jamaican governor, they were treated as backwaters until formally attached to Jamaica in 1863 when an administrative commissioner and legislative body were established to oversee and represent the Cayman Islands (Black 1965). In 1959, Jamaica created a new constitution and management system, ending its dependency with the United Kingdom (Black 1965). The Cayman Islands elected to remain and continue to exist as an overseas territory of the United Kingdom (CIA World Factbook 2011).

The Cayman Islands' population is an estimated 51,384 individuals, most of whom live on Grand Cayman (CIA World Factbook 2011). Of the population,

approximately 49% of the people are non-Caymanians who have entered the country on a work permit (Government of the Cayman Islands 2007b). “The main industries are financial services, tourism, and real estate sales and development” (Government of the Cayman Islands 2005a). The economic importance of tourism and the high percentage of international workers, 80% of whom are from Canada, Honduras, Jamaica, the Philippines, the United Kingdom, and the United States, on Grand Cayman make it uniquely vulnerable to the annual threat of hurricanes (Government of the Cayman Islands 2007a).

Hurricanes and the Cayman Islands

Hurricane season in the Atlantic Basin officially runs from 1 June – 30 November with peak hurricane occurrence in September. The Caribbean Sea and the Gulf of Mexico are the two portions of the Atlantic Basin where hurricanes are likely to form throughout hurricane season. Grand Cayman is either in, or adjacent, to areas where hurricanes are likely, more likely, or most likely to form from June – October (Smith 2000; McAdie 2008). Hurricanes tend to track east to northwest in the Caribbean Basin (Figure 3.4) which often takes them on a latitudinal tour of Grand Cayman (Blanchon et al. 1997).

An example of a major hurricane forming near Grand Cayman is Hurricane Wilma, which formed as a tropical depression 354 km (220 miles) east-southeast of the island on 15 Oct 2005; four days previously, Hurricane Wilma created the record minimum central pressure of 882mb (Beven II 2006). In the following hurricane season, Tropical Storm Alberto began as a tropical depression west-northwest of the islands (20° N, 85° W), bringing high waves, wind and rains to the Seven Mile Beach portion of

the island.

Major hurricanes pepper the climatologic history of the Cayman Islands. On average, a hurricane passes close enough to the Cayman Islands to have some effect on them once every 2.23 years, and scores a direct hit once every 9.06 years (Novelo-Casanova and Suarez 2010). In 1751, a hurricane struck Grand Cayman with an accompanying storm surge high enough that it “temporarily partitioned the land into separate sections at the lowest part of the island” (Smith 2000, 45). Grand Cayman is susceptible to inundation and overwashing by storm surge traveling northward at several locations including Newlands, Prospect, Pedro, Spotts, Savannah, and Red Bay (Smith 2000).

The Cayman Islands were impacted by two Category 5 storms ten years apart: Hurricane Gilbert in 1988 and Hurricane Mitch in 1998 (Tompkins 2005). Prior to Hurricane Gilbert, the worst impacts experienced by residents of Grand Cayman from a hurricane occurred in 1932 (Burton 1994). The 1932 hurricane was the “worst disaster of the century” (Williams 1970, 73) and caused significant property damages and loss of life (Bodden 2007). In the following years, deaths were low in hurricane events, breeding a false sense of security in the generations who had not seen the 1932 storm and created complacency in coastal growth control (Bush et al. 2006). Following Hurricane Gilbert in 1988, the Cayman Islands’ government enacted a new building code in 1995-1996 that changed the waterfront set-back distance in beach areas island-wide. The island-wide change was to measure the distance from the high-tide line instead of the low-tide line. In the hotel and tourism zones, the distance was increased so buildings were set back 130 feet from the high tide line instead of 100 feet as previously enforced (Tompkins 2005).

This change keeps with the research findings that maintaining as much landscape stability as possible gives room for natural disturbances such as hurricanes to occur with less impingement on human developments (Bush et al. 2006; Reice 2006; Bankoff 2009).

One day short of sixteen years after Hurricane Gilbert, Hurricane Ivan in 2004 (Figure 3.5) caused considerable damage to Grand Cayman, passing 148km from the island as a Category 4 storm just below the threshold for Category 5 (Stewart 2005; Craig et al. 2006). Hurricanes Gilbert and Ivan both exhibited eyewall replacement cycles, the process by which concentric eyewalls form and the interior eyewall deteriorates as the outer eyewall forms (Hobgood 2005; Stewart 2005). Hurricane Gilbert was entering a period of such deepening and rapid intensification as it passed Grand Cayman, transiting the Caribbean Sea towards the Yucatan Peninsula (Black and Willoughby 1992). This similarity between the development and intensification patterns of the two storms reinforces the similar damage patterns on Grand Cayman. Although Hurricane Ivan is recorded as the most intense storm over Grand Cayman in terms of wind speed, the path of the storm avoided the most high-risk, developed portion of the island, Seven Mile Beach, and did not realize the maximum damage potential for the island (Novelo-Casanova and Suarez 2010). After Hurricane Ivan, the Cayman Islands recovered slowly because of a relative inability by public and private institutions to respond to the after-effects of a major hurricane (Bodden 2007). The recovery efforts were also hindered by the effort to maintain a stable image on the international stage to retain the financial and tourism sectors that drive the Cayman Islands' economy. In an effort to retain their image, the Cayman Islands did not accept any international assistance following Hurricane Ivan, including declining help from the European Union and Great Britain

(Bodden 2007). If tourists changed their travel plans because of perceiving the resorts of the island as having been “blown off the face of the map” (66), recovery to pre-hurricane levels could take years (John Heinz III Center 2000).

Although Hurricane Ivan was the last major hurricane to bring hurricane conditions to Grand Cayman, Hurricane Wilma in 2005, Hurricane Dean in 2007, and Hurricane Paloma in 2008 passed close enough to the island to bring tropical storm conditions (Pasch et al. 2006; Franklin 2008; Brennan 2009). Proximity of a hurricane to Grand Cayman plays a large role in the damage done to the island. Hurricanes Gilbert and Ivan transited very close to the island ($19^{\circ} 23'N$, $82^{\circ} 30'W$ for Gilbert and $18^{\circ} 23'N$, $80^{\circ} 24'W$ for Ivan) and brought hurricane conditions to Grand Cayman. This situation contrasts with hurricanes that passed further from the island ($16^{\circ} 53' N$, $83^{\circ} 5'W$ for Mitch and $17^{\circ} 23'N$, $83^{\circ} 24'W$ for Wilma) and brought tropical storm conditions to Grand Cayman (Rappaport and McAdie 1991; Guiney and Lawrence 2000; Stewart 2005; Pasch et al. 2006). The continuing occurrence of hurricanes passing close to Grand Cayman shows the importance of preparing for these destructive storms and ensuring the safety of the residents of the island. The Cayman Islands’ history of hurricanes and the continued exposure to them “is crucial to the generation of its historical development and present culture” (Bankoff 2009). The Cayman Islands National Hurricane Committee is a voluntary organization that creates informal social networks and encourages raising hurricane preparedness and response to a higher priority within its culture (Tompkins and Hurlston 2005).

Tourism in Grand Cayman

Whilst efforts to promote Grand Cayman as a tourist destination began in 1935, the year 1951 marked the beginning of the transition from the exportation of Grand Cayman's resources to the development of Grand Cayman as a resource through the tourism and financial industries. Counter to their history of a sea-going people who sent their males to sea to earn a living, today's Caymanians live on-island full-time and work in the financial or tourism sector, while still finding ways to exploit the seas around the island (Kersell 1998). Parting from their sea-faring traditions, the Cayman Islands' motto, "He hath founded it upon the seas" (CIA World Factbook 2011), now represented their seemingly idyllic island setting with white sand beaches and coral reefs. The focus shifted from exporting what was found in the seas to importing tourists to gaze upon the sea.

When Douglas (1940) visited Grand Cayman, he stayed in a small lodging house. The first hotel on Grand Cayman, the Galleon Beach Club, opened in 1951 with 40 beds (Weaver 1990). Transportation to the island also received support in 1951 with the creation of the Cayman Islands Cooperation, charged with building an airfield on the outskirts of George Town. The airport's construction began in August 1952, was completed in August 1953, and officially opened in March 1954 (Kersell 1987; Craton 2003). Following the Galleon Beach Club's example, seven more hotels were built by 1961, bringing the count of beds up to 300 (Weaver 1990). The Cayman Islands' government began a proactive policy that was designed to attract expatriate workers because of government officials' fears that the native population was insufficient to support the level of change and expansion of the tourism industry that they envisioned

(George and Clark 1998). In 1961, the expatriate population upon which the tourism industry depended was vocal enough to instigate the formation of a tourist board on Grand Cayman to address the needs of tourists and expatriates working on the island (Weaver 1990).

The continued expansion of the expatriate working population has changed the demographic and skills profiles of the labor force in The Cayman Islands (Amit 2001). Despite a feeling that Caymanians will be displaced from jobs in their own country by expatriates, Caymanians prefer the prestige of working in the financial industry rather than in the service industry associated with tourism unless they can be trained to hold the top level jobs within hotels (George and Clark 1998; Amit 2001). Though the expatriate workers comprise half of the islands' population, a common perception among Caymanians is that "the Cayman Islands can be preserved by legislating a protectionist path that will ensure that expatriates can never be accepted as Caymanians in Cayman" (Bodden 2007). The tourism industry, more so than the financial industry, is seen to be the main source of expatriates, particularly unskilled and semiskilled workers (Roberts 1995). Regardless of the industry, native Caymanians receive preferential hiring over expatriates both in the initial hire and at contract renewals, which means an expatriate can be displaced from a job if a qualified Caymanian applies (Amit 2001).

In 1962, the Cayman Islands voted to remain under the jurisdiction of the British as a Crown Colony, severing jurisdictional ties with Jamaica (Roberts 1995; Craton 2003). This development spawned increased business travel because of the increasing financial sector, prompting an increase in hotel sizes and numbers from 380 beds (1965) to 1702 beds (1975) to 4030 beds (1984) to 5238 (2006) (Weaver 1990; Caribbean

Tourism Organization 2008). With the development of land on Grand Cayman for office buildings, hotels, and other tourism attractions, the Cayman Islands government enacted various laws and regulations to attempt to protect some of the environmental resources that made it attractive to tourists. In 1977, a Central Planning Authority and land use parameters were created by the Development and Planning Law (Weaver 1990). Canal excavation for boat access to new developments, golf courses, and new construction required the razing of mangrove forests on the island, bringing the total coverage below 50 percent on Grand Cayman, eliminating natural habitats for invertebrates and vertebrates alike (Roed 2006). The first golf course on Grand Cayman was built on an area formerly covered by mangrove forests, decreasing its natural vegetation barrier from hurricanes (Weaver 1990; Ostling et al. 2009). One of the manmade quasi-natural marine attractions on Grand Cayman is Stingray City, a location near the outer reef of the North Sound where Southern Stingrays congregate in response to being fed daily by tourists and boat tour operators (Shackley 1998). Boatswain's Beach Adventure Park and Turtle Farm is another example of manmade attractions replacing and compensating for the tourist-attracting natural amenities that are being lost or degraded to unattractiveness (de Albuquerque and McElroy 1992). Boatswain's Beach provides an outdoor aquarium with the opportunity to snorkel near ocean life with a protective barrier between the tourist and the fish. Turtles are also displayed in tanks as they are grown for release into the wild and the international turtle meat market. (Wood and Wood 1994; Boatswain's Beach 2011).

Tourism researchers use Grand Cayman as a case study because of its relatively linear development pattern and uncomplicated management history, having been a colony of Britain since before settlement (Weaver 1990). When compared to other countries in

the Caribbean, the Cayman Islands are classed as an intermediate tourist island with other islands including Antigua, St. Kitts, and Montserrat, whereas more mature and larger island nations such as the Bahamas, Bermuda, and the U.S. Virgin Islands dominate tourism in the region (de Albuquerque and McElroy 1992). Researchers representing multiple disciplines focus on the sustainability of tourism development and how the expansion of tourism on the island impacts the natural elements (corals reefs, sandy beaches, and fauna) that attract the tourists to Grand Cayman (De Albuquerque and McElroy 1992; Jackson 1997; Tratalos and Austin 2001). The revenue collected from import duties, hotel room tax (10% of per night room rate), real estate sales tax, and license fees for banks and corporations supports the public education, health services, and social services provided by the Cayman Islands' government (Bodden 2007). With this dependency on tourism for income to support the Gross Domestic Product (GDP) and social services, researchers are also investigating the potential impacts of climate change on the country and its economic viability. With an increase in sea levels, bleaching of coral reefs resulting from warmer ocean temperatures, and the potential for more frequent or more intense storm systems, the Cayman Islands could lose 8.8% of their 2004 GDP by 2025 and 20.1% by 2050 if inaction remains the approach of the islanders to climate change (Bueno et al. 2008). The relative absence of natural hazards research on the Cayman Islands, and of research into the tourism industry and its relationship with natural hazards, demonstrates the gap in the academic literature that this research helps to fill (Faulkner 2001; O'Reilly 2005). This research also aims to find ways to educate and inform the transient population of expatriate workers that supports the tourism and finance industry in the Cayman Islands, a gap identified by Tompkins et al. (2009a).

Case Study Hotels on Grand Cayman

Grand Cayman offers a variety of places for tourists to stay when they visit the island, including resorts, hotels, condos, and villas. Marriott International, Inc. owns the two resorts in this case study, two of the four major resorts on Seven Mile Beach: Grand Cayman Marriott Beach Resort and The Ritz-Carlton, Grand Cayman (Figure 3.6). These two resorts are both part of Marriott International, Inc., however, The Ritz-Carlton, L.L.C. operates as an independent company under the Marriott umbrella. Within the structure of Marriott International, Inc., the two resorts represent two of the five different tiers in the company's holdings. The Ritz-Carlton, Grand Cayman is one of The Ritz-Carlton's 103 properties, all of which are part of the Luxury Tier. Marriott Hotels and Resorts operate 550 properties within the Quality Tier, including the Grand Cayman Marriott Beach Resort. The third major resort on Seven Mile Beach, the Hyatt Regency Grand Cayman, suffered extensive damage during Hurricane Ivan and never returned to its pre-Ivan state. The fourth major resort, the Westin Casuarina, re-opened post-Ivan with many of its bookings coming from group events (McGowan 2005b). This case study focuses on the two resorts under the auspices of Marriott International, Inc.

Situated on 144 acres spanning the island from Seven Mile Beach to the North Sound, The Ritz-Carlton, Grand Cayman opened in December 2005. The opening was originally planned for late 2004, but the impacts of Hurricane Ivan on the island in September 2004 caused a delay in opening. The eight-story resort features 365 guest rooms and suites, a 9-hole golf course, a spa, a children's program, and three restaurants. To run the resort, The Ritz-Carlton, Grand Cayman employs a total of 833 Caymanians

and expatriates with a goal of maintaining a ratio of two employees to every occupied guest room.

Located on a narrower portion of Seven Mile Beach near George Town, the Grand Cayman Marriott Beach Resort survived Hurricane Ivan in 2004, but it made it through with significant damage from storm surge and winds. The five-story resort features 295 guest rooms and suites, a spa, a children's program, and four restaurants. Grand Cayman Marriott Beach Resort depends on 218 Caymanians and expatriates to run the resort.

Expectations for Employees During Hurricane Preparation

The Ritz-Carlton Hotel Company, L.L.C. operates under the guiding principles of its Gold Standards (Appendix G). Included in these Gold Standards is the Employee Promise, the first line of which reads, “At The Ritz-Carlton, our Ladies and Gentlemen are the most important resource in our service commitment to our guests” (The Ritz-Carlton Hotel Company, L.L.C. 2011). Marriott International, Inc., the parent organization of The Ritz-Carlton Hotel Company, L.L.C., espouses a similar sentiment in its Core Values (Appendix H), operating under “the unshakeable conviction that our people are our most important asset” (Marriott International, Inc. 2011). These integral principles pledging the importance of their employees to the company are tested in Grand Cayman when hurricanes threaten the entire structure of the resorts.

The approach of a tropical cyclone changes the pattern of life in a community, particularly in the microcosm of a small Caribbean island. Contingency plans are put into action and decisions are made based on available information about the intensity and

likely path of the storm. For the employees of the study hotels, the impending arrival of a hurricane requires personal preparation to weather the storm, as well as preparation at the hotel to ensure their place of employment is ready for the inclement weather and for re-opening afterwards, providing them continued employment. The anticipated needed time for employees to complete their personal preparation is included in the qualitative findings section. Using the Action Plan for the Critical Path of Hurricane Gustav in 2008 from The Ritz-Carlton, Grand Cayman (2008), this section explains the preparations of the resort prior to and during hurricane season, including the expectations of the resort management for employees as a hurricane approaches.

In order to be ready for the start of hurricane season, The Ritz-Carlton, Grand Cayman completes preparations that form the framework for the hurricane season and provide a baseline of preparation in place for individual storms. By 1 May, departments are expected to have completed the inventorying and ordering of supplies like generators, plywood, 2x4 boards, plastic sheeting, diesel fuel, water (Figure 3.7), etc. In regard to the employees, 1 May is the completion deadline for tasks such as determining the employees critical to the operation of the resort who will move into the hotel for the duration of the hurricane, arranging plans for employees to evacuate off- island to other countries, checking legalities for entry requirements based on the current expatriate population, and creating a phone tree for employees remaining on-island.

When The Ritz-Carlton, Grand Cayman is declared in the projected path of a hurricane, the Hurricane Response Team begins meeting to track the progression of the storm. The response dictated by the Action Plan is dependent upon the lead time prior to the hurricane. If the hurricane is more than five days out from Grand Cayman, no

preparations are initiated within the resort. Once the hurricane is estimated to arrive in five days or less, preparations to secure the physical assets of the resort begin. Initial preparations are taken with the expectation that the hurricane will attain Category 5 status prior to arrival at Grand Cayman. This level of preparation was chosen because of the potential for rapid intensification of a hurricane with little or no warning. As the storm approaches, the level of preparation may be scaled back as warranted based on information available from the National Hurricane Center. As preparations begin, the appearance of the resort changes as outdoor furniture is taken inside for storage and information boards go up near the lobby to keep guests apprised of the situation (Figure 3.8). Information boards for employees are located near the locker rooms near the Employee Dining Room. During this process, employees are expected to work outside of their normal roles to ensure the care of the guests and the protection of the resort's physical assets. The external areas of the resort undergo drastic changes as furniture and other accoutrements are removed and entrances to the building are secured. Employees are responsible for removing everything from the beach that could potentially cause structural damage to the hotel. Clearing the beach is a two-day process for which the Watersports department is responsible. As shown in Figure 3.9, the conversion from a resort-ready to a hurricane-prepared beach is considerable. Lounge chairs, cabanas, and water craft are removed from the beach for storage in various locations elsewhere on the resort. Employees use small machinery to create artificial dunes on the beach for protection from wave action and storm surge during the hurricane's passage. The low wall marking the boundary between the beach and resort acts as a protective barrier for the resort and the building's foundation. The wall is a total of three meters tall with one

meter exposed and the other two buried in the sand. During Hurricane Ivan, the storm surge wave action exposed the base of the wall (Figure 3.10) and created a new channel between the end of the wall and the adjoining property's surge wall (Carman 2011). Plastic barriers are also deployed on the beach to protect the resort area from waves and storm surge entering the pool area via the stairs connecting to the beach. By twenty-four hours prior to the anticipated arrival of hurricane conditions, the beach is cleared and access from the resort is blocked by sandbags and barricades. At the end of the preparation, the beach is no longer a place to relax and enjoy the sun, sand, and sea of the Caribbean. Instead, it is a place prepared for inundation and the forces associated with a hurricane.

While the beach and other external areas of the resort are being prepared to withstand hurricane conditions, the internal areas of the hotel are being prepared to repel the potential incursions of water and wind into the structure. The Housekeeping department has a dual role during hurricane preparation: maintaining the guest room standards and preparing the employees who will reside in the hotel during the hurricane. Housekeeping is responsible for bringing the furniture from the balconies of each of the 365 rooms into the room, securing the exterior door, and filling the bathtub with fresh water. When the critical employees move into the hotel for the hurricane, they are housed in the main ballroom instead of guest rooms (Figure 3.11). The mattresses, linens, and hygiene supplies in the windowless ballroom are transported and set-up by the housekeepers by twenty-four hours prior to the hurricane. Each department has time-sensitive preparations for which it is responsible in the days and hours leading up to a hurricane arriving at Grand Cayman.

Employees who are designated as critical are required to move into the hotel twelve hours before the arrival of the storm. Immediate family members are allowed to accompany the employee to the hotel and stay there for the duration of the storm, a critical precaution to avoid having employees abandon their roles. This practice allows employees to focus on their work during the storm, knowing where their family is and that they are safe. In the days prior to the hurricane, the critical employees are still required to assist in the preparation of the resort (Figure 3.12). They must balance their preparation at work with their preparation at home and are given time off to do so. When the resort is fully staffed, hurricane preparation is spread amongst all of the employees and requires less time per person. However, hurricane season coincides with low season on Grand Cayman, requiring hotels to operate with lower numbers of employees. As the number of employees on-island decreases, the amount of time required per employee to prepare the resort increases. For employees who are not designated as critical, the pre-hurricane preparations and decisions are also time-critical and consumptive. Preparations at The Ritz-Carlton, Grand Cayman continue until twelve hours before the storm when the hotel is locked down and non-critical employees are sent home.

Hurricane Ivan: A Case Study of a Hurricane and Grand Cayman

When Grand Cayman experiences a direct hit or passing blow from a major hurricane, a high potential exists for island-wide destruction and devastation exists in all facets of the island's economy and lifestyle: tourism, environmental health, banking, and domiciles. On 11-12 September 2004, Hurricane Ivan (Figure 3.13) made a close pass to Grand Cayman while undergoing an eyewall replacement cycle and maintaining

Category 4 and 5 intensities (Stewart 2005). During an eyewall replacement cycle, the minimum surface pressure increases and wind speeds decrease temporarily as the outer eyewall replaces the disintegrating inner eyewall (Hobgood 2005). In the case of Hurricane Ivan, the intensity dipped from Category 5 to Category 4 as the eye of the storm passed Grand Cayman and reintensified to Category 5 following the eyewall replacement cycle (Stewart 2005). The accompanying storm surge over-swept the island with 2.4 – 3 meters (8 – 10 feet) of water, covering the island with the exception of the slightly higher northeastern edge of the island (Stewart 2005; Johnson et al. 2008). The maximum land-based observed wind speed associated with Hurricane Ivan was measured on Grand Cayman as sustained at 67m/s (130 knots) and gusts up to 77 m/s (149 knots) at 1345 UTC on 12 September 2004 (Stewart 2005). As an event, Hurricane Ivan can be considered a “radical surprise” because it redefined the collective perception of necessary protective actions, safe locations on the island, and hurricane strength and its potential impacts to Grand Cayman (Kuhlicke 2009). Images from during and after Hurricane Ivan at the study hotels are included in Appendix I.

In the aftermath, the damage reports included 95% of the homes and buildings on Grand Cayman as damaged or destroyed and an estimated damage total of \$1.85 billion US dollars (Stewart 2005). Full power was not restored to the island until December 2004, hindering recovery efforts (Johnson 2008). Only one of the four grocery stores on Grand Cayman survived the storm, causing residents to have to wait four to five hours in line for what few resources remained (Craig et al. 2006). The active hurricane season prior to Hurricane Ivan had delayed shipment of used oil off the island and created a backlog of approximately 900 oil drums that were swept by the storm surge from the

holding areas to nearby canals and vegetated areas, including mangroves (Johnson et al. 2008). The drums were not fully removed until May of 2005 when a full recovery crew was able to return to the island and resources were available to contain and collect what oil they could that had spilled (Johnson et al. 2008). The local medical school, St. Matthew's University, was damaged beyond usability, forcing the students and faculty to relocate to Windham, Maine at another campus until the Grand Cayman location could be re-opened in May 2005 (Ceaser 2005).

In the tourist sector, by January 2005, only twenty-five percent of the total room inventory (2,292 rooms pre-Ivan) were available on Grand Cayman with the Hyatt Regency and Grand Cayman Marriott Beach Resort (Figure 3.14) still closed and The Ritz-Carlton, Grand Cayman having delayed its opening (McGowan 2005a). As recovery continued over the course of the year, hotels opened what rooms were available and experienced high occupancy levels in the 2005 holiday season. Following receipt of a US\$150 million insurance claim, mold remediation, and rebuilding, The Ritz-Carlton, Grand Cayman opened in December 2005 with 173 of its 365 rooms ready for guests (McGowan 2005b; Carman 2011). The Hyatt Regency re-opened its beach suites and the portion of the hotel on Seven Mile Beach. Now known as Grand Cayman Beach Suites, the ocean-front portion of the resort is in operation, whereas the remaining 230 rooms of the former-Hyatt Regency stand abandoned and derelict on the other side of West Bay Road as an insurance claim from Hurricane Ivan remains outstanding (McGowan 2005b; Shereves 2009; Cayman News Service 2011). The Grand Cayman Marriott Beach Resort re-opened its entire property in time for the Christmas season as did the Westin Casuarina (McGowan 2005b).

The residual impacts of Hurricane Ivan on the tourism industry are visible in the statistics from the Caribbean Tourism Organization from 2004 – 2010. With the passage of Hurricane Ivan in September 2004, the prospects for a profitable high season (November – March) disappeared as the hotels and other establishments on the island took inventory of the damage and began repairs. Table 3.1 illustrates the change in stop-over arrivals of international tourists by year from 2004 – 2010 (Caribbean Tourism Organization 2011). In 2004, the summer arrivals were 11.8% higher than they were in 2003, suggesting that if Hurricane Ivan had missed the island or done less damage, the winter season would also have seen an increase in arrivals instead of the 26.5% loss that occurred. Summer of 2005 showed the most significant decrease in arrivals with 55.7% fewer tourists arriving than in the summer of 2004. The opening of The Ritz-Carlton, Grand Cayman in December 2005 as well as the re-opening of other island hotels, particularly the Marriott Grand Cayman Beach Resort and the Westin Casuarina, in time for the winter season forestalled a larger loss in tourist arrivals, with 15.5% fewer arrivals than in the winter of 2004. After the winter of 2005, tourist stop-over arrivals rebounded in 2006 with an overall increase in arrivals of 59.3%, reflecting the island's recovery from the hurricane and the return to preeminence as a tourism destination in the Caribbean. With the exception of 2009, the Cayman Islands have seen an increase in tourist arrivals each year since Hurricane Ivan. The decrease in 2009 was caused not by a hurricane, but instead a global economic crisis that wreaked havoc in the tourism industry worldwide (Blanke and Chiesa 2009). In Table 3.2, international arrivals by major market reflect the downturn in arrivals from all countries caused in 2004 and 2005 by Hurricane

Ivan and in 2009 by the worldwide economic downturn (Caribbean Tourism Organization 2011).

The longer recovery time necessary for Grand Cayman from the hurricane-caused destruction shows the lasting impact hurricanes have on one of the main economic drivers of the Cayman Islands' economy. The dominance of tourists arriving from the United States also illustrates the intertwinedness of the Cayman Islands' tourism industry with the United States' economy and its vagaries.

Table 3.1: Tourist Arrivals 2004-2010

Tourist (Stop-Over) Arrivals (Jan-Dec)				
% Change				
<i>Year</i>	<i>Annual Total</i>	<i>Overall</i>	<i>Summer</i>	<i>Winter</i>
2004	259,929	-11.4	11.8	-26.5
2005	167,801	-35.4	-55.7	-15.5
2006	267,257	59.3	84.2	46.4
2007	291,503	9.1	8.3	9.5
2008	302,879	3.9	9.5	0.3
2009	271,958	-10.2	-12.5	-8.6
2010	288,272	6	5.6	6.2

Table 3.2: Tourist Arrivals on Grand Cayman by Origin

Tourist Arrivals by Main Market								
<i>United States</i>			<i>Canada</i>		<i>Europe</i>		<i>Other</i>	
Year	Tourists	% change	Tourists	% change	Tourists	% change	Tourists	% change
2004	35,751	16.7	1,549	20.2	8,037	27.4	8,650	-0.3
2005	118,843	-42.1	10,480	-13.5	12,716	-16.8	25,762	-5.7
2006	217,363	82.9	14,910	42.3	16,721	31.5	18,263	-29.1
2007	231,865	6.7	17,355	16.4	20,267	21.2	22,016	20.5
2008	240,462	3.7	18,544	6.9	21,271	5.0	22,602	2.7
2009	215,037	-10.6	17,254	-7.0	19,117	-10.1	20,550	-9.1
2010	228,461	6.2	19,499	13.0	19,850	3.8	20,462	-0.4



Figure 3.1: The Cayman Islands Source: CIA World Factbook

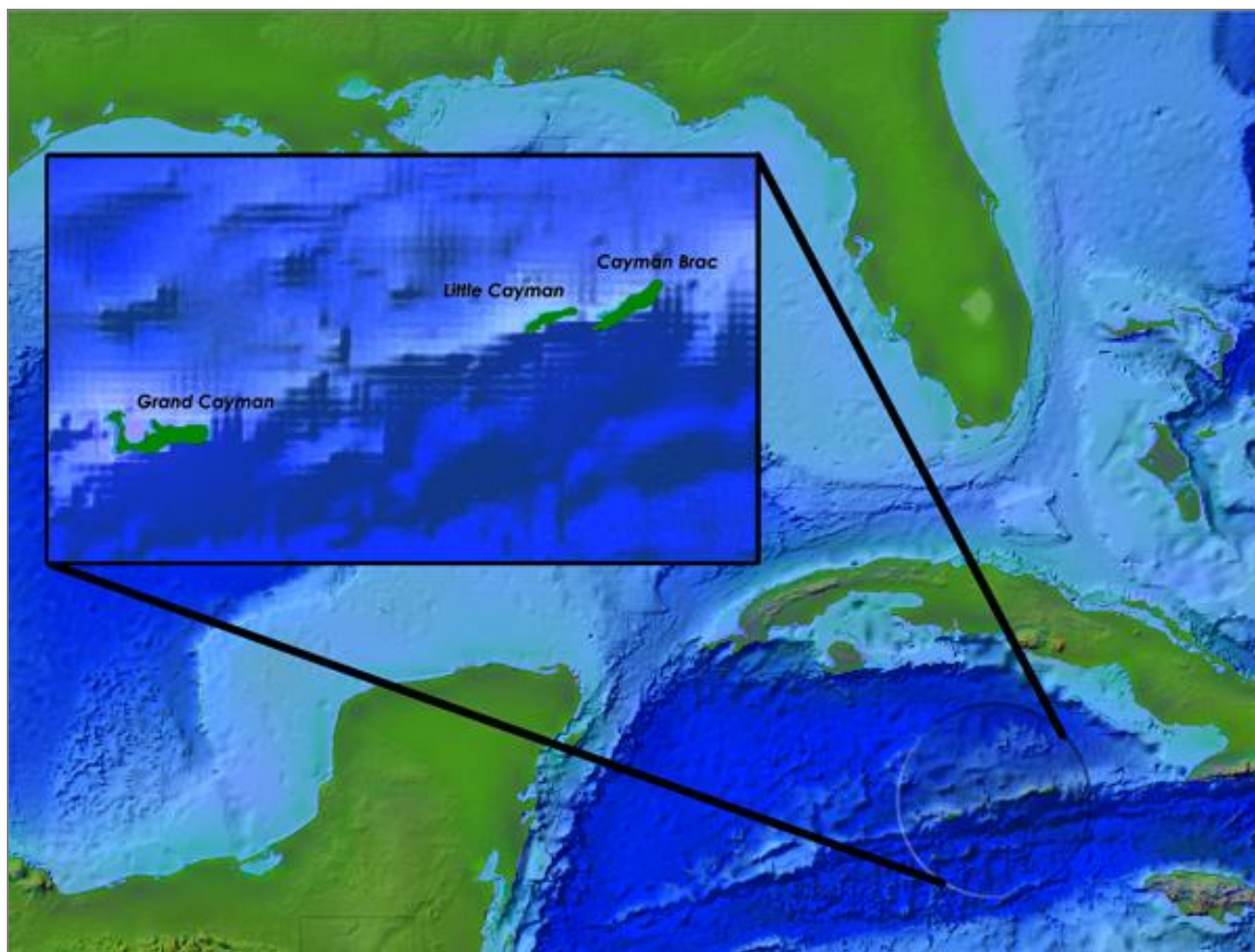


Figure 3.2: Location of the Cayman Islands Source: Cayman Islands Twilight Zone 2007 Exploration, NOAA-OE



Figure 3.3: Astronaut photo of Grand Cayman Source: NASA

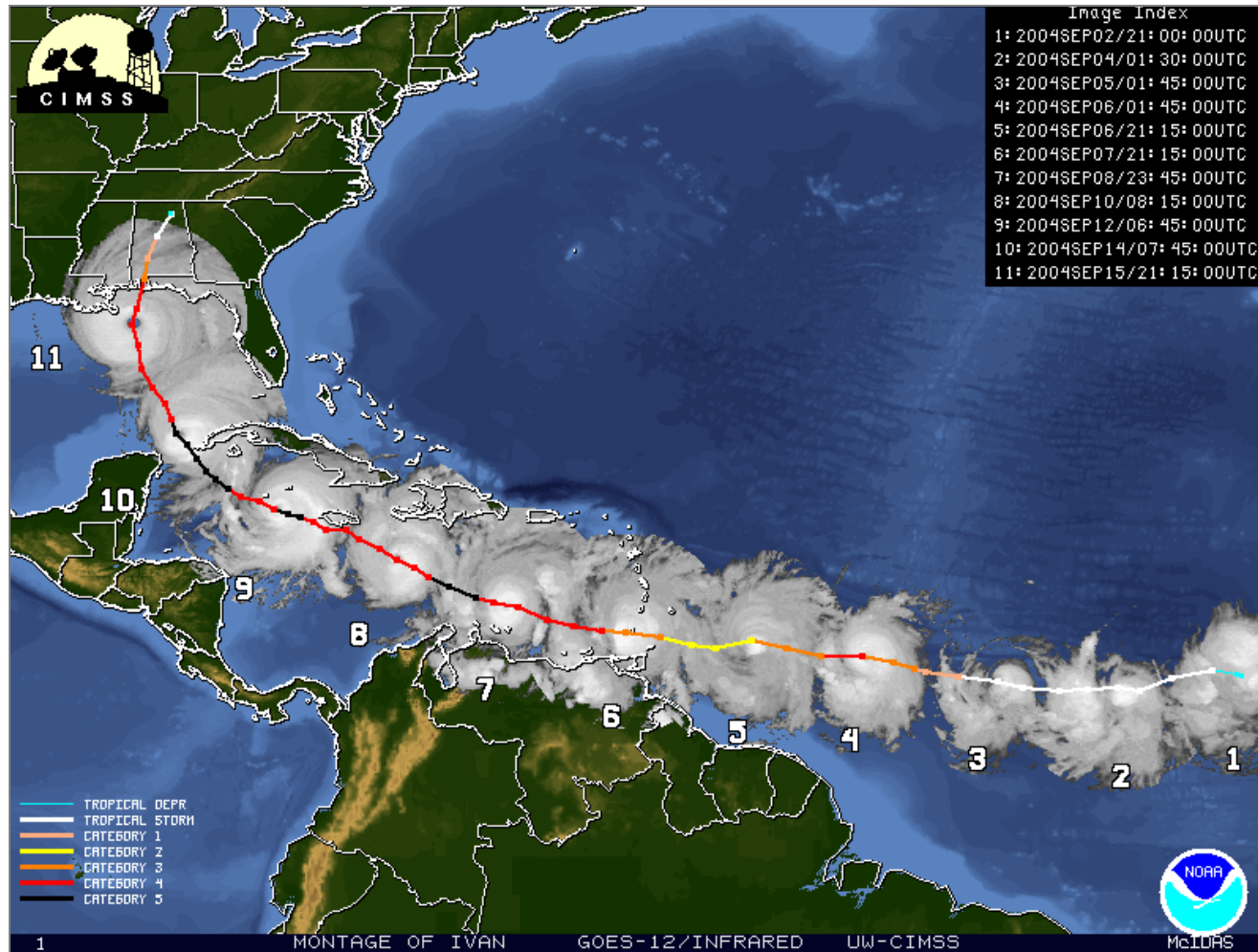


Figure 3.4: Composite of satellite imagery and best track line for Hurricane Ivan
Source: GOES, National Hurricane Center, NOAA



Figure 3.5: Eye of Hurricane Ivan from the International Space Station **Source: NASA**



Figure 3.6: Aerial view of The Ritz-Carlton, Grand Cayman (left) and the Marriott Grand Cayman Beach Resort (right)
Source: Hotels (respectively)



Figure 3.7: Bottles of fresh water for Hurricane Dean
Source: The Ritz-Carlton, Grand Cayman

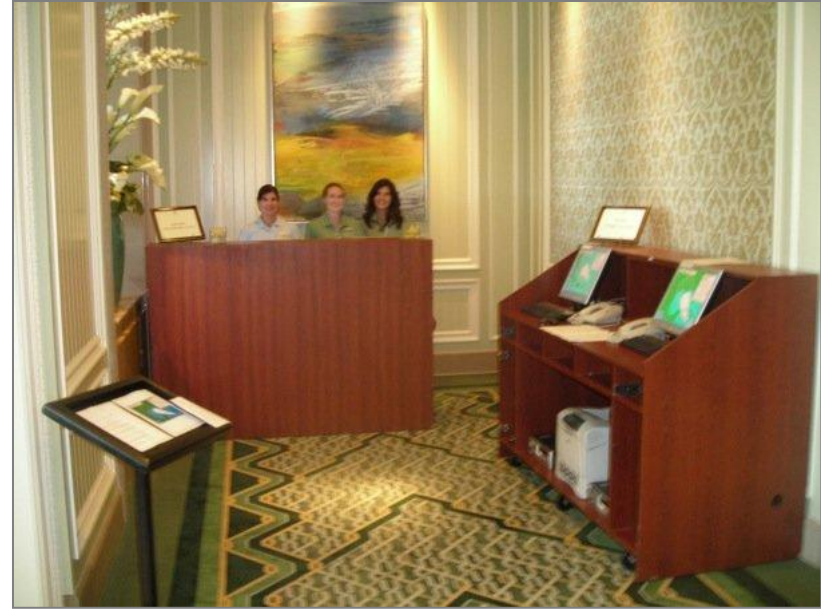


Figure 3.8: Flight assistance desk for hotel guests
Source: Sam Andersen



Figure 3.9: The beach at The Ritz-Carlton, Grand Cayman normally (left) and Pre-hurricane (right)
Source: Nick Wyatt (left) and The Ritz-Carlton, Grand Cayman (right)



Figure 3.10: Seven Mile Beach during Hurricane Ivan from The Ritz-Carlton, Grand Cayman

Source: Jim Carman



Figure 3.11: Critical employees during Hurricane Dean

Source: The Ritz-Carlton, Grand Cayman

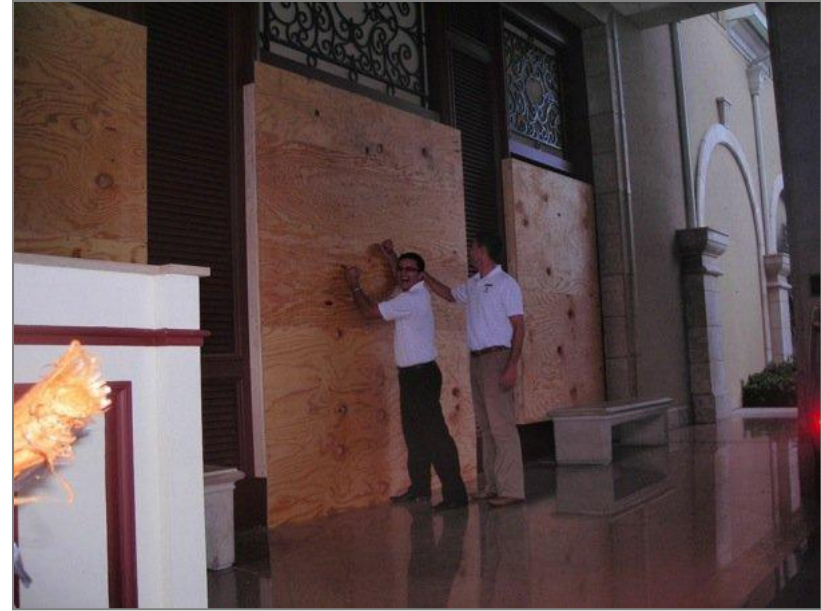


Figure 3.12: Securing the front entrance of The Ritz-Carlton, Grand Cayman

Source: Sam Andersen

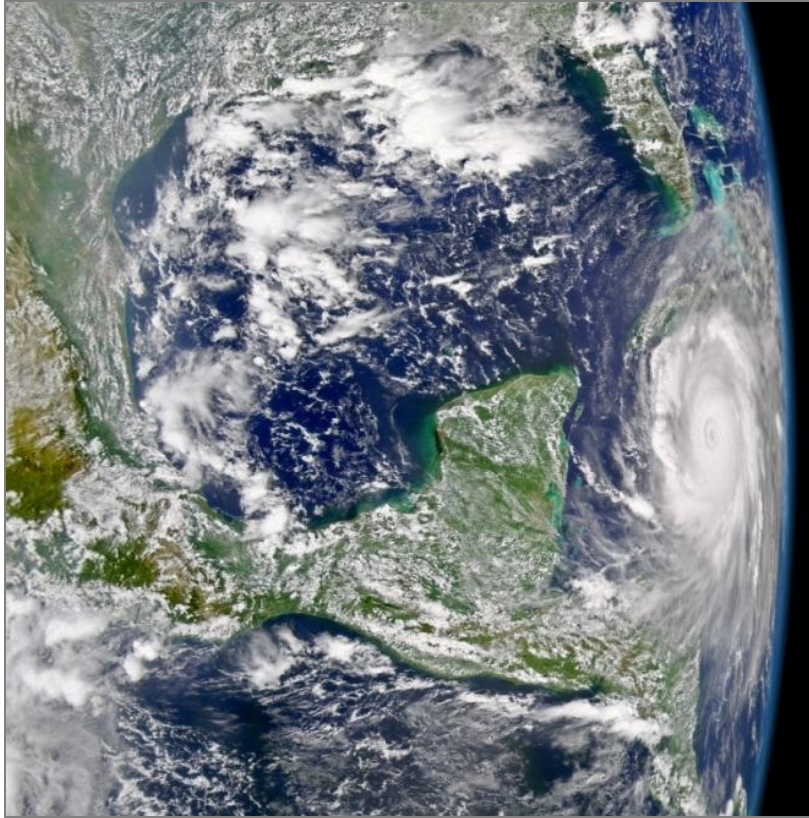


Figure 3.13: Hurricane Ivan in the Caribbean Sea
Source: MODIS, NASA



Figure 3.14: Sign in main entrance after Hurricane Ivan
Source: Grand Cayman Marriott Beach Resort

CHAPTER IV

METHODOLOGY

Creating the Case Study

In order to gain access to the employees of the two hotels, the researcher used existing relationships with the management at both properties. As explained by Feldman et al. (2003), using endorsement by management to conduct research has three potential outcomes: 1) doors can be opened and employees encouraged to participate 2) doors can be opened but employees need further encouragement to participate or 3) doors can be closed and access to employees denied. In this case study, the management positively influenced the outcomes by allowing the researcher full access to employees and the hotel properties and publicizing the research opportunity via daily outreach to employees. As a former employee at The Ritz-Carlton, Grand Cayman, the researcher was known to some of the employees at both hotels, providing “insider status” and creating a sense of familiarity that opened a gateway to other employees being less leery of the research and responding (Feldman et al. 2003). In “Towards a Framework for Tourism Disaster Management,” Faulkner (2001) identifies six phases in the timeline of a disaster: pre-event, prodromal, emergency, intermediate, long-term, and resolution. By surveying hotel employees, this research creates a baseline for employee readiness for hurricanes and employees’ likely actions during Faulkner’s first three phases.

A mixed-mode survey with both fixed responses and options for respondents to answer in their own words was utilized to acquire quantitative and qualitative data regarding their perceptions of hurricane evacuation preparedness. The survey attempted to capture the hotel employees' level of preparedness education, ability to create contingency plans when a hurricane is imminent, and plans for evacuation prior to the onset of the hurricane (Faulkner 2001). Although it can be argued that people distort their responses, either inadvertently or deliberately, when they take surveys, research has found that people's anticipated behavior corresponds closely with what they actually did in the case of an evacuation (Kang et al. 2007).

Data Collection

A survey instrument was created based on Drabek's (2001) characteristics of employees in the tourist industry: position level, length of community residence, marital status, and age. Additionally, because of Grand Cayman's high percentage of expatriate employees, questions were included to assess the previous experience employees have had with tropical systems, other places of residence, and primary language(s) spoken. These questions allow analysis to show the demographic profile of responding employees to the overall demographic profile of expatriate employees of Grand Cayman (Amit 2001). The research was designed based on the level of access to the employees the researcher would have (Feldman et al. 2003).

Though employees on Grand Cayman come from around the world, the official language of the island is English. The Department of Immigration administers an English Skills Test upon arrival to the island for work permit holders who do not speak English as

a first language. Expatriate workers are expected to have a basic understanding of spoken and written English in order “to ensure that they are able to perform their work duties effectively, administer themselves and their families, and assimilate quickly into the community (Cayman Islands Immigration 2007).” Based on this requirement, the survey was created solely in English, providing definitions for terms that are not common in everyday English.

Over the course of a week, surveys (see Appendices C&D) were administered by the researcher in the employee dining rooms of The Ritz-Carlton, Grand Cayman and the Grand Cayman Marriott Beach Resort (Figure 4.1). The employee dining rooms were chosen as a survey location for several reasons. First, employees are not permitted to leave the property during their shifts for meals. Both hotels provide meals for their employees in the employee dining room three times per day. Second, the employee dining rooms are not visible to the guests of the hotel, eliminating the potential for guests to see employees taking a survey or wondering why the employees are answering questions about hurricanes. Third, employees also take breaks in the employee dining rooms and often look for something to do in their downtime.

The information in both surveys was the same with each survey personalized for The Ritz-Carlton, Grand Cayman and the Grand Cayman Marriott Beach Resort. Hotel employees who were working on those days were asked to participate in the survey. In order to acquire a sample from the broadest portion of the hotel possible, the researcher was present for the three major meals of the day provided by each hotel as well as the time in between meals when hotel employees use the employee dining room as a break room. Participation was completely voluntary and anonymous. Employees were asked to

accept a survey and cover letter as they entered the employee dining rooms. Pens were provided as needed. The cover letter for the survey (Appendices A&B) described the research being undertaken and the uses of the data collected. By filling out a survey, participants consented to their responses being used in the data analysis. Once they took it, they could hand it back to the researcher or add it to the pile of completed surveys in a box on the table. Those who chose not to take the survey were able to leave the blank survey on the table. The respondents kept the cover letters which contained contact information for the researcher in case of further questions or comments regarding the research.

The researcher was present to clarify and address any technical issues that arose. The survey took approximately 5-15 minutes of the respondents' time. In order to have minimum impact on the operations of the hotel, respondents were asked to take the survey during their lunch or break times. Both hotels consented to participate in the research project and provided support for the researcher by promoting employee participation in the survey and providing a table in the employee dining room from which to administer the survey (Appendices E&F). The survey instrument was approved by the Texas State University Institutional Review Board under IRB#2008-17775.

Case Study Analysis

Within the populations of The Ritz-Carlton, Grand Cayman and the Grand Cayman Marriott Beach Resort, the sample unit of respondents was considered a sample of convenience as the researcher only had access to the employees who were scheduled to work. The researcher had no influence over who was scheduled to work or which shift

they were working that day. In an attempt to reach employees across the shift changes, the researcher administered the survey throughout the day, including breakfast, lunch, and dinner services as well as the intervening time. The chi-square (X^2) test was the main statistical test used to determine the significance of relationships between variables in the study including gender, experience with hurricanes, and age.

Questions on the survey were designed to collect information on employees' preparations for, and anticipated responses to, the impending arrival of a tropical storm or hurricane. Basic demographic information was included to create a profile of the sample taken from the employee populations of The Ritz-Carlton, Grand Cayman and the Grand Cayman Marriott Beach Resort. Because of the varying international educational requirements and terminology for different levels of education, respondents were not asked about their highest level of education. In order to address the first and second research questions, respondents were asked to indicate which level of hurricane activity would cause them to evacuate their residence to seek shelter elsewhere on Grand Cayman or leave the island in advance of the storm. To ascertain how well respondents understand the scope of a hurricane's influence in the region, they were asked how many hours in advance of a hurricane's arrival they would evacuate on-island or off-island. It was speculated that respondents will have a varied range of time for departure depending on previous experience with hurricanes (part of the demographic questions section). Leaving a small island in advance of a hurricane can be an expensive proposition, so respondents were asked to place a maximum price they would be willing to pay to evacuate off-island.

The results were compared to the findings by Tompkins et al. (2009b) that foreignness is a determining factor on hurricane preparedness on Grand Cayman. In this

study, place of birth and time of residency on Grand Cayman were examined to see if foreignness factors into hotel employee preparedness.



Figure 4.1: Employee dining room at The Ritz-Carlton, Grand Cayman (left) the Grand Cayman Marriott Beach Resort (right)
Source: Author

CHAPTER V

DATA ANALYSIS

Survey Demographics

The number of employees available to be surveyed at each hotel reflected both the total number of employees at each of the properties and the practice of reducing hotel staffing in the off-season (de Albuquerque and McElroy 1992). At both properties, employees are encouraged and sometimes required to take vacation time during the peak of hurricane season and the trough of low hotel occupancy, July – mid-October. The Ritz-Carlton, Grand Cayman had a large group staying at the property during the study period, utilizing approximately 90% of its full staffing schedule. The Grand Cayman Marriott Beach Resort was in a period of low occupancy because of the off-season which coincides with hurricane season and had about 45% of its full staffing schedule, decreasing the availability of employees to participate in the survey. As shown in Table 5.1, each of the resorts employs people in two overarching categories: salary and hourly. The salary workers at each resort are the hotel, resort, and department managers who represent a minority portion of the total workforce (11% at The Ritz-Carlton, Grand Cayman and 12% at Grand Cayman Marriott Beach Resort). The hourly workers make up the majority of the staff at each resort, including supervisors.

After conducting the survey at the two hotels, a total of 123 surveys were collected and completed to a useable level. As respondents took the survey independently, they were able to leave items blank. In some cases, this caused the total surveys collected to be greater than the total number of responses to a particular question. In statistical calculations, the N-value was adjusted accordingly. Thirty-five surveys were completed at the Grand Cayman Marriott Beach Resort, representing 16% of the total employees at the resort. However, given the low staffing period, the percentage of respondents increased to 63% of the employees scheduled to work during the survey period. Employees of the Ritz-Carlton, Grand Cayman completed 88 surveys, representing 11% of total employees. The distribution of respondents by employment category is also shown in Table 5.1. While all 833 of the Ritz-Carlton, Grand Cayman's employees are not scheduled to work every day, the response rate at that hotel was significantly lower than that of the Grand Cayman Marriott Beach Resort. The crowded employee dining room at the Ritz-Carlton, Grand Cayman contributed to a lower response rate as employees ate quickly and left to go outside for air or used their break to catch up with friends from other departments.

Expatriates are employed more by the Ritz-Carlton, Grand Cayman than the Grand Cayman Marriott Beach Resort. Of its 833 employees, the Ritz-Carlton, Grand Cayman has 188 (23%) who are Caymanian or have resident status and 645 (73%) who are expatriates. The pool of eighty-eight respondents at the Ritz-Carlton, Grand Cayman consists of twenty-three (26%) Caymanian status holders and 63 (72%) expatriates. Though the percentage of respondents is low, the ratio between respondents with a level of Caymanian status and expatriate workers maintains representation for the two groups

relative to the employment ratio of the whole resort. At the Grand Cayman Marriott Beach Resort, the response rate of the employees relative to the total number of people employed by the hotel was also low, disregarding the adjustment for how many were scheduled to work during the survey period. The Grand Cayman Marriott Beach Resort employs ninety-three (43%) Caymanian status holders and 125 (57%) expatriates. Thirty-five people returned the survey, twelve (34%) of whom hold Caymanian status and twenty-two (63%) expatriates. The ratio of respondents shifts a little towards the expatriates for responding to the survey. The slight variance between the ratios of total employees and survey respondents may be attributable to the staffing schedule for the survey period.

Where the survey respondents considered home was important in this study to identify the diversity of the respondents and identify any patterns within the pool of expatriate workers. Respondents answered the Question #5 in the demographics section with the name of what they consider to be their home country. As shown in Figure 5.1, Jamaica (n=24, 19.83%) and the United States (n=16, 13.22%) had the most respondents out of the thirty countries represented. The Cayman Islands (n=12, 9.92%) ranked third. Rounding out the top five are the Philippines (n=11, 9.09%) and Canada (n=10, 8.26%). The five countries with the most representation among the respondents constitute a majority of the respondents (n=73, 60.32%). Each of these four nations is closely tied to the fifth nation, the Cayman Islands, either politically or geographically. Jamaica is located in close geographic proximity to Grand Cayman and was the source of colonial government until Jamaica declared its independence from England in 1959 and the Cayman Islands became a Crown Colony to the United Kingdom (Black 1965). Canada is

also a member of the British Commonwealth, allowing for different entry requirements to the Cayman Islands. The United States is a dominant country located near the Cayman Islands and the primary air link for the island nation. The Cayman Islands dollar and US dollar are used interchangeably at most locations on Grand Cayman, showing the influence of the United States on the island economically. Although located on the other side of the world, the Philippines are tied politically to the United States and as such share entry permissions for the Cayman Islands.

The primary language of respondents was also of interest in this study because the warnings and information issued from the National Hurricane Center website (www.nhc.noaa.gov) are issued primarily in English and some products are issued in Spanish. The Cayman Islands government weather website (www.weather.gov.ky) only provides information in English. Although the Cayman Islands require work permit holders to understand basic spoken and written English, hurricane forecasts may be more comprehensible in a native language. Question #3 of the survey demographics asks an open-response question, “What is your primary language?” to which 133 responses were given by 122 respondents. As Figure 5.2 shows, all of the languages cited as primary were included in the analysis, creating a higher total than the number of respondents. Two respondents answered with three primary languages: French, Arabic, and Swedish and Tamil, Hindi, and English. Seven respondents reported speaking two primary languages. The most common primary language was English (n=85, 63.91%). Spanish (n=16, 12.03%) follows English as the second most common primary language. The breakdown of primary languages is closely related to the primary language of the respondents’ home countries. However, discrepancies may exist within each language

because of different dialects spoken in various countries such as English as spoken in the United Kingdom, the United States, the Cayman Islands, and Jamaica.

Respondents answered three questions regarding their work experience including their time working on Grand Cayman, at the specific hotel, and for the hotel chain overall, including other properties. The time of employment on Grand Cayman was determined based on responses to Question 6, “How long have you worked on Grand Cayman? ____ (Months/Years).” The average length of employment on Grand Cayman by respondents is 81.43 months (6 years, 9.48 months) with a minimum of one month and a maximum of 552 months (46 years). As Figure 5.3 illustrates, the time of employment on Grand Cayman is clearly divided between expatriate workers who have a shorter legal working time on-island and Caymanians workers who may live and work on-island their entire lives. The median and mode were 36 months (3 years), reflecting the more transitory nature of hospitality employees and the length of time The Ritz-Carlton, Grand Cayman had been open. Figure 5.4 shows the time respondents have been working at one of the study hotels has a similar distribution to the amount of time they have been working on the island. Part of this similarity can be attributed to the opening of The Ritz-Carlton, Grand Cayman and the influx of expatriate workers who were hired to work at the resort. With 110 of 123 (89.4%) respondents reporting that they have worked for 36 months or less at the study hotel, the transitory nature and high turnover of hospitality workers at both study hotels were confirmed. The numbers shift when considering the total time a respondent has worked for Marriott, International or The Ritz-Carlton, L.L.C. as shown in Figure 5.5. Using the same 36 month time period captures only seventy-eight of 108 (72%) respondents, suggesting that employees who are already employed by

either hotel chain transfer within the company to work on Grand Cayman. The larger number of respondents who have worked more than five years ($61 \geq$ months) for their hotel company (17) than those respondents who have worked at the study hotel for the same length of time (6) suggests that these respondents are expatriates who have worked elsewhere for the company and transferred to Grand Cayman when an opportunity arose.

Using chi-square analysis, tests of homogeneity revealed whether the observed demographic categories of respondents were different from what would be expected. Using the data in the below table (Table 5.2), tests of homogeneity were run to determine if differences existed among respondents based on combinations of age, sex, and work permit status. The first test examined the differences between the age and sex of survey respondents and found no statistically significant difference between the ages of men and women in the study group ($X^2=0.803$, $df=1$, $p=0.370$). Respondents who reported having a work permit versus resident or citizen status for the Cayman Islands did differ significantly in terms of gender ($X^2=8.18$, $df=1$, $p=.004$), whereas age was not a significant factor ($X^2=1.05$, $df=1$, $p=.306$) for work permit status.

Previous experience with hurricanes was included in the demographics section via Questions #14-18, which asked whether respondents had been in or lived somewhere with hurricanes and, if so, which ones they were. Between 1969-2008, the respondents in this survey collectively experienced thirty different tropical cyclones (see Appendix J for a full list). The list included a variety of hurricanes that impacted more than one location. Using Hurricane Wilma as an example, a rough estimate of the hurricane's path can be made from the countries in which respondents were located: Grand Cayman, Cancun, Mexico, Florida, U.S., and Bermuda. Respondents cited ten different countries as their

locations when they experienced a tropical cyclone (Table 5.3). Within the United States, respondents reported being in five different states during hurricanes: Florida (10), Georgia (1), New York City, NY (2), North Carolina (7), and Virginia (1). With the exception of Mozambique, all of the countries cited are within the Americas and the Caribbean Basin. Respondents citing experience in Mexico were in Cancun, on the Caribbean side of the country.

Quantitative Results for Hurricane-related Actions

In order to find the significant factors for respondents to take action in advance of a hurricane, chi-square tests of homogeneity were run using demographics, previous experience in tropical cyclones, sources of information, and anticipated actions for the next hurricane on Grand Cayman. Experience in a previous storm is often cited as an indicator of future protective actions. To determine if previous experience was limited to Caymanians in this study or if expatriates also came to the island with tropical cyclone experience, a chi-square analysis was run with work permit status and previous experience as the two variables. Results showed that work permit status was not a significant factor ($X^2=2.20$, $df=1$, $p=0.138$) in determining which respondents would have previous experience. Age ($X^2=0.675$, $df=1$, $p=0.411$) and sex ($X^2=0.477$, $df=1$, $p=0.490$) also proved to be not significant variables in relation to previous experience. In addition to ascertaining their previous experience with tropical cyclones, respondents were asked if they had lived anywhere other than Grand Cayman susceptible to hurricanes. The results of chi-square analysis showed that work permit status ($X^2=0.104$, $df=1$, $p=0.747$), age ($X^2=2.19$, $df=1$, $p=0.138$), and sex ($X^2=2.64$, $df=1$, $p=0.104$) were not significant

indicators of having lived elsewhere with tropical cyclones.

Respondents were asked to predict under what circumstances they would evacuate their home to somewhere else on-island and under what circumstances they would evacuate Grand Cayman to another country for the duration of the storm. When making their decisions whether or not to evacuate on-island or off-island, respondents need to find information on the storm's characteristics. In the survey, respondents had ten options for information sources, including an "Other" option. For analysis purposes, the ten options were sorted into general categories of official, hotel, media, and social sources. Official sources were considered to be information from the governments of the Cayman Islands and the United States, including agencies such as the National Hurricane Center. Hotel sources included any information disseminated to employees via email, postings in the hotel, etc., even if the hotel was reposting information from a government or media source. Media information included television broadcasts, internet sources, radio stations, and newspapers. Social sources included networks of friends and family, regardless of how the information is exchanged. Respondents who explained their response in the "other" column cited sources that fell within the general categories and were included within them. Chi-square analysis showed that age ($X^2=5.80$, $df=3$, $p=0.122$) and sex ($X^2=0.252$, $df=3$, $p=0.969$) were not significant factors in determining which source of information respondents would use.

In addition to citing from which sources they would seek storm information, respondents also indicated at which predicted intensity of tropical storm or hurricane they would make the decision to evacuate on-island or off-island. The options to evacuate on-island and off-island were non-exclusive to incorporate the most possible options.

Respondents were able to indicate that they would evacuate on-island or off-island for all intensities of storms since the decision depends on multiple variables. For evacuating on-island (Survey: Section B, Question #2) and evacuating off-island (Survey: Section B, Question #8), respondents were asked to check for which intensities of tropical cyclones they would evacuate on-island or off-island (Figure 5.6). The responses were classified into two intensity classes: minor and major hurricanes. As defined by the National Hurricane Center, a major hurricane is one that has sustained one-minute wind speeds of 50m/s (130kt) or greater, encompassing Category 3, 4, and 5 storms on the Saffir-Simpson scale (Goldenberg 2011). Within each class, chi-square tests were used to determine if a significant difference existed between the actions respondents would take if a hurricane was approaching the island and predicted to make a direct hit, as with Hurricanes Gilbert and Ivan, or pass by with a glancing blow, as with Hurricanes Mitch and Wilma. For minor hurricanes, the difference between a direct hit and a glancing blow did not result in statistically significant differences for evacuating off-island ($X^2=0.2$, $df=1$, $p=0.655$) whereas the differences for evacuating on-island approached significance at the 95% confidence level ($X^2=5.57$, $df=1$, $p=0.018$). For major hurricanes, a statistically significant difference occurred between actions taken for a glancing blow versus a direct hit for both evacuating on-island ($X^2=8.22$, $df=1$, $p=0.004$) and evacuating off-island ($X^2=18.3$, $df=1$, $p=0.000$).

Given the threat posed by hurricanes to Grand Cayman, especially the lasting destruction caused by Category 5 storms, age, sex, having been in a hurricane, and having lived elsewhere with storms were examined to determine if one or more of them was a determining factor in deciding to leave the island in advance of a direct hit from a

Category 5 hurricane. Age ($X^2=1.80$, $df=1$, $p=0.179$) and sex ($X^2=2.97$, $df=1$, $p=0.085$) proved to be not significant determinants of evacuating off-island ahead of a Category 5. Although direct experience with hurricanes or living in an area subject to their hazards is often cited as a determinant of future action, the results from this study did not find a significant relationship between have been through a tropical cyclone ($X^2=0.00$, $df=1$, $p=1.0$) or having lived somewhere with tropical cyclones ($X^2=0.00$, $df=1$, $p=1.0$) and evacuating off-island in anticipation of a direct hit from a Category 5 hurricane.

Qualitative Results

Respondents were asked a variety of open-ended questions in the survey to capture the qualitative side of their experiences with tropical cyclones and factors for the actions they plan to take when the next one approaches Grand Cayman. Responses ranged from locations they view as safer than Grand Cayman, personal and family considerations, faith-based reasoning, and a sense of home. In this analysis, responses are agglomerated and reported as a representation of an individual rather than discussed on a question-by-question basis.

In this study, Jamaica is viewed by its citizens as a safer alternative to Grand Cayman. Four women cited general safety as a primary reason they would return to Jamaica for a hurricane. One woman (30-49) who was on Jamaica for Hurricanes Gilbert, Ivan, and Dean stated that she would not stay on Grand Cayman for any type of tropical storm or hurricane because she feels safer at home and views Jamaica as less flood-prone than Grand Cayman. Although the previous woman would leave forty-eight hours ahead of a storm's arrival on Grand Cayman, another woman (30-49) would wait until one hour

before a forecasted direct hit by a Category 4 or 5 hurricane reached Grand Cayman to leave for Jamaica because “it is more safe.” The other two women (18-29 and 30-49) would evacuate off-island before any type of interaction between a Category 4 or 5 hurricane and Grand Cayman, leaving either eight hours (30-49) or twenty-four hours before the storm for a home country that can survive a major hurricane and feels safer than Grand Cayman.

As a more mountainous country with its Blue Mountains and their maximum elevation of 2,256m (CIA World Factbook 2001b), Jamaica offers the option to go to an elevation above potential storm surge heights that Grand Cayman does not. The ability to be on land well above sea level provides the respondents with a sense of security. Respondents cited topography as an important factor in their decision to return to Jamaica from Grand Cayman to ride out the hurricane. A female respondent, aged 30-49 who was in Jamaica for Hurricane Gilbert, would evacuate off of Grand Cayman in advance of a hurricane Category 3 or above since “land in Cayman is too flat, land terrain better in Jamaica.” Another woman (30-49) who was on Grand Cayman for Hurricane Ivan would evacuate off-island to Jamaica for a hurricane Category 3+ because they have “lots of mountains.” Having survived Hurricane Gilbert and Hurricane Ivan on Grand Cayman, a Caymanian woman (30-49) would go to Jamaica at any cost five hours ahead of a Category 5 on Grand Cayman “because they have a lot of mountains.”

Contrary to the other cited Jamaican respondents, a woman, aged between 50-59 who was on Jamaica for both Hurricane Gilbert and Hurricane Ivan, would leave the island before a Category 5 approaching Grand Cayman by going to England since it is “out of hurricane reach.” A respondent (male, age 30-49), who shares her sentiment of

getting out of the potential range of the hurricane, would evacuate off-island twelve hours before a direct hit or glancing blow by a Category 3+ hurricane to “the nearest opposite of the direct hit country...for sure hurricane has less chance to comeback.” The timeliness of evacuating off-island varies greatly amongst respondents. Within the group of respondents who would go to Jamaica for the duration of the storm, times ranged from departing times ranged between 1-72 hours prior to the arrival of a Category 5 storm at Grand Cayman. Given the 268km distance between Jamaica and Grand Cayman, both islands can be experiencing hurricane conditions at the same time as in Hurricane Ivan (Figure 5.7) when Grand Cayman was beginning to experience the force of the hurricane as the storm was finishing its passage over Jamaica. Respondents who estimated their time of departure at less than forty-eight hours before the hurricane reached Grand Cayman may find their passage blocked by the very storm they are trying to elude. Only one respondent, a 30-49 year-old Jamaican woman who was on Jamaica for Hurricane Gilbert and on Cayman for Hurricane Ivan, cited this issue in her response stating, “(Hurricanes) usually hit Jamaica first, so Miami would be my next choice” to leave Grand Cayman twelve hours in advance of a forecast direct hit or glancing blow by a Category 3+ hurricane.

The sentiment of returning home was shared by respondents across international lines as people expressed their desire to be home during a hazardous event, not in a foreign country. Having experienced Hurricane Ivan on Grand Cayman, one woman in her fifties would return to Jamaica because it is her home country two hours before the arrival of a Category 5 at Grand Cayman. A male worker (30-49) from the Philippines had no experience with hurricanes but would evacuate off-island before any category of

hurricane to return home because it is a better place to work. A 30-49 year-old male from India would return home to India in advance of a Category 3+ storm because of his perception that India is a “hurricane-free country.” An American woman (18-29) reportedly experienced Hurricane Andrew in New York and was on Grand Cayman for Hurricanes Gustav and Dean. She would remain on-island for a Category 1-4 hurricane, and would return to the United States in advance of a Category 5 storm because “I can avoid the storm even if it comes to the US and I have family there.” Citing her experiences on Grand Cayman with Hurricanes Charley, Ivan, Wilma, Dean, and Gustav, a Canadian woman (18-29) would not evacuate from her cement home with shutters, but she would evacuate off-island twenty-four hours ahead of a Category 5 storm for her home in Canada, preferably, or the United States to be closer to home. An American male (30-49) would be required to be at work for a Category 3+ hurricane, but he would evacuate off-island thirty-six hours before the arrival of a Category 5 (direct hit or glancing blow), returning home to the United States because “My girlfriend went through Ivan and will not go through the aftermath again.”

The stories about experiences on Grand Cayman with Hurricane Ivan are pervasive and influence the decisions of those who were not on-island for the event. Having been on Grand Cayman for Hurricane Dean, a South African male (18-29) would leave Grand Cayman seventy-two hours before the direct hit of a Category 4 or 5 hurricane. His reasons to leave include “fleeing for my life and being with close friends and family. The damage that a Cat 5 hurricane can do and the stories that the local people have told me. Would not like to live and tell the tale.” Returning home ahead of a storm was cited for social reasons by a Canadian female (30-49) who was in Bermuda for

Hurricane Fabian. She would evacuate to an undecided location or evacuate off-island to return home to Canada a couple of hours before a direct hit from a Category 3+ storm or a direct hit from a Category 5 hurricane. The storm's intensity is a factor in her decisions to evacuate on-island and off-island; the other factor for evacuating on-island is if she would be home alone during the storm and for evacuating off-island is "if I hadn't been off-island in awhile."

Proximity and topography were added to returning home by other respondents as reasons to evacuate off-island to another location. A female (30-49) experienced Hurricanes Fifi, Greta, and Fraselina in her home of Honduras and was on Grand Cayman for Hurricane Ivan. If she made the decision to evacuate off-island, she would return to Honduras "because we have highland." Another woman (30-49) from Honduras had not chosen an on-island evacuation location but knew she would evacuate off-island to Honduras twenty-four ahead of a major hurricane "since it's close."

Having family in a nearby country is another reason respondents choose a particular destination when they decide to leave Grand Cayman because of a hurricane. A male with hurricane experience in the Dominican Republic and on Grand Cayman would pay US\$1000 for himself and an unlimited amount for his wife and kids to evacuate off-island to stay with relatives in the United States. A German male (30-49) with no hurricane experience would remain on-island and evacuate in advance of a direct hit by a Category 4 or 5 storm or a glancing blow by a Category 5 to a friend's house that survived Hurricane Ivan. Using storm intensity as the most important variable, he would also consider the "duration of the hurricane, kinetic energy built up, possible storm surge, and curfew" to decide whether or not to evacuate off-island twenty-four hours ahead of a

direct hit by a Category 5 hurricane to stay with family in Georgia, USA. Having experienced all of the hurricanes to reach Louisiana, USA since 1989, a 30-49 year-old male would take action to protect his children, who are also United States citizens, thirty-six hours ahead of a direct hit by a Category 4 or 5 storm and a glancing blow by a Category 5 hurricane, “I would be required to be at work, but I would ensure my *children* are *safely* evacuated off-island (emphasis original).”

Citizenship, visa requirements, and the ability to legally enter the United States are factors for the internationally diverse employees in this study. A female (18-29) from Mexico sums up the problem facing those who need to acquire a visa to enter the United States, “Flights from Cayman only goes direct to Miami when a hurricane alert. All other flights normally cancel or re-schedule.” Having been in Cancun, Mexico, for Hurricanes Gilbert, Mitch, and Wilma and on Grand Cayman for Hurricane Gustav, she would take the hurricane’s forward speed into account when making her decision to evacuate on-island or off-island. If she had less than thirty-six hours before a Category 4 or 5 arrived at Grand Cayman, she would evacuate on-island to an undetermined location, but she would evacuate off-island to the United States if she had between 36-48 hours and could purchase a ticket for between US\$500-800.

Although some respondents expect to evacuate off-island as a hurricane approaches, others plan to remain on-island for the duration of the storms. Their reasons for doing so vary and exemplify common responses to natural hazards events. In the face of a natural hazard, fatalism is a common response, including the reaction to dissociate from personal responsibility and place one’s outcome in the responsibility of a higher power (Slovic et al. 2000). One woman (50-59) from Jamaica expects God to protect her

and see her through the storm if she stays calm and prays. She was on Grand Cayman for Hurricane Ivan and would not evacuate on-island or off-island if another hurricane tracked over or near the island. Her response to the most important factor in her decision to evacuate or not was “the only evacuate is to show more love in action live the love life through Christ.” She would not leave the island for a hurricane, instead she would “stay contrust (*sic*) and calm...hoping for survival and recovery. Trust in God. Till the storm pass.” Her personal preparation before a hurricane is “only to pray pray pray on.” She cited calm as her only factor in deciding not to evacuate off-island from an approaching hurricane, “only to keep more closer to family’s friends and help to keep one other calm. After a storm their (*sic*) is a calm.” Contrasting with the divesting of responsibility by the previously discussed respondent, another woman would not evacuate off of Grand Cayman for a hurricane and takes complete responsibility for the decision. Originally from Honduras, this 30-49 year-old woman sheltered at work in the Marriott Grand Cayman Beach Resort during Hurricane Ivan. When describing what she would do for a future storm, she wrote, “If it’s a strong storm I will evacuate immediately (*sic*). Mi fimaly (*sic*) safety is first and I always track the weather in order to move quickly if I need to.” Rather than place trust in a higher authority, this respondent takes the information available to her and makes a decision to either shelter in her home or to evacuate elsewhere on island. One Caymanian male (18-29) was on Grand Cayman for “many hurricanes” but only two “significant ones:” Hurricane Gilbert and Hurricane Ivan. His choice in another hurricane would be to remain at home because “I would rather ensure the safety of my family members than evacuate.” Another male (30-49) who experienced Hurricane Gloria (1985) in New York City would remain on-island

because he is required to be at work and is concerned about the resort's "infrastructure and safety after strike more than likely I would stay to protect the physical plant."

Respondents were asked to list the factors they would use to decide whether or not to evacuate on-island or off-island ahead of an approaching hurricane, indicating which one or two factors were the most important in their decision-making process. The factors given by the respondents were coded into five overarching categories. The geophysical category included any of the physical characteristics of the hurricane, including intensity, storm surge, potential for flooding, etc. Any references to friends, family, or other social connections were grouped into the social network category. Factors that were on the individual level such as work requirements, legal issues, and personal preparation were included in the personal category. The ramifications category included any references to the conditions on the island after the hurricane's passage. References to the safety of an individual and family members, the proximity of a residence to the coastline, and concerns about the structural integrity of a residence were included in the situational safety category. For on-island evacuation decisions (Table 5.4), the geophysical category was the most often cited as a general reason to evacuate and as the most important factor. Social networks, personal factors, and situational safety were cited with nearly equal frequency as general reason to evacuate. However, when considered as the most important factors, their importance dwindles when compared to geophysical factors. In terms of reasons to evacuate off-island (Table 5.4), respondents gave a variety of responses and often cited factors from multiple categories. When the most important factors were tallied, the geophysical category was cited most often, double that of the second most important, social networks. Within the geophysical

category, the intensity of the hurricane was cited most often (19, 86%) as the most important factor.

Table 5.1: Breakdown of Demographics

The Ritz-Carlton, Grand Cayman			Grand Cayman Marriott Beach Resort		
	<i>Hotel Population</i>	<i>Case Study Respondents</i>		<i>Hotel Population</i>	<i>Case Study Respondents</i>
Total Employees	833	88	Total Employees	218	35
Caymanian	188 (23%)	23 (26%)	Caymanian	93 (43%)	12 (34%)
Expatriate	645 (77%)	63 (72%)	Expatriate	125 (57%)	22 (63%)
Hourly	740 (89%)	67 (76%)	Hourly	191 (88%)	25 (71%)
Salary	93 (11%)	19 (22%)	Salary	27 (12%)	7 (20%)

Table 5.2: Demographic Information used in Chi-Square Analysis

The Ritz-Carlton, Grand Cayman		Grand Cayman Marriott Beach Resort	
18-29	28	18-29	9
30-60+	59	30-60+	24
Female	45	Female	13
Male	42	Male	20
Work Permit	63	Work Permit	22
No Work Permit	23	No Work Permit	12

Table 5.3: Countries in Which Respondents Experienced Hurricanes

Country	Frequency (N=202)
Grand Cayman	136 (67.2%)
Jamaica	23 (11.3%)
United States	21 (10.3%)
Mexico	6 (3.0%)
Nicaragua	5 (2.5%)
Bermuda	4 (2.0%)
Honduras	4 (2.0%)
Dominican Republic	1 (0.5%)
Mozambique	1 (0.5%)
St. Lucia	1 (0.5%)

Table 5.4: Factors Considered for Evacuation

Evacuation Factors			Most Important Evacuation Factors		
	On-Island (N=152)	Off-Island (N=120)		On-Island (N=35)	Off-Island (N=36)
Geophysical	55 (36.2%)	39 (32.5%)	Geophysical	20 (57%)	22 (61.1%)
Social Network	33 (21.8%)	28 (23.3%)	Social Network	8 (22.9%)	11 (30.5%)
Personal	29 (19.1%)	21 (17.5%)	Personal	2 (5.7%)	1 (2.8%)
Situational Safety	28 (18.4%)	20 (16.7%)	Situational Safety	5 (14.4%)	1 (2.8%)
Ramifications	7 (4.6%)	12 (10%)	Ramifications	0	1 (2.8%)

Home Countries of Respondents (Total from Each Country)

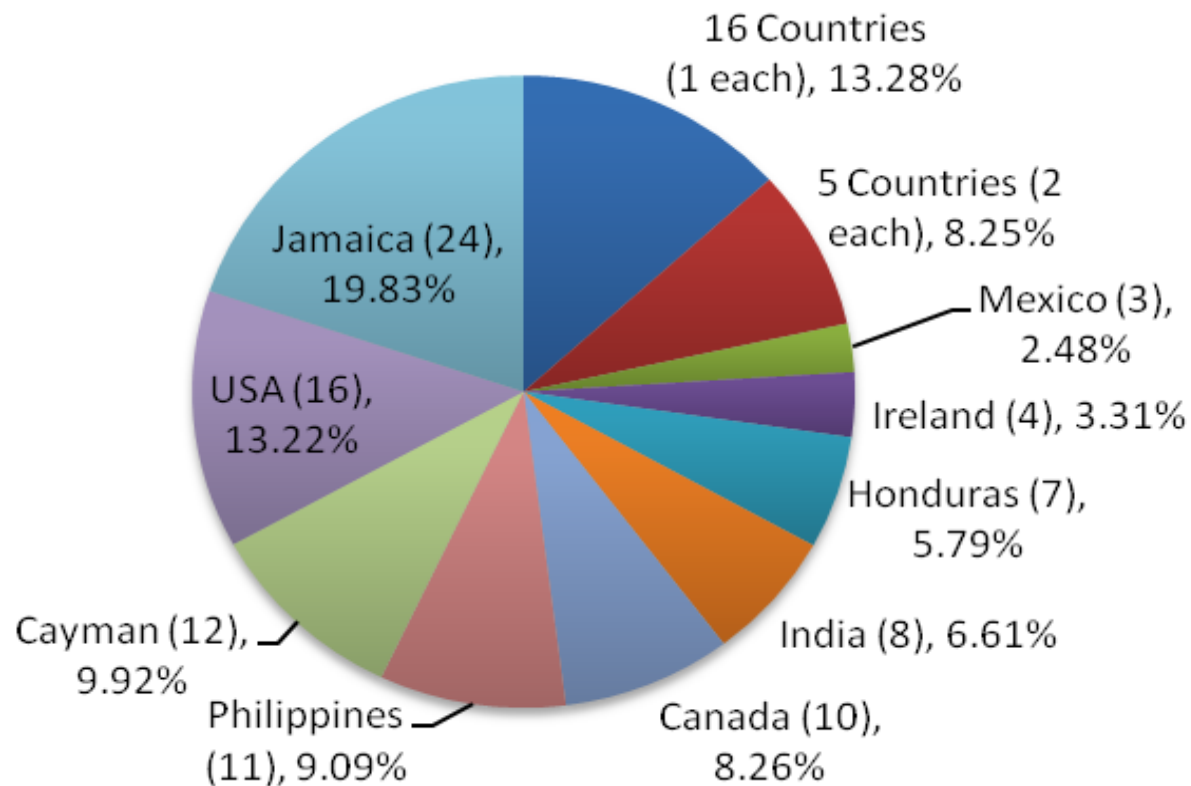


Figure 5.1: Self-reported home countries of survey respondents

Primary Languages of Respondents (Total per Language)

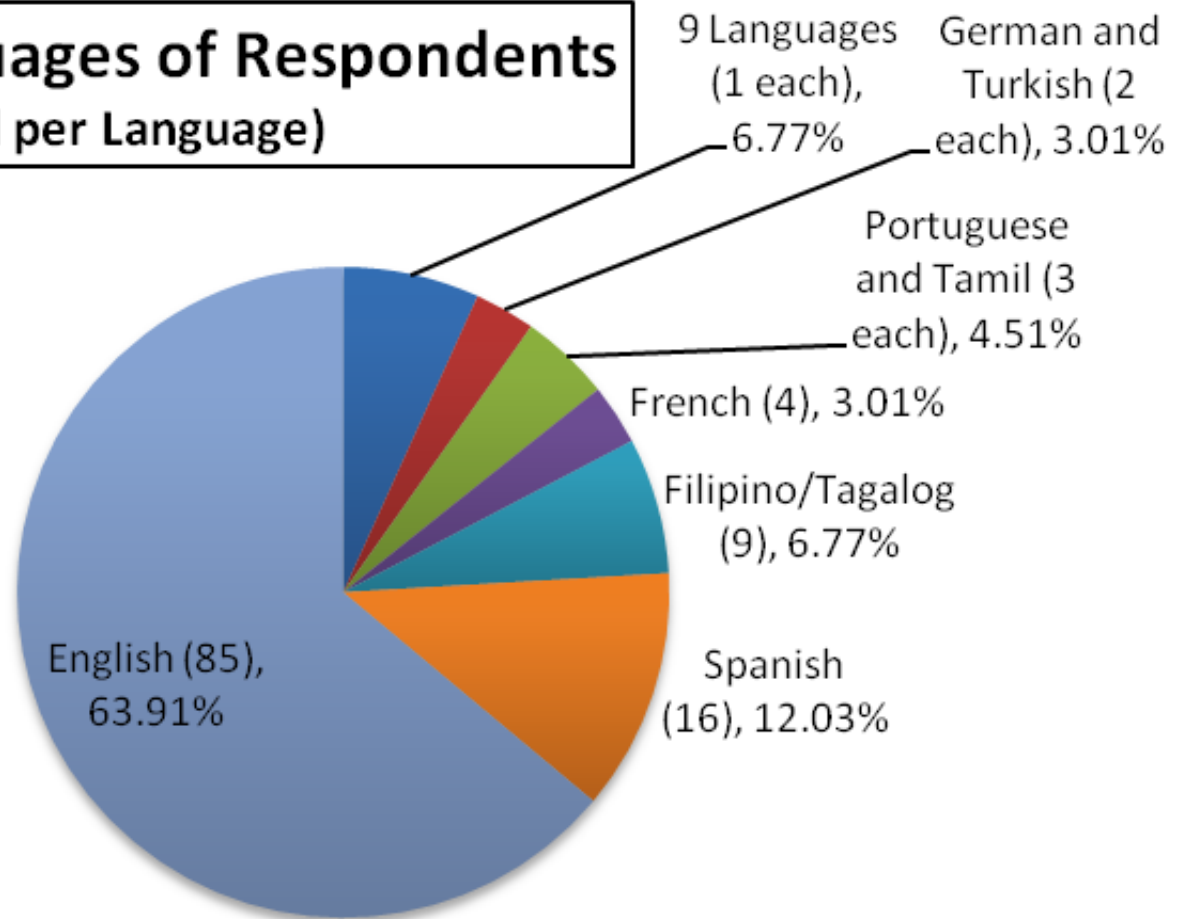


Figure 5.2: Primary language spoken and read by survey respondents

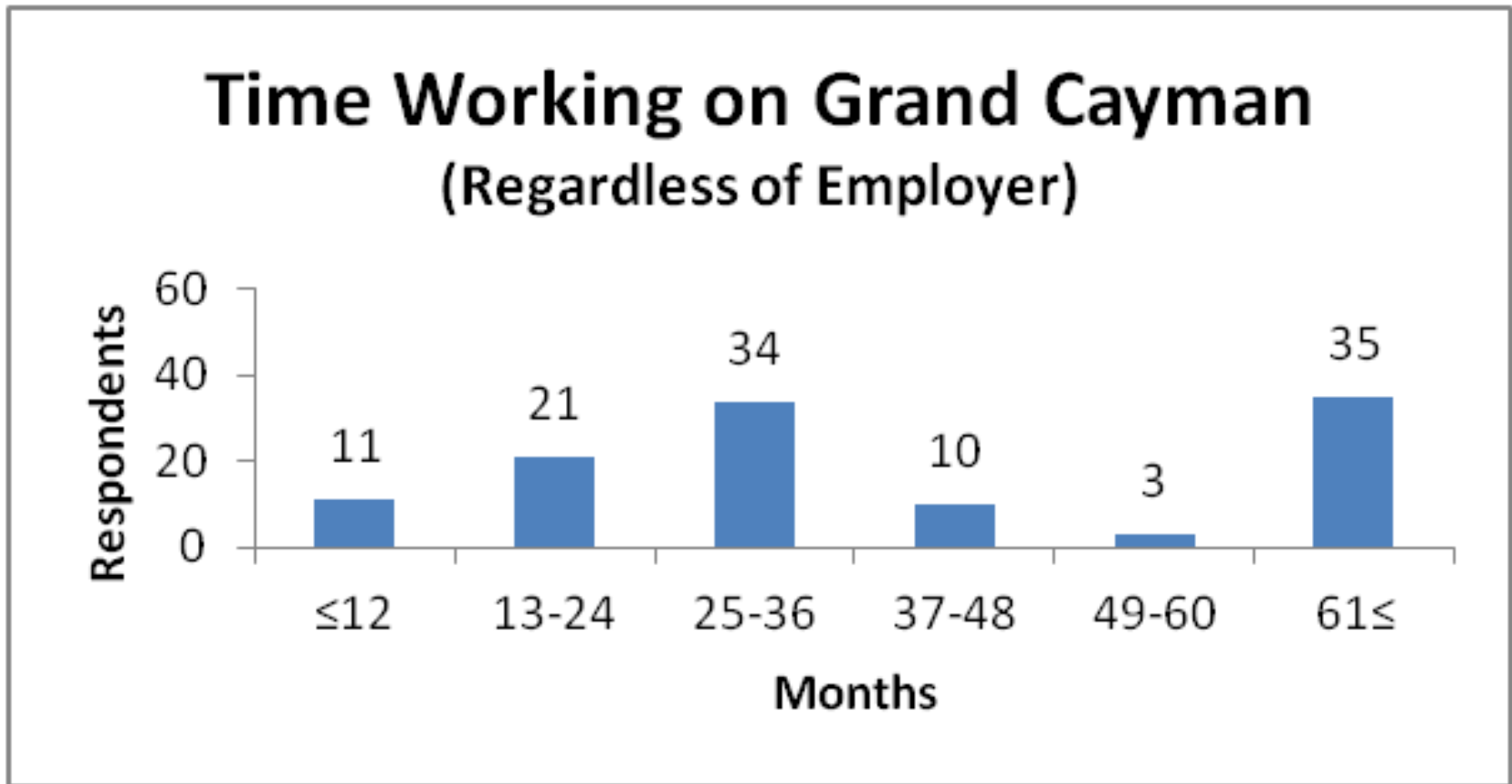


Figure 5.3: Time (in months) each respondent has been employed on Grand Cayman

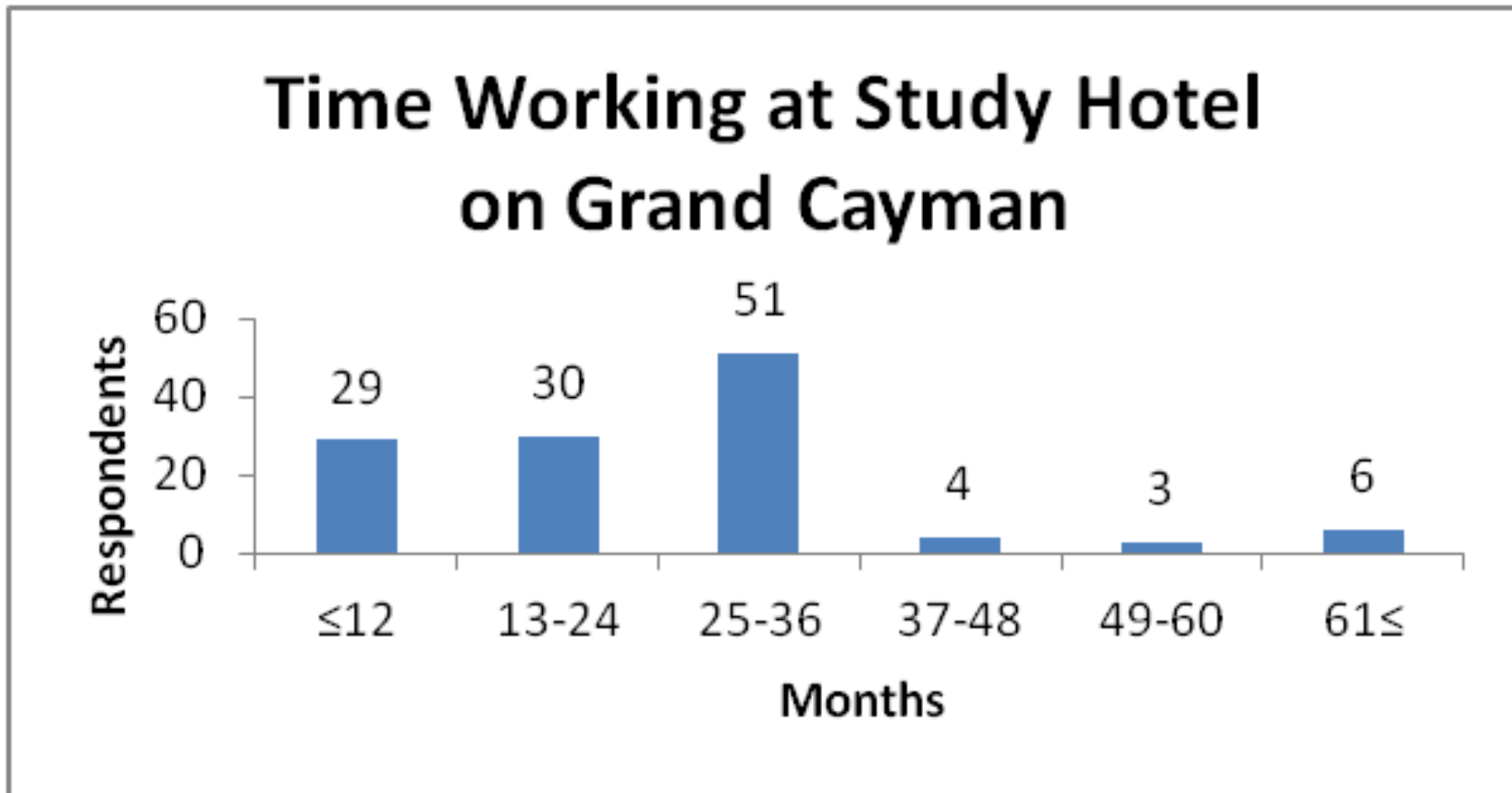


Figure 5.4: Time (in months) of employment at a study hotel per respondent

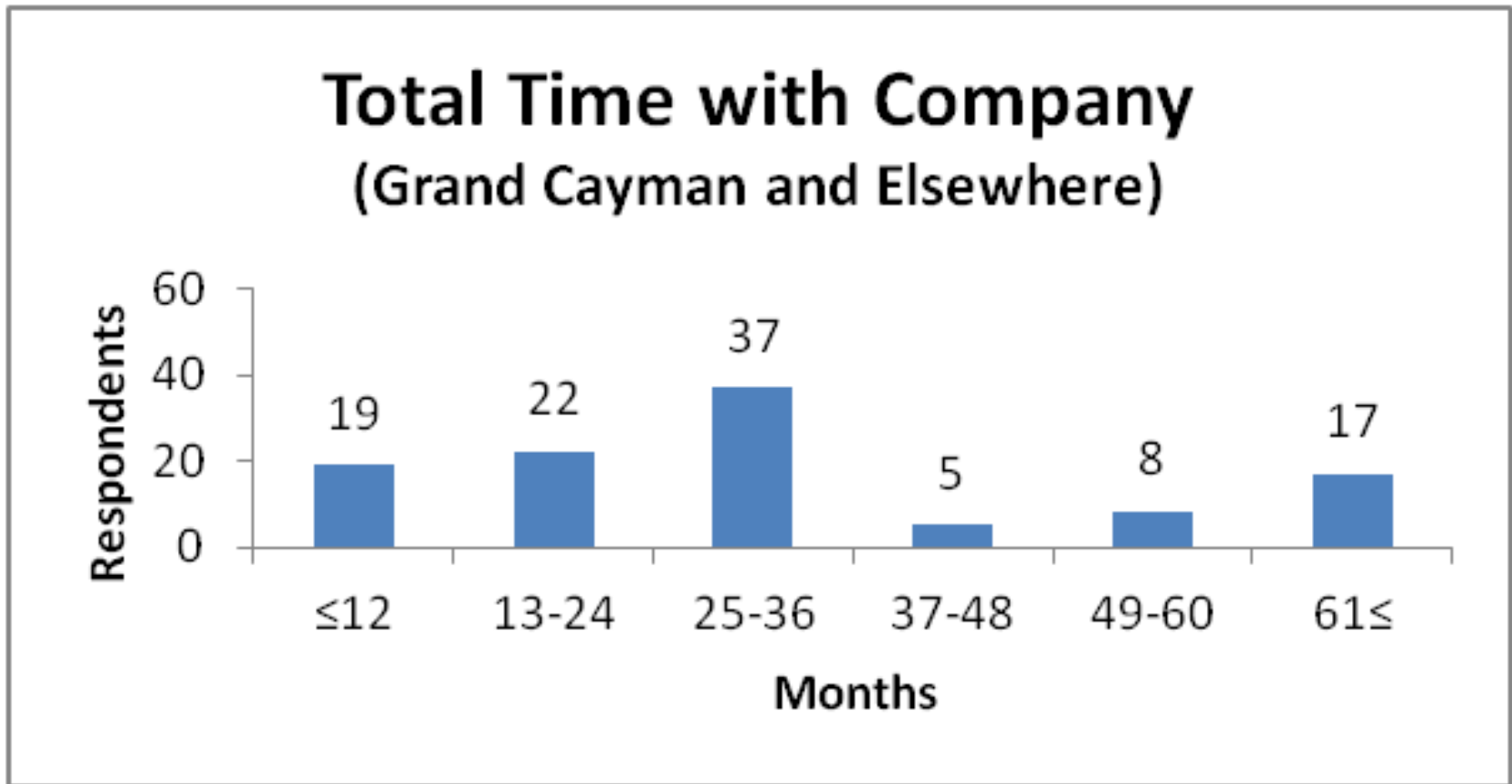


Figure 5.5: Total time (in months) each survey respondent has been employed by the hotel company

A direct hit by a...	A glancing blow by a...
<input type="checkbox"/> Category 5 hurricane	<input type="checkbox"/> Category 5 hurricane
<input type="checkbox"/> Category 4 hurricane	<input type="checkbox"/> Category 4 hurricane
<input type="checkbox"/> Category 3 hurricane	<input type="checkbox"/> Category 3 hurricane
<input type="checkbox"/> Category 2 hurricane	<input type="checkbox"/> Category 2 hurricane
<input type="checkbox"/> Category 1 hurricane	<input type="checkbox"/> Category 1 hurricane
<input type="checkbox"/> Tropical Storm	<input type="checkbox"/> Tropical Storm

Figure 5.6: Survey choices by Saffir-Simpson categories for when or where to evacuate



Figure 5.7: Hurricane Ivan between Jamaica and Grand Cayman
Source: MODIS, NASA

CHAPTER VI

FINDINGS

Employment and Residency on Grand Cayman

Hotel practices and time open were factors in the results of this research. Because of low-season staffing practices (de Albuquerque and Mc Elroy 1992), the total number of employees at work during the study period were different than would be expected during high season when a full staffing schedule is vital. The two hotels were in different staffing situations because of a large corporate group staying at The Ritz-Carlton, Grand Cayman whereas the Grand Cayman Marriott Beach Resort was in a period of low occupancy necessitating approximately 25% of its full staffing schedule, decreasing the availability of employees to participate in the survey. If the study had been conducted during high season, both hotels would have been running with a full complement of employees, changing the potential dynamics of the respondent pool. Unfortunately, low season was the only time during which the hotel managers were amenable to allowing the researcher access.

The data were also skewed by the length of time The Ritz-Carlton, Grand Cayman had been open. The survey was conducted 34 months after the official opening of the hotel, and respondents may have rounded to the nearest year of employment or been

employed prior to the opening of the hotel ready it for opening. The Grand Cayman Marriott Beach Resort was closed as it was renovated after the destruction of Hurricane Ivan, reopening in August 2005. During the renovation, employees were employed elsewhere in the Marriott, International properties or sought other employment on Grand Cayman. The time the hotel was closed also limits the length of employment at the property for respondents who left the island.

An additional constraint in the potential length of employment on Grand Cayman for expatriates is the time limit for work permits. Non-Caymanians are permitted to live and work in the Cayman Islands for seven years on a regular work permit and for nine years as a key employee (Government of the Cayman Islands 2007). Although this is not a constraint in this study based on the time both hotels were open between Hurricane Ivan and when the study was conducted in October 2008, the limitations to stay on Grand Cayman indefinitely as an expatriate worker decrease opportunities for expatriates to become involved in the community and plan a life there. This adds to the transitory nature of expatriates on Grand Cayman who will come for one-five years and move along when they are ready to establish themselves long-term in a location.

When looking at the six respondents who have worked at the study hotel for five years ($61 \geq \text{months}$) and the seventeen respondents who have been with their hotel company for five years ($61 \geq \text{months}$), the difference suggests that expatriate workers are brought in for positions that require more experience with how the company does business. This theory is supported by the data which show that of the six respondents who have worked at the property for over five years, five of them are hourly employees who could be in supervisory positions but would not be considered managers. The sixth

respondent is on salary. All six of the respondents work at the Grand Cayman Marriott Beach Resort, because The Ritz-Carlton, Grand Cayman was not open five years prior to the study and none of its key employees were on-island at that stage in its construction. Of the seventeen who have been with one of the companies for more than five years, ten of them work for The Ritz-Carlton, L.L.C. with seven in salaried positions, two in hourly, and one who declined to answer. In addition to the aforementioned six Marriott employees, one more salaried worker is added to the total for the Grand Cayman Marriott Beach Resort. The difference between the distribution of salaried workers with longevity at the hotel and with the company may be partially attributed to the short time for which The Ritz-Carlton, Grand Cayman had been open. However, even high-level managers move on from the properties for other opportunities. From opening to the time of the study period, both the General Manager and the Hotel Manager for The Ritz-Carlton, Grand Cayman had left the hotel for other employment opportunities. The Managing Director at the Marriott Grand Cayman Beach Resort also left for another opportunity after two years at the hotel.

Caymanians, Expatriates, and the Hurricane Experience

Tompkins et al. (2009b) found that residents on Grand Cayman were more likely to prepare for hurricanes if they are integrated into island life and that residency status was a significant indicator of to what level a respondent would prepare for a hurricane. The implication is that relationships with local residents would allow expatriates access to colloquial knowledge and island history that would give them insight to the danger posed by an approaching hurricane. These findings are not substantiated by the case study respondents in this research. Regardless of age, gender, or work permit status,

respondents reported that in the event of a major hurricane forecast to hit Grand Cayman, they would evacuate their residences or off of the island ahead of the storm's arrival. The colloquial knowledge that could be imparted may not translate in an applicable manner for expatriates with different experiences or it may lead to a false sense of security.

Respondents reported hearing stories about Hurricane Ivan and shared an understanding that the storm was the worst-case scenario possible for Grand Cayman. This inaccuracy in the potential for damage by a hurricane that approaches from a different angle and has different geophysical characteristics from Hurricane Ivan creates an expectation based on others' perceptions that may lead to improper preparation for future events. The survey conducted by Tompkins et al. was more broad-reaching than the specific nature of the case study research done here. From the published findings, it is not clear if emphasis was given to the tourist expatriate population which is an underrepresented population in the academic literature as a whole.

Respondents cited a variety of explanations of where they intended to evacuate off-island in the event of a hurricane striking Grand Cayman either as a direct hit or a glancing blow. Those who viewed Jamaica as a viable alternative seemingly neglected to incorporate the likely path of a hurricane in the area. Hurricanes often track from the east-southeast to west-northwest in the Caribbean Sea as they move on towards Central America and the Gulf of Mexico. Hurricanes Gilbert (1988), Ivan (2004) and Dean (2007) are examples of storms that followed this basic trajectory and passed over or by Jamaica prior to arriving at Grand Cayman. Respondents evacuating off of Grand Cayman for Jamaica would be running into the storm's path rather than out of it in most instances. Respondents stated they would feel safer on Jamaica than on Grand Cayman

during a hurricane because of its topography. Although Jamaica does have mountains and elevations higher than Grand Cayman, it also is prone to mass earth movements resulting from exposed topsoil and deforestation (Miller et al. 2009). Buildings on Grand Cayman are supposed to be built to the specifications of the Florida Building Code, which is more rigorous than the building codes on Jamaica. If residents planned to stay on Grand Cayman, they would be at lower elevations, but the buildings would theoretically be built in a more hurricane-resistant manner and, without slopes and topsoil, mudslides and landslides are eliminated as a potential consequence of the hurricane's passage.

Other respondents plan to evacuate off-island to Miami, Florida, to escape the path of an approaching hurricane. Although this is an immediate option for US citizens and citizens of countries that participate in the Visa Waiver Program (Table 6.1), citizens of countries not on the list face an uncertain welcome in the United States. Information regarding entry during a hurricane is not readily available on the US State Department website or that of its consulate in Jamaica which is the nearest consulate to Grand Cayman. Measures to facilitate entry to the United States are generally initiated after a major event, not before. The inability to evacuate off-island because of visa restrictions is a limiting factor for any hotel employee who is not a citizen of a member nation in the Visa Waiver Program.

One of the unanticipated factors respondents used to determine whether or not they would evacuate their homes or off of the island was the implications of living on Grand Cayman in the aftermath of a major hurricane. Respondents referred to having been through the aftermath of Hurricane Ivan and not wanting to experience that again. Other respondents stated that they would stay on-island for the storm and depending on

the destruction, they would stay or leave the island after the storm. For the respondents who said they would return home if they fled the island, some would use it as a reason to stay home and end their employment on Grand Cayman. This mindset contributes to the perception of employment in the Cayman Islands as a temporary period working abroad before returning home to establish themselves permanently.

For evacuation concerns, respondents cited geophysical factors as the most important in their decision-making process. Social networks were more important than situational safety and personal factors when looking at the most important factors, even though they were cited with similar frequency in the general factors. Five respondents cited their off-island family's concern for them as a reason to evacuate, suggesting that they have a higher threshold for acceptable personal risk than their families do. The frequency with which respondents cited the hurricane's intensity as a factor for evacuating off-island shows that the respondents are evaluating the hurricane based more on its physical characteristics than on qualitative factors.

The chi-square tests utilizing the responses for what respondents would do in the event of a glancing blow or direct hit by a major or minor hurricane answer part of the questions this research seeks to address. Hotel employees are more likely to evacuate for a direct hit by a major or minor hurricane and a glancing blow by a major hurricane. A glancing blow by a minor hurricane elicited eighteen (14.6%) responses to evacuate elsewhere on-island. The significant results were in regard to evacuating off-island to seek safety in another country out of the path of the storm. While less than ten percent of respondents would evacuate off-island ahead of a forecast glancing blow or direct hit by an approaching minor hurricane, seventy-eight percent of respondents (96) would

evacuate off-island ahead of a direct hit by a major hurricane and fifty-two percent of respondents (64) would evacuate off-island if a major hurricane were forecast to strike the island a glancing blow. These quantitative findings show that respondents are aware of the threat posed by major hurricanes to Grand Cayman and their knowledge of when it is appropriate to evacuate off-island and in which circumstances evacuating to a safer location on-island will suffice.

The appropriate understanding of respondents regarding the danger posed by a Category 5 hurricane, regardless of their previous experience with tropical cyclones, is confirmed by the lack of statistically significant results for the chi-square tests. Looking at evacuating off-island ahead of a Category 5 hurricane directly impacting Grand Cayman, respondents make their decision to evacuate off-island independently of their age, sex, having previously been through a tropical cyclone, or lived somewhere prone to tropical cyclones. The independence of the decision process runs counter-intuitively to the idea that previous hurricane experience should have some sort of influence on future responses (Baker 1991). These findings indicate that respondents know the implications of being on Grand Cayman during and after a Category 5 hurricane.

This research reinforces “the difficulty in defining and then measuring experience” (Baker 1991, 302) when investigating the relationship between experience and the likelihood of evacuation. The respondents in the case study show an understanding of the impacts of various strengths of hurricanes. These results can be used to tailor the training of hotel employees to include definitions of the various geophysical aspects of a hurricane and the varying degrees of severity associated with the different storm categories. As individual storms, hurricanes have similar geophysical

characteristics; however, the severity of the threat of each characteristic varies by storm.

A better understanding of these characteristics will aid those in the path of the storm to decide what responses are appropriate for them to take.

Table 6.1: Countries Whose Citizens May Enter the United States Without a Visa
Source: U.S. Department of State 2011

US Visa Waiver Program Member Nations		
Andorra	Hungary	New Zealand
Australia	Iceland	Norway
Austria	Ireland	Portugal
Belgium	Italy	San Marino
Brunei	Japan	Singapore
Czech Republic	Latvia	Slovakia
Denmark	Lichtenstein	Slovenia
Estonia	Lithuania	South Korea
Finland	Luxembourg	Spain
France	Malta	Sweden
Germany	Monaco	Switzerland
Greece	the Netherlands	United Kingdom

CHAPTER VII

FUTURE RESEARCH

Following the example of other small island nations such as Tonga (Jayavanth et al. 2009), the Cayman Islands could increase their preparedness and response capacity by periodically running drills and exercises to practice what they may encounter during a hurricane. The Ritz-Carlton, Grand Cayman had essentially a dry-run of its hurricane plan in 2006 when Hurricane Ernesto was plotted to directly hit Grand Cayman before atmospheric conditions turned it northward to Florida instead. The preparation the hotel went through in anticipation of the storm allowed for the Hurricane Response Team to evaluate the workability of its Hurricane Plan for a Critical Path. This raises the question of whether or not more employers should have formal emergency preparedness drills as part of their new employee training. More formal practice runs island-wide would give businesses and individuals a better idea of what to expect when a hurricane threatens. A potential research question for preparedness practice on Grand Cayman could ask if the necessity of importing expatriate workers to sustain the country's economy negatively influences the resiliency of the Cayman Islands from hurricanes.

Although a repeat survey was beyond the scope of this dissertation and impractical because of the high turnover rate of hotel employees, future research could examine the correlations between anticipated and actual behavioral response as was done

by Kang et al. (2007) in Texas. These findings would be useful from a perspective of looking at hotel employees and also as a representation of small island populations with different options than mainlanders when a hurricane is on its way. Another possibility is to repeat the same study in a resort area with a less transient population, such as Florida in the United States or Cancun in Mexico. Given a different demographic profile, including more respondents with children living in their households and older respondents, the results may be significantly different. Being located on a mainland provides more methods by and destinations to which to evacuate off-island; repeating the survey at other Caribbean island resorts would be a way to test the findings of this study. If employees on the Bahamas, Jamaica, the U.S. Virgin Islands, and other similar locations respond similarly, the findings could lead to creating a new understanding of hotel employees and how best to address their safety and knowledge in hurricane situations while maintaining a viable business setting at the resort. Adding a question regarding how living on the island in post-hurricane conditions would change their actions could open a new avenue of research and lead to some interesting findings if respondents are found to make their decision based not only by the immediacy of the hurricane, but also by the conditions during recovery, including the availability of basic necessities such as food, water, electricity, etc.

In this study, the respondents were asked to identify to where they would evacuate if they left Grand Cayman in advance of a hurricane. Responses were limited based on where they have the option to go based on airline destinations. In future research, it would be interesting to include a question to ascertain where respondents would like to go if they were not limited by flight availability. Asking either question on islands with

air service and proximity to more locations than Miami, Florida, would result in a more diverse range of answers, possibly providing insight to whether employees would return to the island after a hurricane. Although asking if employees would return to Grand Cayman following a major hurricane was considered for this research, such a question was not included in the survey because of concerns that employees would not respond truthfully in case of repercussions from management despite the blind nature of the survey.

Considering the potential visa restrictions and real limitations on where airlines fly ahead of a hurricane, it would be interesting to apply Stouffer's (1940) Theory of Intervening Opportunities to where respondents would go given unrestricted options. Current research applies the intervening opportunities to any number of situations where movement is proportional to opportunities at the destination and inversely proportional to any opportunities between the origin and destination (Hay 2000). The bounds of spatial distance have changed since Stouffer published his theory and have become less restrictive because of the ease of air travel. A component that would limit the ability of a respondent to travel great distances is the cost of airfare. By providing respondents a ability to travel hypothetically without costs, legal restrictions, or airline flight plans, a new picture of where hotel employees would really want to go could provide valuable information to researchers and their employers alike.

Verbiage presented an issue in this study. In some cases, respondents seemed to be focused on the word "hurricane" as not being representative of all tropical cyclones despite the definition in the survey's cover letter: "'hurricane' is used to represent all tropical cyclones, typhoons, and hurricanes." Given the highly international nature of the

survey respondents, this issue was likely to exist and difficult to avoid. Future researchers should be cognizant of this issue and attempt to circumvent misunderstandings where possible.

This research focused on hospitality workers, a segment of Grand Cayman's population that carries a portion of the island's economy while living in the margins of island society. The findings of this case study can be incorporated into the training offered to new employees at hotels on Grand Cayman and other similar locations around the world. In keeping with Baker (1991), caution should be employed when attempting to generalize the findings to other situations where the specifics of a situation, whether of the island or the hurricane, "could restrict the findings' relevance to other situations" (309). Employees of other businesses may not have the same requirements at work as hotel employees, changing their level of responsibility and duty to stay at their jobs. The residents of continental locations and larger countries have more options than those residing on small island nations who do not have the ability to escape the storm by driving inland. Overall, this case study serves to identify a marginalized population and provide insight into their knowledge of and preparation for hurricanes, while also highlighting the difficulty of defining and measuring experience whether with hurricanes or other natural hazards.

APPENDIX A

COVER LETTER FOR SURVEY USED AT GRAND CAYMAN MARRIOTT BEACH RESORT

Thank you for volunteering to participate in this survey of how hotel employees prepare for hurricanes. In this survey, “hurricane” is used to represent all tropical cyclones, typhoons, and hurricanes. “Tropical storm” is used for a storm slightly weaker than hurricane strength. The following short survey will ask some questions about you as a person (Section A: Demographics) and about how you get ready for a hurricane (Section B: Hurricane Preparedness). All of your answers will be kept confidential and no personal identifying information will be linked to your responses. By completing the survey, you consent to your responses being used confidentially in any resulting publications.

The findings from this research will be included in my dissertation which is one of the components of my degree program for the PhD in Environmental Geography. The findings from the research will also be shared with the Grand Cayman Marriott Beach Resort in an effort to assist them in improving hurricane preparedness for their associates.

I am a graduate student in the Department of Geography at Texas State University-San Marcos in the United States. Please contact me using the information on my card if you have any questions or concerns after I leave island.

My research advisor is Dr. Richard Dixon. You may contact him via mail at Department of Geography, Texas State University-San Marcos, 601 University Drive, San Marcos, TX 78666 USA or via email at rd11@txstate.edu. Pertinent questions about the research, research participants' rights, and/or research-related injuries to participants, should be directed to one or both of the IRB co-chairs, Dr. Eric Schmidt (512-245-3979

– es17@txstate.edu) and/or Dr. Lisa Lloyd (512-245-8358 – LL12@txstate.edu), or to the OSP Administrator, Ms. Becky Northcut, at 512-245-2102.

Again, thank you for your participation!

Johanna L. Ostling
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PhD Graduate Assistant
Department of Geography
Texas State University-San Marcos

APPENDIX B

COVER LETTER FOR SURVEY USED AT THE RITZ-CARLTON, GRAND CAYMAN

Thank you for volunteering to participate in this survey of how hotel employees prepare for hurricanes. In this survey, “hurricane” is used to represent all tropical cyclones, typhoons, and hurricanes. “Tropical storm” is used for a storm slightly weaker than hurricane strength. The following short survey will ask some questions about you as a person (Section A: Demographics) and about how you get ready for a hurricane (Section B: Hurricane Preparedness). All of your answers will be kept confidential and no personal identifying information will be linked to your responses. By completing the survey, you consent to your responses being used confidentially in any resulting publications.

The findings from this research will be included in my dissertation which is one of the components of my degree program for the PhD in Environmental Geography. The findings from the research will also be shared with The Ritz-Carlton, Grand Cayman in an effort to assist them in improving hurricane preparedness for their Ladies and Gentlemen.

I am a graduate student in the Department of Geography at Texas State University-San Marcos in the United States. Please contact me using the information on my card if you have any questions or concerns after I leave island.

My research advisor is Dr. Richard Dixon. You may contact him via mail at Department of Geography, Texas State University-San Marcos, 601 University Drive, San Marcos, TX 78666 USA or via email at rd11@txstate.edu. Pertinent questions about the research, research participants' rights, and/or research-related injuries to participants, should be directed to one or both of the IRB co-chairs, Dr. Eric Schmidt (512-245-3979

– es17@txstate.edu) and/or Dr. Lisa Lloyd (512-245-8358 – LL12@txstate.edu), or to the OSP Administrator, Ms. Becky Northcut, at 512-245-2102.

Again, thank you for your participation!

Johanna L. Ostling
jo1135@txstate.edu
PhD Graduate Assistant
Department of Geography
Texas State University-San Marcos

APPENDIX C

SURVEY USED AT GRAND CAYMAN MARRIOTT BEACH RESORT

Section A: Demographics

- | | |
|--|--|
| 1) What is your age?
<input type="checkbox"/> 18 - 29 <input type="checkbox"/> 50 - 59
<input type="checkbox"/> 30 - 49 <input type="checkbox"/> 60+ | 2) What is your gender?
<input type="checkbox"/> Female
<input type="checkbox"/> Male |
| 3) What is your primary language?
_____ | 4) Are you on Grand Cayman on a work permit? <input type="checkbox"/> Yes <input type="checkbox"/> No |
| 5) What is your home country?
_____ | 6) How long have you worked on Grand Cayman? _____(months/years) |
| 7) Are you....
<input type="checkbox"/> Single
<input type="checkbox"/> In a long-term relationship
<input type="checkbox"/> Married
<input type="checkbox"/> Divorced
<input type="checkbox"/> Widowed | 8) With whom do you live?
(Mark all that apply)
<input type="checkbox"/> No one, live alone
<input type="checkbox"/> Spouse/ significant other
<input type="checkbox"/> Children
<input type="checkbox"/> Roommate(s) |
| 9) How long have you worked at the Grand Cayman Marriott Beach Resort?
_____ (months/years) | 10) How long have you worked for Marriott International?
_____ (months/years) |
| 11) Which division do you work for?
<input type="checkbox"/> Rooms
<input type="checkbox"/> Food and Beverage | 12) What type of employee are you?
<input type="checkbox"/> Hourly
<input type="checkbox"/> Salary |
| 13) Are you...
<input type="checkbox"/> A Manager
<input type="checkbox"/> A Supervisor
<input type="checkbox"/> Neither of the above | 14) Were you on Grand Cayman during Hurricane Ivan in September 2004?
<input type="checkbox"/> Yes
<input type="checkbox"/> No |

- 15) Have you ever been in a hurricane?
 ___ Yes (Please answer #16)
 ___ No (Please go to #17)
- 16) Which hurricane(s) have you personally experienced? (Where, when, which one)

- 17) Have you lived anywhere else that regularly experiences hurricanes?
 ___ Yes (Please answer #18)
 ___ No (Please skip #18)
- 18) Where did you live with hurricanes?

Section B: Hurricane Preparedness

A “direct hit” refers to the eye of the hurricane striking the island. A “glancing blow” refers to the eye of the hurricane passing near the island with Grand Cayman experiencing tropical storm or hurricane conditions.

- 1) From what sources do you get information on approaching hurricanes? (Mark all that apply)
- ___ Cayman Government Sources (i.e. www.weather.gov.ky)
 - ___ United States Government Sources (i.e. the National Hurricane Center online)
 - ___ Hotel Sources (i.e. manager or supervisor, email from management)
 - ___ Other Internet Sources (i.e. www.weather.com; www.stormcarib.com)
 - ___ Television (i.e. The Weather Channel, local news)
 - ___ Radio
 - ___ Newspaper (please specify): _____
 - ___ Family and/or friends on Grand Cayman
 - ___ Family and/or friends off-island
 - ___ Other (Please describe): _____

The following questions refer to evacuating from your residence and seeking shelter somewhere else on Grand Cayman.

- 2) In which of the below scenarios would you evacuate? (Mark all that apply)

A direct hit by a...

- ___ Category 5 hurricane
- ___ Category 4 hurricane
- ___ Category 3 hurricane
- ___ Category 2 hurricane
- ___ Category 1 hurricane
- ___ Tropical Storm

A glancing blow by a...

- ___ Category 5 hurricane
- ___ Category 4 hurricane
- ___ Category 3 hurricane
- ___ Category 2 hurricane
- ___ Category 1 hurricane
- ___ Tropical Storm

- 3) How many hours in advance would you evacuate? _____

- 4) Where do you plan to take shelter?

- ___ Public/government shelter
- ___ A friend's house

- ___ At work
- ___ Significant other's workplace

- ___ Other (Please describe): _____
 ___ Not sure/Haven't decided (if so, please skip to #6)

5) Why did you choose the above as your shelter location? (Mark all that apply)

- | | |
|--------------------------------|------------------------------------|
| ___ Sturdier | ___ Higher floor of building |
| ___ It survived Hurricane Ivan | ___ Not on the beach |
| ___ Social aspects | ___ Required to be at work |
| ___ Volunteered to be at work | ___ Other (Please describe): _____ |

6) How much time do you think you would need for your personal hurricane preparations? _____

7) Please list the factors you consider when deciding to evacuate. (i.e. Hurricane's intensity, family obligations) Please circle the most important factor in your decision.

The following questions refer to fleeing Grand Cayman as the hurricane approaches and seeking shelter somewhere off-island.

8) In which of the below scenarios would you flee? (Mark all that apply)

A direct hit by a...

- ___ Category 5 hurricane
 ___ Category 4 hurricane
 ___ Category 3 hurricane
 ___ Category 2 hurricane
 ___ Category 1 hurricane
 ___ Tropical Storm

A glancing blow by a...

- ___ Category 5 hurricane
 ___ Category 4 hurricane
 ___ Category 3 hurricane
 ___ Category 2 hurricane
 ___ Category 1 hurricane
 ___ Tropical Storm

9) How many hours in advance of the hurricane's arrival would you flee? _____

10) Approximately how much would you be willing to pay for airfare to flee the approaching hurricane? US \$ _____

11) a. Where would you flee to for safety? (i.e. country) _____

b. Why did you choose there? _____

12) How much time do you think you would need for your personal hurricane preparations? _____

13) Please list the factors you consider when deciding to flee. (i.e. Hurricane's intensity, family obligations) Please circle the most important factor in your decision.

APPENDIX D

SURVEY USED AT THE RITZ-CARLTON, GRAND CAYMAN

Section A: Demographics

- | | |
|---|--|
| 1) What is your age?
___ 18 - 29 ___ 50 - 59
___ 30 - 49 ___ 60+ | 2) What is your gender?
___ Female
___ Male |
| 3) What is your primary language?
_____ | 4) Are you on Grand Cayman on a work permit? ___ Yes ___ No |
| 5) What is your home country?
_____ | 6) How long have you worked on Grand Cayman? _____(months/years) |
| 7) Are you....
___ Single
___ In a long-term relationship
___ Married
___ Divorced
___ Widowed | 8) With whom do you live?
(Mark all that apply)
___ No one, live alone
___ Spouse/ significant other
___ Children
___ Roommate(s) |
| 9) How long have you worked at The Ritz-Carlton, Grand Cayman?
_____ (months/years) | 10) How long have you worked for The Ritz-Carlton, LLC?
_____ (months/years) |
| 11) Which division do you work for?
___ Rooms
___ Food and Beverage | 12) What type of employee are you?
___ Hourly
___ Salary |
| 13) Are you...
___ A Manager
___ A Supervisor
___ Neither of the above | 14) Were you on Grand Cayman during Hurricane Ivan in September 2004?
___ Yes
___ No |

- 15) Have you ever been in a hurricane?
 ___ Yes (Please answer #16)
 ___ No (Please go to #17)
- 16) Which hurricane(s) have you personally experienced? (Where, when, which one)

- 17) Have you lived anywhere else that regularly experiences hurricanes?
 ___ Yes (Please answer #18)
 ___ No (Please skip #18)
- 18) Where did you live with hurricanes?

Section B: Hurricane Preparedness

A “direct hit” refers to the eye of the hurricane striking the island. A “glancing blow” refers to the eye of the hurricane passing near the island with Grand Cayman experiencing tropical storm or hurricane conditions.

- 1) From what sources do you get information on approaching hurricanes? (Mark all that apply)
- ___ Cayman Government Sources (i.e. www.weather.gov.ky)
 - ___ United States Government Sources (i.e. the National Hurricane Center online)
 - ___ Hotel Sources (i.e. manager or supervisor, email from management)
 - ___ Other Internet Sources (i.e. www.weather.com; www.stormcarib.com)
 - ___ Television (i.e. The Weather Channel, local news)
 - ___ Radio
 - ___ Newspaper (please specify): _____
 - ___ Family and/or friends on Grand Cayman
 - ___ Family and/or friends off-island
 - ___ Other (Please describe): _____

The following questions refer to evacuating from your residence and seeking shelter somewhere else on Grand Cayman.

- 2) In which of the below scenarios would you evacuate? (Mark all that apply)

A direct hit by a...

- ___ Category 5 hurricane
- ___ Category 4 hurricane
- ___ Category 3 hurricane
- ___ Category 2 hurricane
- ___ Category 1 hurricane
- ___ Tropical Storm

A glancing blow by a...

- ___ Category 5 hurricane
- ___ Category 4 hurricane
- ___ Category 3 hurricane
- ___ Category 2 hurricane
- ___ Category 1 hurricane
- ___ Tropical Storm

- 3) How many hours in advance would you evacuate? _____

- 4) Where do you plan to take shelter?

- ___ Public/government shelter
- ___ A friend's house
- ___ Other (Please describe): _____
- ___ Not sure/Haven't decided (if so, please skip to #6)
- ___ At work
- ___ Significant other's workplace

5) Why did you choose the above as your shelter location? (Mark all that apply)

- | | |
|---|---|
| <input type="checkbox"/> Sturdier | <input type="checkbox"/> Higher floor of building |
| <input type="checkbox"/> It survived Hurricane Ivan | <input type="checkbox"/> Not on the beach |
| <input type="checkbox"/> Social aspects | <input type="checkbox"/> Required to be at work |
| <input type="checkbox"/> Volunteered to be at work | <input type="checkbox"/> Other (Please describe): _____ |

6) How much time do you think you would need for your personal hurricane preparations? _____

7) Please list the factors you consider when deciding to evacuate. (i.e. Hurricane's intensity, family obligations) Please circle the most important factor in your decision.

The following questions refer to fleeing Grand Cayman as the hurricane approaches and seeking shelter somewhere off-island.

8) In which of the below scenarios would you flee? (Mark all that apply)

A direct hit by a...

- ☐ Category 5 hurricane
- ☐ Category 4 hurricane
- ☐ Category 3 hurricane
- ☐ Category 2 hurricane
- ☐ Category 1 hurricane
- ☐ Tropical Storm

A glancing blow by a...

- ☐ Category 5 hurricane
- ☐ Category 4 hurricane
- ☐ Category 3 hurricane
- ☐ Category 2 hurricane
- ☐ Category 1 hurricane
- ☐ Tropical Storm

9) How many hours in advance of the hurricane's arrival would you flee? _____

10) Approximately how much would you be willing to pay for airfare to flee the approaching hurricane? US \$_____

11) a. Where would you flee to for safety? (i.e. country) _____

b. Why did you choose there? _____

12) How much time do you think you would need for your personal hurricane preparations? _____

13) Please list the factors you consider when deciding to flee. (i.e. Hurricane's intensity, family obligations) Please circle the most important factor in your decision.

APPENDIX E

LETTER OF CONSENT FROM GRAND CAYMAN MARRIOTT BEACH RESORT



Feb. 15th, 2008

Dear Johanna Ostling,

The Grand Cayman Marriott Beach Resort will be more than happy to assist you in your studies.

Please feel free to conduct your survey with our associates and if you require any additional help please contact Taneisha Bodden, Executive assistant, she will assist you in any way that she can.

If you should need any additional information, please do not hesitate to contact her via email or telephone.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Panna Utpaul'.

Panna Utpaul
Director of Operations
345-949-0088

APPENDIX F

LETTER OF CONSENT FROM THE RITZ-CARLTON, GRAND CAYMAN





March 21, 2008

Dear Johanna,

Thank you for all your hard work during your time at The Ritz-Carlton, Grand Cayman. We are very supportive of your studies and are happy to assist you with your research project.

Please feel free to conduct your survey with our associates and if you require additional assistance please let us know.

Warm regards,


Jean Cohen
Vice President & General Manager




APPENDIX G

THE RITZ-CARLTON HOTEL COMPANY, L.L.C. GOLD STANDARDS

Gold Standards

Our Gold Standards are the foundation of The Ritz-Carlton Hotel Company, L.L.C. They encompass the values and philosophy by which we operate and include:

The Credo

The Ritz-Carlton Hotel is a place where the genuine care and comfort of our guests is our highest mission.

We pledge to provide the finest personal service and facilities for our guests who will always enjoy a warm, relaxed, yet refined ambience.

The Ritz-Carlton experience enlivens the senses, instills well-being, and fulfills even the unexpressed wishes and needs of our guests.

Motto

At The Ritz-Carlton Hotel Company, L.L.C., "We are Ladies and Gentlemen serving Ladies and Gentlemen." This motto exemplifies the anticipatory service provided by all staff members.

Three Steps Of Service

1. A warm and sincere greeting. Use the guest's name.
2. Anticipation and fulfillment of each guest's needs.
3. Fond farewell. Give a warm good-bye and use the guest's name.

Service Values: I Am Proud To Be Ritz-Carlton

1. I build strong relationships and create Ritz-Carlton guests for life.
2. I am always responsive to the expressed and unexpressed wishes and needs of our guests.
3. I am empowered to create unique, memorable and personal experiences for our guests.
4. I understand my role in achieving the Key Success Factors, embracing Community Footprints and creating The Ritz-Carlton Mystique.

5. I continuously seek opportunities to innovate and improve The Ritz-Carlton experience.
6. I own and immediately resolve guest problems.
7. I create a work environment of teamwork and lateral service so that the needs of our guests and each other are met.
8. I have the opportunity to continuously learn and grow.
9. I am involved in the planning of the work that affects me.
10. I am proud of my professional appearance, language and behavior.
11. I protect the privacy and security of our guests, my fellow employees and the company's confidential information and assets.
12. I am responsible for uncompromising levels of cleanliness and creating a safe and accident-free environment.

The 6th Diamond

Mystique

Emotional Engagement

Functional

The Employee Promise

At The Ritz-Carlton, our Ladies and Gentlemen are the most important resource in our service commitment to our guests.

By applying the principles of trust, honesty, respect, integrity and commitment, we nurture and maximize talent to the benefit of each individual and the company.

The Ritz-Carlton fosters a work environment where diversity is valued, quality of life is enhanced, individual aspirations are fulfilled, and The Ritz-Carlton Mystique is strengthened.

APPENDIX H

MARRIOTT INTERNATIONAL, INC. CORE VALUES

Core Values

The fundamental ideals of service to associates, customers, and community which serve as the cornerstone for all Marriott associates are exemplified by Marriott's "Spirit to Serve" philosophy.

...Our Associates

- The unshakeable conviction that our people are our most important asset
- An environment that supports associate growth and personal development
- A reputation for employing caring, dependable associates who are ethical and trustworthy
- A home-like atmosphere and friendly workplace relationships
- A performance-reward system that recognizes the important contributions of both hourly and management associates
- Pride in the Marriott name, accomplishments, and record of success
- A focus on growth -- managed and franchised properties, owners, and investors

...Our Guests

- A hands-on management style, i.e., "management by walking around"
- Attention to detail
- Openness to innovation and creativity in serving guests
- Pride in the knowledge that our guests can count on Marriott's unique blend of quality, consistency, personalized service, and recognition almost anywhere they travel in the world or whichever Marriott brand they choose

...Our Communities

- Demonstrated every day by associate and corporate support of local, national and global initiatives and programs
- An important part of doing business the "Marriott Way"

Source: <http://www.marriott.com/corporateinfo/culture/coreValues.mi>

APPENDIX I

GRAND CAYMAN AND STUDY HOTELS DURING AND AFTER HURRICANE IVAN

House of the Governor of the Cayman Islands

Source: James Carman



Hurricane Flag in Advance of Hurricane Ivan (left) and the Remains of the Flags Afterwards (right)
Source: Trisha Wherley



West Bay Road Covered in Sand Left By Storm Surge (left) and the Westin Casuarina Resort from West Bay Road
Source: James Carman



**Photos from the Grand Cayman Marriott Beach Resort
(Source: Hotel Unless Otherwise Noted)**

Front of the Hotel Post-Ivan (left) and During the Study Period (Right, Source: Author)



Hotel Sign on West Bay Road Post-Ivan (left) and During the Study Period (Right, Source: Author)



Interior Courtyard Post-Storm



Storm Wall and Caribbean Sea, Lacking a Beach in 2004 (Left) and the Beach in October 2008 (Right, Source: Author)



Mold on the Walls of Room 528 (left) and Pile of Carpets to be Discarded (right)



Photos from The Ritz-Carlton, Grand Cayman
(Source: James Carman Unless Otherwise Noted)

Oceanside after Hurricane Ivan (Left) and During Opening in December 2005 (Right, Source: Hotel)



Shipping Containers Drift in the Overwash from the North Sound (left) and Lagoon Side in December 2005 (right, Source: Hotel)



APPENDIX J

HURRICANES EXPERIENCED BY SURVEY RESPONDENTS

Hurricane	Year	Location (# of Respondents)
Francelia	1969	Honduras (1)
Fifi-Orlene	1974	Honduras (1)
Allen	1979	St. Lucia (1)
Gloria	1985	New York City (1)
Greta-Olivia	1985	Honduras (1)
Floyd	1987	Jamaica (1)
Gilbert	1988	Grand Cayman (9); Jamaica (13); Cancun, Mexico (1)
Joan-Miriam	1988	Nicaragua (2)
Mitch	1988	Honduras (1); Cancun, Mexico (2); Nicaragua (1)
Andrew	1992	North Carolina, US (2); New York City (1)
Opal	1995	Georgia, US (1)
Bertha	1996	North Carolina, US (1)
Fran	1996	North Carolina, US (2)
Georges	1998	Dominican Republic (1)
Fabian	2003	Bermuda (2)
Isabel	2003	Virginia, US (1)
Charley	2004	Florida, US (2); North Carolina, US (2); Grand Cayman (3)
Frances	2004	Florida, US (2)
Ivan	2004	Grand Cayman (43); Jamaica (8); Florida, US (3)
Jeanne	2004	Florida, US (2)
Beta	2005	Nicaragua (1)
Emily	2005	Grand Cayman (2)
Nate	2005	Bermuda (1)
Wilma	2005	Grand Cayman (5); Florida, US (1); Cancun, Mexico (3); Bermuda (1)
Dean	2007	Grand Cayman (27); Jamaica (1)
Elena*	2007	Mozambique [more likely Favio] (1)
Felix	2007	Nicaragua (1)
Gustav	2008	Grand Cayman (48)
Hanna	2008	Grand Cayman (1) *not on storm's path
Ike	2008	Grand Cayman (6)

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VITA

Johanna L. Ostling is a native of the San Francisco Bay Area. While growing up in various parts of the Bay Area, she developed a fascination with weather, especially the local microclimates. This passion took her to the University of California at Davis in pursuit of a degree in Atmospheric Sciences. After her first year, she realized she needed her realm of study to be a bit more grounded and transferred to the University of Colorado, Colorado Springs, where she discovered her academic home in the Department of Geography. Two geography degrees and a semester abroad in Australia later, she was ready to experience more of the world. Her wanderlust took her to live and work on Grand Cayman until the siren song of academia called again. Johanna returned to the United States and entered the Ph.D. program at Texas State University-San Marcos. Whilst in the program, she continued her world travels, visiting with friends and family in Japan, England, Malta, and all over the United States. Now, on her third passport, Johanna looks forward to discovering new locales and continuing to share her love of geography through teaching.

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This dissertation was typed by Johanna L. Ostling.