Initial Windshield Damage Assessment

Thomas Murphy Jr.

Boynton Beach Fire Rescue Department

Boynton Beach, Florida

Certification Statement

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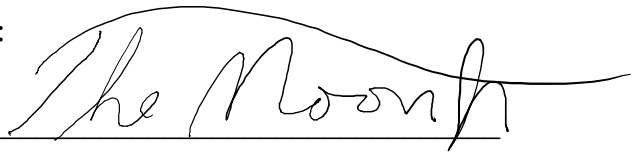
Signed: 

Abstract

The problem is that the City of Boynton Beach Fire Rescue Department has been responding to natural or manmade disasters, performing windshield damage assessments without a dedicated policy or procedure in place for assessing and reporting the initial damage. The purpose of this applied research project has been to determine what elements should be included in a draft policy or procedure to standardized and effectively record, and, relay information to the Emergency Operations Center (EOC). The descriptive research method was used to answer the four research questions:

1) What is the history of natural or manmade disasters in the City of Boynton Beach over the last 30 years, and what type of disasters are likely to occur in the future?
2) What is the purpose and benefit of a rapid windshield damage assessment during or immediately after a natural or manmade disaster event?
3) What other agencies around the City of Boynton Beach have formal policies or procedures in place, and what departments are primarily responsible to conduct rapid windshield damage assessments during or immediately after a natural or manmade disaster event?
4) How are other agencies around the City of Boynton Beach reporting information gained from rapid windshield damage assessments?

Personal communications, literature review, and questionnaires indicated that Boynton Beach is susceptible to hurricane disaster events. The windshield damage assessment performed primarily by fire departments is the first step in community recovery after these events. Most agencies in the area have some formal policy in place defining roles and responsibilities for damage

assessment. Designated communications and documentation methods are used to report information to local EOC. Recommendations indicated that streamlined departmental standard operating procedures would be helpful and should include the elements of accurate, efficient and consistent damage reporting.

Table of Contents

Appendices

Introduction:

Fire departments all over the country respond to manmade or natural disasters each year. Many times, these events are large-scale incidents involving multiple agencies requiring tremendous recovery effort from the state and the federal government. More often these events are of a lesser scale simply requiring municipal or county resources. Whatever the occurrence, mitigation of any disaster situation starts at the local level. Accurate, timely data and information is a key element to initiate proper and effective allocation of workforce and resources when mitigating these incidents. To assure successful outcomes and precise information through initial damage assessment reports is fundamental to the incidents mitigation and recovery success. This initial information can provide a basic snapshot of the overall damage to the community and can help initial rescue efforts in recovery (Federal Emergency Management Agency, n.d.).

Numerous agencies may be tasked with the responsibility of reporting damage after an incident. Identifying which agency is responsible for initial damage reporting after an incident can become unclear without proper pre-planning. How information is relayed to the emergency operations center is also critical for expediting rescue efforts along with financial recovery. Preplanning through policies and clear and concise procedures before an incident can be extremely helpful for the speedy recovery of the citizens and community involved.

The problem is that the City of Boynton Beach Fire Rescue Department continues to respond to natural or manmade disasters, performing damage assessment without a dedicated policy or procedure for assessing and reporting initial damage. Without a written policy and procedure in place, there can be confusion as to what proper procedure and which agency is responsible for conducting an initial damage assessment. This uncertainty in responsibility can

lead to a delay or lack of accurate and timely information getting to the Emergency Disaster Management Teams, resulting in an additional interruption in emergency responses. The purpose of this applied research project is to determine what elements should be included in a draft policy or procedure for the City of Boynton Beach Fire Rescue Department to standardized and effectively record, and, relay information to the Emergency Operations Center regarding rapid windshield damage assessment when mitigating natural or manmade disasters. Descriptive research, internal and external questionnaires, direct correspondences, and literature review were used to answer the following research questions.

1) What is the history of natural or manmade disasters in the City of Boynton Beach over the last 30 years, and what type of disasters are likely to occur in the future?

2) What is the purpose and benefit of a rapid windshield damage assessment during or immediately after a natural or manmade disaster event?

3) What other agencies around the City of Boynton Beach have formal policies procedures in place, and what departments are primarily responsible to conduct rapid windshield damage assessments during or immediately after a natural or manmade disaster event?

4) How are other agencies around the City of Boynton Beach reporting information gained from rapid windshield damage assessments

Background and Significance

Boynton Beach is a rapidly growing area located in Palm Beach County Florida. This urban city nestled on the east coast of Florida is located approximately midway between West Palm Beach and Miami. After a distinguished career during the American Civil War Major Nathan Boynton and Congressman William Linton were looking to find a location to escape the cold winters of Port Huron Michigan. In 1894 the two adventurers traveled south through the native tropical east coast of southern Florida and purchased 500 acres of property on the Intracoastal Waterway (ICW). Falling in love with the warm climate and tropical atmosphere the two gentlemen decided to make the area their new home. A few months later Major Nathan Boynton officially founded the City of Boynton Beach (DeVries, 2006, p. 9).

The City of Boynton Beach has a total land mass of 16.18 square miles and a population of 75,569 full-time residents (United States Census Bureau, 2016). Like the South Florida area in general, Boynton Beach has a diverse demographic makeup allowing the opportunity for residents to enjoy and explore a variety of unique art and cultural events. Boynton Beach is more commonly known as the Gateway to the Gulfstream because of its renowned sports fishing, and convenient location to the south Lake Worth Inlet (Boynton Beach, 2016). The City of Boynton Beach governing body is structured very similarly to the surrounding municipalities. The elected commission is comprised of four districts. Each district has a commissioner that is elected by the residences of that particular district. The Mayor is elected at large from the four total districts. All the elected officials serve a three-year term and are term limited after two consecutive terms. Boynton Beach utilizes a strong city manager form of government. However, all final decisions, policies, and issues are reviewed, discussed, and often revised by the elected

city officials. These elected individuals are tasked with appointing a city manager to operate the daily business of the city and oversee the different department heads. There are 11 major department heads that supervise a variety of different services including emergency communications, code enforcement, animal control, police services, fire services, and emergency medical services.

The Boynton Beach Fire Department was born in July of 1924. "A group of citizens got together for a few drinks at Bucks Place, a favorite watering hole for the locals" (M. Landress, personal communication, July 9, 2017). Charles Senior, the superintendent of the light and water department, and unofficial spokesman, along with a small group of men decided the town needed a Fire Department. That night they decided the idea should be officially presented at the next town meeting. Charles Senior was elected to present the idea to the mayor and commission. At the next town meeting, the idea to form a fire department was accepted, and Charles Senior was officially appointed to start the new fire department from scratch. Mr. Senior was given a budget of 100 dollars to buy the necessary equipment needed to fight fire, and was also tasked with recruiting some new firefighters. A few weeks later Charles Senior organized a meeting with approximately 30 men at the Menzell Theatre on Palmetto Street. That night, Charles Senior was unanimously elected as the first Fire Chief, and 20 men were willing to join the newly formed department. Later at the next month town meeting the commission and mayor approved a 233-dollar annual budget, and with that, the Boynton Beach Fire Department was officially started (M. Landress, personal communication, July 9, 2017). The Boynton Beach Fire Rescue Department (BBFRD) is a progressive and dynamic fire department, offering a variety of emergency services including fire and emergency medical services to over 75,000 of its citizens.

Through contract agreements, the department also provides fire rescue services to four neighboring cities, the Town of Ocean Ridge, the Town of Hypoluxo, The Town of Briney Breezes, and The Village of Golf. The Boynton Beach Fire Department responded to 14,348 emergency calls in 2016 (Boynton Beach Fire Rescue Department, 2016, p. 1).

There are current inter local agreements including mutual aid and some automatic aid contracts with all the fire departments and bordering cities in Palm Beach County. The department is staffed with a total of 157 full time fire department employees (G. Joseph, personal communication, August 4, 2017). The departments three major divisions are Community Standards, Fire Administration, and Fire Operations. Beginning at the top, the organizational chart starts with the Fire Chief. Directly below the Fire Chief, are the Deputy Chief of Operations, Deputy Chief of Fire Administration, the Director of Fire and Life Safety/Fire Marshal, and the Director of Community Standards. Directly below the Deputy Chief of Operations is the Division Chief of Emergency Medical Services, the Division Chief of Training and the three Battalion Chiefs/Shift Commanders. The Community Standards Division is staffed with one fire protection engineer, six assistant fire marshals, an administrative assistant to the fire marshal, and the director of fire and life safety/fire marshal. Recently added to the department were six community standards officers and the director of the community standards division. The fire administration is staffed with two administrative assistants, four administrative associates, two emergency medical billing specialists, a financial officer, an information technology specialist, and the deputy chief of fire administration. The operations division is staffed with the deputy chief of operations, three battalion chiefs, seven captains, 26 lieutenants, and 100 firefighters.

The line operational personnel work schedule is based on a 48 hour week. There is a three day work cycle consisting of a 24 hour on duty and a 48 hour off duty shift with a Kelly day offered on a seven day cycle. There are three operational battalions, Alpha, Bravo, and Charlie, each battalion is staffed with 45 total personnel made up of a battalion chief, two captains, nine lieutenants and 33 firefighters, with the exception of Charlie Battalion, which is assigned three captains and eight lieutenants. All operational personnel must maintain a Florida Fire Certification and be a minimum of a Florida certified Emergency Medical Technician. There are five fully operational fire stations in the City of Boynton Beach. Each of the four outlying stations are staffed with eight firefighters per day. A fire suppression unit and a transport medical unit are assigned to each of the outlying stations. The main headquarters fire station is staffed with 13 firefighters including a suppression unit, a medical transport unit, along with, a truck company, a technical rescue company, and a battalion chief vehicle. Dive rescue, heavy extrication, and technical rescue are some specialized services that the fire department offers to the community in addition to traditional fire rescue services. There are 26 members of the Boynton Beach Technical Rescue Team that are recognized by the state of Florida as an official Florida Urban Search and Rescue Team 746 (FLUSAR 746).

The BBFRD is like many departments in the South Florida area when it comes to types of calls that it responds to. Like most places around the country, BBFRD responds to a very diverse array of emergency incidents each day. The specific incidents can range from vehicle accidents, hazardous materials incidents, public assistance, fires, and medical situations. A large percentage of the work volume is related to emergency medical services. In 2016 the department responded to a total of 14,348 emergency responses. Of that total 9,802 responses

were medically related incidents, representing about 68 percent of the total call volume for the year (Boynton Beach Fire Rescue Department, 2016, p. 4).

Along with all the diverse incidents fire departments responded to, they are also responsible for answering and helping mitigate situations relating to natural or manmade disaster incidents. These situations can include an endless assortment of circumstances including severe weather, earthquakes, wildland fires, landslides, sinkholes, terrorist attacks, tornadoes, tidal waves or tsunamis, flooding, severe weather and electrical storms, and tropical storms or hurricane conditions. Like the trend of our nation's fire departments, the BBFRD is also called on to respond to such natural or manmade disasters.

The City of Boynton Beach is located in the south Florida region. Florida's peninsula geography and tropical climate with warm waters on three sides make this area extremely susceptible to inclement weather, such as tropical storms, heavy rain, flooding, and in most extreme conditions hurricanes. Statistically Florida is placed third among the nation's most dangerous places for wildland fires, however, South Florida is ranked in the nation as the second most dangerous hurricane area (Chaney/ the Weather Channel, 2015).

Over the Past 30 years, nine major hurricanes have made landfall in Florida and have impacted Palm Beach County and the Boynton Beach area. Starting in 1992 with hurricane Andrew, followed by hurricane Opal in 1995. Hurricanes Charlie, Francis, and Jean affected Florida in 2004 and the most active hurricane season in 2005 produced Dennis, Katrina, Rita, and Wilma. One of the most devastating hurricanes to affect South Florida was hurricane Andrew in 1992. The storm was a category five hurricane that destroyed the western portion of Dade County. Andrew was a rather small hurricane comparatively, however, it was one of the most powerful and overwhelming storms to make landfall in South Florida in many years.

Hurricane Andrew did not directly impact the City of Boynton Beach, but its outward effects had an overwhelming impact on the infrastructure and the communities in Dade, Broward, and Palm Beach Counties. In addition to the hurricanes that have made landfall in Florida, there have also been many tropical storms, flooding, high wind, and lightning storm situations that have adversely affected many local communities on a smaller scale. The most recent hurricane to threaten Boynton Beach was hurricane Matthew in September 2016 (National Oceanic and Atmospheric Administration, n.d.).

One of the most imperative functions immediately after a natural or manmade disaster is reporting damage that the community has sustained. The states, counties, and local entities usually have complex emergency disaster plans including plans for damage assessment. These documents are very lengthy, and often go into detail about the financial and longer-term recovery responses. First responders must be very clear on the policies and procedures that they are required to follow immediately after the disaster event. Many local entities can complete windshield Damage Surveys, or Initial Rapid Damage Assessment reports (RDA), however, fire rescue or police personnel are often given this assignment because they are typically the first units out into the communities after natural or manmade disasters. RDA are primarily critical when mitigating the very early stages of natural or manmade disasters. The initial reporting of damage to the emergency operations center immediately after an incident is critical and essential to expedite and ensure the deployment of limited primary emergency resources, and prioritize the areas of the city that have experienced the most severe impact of the disaster. The RDA also is the initial report that allows the incident commanders to assign limited field units properly and correctly during the early mitigation process. These initial rapid damage assessment reports also

may eventually be compiled and be critical to the emergency operation centers for eventual financial recovery preparation (Fire Rescue Magazine & Donohue, 2016).

In the past BBFRD has been expected to conduct initial damage assessment after natural or manmade disasters. Many times, these damage reports were given randomly and differently from each company officer assigned to the particular zones. There was a county emergency plan in place, however, the city of Boynton Beach did not have own city emergency plan, and the BBFRD had not implemented any inter department policies or procedures in reference to initial windshield damage assessment. Operational crews were uncertain in some cases and reported damage as best they could during these past incidents. Fire department policies and procedures, such as standard operating procedures or operating guidelines specifically depicting who, how, and where to report initial damage after an incident did not exist. The BBFRD emergency crews that were responding to emergency calls immediately after an incident generally reported damage back to the city dispatching center where some of the information was communicated back to the emergency operations manager either by the dispatch center, company officers, or the on-duty shift commander. Although this system worked, it was not consistent or efficient, sometimes resulting in delays of critical information to the Emergency Operations Center (EOC). In some circumstances these delays impeded or slowed down critical emergency response resources, possibly causing multiple responses or duplicated resources to a single incident. In one case after a tropical storm in 2000 the lack of preliminary information resulted in several additional days of extreme flooding in a highly populated neighborhood. Initial emergency crews responded to the neighborhood and reported that the flooding was excessive and the drainage gates needed to be opened. It was uncertain as to what crew reported this information and to what entity, whether it be the dispatching center a company officer, or on duty battalion chief. In

this case, the information did not reach the emergency operations center in a timely manner. Several days later additional responding crews realized that these drainage gates were not opened and then proceeded to go through proper channels to take care of the situation. In the interim multiple calls for rescue and emergency medical service due to the severe flooding of the neighborhood increased. If the responding crews had a policy or procedure with a clearer direction for conducting initial damage assessment this type of situation could have been avoided (W. Gulbrandson, personal communication, August 23, 2017). Chief William Gulbrandson, worked with the Boynton Beach Fire Department for 23 years and retired in 2001. During his time with the city Chief Gulbrandson was assigned a multitude of tasks by the fire department as well as the city governing entities and the city manager. Chief Gulbrandson was promoted to the rank of battalion chief and also promoted to the division chief of training. During hurricane Andrew Chief Gulbrandson was appointed to the position of acting Fire Chief, and also assigned the responsibilities of the emergency operations manager for the city. After retiring from the City of Boynton Beach, he was hired in Sumter County Florida in 2002 and served as the Fire Chief until 2011. In September 2011 Chief Gulbrandson accepted a position with the City of Longwood Florida where he served as the Director of Fire Services until 2016. In 2003 Chief Gulbrandson was honored with the deserving title of Florida Fire Chief of the year from the Florida Fire Chiefs Association.

The recent fire departments administration has concentrated a more detailed focused on preparation for possible hurricane, natural, or manmade disaster impact in the City of Boynton Beach. The city's comprehensive emergency management plan was revised in 2013. This plan does give some direction as to damage assessment, however, particular procedures on who should perform the initial RDA and how, and to who it should be reported is not fully included.

The plan describes roles and responsibilities and has valuable information and contacts for additional assistance which is extremely helpful, and it also describes how longer term recovery efforts should be accomplished. This document is certainly valuable, however, on scene field crews need through direction as to who is responsible and how tasks should be reported and completed (EREC Inc., 2013, p. 2).

In 2015 city management assigned the fire department administration to create an emergency plan, to include manmade and natural disasters focusing on hurricanes and tropical storms. The plan provides a structured system for Boynton Beach Fire-Rescue to safeguard the citizens and visitors from adversarial effects of a hurricane. It also assigns accountabilities and establishes measures for the coordinated effort necessary to provide for the preparedness, response, and recovery from a hurricane. This document is very informative and contains valuable resource information, and it does describe the damage assessment process, pertaining to the primary elements of disaster preparedness, response, and recovery. What is not found in this document are the policies or procedures on who is primarily responsible for initial damage assessment. Secondly, how this critical initial information should be consistently and accurately reported. And finally, who should receive this information to relay it in a timely manner to the emergency operations center (Carter, 2015, p. 9).

The most recent incident occurred in September 2016 when hurricane Matthew threatened the south Florida coast. In preparation for a potential impact in Palm Beach County and in the City of Boynton Beach, fire administration and operations informed emergency fire crews that after the storm they would need to execute an initial windshield damage assessment for the impacted areas. The operation company officers including the battalion chiefs were unsure about their responsibility regarding initial windshield damage assessment. When the line

officers looked to Standard Operating Guidelines (SOG) and fire department policies and procedures they were unable to find any written procedures. The detailed and complex county and city emergency plans were unavailable at the battalion or company officer level. Although hurricane Matthew inevitably ended up causing little damage and did not make an impact in South Florida, the tremendous potential for severe damage was real. The problem of the company officer's uncertainty as to the roles and responsibilities concerning initial windshield damage assessment could have been overwhelming and certainly a hindrance to initial resource assignments and mitigation operations. This perplexity could have caused a delay in obtaining an initial RDA if Matthew had made landfall. The delay of damage assessment information getting to the emergency operations center could have possibly resulted in limited resources not being allocated or misallocated during a major time of need. Whatever the reason for this problem Boynton Beach Fire Rescue Department is obligated to investigate and resolve the issue. Fire rescue personnel in the past, currently, and in the future, will inevitably be expected to conduct and report initial damage assessment after natural or manmade disasters. (L. Clemons, personal communication, September 6, 2017). Deputy Chief Latosha Clemons has worked with the Boynton Beach Fire Department for the past 22 years. Chief Clemons started as a probationary firefighter and has worked her way through all the ranks of the Boynton Beach Fire Department up to her current position of Deputy Chief in charge of fire operations. Chief Clemons has extensive experience and educational credentials, including a master's degree in public administration, and is also a graduate of the Executive Fire Officer Program from the National Fire Academy.

The threat of natural or manmade disasters is ever present to all our brothers and sisters working in the fire service today. The white sandy beaches, sunny tropical climate, tranquil

oceans, and serene wilderness of the State of Florida certainly can make it difficult to believe that such a tropical paradise could be so susceptible to the potential for so many natural disasters. The past, present, and potential future issue of uncertainty, in the BBFRD regarding initial windshield damage assessments undoubtedly gives credence and justifies further investigation for a possibly better solution to the concern. South Florida, Palm Beach County and The City of Boynton Beach are particularly susceptible to natural disasters such as high winds, rain, tropical storms, lightning storms, and hurricanes. The history data can certainly solidify the fact that although these events may have at times long intervals between occurrences, they can occur at any time and unfortunately will inevitably occur again in the future (National Oceanic and Atmospheric Administration, n.d.). When the next disaster will transpire may undoubtedly be unpredictable, however, the necessity for Boynton Beach Fire Rescue and emergency responders to initially spearhead the mitigation process is certain. Initial damage assessments will absolutely be necessary and required by emergency field crews to begin a successful mitigation and recovery process for these incidents. Boynton Beach Fire Rescue will be called upon to perform such duties and damage assessment. When this responsibility is placed upon the men and women of the Boynton Beach Fire Rescue Department, they must be prepared to accurately, consistently, and efficiently complete the initial damage assessment task and be clear on their responsibilities when doing so. Providing preplanned and carefully laid out, accurate, concise policies or procedures will be valuable to a successful outcome in any future disaster incident.

The problem is that the City of Boynton Beach Fire Rescue Department continues to respond to natural or manmade disasters, performing damage assessment without a dedicated policy or procedure for assessing and reporting initial windshield damage assessment. The BBFRD must act to resolve the problem. If left unattended an adverse outcome during a natural

or manmade disaster pertaining to initial damage assessment will eventually happen. This type of behavior has been well defined in the private industry particularly by NASA concerning the space shuttle Challenger and the damaged O-rings. The concept is basically simple, the improper behavior if allowed to continue becomes the norm for a group, eventually resulting in a catastrophe. These types of situations are unacceptable because the problem was predicted and could have been prevented with preplanning and pre-action (Mullane, 2012).

This applied research project relates directly to the Executive Fire Officer Program and is relevant to the Executive Fire Service Operations in Emergency Management course by addressing the third course objective, "Conducting Damage Assessment" (National Fire Academy, 2016). Properly implementing the essential elements of a draft policy for initial windshield damage assessment in the BBFRD for fire rescue personnel will require leadership abilities, in depth commitment to research the issues, and an adaptive ability to introduce future changes. Emergency responders that are well prepared and trained for their initial responsibilities immediately after a manmade or natural disaster can only lead to a more professional and safer status. They will possess the ability to attain one of the strategic goals of the United States Fire Administration which is "Goal 2: Promote response, local planning and preparedness for all-hazards" (United States Fire Administration, 2017).

Literature Review

The Center for Research on the Epidemiology of Disasters found that Natural and manmade disasters seem to be occurring more often each year. These events include but are not limited to earthquakes, landslides, sinkholes, wildland fires, active shooters, terrorist attacks, biological weapons, sandstorms, tornados, tidal waves, tsunamis, and hurricanes. The reasons for these increases are not certain and may range from human errors, global warming, climate

adjustments, or just simply a natural progression. On average from 2004 to 2013 the number of disasters in the United States was 21 per year. In 2015 the United States experienced 28 natural disasters which is a 33 percent increase from its 2003 to 2014 average (Center for Research on the Epidemiology of Disasters, 2016).

The possibilities of a variety of natural disasters affecting Palm Beach County and the City of Boynton Beach are as probable as any other place in the United States. Danger and catastrophe such as hazardous materials incidents, biological situations, acts of terrorism, and wildland fires are a great concern, however, the magnitude of disaster damage overwhelming results from adverse weather incidents. All the most devastating hurricanes to assault the United States in past years have caused billions of dollars in damage. The most affected states are those on the East Atlantic Coast and near the Gulf of Mexico. The preparation of the local, county and state emergency responders for any disaster must remain at a very high state of readiness for any occurrence. The data results show that severe weather disasters are the most common occurrence, the most dangerous and costly are hurricanes (Beers/CNBC, 2013). South Florida, Palm Beach County and the City of Boynton Beach are particularly susceptible to hurricanes. The area has experienced certain years when multiple events have occurred, and other times where many years in succession have produced no hurricane impact activity at all. Regardless of the situation, these events are extremely dangerous and hazardous to life safety, and devastating economically. When the next incident occurs is unpredictable, however, the data history indicates that hurricanes have occurred in the past, and present, and, it is inevitable that hurricane disasters will occur again in the future (National Oceanic and Atmospheric Administration, n.d.).

Looking at data from 1960 to 2016 multiple tropical storms and severe weather events have affected South Florida. Of those events, over 20 of them have been a result of major hurricanes.

These storms have taken lives, destroyed homes and have physically and financially, been some of the most adversely impacting events of modern times. (FLORIDADISASTERS.COM, 2017).

Table: 1

Florida Disaster History

Hurricanes

Year	Date	Disaster
2005	10/24	Hurricane Wilma
2005	08/28	Hurricane Katrina
2005	07/10	Hurricane Dennis
2004	09/26	Hurricane Jeanne
2004	09/16	Hurricane Ivan
2004	09/04	Hurricane Frances
2004	08/13	Hurricane Charley and Tropical Storm Bonnie
1999	10/20	Hurricane Irene
1999	09/22	Hurricane Floyd
1998	09/28	Hurricane Georges
1998	09/04	Hurricane Earl
Year	**Date**	**Disaster**
1995	10/04	Hurricane Opal
1995	08/10	Hurricane Erin
1992	08/24	Hurricane Andrew
1985	12/03	Hurricane Kate
1985	09/12	Hurricane Elena
1979	09/13	Hurricane Frederic
1968	11/07	Hurricane Gladys
1965	09/14	Hurricane Betsy
1964	09/10	Hurricane Dora
1964	09/08	Hurricane Cleo
1960	09/12	Hurricane Donna

Fire Hazards

Year	Date	Disaster
1998	06/18	Florida Extreme Fire Hazard

Of the ten most devastating and costly storms over the last 30 years seven of them have affected South Florida, Palm Beach County, and the City of Boynton Beach. The most devastating hurricane was Katrina in August 2005. This storm critically affected the state of

Louisiana but also caused damage in Georgia, Alabama, Mississippi, Tennessee, and Florida. The enormous dollar cost of Katrina was over 47 billion dollars. In August of 1992 Hurricane Andrew destroyed the south west portion of Miami Dade County. The dollar loss during Hurricane Andrew was estimated to be more than 23 billion dollars. Hurricane Wilma struck South Florida in October of 2005 causing almost 12 Billion dollars in damage to the State of Florida alone. In August of 2004 Hurricane Charlie slammed into the southern part of Florida reeking its damage through the Carolinas. Charlie's cost in damages exceeded 8.9 billion dollars. In September of 2005 Hurricane Ivan traveled the Atlantic coast from Florida to Delaware causing damage to a total of 16 different states. The final toll for Ivan was just short of 8.5 billion dollars. In September of 2004 Hurricane Rita made landfall in South Florida, also affecting Alabama, Louisiana, Texas, Tennessee, Mississippi, and Arkansas. The dollar loss because of Rita was about 6.4 billion dollars. Also in September of 2004 Hurricane Francis struck the coast of South Florida. Francis affected Georgia, North and South Carolina, and New York accounting for nearly 5.5 billion dollars in total damage (Insurance Information Institute Incorporated, 2017).

The most recent hurricane to affect Boynton Beach was Mathew in September of 2016. This was a devastating storm, but fortunately, the Florida coast was spared direct impact. Although financially Florida fared well with Matthew sadly and regrettably four people lost their lives in Florida as a direct result of the storm. Mathew stayed about twenty miles off the coast of Florida causing some storm surge before it flooded parts of Georgia near Savannah. It finally made landfall east of Charleston South Carolina causing heavy flooding, six to eight foot storm surge, and coastal damage through North Carolina (Miller/USA Today, 2016).

Hurricane Wilma in 2005 was the most recent storm to have a direct impact on Palm Beach County and the City of Boynton Beach. Many government buildings and almost every school in Palm Beach County suffered extensive roof and building damage, at an estimated cost of 37.7 million dollars. Over 90 percent of businesses and communities lost electrical power, and some areas were without power for up to three weeks. The storm caused damage to more than 55,000 homes and 3,600 businesses. Excessive winds caused tremendous damage to vegetation and trees resulting in 7.7 million cubic yards of brush and debris collection after the storm. The total damage for Palm Beach County was estimated at 2.9 billion dollars, with 1.6 billion dollars to residential structures, one billion dollars to local businesses, and over 300 million dollars to municipal and public property (Cryer/Everything Explained Today Reference Encyclopedia, 2017).

Some of the most costly and devastating hurricanes that have directly impacted the City of Boynton Beach begins with hurricane Francis. In September of 2004, Francis made landfall in South Florida and impacted the City of Boynton Beach, causing 1.4 million dollars in damage. One month later in October of 2004 hurricane Jeanne struck Boynton Beach, causing an additional 600,000 dollars in damage. In August of 2008, although not an official hurricane, tropical storm Fay hovered over the city for several days causing extensive flooding and damage. The final cost resulting from Fay was close to 175,000 dollars in damage. In August of 2012 hurricanes Isaac struck Boynton Beach causing 310,000 dollars' worth of damage to the city infrastructure. The most recent hurricane was Mathew that impacted Boynton Beach and caused over 425,000 in public property damage.

The City of Boynton Beach was severely and directly affected by hurricane Wilma, and to date, it is the most financial impacting storm to affect the city in the past 30 years. Multiple

buildings in the facilities department, including public works buildings, the animal shelter, the city hall and two of the five fire stations were damaged. Also, there was significant damage to the utility departments affecting the east and west water treatment plants including 44 pumping stations, both water plants mechanical rooms, the chlorine rooms and the east water tower. Additionally, the city golf course grounds and clubhouse, along with the city library and schoolhouse museum was badly damaged. The police department headquarters had major flooding due to roof damage and the K-9 training facility and marine unit headquarters along with two police marine boat units were destroyed. Almost all of the parks along with several of the public pools and tennis courts received extensive damage. The final toll and financial cost to the public buildings in the city totaled approximately 5.2 million in damage. There was 16,447 dollars of damage to the Florida East Coast railways in the city, and about 9,481 dollars of damage in broken glass, and damaged paint to city vehicles. The most sad and unfortunate loss to the City of Boynton Beach was not financial but occurred in loss of life. Three people were killed because of Wilma after the storm subsided. One person was electrocuted by contacting a downed power line. Another was killed in a motor vehicle accident at the intersection of a busy cross street. The final person lost their life due to a large piece of falling glass from debris cleanup during the effort after the storm (Miller/Human Resources and Risk Management, 2006).

Whenever these incidents occur, the total recovery effort will begin utilizing local first responders. The task at hand will be challenging and demanding and will require accurate, efficient, and consistent roles and responsibility direction for the first responders. In any recovery from a natural or manmade disaster the priority is always life safety, however, financially recovering from an incident and restoring normalcy to a community is the ultimate goal. Clear and concise understanding of the entire recovery progression and how physical and

financial recovery will start with an accurate, consistent, and efficient damage assessment process.

The Stafford act of 1988 emphasized the importance of communities being ready to prepare for such disastrous events. It intended to empower state and local agencies to be prepared in an effective and systematic effort when facing disaster recovery. The focus was on states and local entities to develop comprehensive disaster preparedness plans along with implementing better communication and relations with outlying local agencies. It gave power through presidential declaration and the authority to the Federal Emergency Management Agency (FEMA) to physically and financially assist areas affected by disasters. “The Robert T. Stafford Disaster Relief and Emergency Assistance Act (Public Law 100-707), signed into law on November 23, 1988; amended the Disaster Relief Act of 1974 (Public Law 93-288). The Stafford Act constitutes the statutory authority for most Federal disaster response activities especially as they pertain to the Federal Emergency Management Agency (FEMA) and FEMA programs” (Federal Emergency Management Agency, 2016).

Research from Saint Louis County Missouri has found that Emergency Management of any natural or manmade disaster is commonly broken down into four sections. They are the mitigation phase, preparedness phase, response phase, and the recovery phase. The mitigation phase is focused on reducing the chance of an emergency happening or limiting the effects of an unavoidable incident. Mitigation measures relate to risk reduction efforts through regulations. Building codes, zoning requirements, and construction barriers such as levee regulations are some examples. The preparedness phase is concerned with an entities ability to respond and react to a natural or manmade disaster. Some preparedness measures include mutual aid agreements, training exercises, response readiness, and memorandums of understanding. Some

examples would be back up generators for electrical power, build retention ponds for additional drainage issues, and pre-planned evacuation routes. This phase is different from the mitigation phase because it deals with aspects of recovery that should be in place to ease the effects of an incident after a disaster has occurred. The response phase should be a detailed part of the immediate recovery needs of a disaster. This section involves response efforts immediately before, during, or after, a disaster impact incident. An initial windshield damage assessment performed by first responders is a component of this phase. Deployment of police, fire, and medical units in addition to the proper allocation of limited lifesaving resources is the main function in this phase. Response efforts include activities that relate to the short-term and direct effects of an incident, especially those activities that involve life safety and initial first responders. The last phase is the recovery phase where the focused effort is on making the community whole again. Typically, this involves the restoration of basic services, by repairing the social, physical, and economic damage that has occurred. Recovery is different from response because it deals with efforts that arise after basic needs are resolved. This is a rigorous process and often takes years for communities to fully recover (Saint Louis County Missouri, n.d.).

The initial disaster emergency resource allocation will begin immediately after the disaster with the analysis of initial windshield damage assessment reports conducted by the primary first responders. Fire department disaster plans, city emergency plans, and supplement emergency plans will have valuable information, but, often the documents are very detailed concerning the recovery phase and not always readily available at the first responder level. The Federal Emergency Management Agency (FEMA) has produced many documents, guidelines, tools and job aids on roles of validating damage, however, to give responders a more clear and concise

understanding of what is expected of them when performing a damage assessment, the Damage Assessment Operations Manual was written. This document was developed particularly to help local, tribal, and state officials to better and more clearly understand the necessary elements that should be included when performing damage assessment to more efficiently achieve the final goal of receiving federal assistance to expedite community recovery. To support this overall objective, three major goals were defined. First to promote accuracy by clearly defining the information and documentation that should be collected and assessed to obtain federal financial and physical assistance. Next was to assure consistency by standardizing damage assessment requirements. The last goal was to maintain efficiency by allowing municipal, county, state, and tribal entities to understand what necessary information is required to expedite damage assessment efforts (Federal Emergency Management Agency/FEMA, 2016, p. 1).

Figure: 1

In the past damage assessment manuals, standard operating procedures, tools, and job aids developed by FEMA have primarily concentrated on the responsibilities of agency personnel in validating damage and impact information. While these documents have aided as a comprehensive teaching and reference resources for federal damage assessment team members, they did not address the significant role played by local, state, and tribal governments in assessing damage and impact. The purpose of the document is to emphasize the goals of accuracy, consistency, and efficiency and to support, employ, and sanction, the entire emergency management team concept. Understanding the importance of specific damage and impact information required to elicit federal assistance and explaining how that information is evaluated, will help sanction emergency managers at all levels. Also, the document provides a foundation for local, tribal, and state agencies, to develop consistent job-aids and training materials. The overall intent of this unified team concept is to obtain accurate, consistent, and effective, information needed to invoke a presidential disaster declaration (Federal Emergency Management Agency/FEMA, 2016).

The initial windshield damage assessment is the first step of a three part damage assessment process in an overall attempt to attain the proper information to support a disaster declaration resulting in physical and financial assistance from the Federal Government. This phase is a quick snapshot of the initial damage immediately after the incident has subsided. Although several agencies can conduct the initial windshield assessment, the fire service traditionally has been the lead local government agency responsible for rapidly assessing damage and providing assistance in the areas of life safety, incident stabilization, and property conservation after a disaster (Newby, 2014).

The first part of the windshield survey is to assess any damage the first responders or responding agency has sustained because of the incident. This is accomplished by first assuring that all crew members are uninjured, and are physically and mentally ready to perform their duty. The priority will be conducting an inspection of all the fire apparatus and fire stations for any structural or mechanical damage. Additionally, all equipment and tools must be checked to ensure they are ready and safe for operation. After all personnel and equipment are secured and ready for use, a drive by observation of each preplanned zone or windshield damage assessment that reports what areas are most affected and in most need of emergency or lifesaving limited resources is conducted. This survey should be completed quickly usually taking only hours to complete.

Once started the windshield damage assessment survey should be interrupted only if immediate life safety issues are encountered. The windshield damage assessments are reported to the shift commander by portable radio communications and more recently by cellular telephones. The on duty shift commander should report this information to the Emergency Operations Center. Written documentation of the windshield survey should be made and forwarded to the Emergency Operations Center to be processed with the other damage assessments reports conducted by the local agency teams and the federal and state damage assessment teams. The windshield assessment is followed by an initial assessment conducted within three to five days after the event. This is performed by the city or county teams made up of different department representatives such as public works, development, engineering, building officials, and state or county representatives. The third step process is the preliminary damage assessment performed shortly after the initial assessment by a team of representatives from the state and Federal Emergency Management Agency (FEMA) to confirm the accuracy of the

previously reported damage. With this information reported the financial federal assistance process could begin (R. Carter, personal communication, August 29, 2017).

Formerly the BBFRD has activated their local EOC in September 2016, anticipating damage from hurricane Mathew. During this incident, it was discovered by the fire administration that firefighters and company officers were not sure of their roles and responsibilities for conducting an initial windshield damage assessment procedure (L. Clemons, personal communication, September 6, 2017). This storms eye missed the South Florida coast, but it was a great training experience for the Boynton Beach EOC. Often in local entities, there is a constant influx of new and different people assigned to EOC positions during training or an actual event. Lack of practice scenarios and years in between disasters incidents can lead to apprehension and confusion as to roles and responsibilities in the disaster recovery process. These same principals are true for the damage assessment processes assigned to fire officers and first responders. Hurricane plans, and county emergency plans are written, and all the necessary information can be hunted down in these policies. Adding more streamlined standard operating procedures (SOP) for EOC and first responders may be helpful for personnel memory retention of role and responsibilities. There are no questions that clear and accurate policies can be helpful, however, miscommunication and confusion concerning roles and responsibilities could have been synergistic with some supplementary factors, other than absent or unclear written policies and procedures. Some practical reasons including long intervals between actual hurricane or disaster happenings and a lack of repetitive full scale training events could partially be the origin. An alternative answer to bridge this gap, could be more consistent and repetitive, scenario training. This type of training along with, condensed clear policies, emphasizing the roles and responsibilities assigned to each support function in the EOC, could help with accurate,

efficient, and consistent, emergency operations during a disaster incident. Likewise, repetitive and consistent training along with outlining the damage assessment procedures, for the emergency responders, operations personnel, and company officers, would possibly increase accurate, consistent, and efficient damage assessment tasks (J. Davidson, personal communication, August 31, 2017).

Most of the municipalities and county agencies have some type of written emergency plans in place. These documents describe in detail the entire emergency management process from the initial windshield survey, to the final physical and financial recovery phase of a disaster. The Palm Beach County disaster recovery plan describes the three phases of the rapped impact damage assessment process. The windshield survey is conducted by fire rescue personnel immediately in the aftermath of a manmade or natural disaster. The goal is to gather information accurately and quickly to be used to formulate a county impact map. It also provides early information on the extent of overall damage, and prioritizes where and what limited recourses are available to be allocated to the most severely impacted areas. It is not intended to verify damage for federal assistance. The Initial Damage Assessments (IDA) is the first step in receiving federal assistance through a presidential declaration. It should take place immediately after disaster conditions are considered safe for personnel to do so. The goal of this assessment is to determine the severity of damage to homes, business, publicly owned buildings and critical infrastructures. Municipal, county and special district areas, are all required parts of the assessment team. The information is processed through the county emergency management director to begin requesting Federal Public Assistance (PA) assets and Federal Individual Assistance (IA) assets. The Preliminary Damage Assessment (PDA) is requested by state or federal authorities. The PDA will be conducted by a team of representatives from the

municipalities the county the state and FEMA. The purpose is to verify if the IDA compiled by the local entities is accurate and correct. The goal of the PDA is to determine if the Presidential declaration is warranted and if IA and PA will be granted (Palm Beach County Department of Public Safety, 2011).

The City of Boynton Beach, like all our nation's cities, is vulnerable to a variety of hazards that threaten the population, businesses, community, and environment. To be better prepared for any crisis, the City of Boynton Beach has developed a Comprehensive Emergency Management Plan (CEMP). The CEMP is both a planning and an operations-based document that provides guidance for all aspects of the total emergency management process. The two part plan emphasizes the necessary proper actions during the preparedness, response, and recovery phases of any manmade or natural disaster. The Basic Plan outlines roles and responsibilities of all city departments, and resources mobilized by the city during the recovery phase of the event. The Recovery Functions Annex outlines specific tasks and functions that should be accomplished before, during, and after the disaster event. It details control, coordination, planning, and policies within the City of Boynton Beach implemented to facilitate immediate and long term disaster recovery efforts. It also describes that specific responsibilities and roles should be identified and documented by individual departments through Standard Operating Procedures (SOP) or Standard Operating Guidelines (SOG) (EREC Inc., 2013, p. 2).

Because the entire geographic area of the City of Boynton Beach is subject to the destructive force of hurricane winds, in 2015 the fire administration was tasked by the city manager to write the Fire Rescue Hurricane Plan. This document is intended to provide an organized system for Boynton Beach Fire Rescue to protect the citizens and visitors from adverse effects of a hurricane. The plan assigns responsibilities and establishes procedures for

the coordinated effort necessary to formulate and provide for the preparedness, response, and recovery from a hurricane disaster. Additionally, it allows for latitude in the implementation of components of the process depending on various factors, such as storm strength, size, point of storm eye impact, the amount of rain and flooding, wind strength and the need for evacuations. It also provides valuable information including personnel contact and telephone numbers of multiple necessary departments and organizations that may be needed including private utility, energy, and shelter agencies. There is detail concerning securing, protecting and sheltering city buildings including the five fire stations. The department uses the Incident Command System (ICS) under the National Incident Management System (NIMS). What battalions and how callback of shift personnel and operational work schedules are defined. In the event of necessary evacuations, plans for the public, medical needs, and in place shelter operations, including emergency communications are also detailed. Damage assessment is also addressed in a two part format. The Primary Survey will determine and provides resource information on personnel readiness and station destruction including frontline and reserve fire apparatus. The second part is the Jurisdictional Survey and provides a situation status on pre-planned locations, conditions of major roadways and accessibility, conditions and availability of hospitals and medical facilities and the status of the overall conditions and emergency needs of the communities affected by the storm. This survey is conducted immediately after the primary survey and is reported to the local EOC Planning Section. A designated form is described, the Rapid Evaluation Safety Survey Worksheet, and provided in the plan, including photographs of types of building damage ranging from Collapsed, Severe, Falling Hazards, and Other Hazards. There is much needed damage assessment information in this manuscript, however the Initial Windshield

Damage Assessment for immediate life safety and limited emergency resources is not specifically defined in the document (Carter, 2015)

The City of Boca Raton has a City Emergency Plan and references the Palm Beach County Emergency Plan when dealing with natural or manmade disasters. Their administration has taken a further step when dealing with natural or manmade disasters by developing a fire department SOP directed to the fire operations. The purpose of the SOP is to assign roles and responsibilities along with clear direction when fire personnel are conducting an initial evaluation following a disaster by reporting early, efficient, accurate, and consistent, information on the extent of city wide damages. This quick report is the windshield survey to assess overall disaster impact on the community. The goal is to make certain that limited valuable resources are deployed accurately, consistently, and effectively into areas where they are most needed.

The first part is the snapshot survey to determine fire department emergency response capabilities immediately after the disaster has ended. The officer in charge will check the condition and health of the fire station, apparatus, and personnel ensuring that they are capable of responding to emergency calls. The information will be documented on the Snapshot Survey form included in the SOP. These forms are simple check box type with instructions and photographs allowing identification and degrees of damage to be easily documented. This information can then be officially reported to the local city emergency operations center using facsimile, telephone, mobile or portable radio.

The second step is conducting the Fire Department Rapid Damage Assessment to determine the overall amount of damage sustained in a primary response zone. The survey is intended to allow fire rescue workers to identify and request additional units and limited

resources that will be needed for the area. This assessment should be completed in less than four hours after it is determined that the incident has subsided enough to allow fire crews out of the station to perform work. The assessment information must be collected and documented on the Overall Rapid Damage Assessment Form included in the SOP. These forms are also formatted in a simple check box type with instructions and photographs allowing identification and degrees of damage to be easily documented. It will then be reported to the local EOC via fax, phone or radio (The City of Boca Raton, 2014).

In summary of literature review the research has indicated that countless manmade and natural disasters have occurred and continue to transpire all over the world. According to some of the data, the frequency of these events seems to be increasing. The magnitude of manmade or natural disasters from very minor events to large-scale disasters is also increasing. Types of incidents are often random and very from severe weather, wild fires, earthquakes, landslides, cold-weather incidents, and situations concerning international and national terrorism (Center for Research on the Epidemiology of Disasters, 2016). Much like the rest of the nation, South Florida is also susceptible to a variety and magnitude of the same natural or manmade disasters that occur. South Florida, Palm Beach County, and the City of Boynton Beach, are particularly susceptible to severe weather incidents such as flooding, heavy winds, lightning storms, tornadoes, and in the most severe case hurricanes. Looking at past history from 1960 to the present day, over 22 major hurricanes have affected the Palm Beach County area. The City of Boynton Beach experienced direct effects from hurricane Andrew in 1992, and again by hurricanes Katrina and Wilma in 2005, with Wilma, being the most devastating and costly in Boynton Beach history. As recent as 2016, hurricane Matthew threatened South Florida,

fortunately, it did not directly impact the area although tremendous potential did exist. Considering the evidence of the past and present it is likely that the future will continue to bring severe weather, storms, and ultimately hurricanes (Insurance Information Institute Incorporated, 2017).

The City of Boynton Beach, along with the rest of the South Florida area will have to be prepared and ready for the possibility of an eventual future hurricane impact. It will be critical for city, county, state, and federal officials, to fully understand the phases of emergency management, when any natural or manmade disasters arise. Detailed planning and coordinated response measures will be necessary to enhance and expedite the recovery to the public and business communities. To ultimately achieve the final goal of obtaining a presidential declaration assisting with financial and physical recovery will involve proper mitigation, preparation, response, and recovery phases that incorporate plainly defined roles, and clearly assigned responsibilities (Saint Louis County Missouri, n.d.).

The total damage assessment process will be the first step in successfully achieving the goal of a presidential declaration during any natural or manmade disaster. The process begins with the initial windshield survey performed by the primary fire crews (first responders) immediately after the disaster incident. This is separate and has a different purpose than the initial and preliminary damage reports. Even though the intent of each separate damage assessment section is different all damage assessments require physical inspection to determine the extent and severity of damage (Federal Emergency Management Agency/FEMA, 2016).

At times there can be misperception as to who is primarily responsible to perform the assessment how it is to be reported and who it is reported to. This could be due to deficiency of written

procedures, conversely, it also may be partially attributed to long intervals between actual hurricane or disaster happenings and a lack of repetitive full scale training events (J. Davidson, personal communication, August 31, 2017). In the simplest form, county and city emergency plans would be reduced or summarized into standard or emergency operational guidelines, describing clear roles and responsibilities for the damage assessment process. The initial windshield damage assessments would be conducted by the preliminary fire rescue crews immediately after the disaster. The information would be reported by radio communication to the on duty battalion commander, and relayed to the emergency operations center. The shift commander should document the reports and forward them to the appropriate EOC branch director (R. Carter, personal communication, August 29, 2017). The initial damage assessment would be conducted by the local city and county damage teams and documented, and reported through the proper channels. The preliminary damage assessment would be conducted by the local, county, state, and federal damage teams documented, and reported through the proper channels (Palm Beach County Department of Public Safety, 2011).

Procedures

There were several steps necessary to begin the research in an effort to determine what elements should be included in a draft policy or procedure for the City of Boynton Beach Fire Rescue Department to standardized and effectively record, and, relay information to the Emergency Operations Center regarding rapid windshield damage assessment when mitigating natural or manmade disasters. First it was determined by evaluation and internal department observation that this topic required research and possibly future action by the Boynton Beach Fire Rescue Department. The initial literature review began in May of 2017 at the Learning

Resource Center while attending the Executive Analysis of Fire Service Operations in Emergency Management (EAFSOEM) class at the National Fire Academy in Emmitsburg Maryland. The subject research continued at the local level, through city libraries, periodicals, the World Wide Web, books, various media sources, direct communications, questionnaires, and correspondences. During the entire project research and literature review was ongoing and sustained. The descriptive research method was used to conduct this research project and answered the four research questions.

The second phase of the study involved investigating the natural or manmade disaster history for the City of Boynton Beach. There were several avenues to explore starting with the Boynton Beach risk management division located at 100 East Boynton Beach Boulevard in Boynton Beach Florida 33435. Personal communications with many individuals directly involved with incidents that occurred prior to 2014 was not possible due to a full restructure of the city administration that year. The present risk manager Keyla Miller, Manager of Risk and Wellness was able to retrieve some records and detailed information pertaining to hurricanes Wilma that occurred in 2005 and Mathew in 2016. An additional avenue of data was retrieved from the Florida Department of Emergency Management through the Public Assistance Grants Department located at 255 Shumard Oak Boulevard in Tallahassee Florida 32399-2100. Information on the most financial devastating storms from 2004 to 2016 were able to be retrieved. The next step was to determine what is the purpose and benefit of a rapid windshield damage assessment during or immediately after a natural or manmade disaster event. The first step was to look at the FEMA Damage Assessment Operations manual last updated in 2016 to define the damage assessment process. The next part was to investigate the Palm Beach County

Recovery Plan updated in 2011, City of Boynton Beach Emergency Plan, updated in 2013, and the Fire Department Hurricane Plan, updated in 2015 to determine what was contained in the documents as to definitions, roles and responsibilities pertaining to an initial windshield damage assessment. Another information source was the periodic journals, such as Fire Engineering, from other fire department peers around the country defining the value and purpose of the windshield assessment. The final source of information came from direct communications.

The first correspondence was conducted with Fire Chief Ray Carter. Chief Carter has direct and pertinent information regarding the damage assessment process. He started his fire service career in the city of West Palm Beach in 1978. Chief Carter worked in every position of the West Palm Beach Fire Department and was promoted to Chief of the fire department in 1998. After retiring in 2003 he accepted an opportunity as the Deputy Chief of Fire Operations for the City of Boynton Beach where he recently retired as the Fire Chief of the City of Boynton Beach. From 2003 to 2011 Chief Carter served as the Fire Chief of Operations. He also had the additional title and responsibility as the Emergency Manager for the city. He has function as the director of the Boynton Beach Emergency Operations Center (EOC) as the emergency manager through seven major hurricanes including Wilma that was the most devastating storm to impact the city of Boynton Beach. Chief Carter is a combat veteran of the Vietnam War, has a master's degree in public administration, and is a graduate of the Executive Fire Officer Program. The other correspondence was conducted with Jeffrey Davidson who is a 28 year veteran of the fire service and is currently the division chief of training for the Boynton Beach Fire Rescue Department. He is also the present emergency manager for the City of Boynton Beach. Chief Davidson has an Associate Degree in Fire Science, a Bachelor's Degree in Public

Administration, and a Master's Degree in Emergency and Disaster Management. He is a veteran of the United States Army Reserves where he proudly served from 1987 to 1995, and has recently completed the Emergency Services Leadership Institute, sponsored by the Florida Fire and Emergency Services Foundation. Chief Davidson is a reliable and valuable resource of information due to his direct fire rescue peer associations, impeccable fire service career, and his formal education achievements.

The last step was to determine which other fire departments demographically like the Boynton Beach Fire Department in the surrounding South Florida area had a formal policy or procedure in place and which agency is primarily responsible to conduct the initial windshield damage assessment after a disaster incident. To accomplish this a cover letter (Appendix A) and a questionnaire (Appendix B) was sent out to the training officers of all 12 independent fire rescue departments in Palm Beach County. The information contact list was obtained from the Palm Beach County Training Officers Association, and the Florida Fire Chief Association. Identical questionnaires were sent to multiple other departments in the greater South Florida area to include, the City of Orlando Fire Department in Orange County, Miami-Dade Fire Rescue Department in Dade County, and Martin County Fire Rescue Department in Martin County. Also, the identical questionnaire was sent out to the Fort Lauderdale Fire Rescue Department, Oakland Park Fire Rescue Department, North Lauderdale Fire Rescue Department, Davie Fire Rescue Department, Margate Fire Rescue Department, Tamarac Fire Rescue Department, Coral Springs Fire Rescue Department, Pembroke Pines Fire Rescue Department, and the Hollywood Fire Rescue Department, in Broward County. Questionnaires were also sent to all 12 of the independent city and county fire rescue departments in Palm Beach County.

There were 22 total independent fire departments represented from five major and heavily populated counties in the South Florida area that participated and responded to the questionnaire (Appendix C). For authentication and validation purposes the questionnaire was distributed to some of the senior fire officers in the Boynton Beach Fire Rescue Department for review before it was sent out to the other departments in South Florida.

There were some limits and restrictions to this research. Every officer in charge of each fire training division was included along with additional officers in administrative and operations divisions. A total of 22 departments representing Dade, Broward, Palm Beach, Martin, and Orange Counties were sent questionnaires in early September of 2017 and were asked to return them by October 1, 2017. All 12 independent fire departments in Palm Beach County, which includes the Palm Beach County Fire Rescue Department were sent the questionnaire. Of the fire departments solicited from Dade, Broward, Martin, and Orange Counties all responded back and returned at least one complete questionnaire. Of the 12 independent fire departments from Palm Beach County, all responded except for two departments that did not respond. Multiple attempts were made to solicit their response through e-mail and telephone messages, but produced no results. Some of the departments had more than one response, but no single department had more than four responses. In some cases, because more than one person answered the questionnaire for the same department, different opinions for the same question may be indicated. A total of 24 departments in the South Florida area were solicited by questionnaire, 22 of those departments elected to participate in the research. A total of 37 questionnaires were answered representing 22 total departments participating and one risk management department. An additional limitation was at the time of this research a natural disaster in the form of hurricane Irma occurred. The

Storm directly impacted South Florida and all the counties and cities, including Boynton Beach, solicited by this author. Finally, all the departments that responded to the questionnaire were geographically located in the South Florida area of Dade, Broward, Palm Beach, Orange, and Martin Counties in Florida.

Results

The results through research of this project indicated that nationally, everywhere in our country natural or manmade disasters are occurring and seem to be increasing in number each year. The South Florida area and the City of Boynton Beach are susceptible to a variety of disaster incident, however, most predominant disaster occurrence in the area is caused by severe weather incidents. The history data shows that over the past 50 years the area has been impacted by 22 hurricanes and a countless number of tropical storms and severe weather incidents. These disaster events have caused severe damage, community disruption, and great financial impact to the South Florida area (Center for Research on the Epidemiology of Disasters, 2016). Data and research indicates that South Florida and the City of Boynton Beach have been impacted by a total of seven of the ten most devastating storms that have made landfall in the past 30 years. Hurricanes Andrew, Wilma, and Katrina were some of the most financially impacting natural disasters to affect South Florida. The Boynton Beach area also suffered financial and physical effects caused by these three storms, and particularly was devastated by Wilma. Additionally investigations show that seven of the ten most powerful hurricanes to make landfall in the United States affected the City of Boynton Beach they were in addition to the three just mentioned, hurricanes, Charley, Ivan, Rita and Francis. These hurricanes cause extreme public disruption along with billions of dollars of financial and physical damage to the communities. (Public Assistance Bureau of Recovery, 2017)

Table: 2

Seven of the ten most devastating US Hurricanes to impact Florida

Name	Month	Year	Damage cost in US Dollars
Katrina	August	2005	47 Billion
Andrew	August	1992	23 Billion
Wilma	October	2005	12 Billion
Charlie	August	2004	8.9 Billion
Ivan	September	2005	8.5 Billion
Rita	September	2004	6.4 Billion
Francis	September	2004	5.5 Billion

Hurricane Wilma severely affected the City of Boynton Beach. Wilma's wrath critically impacted public and private infrastructure causing over five million dollars in damage. In addition to financial loss three people were killed because of Wilma (Miller/Human Resources and Risk Management, 2006). The Boynton Beach area has a past and present track record of experiencing natural or manmade disaster events. Most of these seem to manifest in the form of severe weather events or hurricanes. Unfortunately, exactly when and where these unforeseen acts of nature manifest is highly unpredictable. According to weather researchers the data clearly indicates that the probability of South Florida, including the City of Boynton Beach, is

highly likely to experience these types of disaster events in the future (National Oceanic and Atmospheric Administration, n.d.). As these catastrophes continue to unfold preparation and planning will be the key to effective mitigation and recovery. Damage assessments by first responders will be necessary, along with clear roles and responsibilities to ensure the financial and physical assistance process needed for communities to recover is set in motion.

Invoking a Presidential Declaration through the Stafford act is the way that local communities can financially and physically obtain necessary resources when they are impacted by natural or manmade disasters. Ensuing the process and how local state and federal agencies interact with each other is a critical key to obtaining the declaration (Federal Emergency Management Agency, 2016). Understanding of the four phases in emergency management is critical when trying to obtain federal financial and physical assistance. These four phases include the mitigation phase, preparedness phase, response phase, and the recovery phase. Mitigation is focused on reducing or limiting the possibility or results of a disaster incident. This can be accomplished through things such as building and zoning codes, regulations, and construction requirements. Preparedness actions include mutual and automatic aid agreements, training programs, the capabilities of the local response effort, and preplanned written agreements. Pre-planned evacuation routes and road accesses, inter local emergency response agreements, and electrical power water and utility backup plans and procedures are some examples. The third segment is the Response Phase, this is where limited life safety and hazard response resources are used. Organization and deployment of limited emergency resources is the main task in the response phase which includes response efforts immediately before, during, or after, the incident

occurs. The last phase in emergency management is recovery. Basic physical and economic damage from the incident will begin to be restored. This phase is usually on going and often times takes many years for the community to fully recover (Saint Louis County Missouri, n.d.). For a state to invoke a Presidential Declaration enabling the communities to received federal financial and physical assistance after natural or manmade disaster involves a clear understanding of the damage assessment progression. The damage assessment process starts in the response phase and often can continue through the recovery phase of the emergency management process. The purpose and intent of the initial windshield damage assessment is to properly allocate limited resources, it is the first part of the three-step damage assessment process. This assessment is conducted by primary emergency responders immediately after the end of a disaster incident. When deemed safe to do so, rescue and emergency workers will assure that their crews and equipment are ready and operational to perform work. These initial crews report damage conditions so that limited emergency life saving resources are allocated and respond where their most needed. The initial information is reported back in several ways, including mobile radio, cell phones, mobile data terminals, and written documentation. The information is collected and then reported to the emergency operations center. This information should be recorded and is included with additional damage assessment reports to further aid in obtaining physical and financial assistance from the federal government (Federal Emergency Management Agency/FEMA, 2016).

Similarly, the Palm Beach County disaster recovery plan also describes and designates three phases of the damage assessment process. Additionally, the plan explains that the fire rescue personnel are assigned the responsibility of preforming the initial windshield assessments

that are conducted immediately in the aftermath of a manmade or natural disaster. After all personnel are accounted for and all fire equipment and apparatus are in safe working order, the initial windshield survey should begin. The objective is to collect information accurately, consistently, and efficiently to formulate a county impact map. This primary report will include information on the extent of overall damage, and highlights where and what limited resources are available for allocation to the areas in most need of help. The initial windshield damage assessment is included with information necessary for federal support, however this survey is not intended to verify damage for federal assistance (Palm Beach County Department of Public Safety, 2011). Also, the City of Boynton Beach hurricane disaster plan describes that the initial windshield damage assessment begins after all emergency personnel, equipment, and fire apparatus is secured and ready for use. The assessment starts with a drive by observation of each preplanned zone that reports what areas are most affected and in most need of emergency or lifesaving limited resources. This survey should be completed quickly, and once started should be interrupted only if immediate life safety issues are encountered (R. Carter, personal communication, August 29, 2017).

When looking at other agencies in reference to formal policies and procedure for performing damage assessment, the results show that almost all agencies have or use some type of contingent emergency plans. Many agencies use a combination of county and city emergency plans, in addition to or in conjunction with their own departmental emergency plans, to formulate their actions during a natural or manmade disaster. Many of these documents are very lengthy and often not available at the primary responder or the company officer level. Also, there can be confusion particularly pertaining to the different steps that are involved with a rapid damage assessment process (J. Davidson, personal communication, August 31, 2017).

Departments are encouraged to develop their own customized policies and procedures to alleviate any confusion or misinterpretations on the roles and responsibilities of damage assessment during a natural or manmade disaster. The three-step damage assessment process begins with the initial windshield damage assessment survey pertaining to limited lifesaving resources. The Federal Emergency Management Agency (FEMA) realized that confusion and misunderstanding can be an issue relating to roles and responsibilities of the damage assessment process. FEMA has written multiple policies, procedures, produced tools and job aids, to explain the validation of damage assessment, however, the necessary elements needed to perform damage assessment had not been addressed. To help successfully assist local, tribal, county, and state officials at obtaining federal funding through a presidential declaration the Damage Assessment Operations Manual was developed. This document provides guidelines that clearly identify roles and responsibilities and defines the necessary elements needed in a policy that clearly explains the process when preforming proper damage assessments. The three elements are:

1. To promote accuracy by clearly defining the information and documentation that should be collected to assess damage and support requests for Stafford Act assistance.
2. To promote consistency by standardizing the criteria used to assess damage to residential homes and offering clear guidance on assessing damage to infrastructure.
3. To promote efficiency by empowering emergency management at all levels with the structure and information needed to streamline damage assessment efforts.

(Federal Emergency Management Agency/FEMA, 2016).

Drilling down, further research was continued to answer three additional questions. The first was to determine which departments geographically located around the City of Boynton Beach had formal policies or procedures in place addressing damage assessment. The second question was to determine what agency was primarily responsible to conduct the initial windshield damage assessment. The last was to determine how are other agencies around the City of Boynton Beach were reporting information gained from rapid windshield damage assessments.

A cover letter, (Appendix A) and short questionnaire, (Appendix B) was sent out to 24 fire departments in the South Florida area to answer these questions. Questionnaires were sent to the operations, administration, and training divisions of the 12 independent fire departments in Palm Beach County. Also, identical questionnaires were sent to the training divisions of Miami Dade County Fire Rescue Department, in Dade County, Martin County Fire Rescue in Martin County, Orlando Fire Department in Orange County, and Fort Lauderdale Fire Rescue Department, Oakland Park Fire Rescue Department, North Lauderdale Fire Rescue Department, Davie Fire Rescue Department, Margate Fire Rescue Department, Tamarac Fire Rescue Department, Coral Springs Fire Rescue Department, Pembroke Pines Fire Rescue Department, and the Hollywood Fire Rescue Department, in Broward County. See (Appendix C) for all departments and counties represented in the research. In total, there were 24 fire departments that receive questionnaires. Two of the 12 independent Palm Beach County departments did not respond to the questionnaire. There were multiple attempts through telephone calls and emails to solicit a response which produced no results. Of the 22 departments that participated in the questionnaire a total of 37 were returned with results. See (Appendix E, F, and G) for the total and detailed questionnaire results of each individual question.

When looking at the result in response to the second question, asking what department in your jurisdiction is responsible for performing an initial windshield damage assessment immediately after a natural or manmade disaster, the data indicated that, 56.76 percent of all respondents indicated the Fire Department was the primary agency responsible of conducting the initial windshield assessment after a disaster event. This was the most popular response accounting for 21 of the 37 responses. The outcomes also indicated that 5.41 percent indicated that the Police Department was the primary agency to conduct the windshield assessment. The building and engineering departments accounted for 2.4 percent, and no department indicated that the planning or zoning department was primarily responsible. The second most popular response indicated that 35.14 percent of the South Florida departments represented in this research use a combination of all the mentioned departments to conduct the initial windshield damage assessment survey.

Determining how the initial windshield damage assessment information was reported by the responsible department to the emergency operations center was the third question to be answered. The responses to the questionnaire showed that 21.62 percent reported information by mobile or portable radio. Mobile telephones represented 2.7 percent of the responses, with 8.7 percent responses indicating that a written form was used to report damage. None of the solicited departments used a fax machine, and the most popular response indicated was using two or more, or a mix of the mentioned devices to report damage. This response represented 59.46 percent of the total solicited, or 22 of the 37 individual respondents. The last question asked what type of policy or procedure does your agency have in place referencing initial windshield damage assessment. Respondents indicated that 36.11 percent used a city or county emergency plan. Using some type of department plan represented 5.54 present of responses. Utilizing a

department standard operating policy or SOP was used by 13.89 percent of the departments and agencies indicating no policy at all represented 5.56 percent. The most popular result was a combination of the mentioned documents indicated 38.89 percent of the answers representing 14 of the 37 individual responses. See (Appendix D) for a detailed breakdown of each individual departments, type of policy in place, how initial damage is reported, and what department is primarily responsible to perform the initial windshield damage assessment.

The damage assessment process is the beginning step for communities when starting the recovery process after any disaster. Successfully invoking a presidential declaration resulting in federal aid financially and physically is the ultimate goal. Damage assessment is a three step process involving multiple agencies and requiring accurate information and documentation. The first step in this process is the initial windshield damage assessment performed by first responders immediately after the event. Understanding the emergency management system and obtaining effective efficient and consistent information is also key to the recovery process. Policies plans and guidelines reflecting clear roles and responsibilities will also be key to expedite the recovery process after a natural or manmade disaster. Finally, every disaster begins locally and each individual entity is encouraged to understand and develop or use plans that will accurately, consistently, and effectively assist them when tasked to performed damage assessments.

Discussion

The results through research of this project indicated that nationally South Florida and the City of Boynton Beach are susceptible to the same natural and manmade disasters experienced throughout the country. Tragedies such as wildland fires, sinkholes, tornadoes, hazardous materials incidents, or terrorist events are certainly a great concern. The research and data

indicate that the entire Eastern Atlantic coastline, particularly the southern region, is extremely susceptible to severe and inclement weather events. These occurrences have been dominant in the past and present and are likely to continue in the future (National Oceanic and Atmospheric Administration, n.d.). Tidal surges and substantial rain events causing great flooding and damage are devastating. Lightning and heavy wind storm are of equal concern and are capable of extensive disruption and damage to local communities. Of all these disasters and misfortunes hurricanes are the most prevalent and likely to manifest in the future of South Florida coastal communities (FLORIDADISASTERS.COM, 2017). Researching past data, from 1960 to the present many tropical storms and severe weather events have impacted the Boynton Beach area, of those incidents over 20 have been major hurricanes. Out of the ten most devastating storms, seven of them have directly impacted Boynton Beach including hurricanes Andrew, Katrina, and Wilma. These events caused billions of dollars in damage, public and community disruption, and most of all, unfortunately, resulted in the loss of human lives (Insurance Information Institute Incorporated, 2017).

In line with the research according to some recent findings of this project, the City of Boynton Beach has been subjected to hurricane force impacts in the past, present, and should probable be prepared to anticipate future unforeseen events in the future. The most recent severe weather disaster to threaten the area was hurricane Mathew in September 2016 when it skirted the South Florida coast. The storm did not make landfall however its secondary effects and impacts still caused disruption and physical and financial damage to coastal communities. The most devastating storm to impact Boynton Beach was hurricane Wilma in October of 2005. The event caused public financial and physical disruption for several months and took years for total

community recovery. Boynton Beach had serious infrastructure damage and utility outages for extended periods of time. The total financial impact cost to municipal infrastructure was more than five million dollars. The most unfortunate and devastating tragedy was the loss of three Boynton Beach citizens lives due to the after effects of Wilma (Miller/Human Resources and Risk Management, 2006).

Research through this project also shows that preparation and planning for these unseen events will lead to better and more efficient financial, physical and community recovery. The Stafford act of 1988 emphasized to communities the importance of being prepare for natural or manmade disasters. Its goal was to empower all concerned agencies to use key elements to be prepared in an accurate efficient and consistent methodical effort when facing recovery from a disaster. The focus was on municipal, states, local, and tribal entities to progress into developing comprehensive disaster preparedness plans. Additionally, implementing improved communication and relations with outlying local agencies would be included in the effort (Federal Emergency Management Agency, 2016).

Understanding that the recovery process after a manmade or natural disaster involves working through four different phases. This includes clearly defining and understanding roles and responsibilities through each phase. The key is to obtain and deliver accurate efficient and consistent information through damage assessment reports to successfully achieve the overall goal of invoking a Presidential Declaration for federal financial and physical assistance resulting in full community recovery. These phases are the mitigation phase where the objective is focused on reducing the chance of an emergency happening. The preparedness phase evaluates the agencies abilities to respond and react to the disaster. The response phase involves allocation

and deployment of limited and lifesaving resources immediately before, during, or after, a disaster impact. The last phase is recovery. This involves bringing infrastructure, utilities, and wholeness of the public, back to normal allowing the community to return to a regular existence (Saint Louis County Missouri, n.d.).

The total emergency management plan begins with damage assessment reports. This is a three-part process that begins in the response phase with the initial windshield damage assessment survey, and continues through the recovery phase with the Initial Damage Assessment (IDA) and the Preliminary Damage Assessment (PDA). Looking at other fire rescue peers around the nation, research of this project indicates that the purpose of the windshield damage assessment is to provide a quick snapshot of the scene immediately after the disaster has occurred, so deployment of limited lifesaving resources can begin. It is conducted by initial first responders and is generally the responsibility of the Fire Department. This survey activates when all equipment and apparatus and personal are ready and conditions in the environment are deemed safe to do so (Newby, 2014). Findings concur that the implementation of limited emergency resources will commence when reports from the initial windshield survey has been received. This will allow commanders to formulate incident action plans allowing limited lifesaving resources to be deployed and allocated to areas where they are most desperately needed (Federal Emergency Management Agency/FEMA, 2016). The findings also indicated that initial fire crews will primarily be responsible to handle emergency calls as well as report the initial windshield damage. This is a very task intense assignment necessary to deliver appropriate emergency resources to the proper place in a timely manner. It is important to understand that this is a rapid snapshot survey that should only be interrupted if crews find

immediate life safety situations that need to be addressed. The survey is important to the incident commander and some of the information may possibly be used in the validation process of the IDA, and the PDA. Unlike the other two mentioned processes the windshield survey should usually take no more than 12 hours to complete (R. Carter, personal communication, August 29, 2017).

When drilling down through research to a more local level results indicated that nearly all departments use some type of disaster plans or policies. These documents are generally lengthy, and many times are created by emergency management departments incorporating vast amounts of information involving the entire disaster to recovery process. Many departments use multiple plans. Palm Beach County has developed a 2011 countywide emergency plan that is often used as a reference for the municipalities to develop their own citywide emergency plans. There is a tremendous amount of information about individual assistance and public assistance and how the process should work. There is also detailed description about the (IDA) and (PDA) processes and procedures. Most of the plan references validation of damage so that federal financial and physical assistance can be obtained. The plan is not as detailed about emergency resource allocation and the initial windshield damage survey conducted by first responders to allocate limited life safety and emergency resources were mostly needed immediately after the disaster event (Palm Beach County Department of Public Safety, 2011). Additional findings of this research indicated that about 38 percent of the departments participating use a mix of county, city, department, and standard operating guidelines, to define roles and responsibilities for their initial responding crews to perform the windshield damage survey. Closely related about 37 percent use only a county or city emergency plan. About 13 percent use some type of department

emergency plan, and about five percent or one department out of 22 reports using no plan at all. To clearly define the roles and responsibilities for the initial windshield damage assessment, about 14.5 percent of the departments have developed standard operating procedures particularly for their fire emergency crews in direct reference to the initial windshield damage survey. The City of Boca Raton has developed a fire department SOG that clearly outlines which department is responsible, who particularly is responsible, what information is to be gathered, and how it is to be forwarded to the emergency operations center. The fire department is responsible for the initial windshield survey, the information is to be gathered during a rapid damage assessment. It is then documented and forwarded to Boca Raton Fire Rescue Services EOC. Information should be sent via fax, phone or radio reported to the EOC and included in the total damage assessment reports (The City of Boca Raton, 2014).

Additional findings in research indicate that looking around the nation to peers in other departments the trend is that the fire service is predominantly the agency responsible for conducting initial windshield damage assessments after natural and manmade disaster. Fire rescue personnel will be accountable to ensure that conditions are safe, check all their equipment, and make sure that their people and equipment are fully operational before beginning this survey. This is a snapshot of the overall disaster concerned with properly allocating limited life safety resources immediately after the event (Newby, 2014). Furthermore, findings through questionnaire clearly indicate that fire departments in the South Florida area are likewise mainly responsible for the initial windshield damage assessment. About 60 percent of respondents indicated that the fire department was primarily responsible for the initial windshield survey. About five percent indicated that Police Department was responsible, and about three percent

indicated that building and engineering were responsible. No departments indicated the planning and zoning was responsible and 35 percent indicated that a combination of all the above were responsible for the initial windshield survey. How information is reported was the final question to be determined by research and findings. Portable or mobile radios are the primary communication source for almost all fire rescue services. The initial windshield damage survey by fire rescue personnel has traditionally been reported by mobile or portable radio and then documentation is forwarded to the incident commander, which is documented and passed on to the local EOC. Over the years technology and development of cellular telephones, portable laptop computers, and other communication devices, have become a more common form of communication (R. Carter, personal communication, August 29, 2017). Results indicated that most South Florida fire rescue departments use a combination of these devices. Responses indicate that about 22 percent use mobile or portable radio. About three percent use cellular telephone, just over eight percent use portable computer, no departments use solely a fax machine, an additional eight percent use a written document only. Much like the research indicates most South Florida departments, 60 percent, use a combination of these. Additionally, the information is documented in some way by all departments and forwarded to the local EOC.

The damage assessment process is critically important for communities to recover financially and physically from any natural or manmade disaster. Invoking a presidential declaration for financial and physical relief so that communities can recover is the goal. The entire emergency management system involves many phases, departments, entities, personnel, and resources. Specifically defining clear roles and responsibilities to begin the recovery process is key. Research and findings during this project have indicated that the City of Boynton Beach is

susceptible to natural and manmade disasters like any other place in our country. South Florida is particularly susceptible to inclement weather and hurricanes. The past research and data clearly indicates that hurricane events are unpredictable and have happened in the past, present, and will likely continue in the future. Preparation for the emergency management process will be important and should be clearly and fully understood. Immediately after these incidents fire department personnel will be required to perform these initial damage assessments so that immediately life-threatening and limited resources can be allocated where most needed. Clear and proper understanding of who is responsible how information is reported and how that information is forwarded to the emergency operations center will need to be clearly defined. Many departments and agencies utilize multiple plans that are complex and describe the entire damage assessment process focusing mostly on validating the community public damage required for federal assistance. Summarizing complex county, city, department, and emergency hurricane plans into a streamlined fire department standard operating procedure may be necessary to promote accurate, efficient, and consistent information.

The Boynton Beach Fire Rescue Department has experienced confusion in the past and present when tasked with initial windshield survey assignments. Currently there is nothing in place to prevent this behavior from continuing in the future. Other agencies in the area have streamlined county and city emergency plans into SOP form to better clarify and define roles and responsibilities of the initial windshield damage assessment process. Currently the Boynton Beach Fire Rescue Department does not have a policy, procedure, or initial windshield assessment defining clearly how responsibilities are assigned. Although this misperception and confusion may have other contributing factors, such as long intervals between disaster events and lack of scenario based training in any consistent way, clearly defined roles and responsibilities

through written policies or procedures will be a good beginning point to a solution in the future of similar issues.

Recommendations

As the research indicates, like much of the country and South Florida, Boynton Beach is a city that is susceptible to disasters particularly inclement weather such as tropical storms and hurricanes. As recent as 2016 hurricane Matthew threatened Boynton Beach and past hurricanes have caused great community disruption and damage. The most financially, deadly, and devastating being hurricane Wilma 2005 (Miller/Human Resources and Risk Management, 2006). Researching history from 1960 to 2016 countless number of inclement weather events and tropical storms have affected the South Florida area. In that timeframe over 20 of the recorded events were major hurricanes. Some of these storms have been the most destructive to make landfall in the United States. In every case these events have caused community disruption, damaged, public infrastructure destruction, along with causing long term financial physical community effects (FLORIDADISASTERS.COM, 2017). Preparation and planning for any unforeseen major event is the way to promote the accurate, efficient and consistent recovery. The problem is that the City of Boynton Beach Fire Rescue Department continues to respond to natural or manmade disasters, preforming damage assessment without a dedicated policy or procedure for assessing and reporting initial damage. Recently in preparation for hurricane Matthew in September of 2016, fire administration discovered that some company officers were confused as to their roles and responsibilities pertaining to initial windshield damage assessment. City emergency plans and departmental hurricane plans are available however crews were uncertain as to their defined roles of preforming the windshield survey (L. Clemons, personal communication, September 6, 2017). Having the situation go indefinitely without any change in

the regular behavior will become the accepted standard allowing the fire department to fall victim to the concept of normalization of deviance. This would be unacceptable because the problem is predictable and can possibly be prevented with clearly defined policies and procedures in place (Mullane, 2012).

The initial windshield damage assessment survey is a rapid snapshot performed by emergency workers immediately after a disaster incident. The primary function is to relay damage information to the EOC so that limited life safety resources can be allocated where their most needed. When these functions need to be performed accurate efficient and consistent information must be received. Boynton Beach Fire Rescue Department will be called upon in the future to perform these functions. A delay in deploying resources can mean the matter of life or death and should be prevented if possible. Boynton Beach currently uses county and city emergency plans for fire rescue personnel to reference when preforming any damage assessment.

To help reduce any element of confusion to fire rescue crews when called upon to perform windshield damage surveys. The city emergency plan, county emergency plan, along with the Boynton Beach Fire Department hurricane plan could possibly be streamlined into a standard operating procedure for operational personnel. This in a sense would allow Boynton Beach fire personnel to customize and defined roles and responsibilities when called upon to perform windshield damage surveys. Federal Emergency Management Agency (FEMA) realized that damage information and policies and procedures needed to be clearly and accurately documented in policy. FEMA, developed many job aids guidelines and recommendations for validation of damage assessment, however, realized that it needed to be more descriptive when it produced the Damage Assessment Operations Manual to empower agencies to develop their own

policies, to ensure accuracy efficiency and consistency in all aspects of the damage assessment process (Federal Emergency Management Agency/FEMA, 2016).

Developing a fire rescue standard guideline, or procedure would particularly define roles and responsibilities of initial fire rescue crews and emphasize the three necessary elements, of accuracy, efficiency, and consistency when reporting damage. It would clearly identify who is responsible to perform the damage assessment, define how the information should be reported and documented and delivered to the emergency operations center so that limited life safety resources will be efficiently allocated. This procedure would be reviewed in company school by company officers and possibly included in the annual training curriculum. It is not totally necessary to reinvent the wheel when looking for a good example of a procedure developed by other surrounding cities. Boca Raton developed its procedure including clear guidelines on roles and responsibilities, to ensure accurate, efficient, and consistent, damage information including additional information, photo identification, and proper forms to be filled out and forwarded to the local EOC are included in the procedure (The City of Boca Raton, 2014).

As always in the fire service, changes may be implemented slowly. Short-term and long-term goals should be established for any type of change. In the short term, the department should begin to indoctrinate personnel particularly the company officers on the importance of damage assessment. It should strongly emphasize the fire departments roles and responsibilities of the windshield damage survey emphasizing the key elements of accuracy efficiency and consistency when reporting information relating to total community recovery. In the long term a policy could be developed, including input from operations fire rescue personnel to assure clarity and understanding when assignments are made during natural or manmade disaster. Additional long-

term goals may include a training element involving classroom time and real time based training scenarios on disaster events.

With any new or changes in policy or procedures an evaluation process should be included. Constant and consistent updating through valid and most recent information would be key. Classes and scenarios should be current and recent using the most modern and efficient technology, equipment, and information possible. Any training element should also include assistants from neighboring departments and based on overall community needs. All policies should be constantly updated keeping aware of changes around the local community such as other departments operational guidelines, county, or city emergency plan updates, and any new additions to departmental hurricane plans should be evaluated. Additionally, continuing to review any FEMA documentation in the future for updates job tools or new ideas would also be helpful.

Future research on this topic would be well warranted. Through the research of this project this author realized that it is a little more difficult to find historical accurate data in general. It seems that retrieving critical information is sometimes not possible because of changes in city administration. The fire department may want to consider keeping some of its own records relating to damage assessment and disasters in the future. Policies and procedures are a good start when trying to determine roles and responsibilities. Sometimes these procedures become very detailed and lengthy and although information is included it is either difficult to retrieve or possibly not reviewed by the personnel that are asked to perform the tasks. The Boynton Beach Fire Rescue Department could benefit from streamlining these policies into a condensed clearly defined procedure for fire rescue emergency personnel. This procedure should be reviewed and included in the training element at a company level. Other researchers considering this subject

may want to study why critical information, such as roles and responsibilities regarding the windshield damage survey can be missed by company officers when it is included in multiple city plans and county emergency plans. Lack of training scenarios and long interval times between disaster events would also be an interesting topic of research. These subjects would most likely warrant dedicated research and study and should be considered for an entirely different future research project.

One final thought, the federal emergency management agency has established goals empowering agencies to develop their own policies and procedures utilizing the elements of accuracy, efficiency, and consistency, when reporting damage after natural or manmade disasters. Departments around the country, in Florida including Palm Beach County have embraced these elements. Any policy develop by the city of Boynton Beach should incorporate these three basic elements. Total community recovery from any natural or manmade disaster is the final ultimate goal. To ease the burden and make the recovery transition smooth and efficient federal aid will be necessary. Support by invoking a presidential declaration allowing financial and physical assistance is a key to success. To attain this declaration begins with the damage assessment process. The first step in the damage assessment process is the windshield damage assessment survey conducted by emergency first responders.

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Appendix A

From: Thomas Murphy Jr.

Reference: Initial Windshield Damage Assessments

Date: September 2, 2016

To all Fire Rescue Chiefs,

I am currently attending the National Fire Academy's Executive Fire Officer Program (EFO). I have completed the Executive Analysis of Fire Service Operations in Emergency Management (EAFSOEM) class, and I am writing my Applied Research Paper (ARP) on Initial Windshield Damage Assessment for Palm Beach County and South Florida Fire Departments. Your assistance is desperately needed to help me complete this ARP. Attached is a short four answer questionnaire in reference to damage assessment. Please use the link below to complete this short survey.

https://www.surveymonkey.com/r/QD9WXSR

I would greatly appreciate your input and assistance.

Respectively;

Thomas Murphy Jr.
Battalion Chief
Boynton Beach Fire Rescue Department

Appendix B

Initial Windshield Damage Assessments

1. What department do you work in?

2. What department in your jurisdiction is responsible for performing an Initial Windshield Damage Assessment immediately after a natural or manmade disaster**?**

- Fire Department
- Police Department
- Building and Engineering Department
- Planning and Zoning Department
- A combination of any of the above Departments

3. How is the initial damage assessment information reported to the Emergency Operations Center in your department?

- By Mobil or Portable Radio
- By Mobil Phone
- Portable Computer
- Fax Machine
- A Designated Report Form
- A mix of any of the above

4. What type of policy or procedure does your department have referencing Initial Windshield Damage Assessment?

- A City or County Emergency Plan addressing the Damage Assessment Process
- A Department Emergency Plan addressing the Damage Assessment Process
- A Department Standard Operating Procedure (SOP) addressing the Damage Assessment Process
- A combination of the above written policies addressing the Damage Assessment Process
- There is no written policy addressing the Damage Assessment Process

Appendix C

Fire Departments that participated in the Research

County	County	County	County	County
Dade	**Broward**	**Palm Beach**	**Martin**	**Orange**
Miami Dade Fire Rescue Department	Pembroke Pines Fire Rescue	Boca Raton Fire Rescue	Martin County Fire Rescue Department	City of Orlando Fire Department
	Hollywood Fire Rescue	Delray Beach Fire Rescue		
	Fort Lauderdale Fire Rescue	Boynton Beach Fire Rescue		
	North Lauderdale Fire Rescue	Town of Palm Beach Fire Rescue		
	Davie Fire Rescue	Green Acers Fire Rescue		
	Tamarac Fire Rescue	Palm Beach Shores Fire Rescue		
	Margate/Coconut Creek Fire Rescue	North Palm Beach Fire Rescue		
	Oakland Park Fire Rescue	Palm Beach Gardens Fire Rescue		
	Coral Springs/Parkland Fire Rescue	West Palm Beach Fire Rescue		
	Risk Management	Palm Beach County Fire Rescue		

Appendix D

Windshield Damage Assessment Individual Department Information

Name of the Department	Department Responsible for the Windshield Survey	How is Information Reported to the EOC	What Type of Policy or Procedure is in Place
Boca Raton Fire Rescue	Fire Department	A Mix of Portable Radio, Mobile Phone, Fax Machine, Computer, or Written Form	Department SOP
Delray Beach Fire Rescue	Combination of Departments	A Mix of Portable Radio, Mobile Phone, Fax Machine, Computer, or Written Form	Combination of City, County, and Department Plans and SOPs
Boynton Beach Fire Rescue	Fire Department	A Mix of Portable Radio, Mobile Phone, Fax Machine, Computer, or Written Form	A City or County Emergency Plan
Town of Palm Beach Fire Rescue	Fire Department	Written Report	Combination of City, County, and Department Plans and SOPs
Green Acers Fire Rescue	Fire Department	Portable or Mobil Radio	A City or County Emergency Plan
Palm Beach Shores Fire Rescue	Combination of Departments	Mobil Computer	Combination of City, County, and Department Plans and SOPs
North Palm Beach Fire Rescue	Fire Department	Portable or Mobil Radio	A City or County Emergency Plan
Palm Beach Gardens Fire Rescue	Fire Department	Portable or Mobil Radio	Department Plan

Continue on the next page West Palm Beach Fire Rescue	Fire Department	A Mix of Portable Radio, Mobile Phone, Fax Machine, Computer, or Written Form	Combination of City, County, and Department Plans and SOPs
Palm Beach County Fire Rescue	Fire Department	Mobile Phone, Fax Machine, Computer, or Written Form	A City or County Emergency Plan
Tequesta Fire Rescue	Did Not Participate	Did Not Participate	Did Not Participate
Rivera Beach Fire Rescue	Did Not Participate	Did Not Participate	Did Not Participate
Hollywood Fire Rescue	Police Department	Written Report	A City or County Emergency Plan
Fort Lauderdale Fire Rescue	Combination of Departments	Portable or Mobil Radio	Combination of City, County, and Department Plans and SOPs
North Lauderdale Fire Rescue	Combination of Departments	Cell Phone	Combination of City, County, and Department Plans and SOPs
Davie Fire Rescue	Fire Department	Mobile Phone, Fax Machine, Computer, or Written Form	Combination of City, County, and Department Plans and SOPs
Tamarac Fire Rescue	Fire Department	Mobil Computer	A City or County Emergency Plan
Margate/Coconut Creek Fire Rescue	Fire Department	Mobile Phone, Fax Machine, Computer, or Written Form	Department SOP
Oakland Park Fire Rescue	Building Department	Mobile Phone, Fax Machine, Computer, or Written Form	No Policy
Coral Springs/Parkland Fire Rescue	Fire Department	Mobile Phone, Fax Machine, Computer, or Written Form	Department SOP

Continue on the next page Miami Dade Fire Rescue Department	Combination of Departments	A Mix of Portable Radio, Mobile Phone, Fax Machine, Computer, or Written Form	Department SOP
Martin County Fire Rescue Department	Combination of Departments	A Mix of Portable Radio, Mobile Phone, Fax Machine, Computer, or Written Form	Combination of City, County, and Department Plans and SOPs
City of Orlando Fire Department	Combination of Departments	A Mix of Portable Radio, Mobile Phone, Fax Machine, Computer, or Written Form	A City or County Emergency Plan
Pembroke Pines Fire Rescue	Fire Department	A Mix of Portable Radio, Mobile Phone, Fax Machine, Computer, or Written Form	A City or County Emergency Plan
Risk Management	Combination of Departments	Mobile Phone, Fax Machine, Computer, or Written Form	Did not Answer

Appendix E

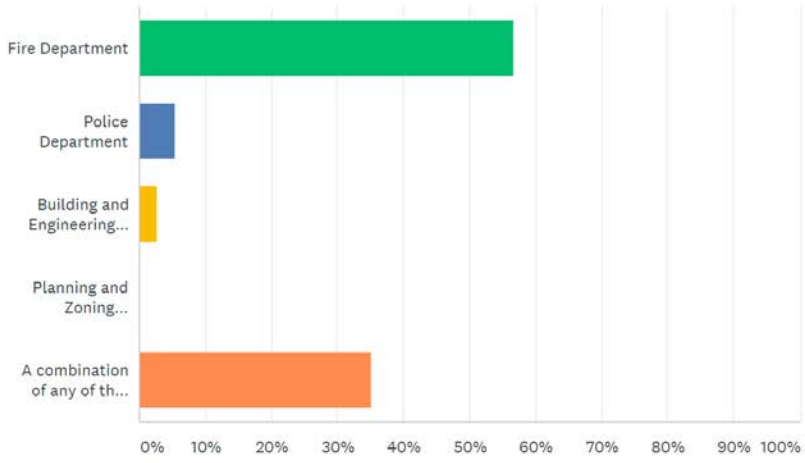
Question Two

Q2

Customize Export

What department in your jurisdiction is responsible for performing an Initial Windshield Damage Assessment immediately after a natural or manmade disaster?

Answered: 37 Skipped: 0



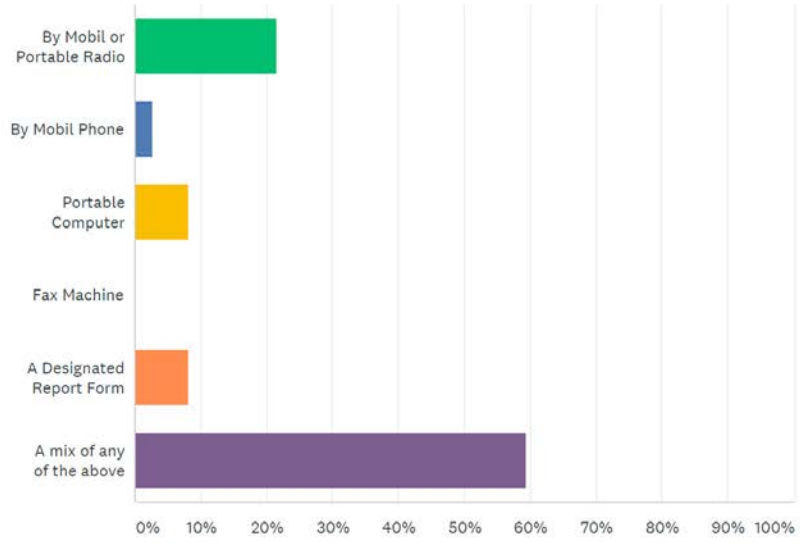
ANSWER CHOICES	RESPONSES	
Fire Department	56.76%	21
Police Department	5.41%	2
Building and Engineering Department	2.70%	1
Planning and Zoning Department	0.00%	0
A combination of any of the above Departments	35.14%	13
TOTAL		37

Appendix F

Question Three

How is the initial damage assessment information reported to the Emergency Operations Center in your department?

Answered: 37 Skipped: 0



ANSWER CHOICES	RESPONSES	
By Mobil or Portable Radio	21.62%	8
By Mobil Phone	2.70%	1
Portable Computer	8.11%	3
Fax Machine	0.00%	0
A Designated Report Form	8.11%	3
A mix of any of the above	59.46%	22
TOTAL		37

Appendix G

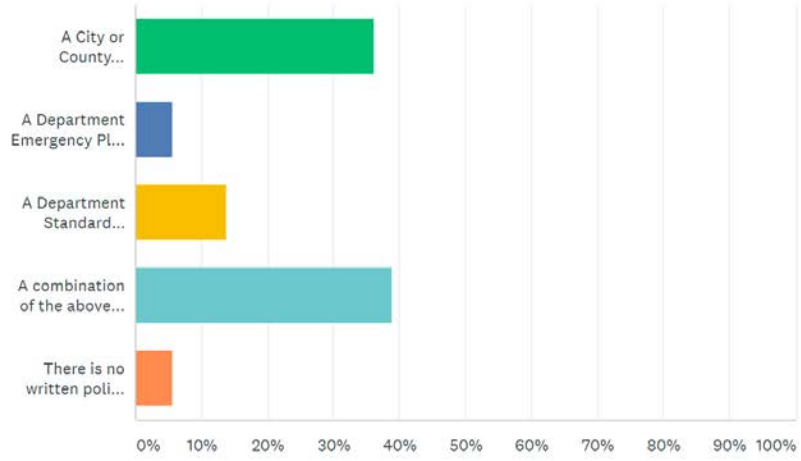
Question Four

Q4

Customize Export

What type of policy or procedure does your department have referencing Initial Windshield Damage Assessment?

Answered: 36 Skipped: 1



ANSWER CHOICES	RESPONSES	
A City or County Emergency Plan addressing the Damage Assessment Process	36.11%	13
A Department Emergency Plan addressing the Damage Assessment Process	5.56%	2
A Department Standard operating Procedure (SOP) addressing the Damage Assessment Process	13.89%	5
A combination of the above written policies addressing the Damage Assessment Process	38.89%	14
There is no written policy addressing the Damage Assessment Process	5.56%	2
TOTAL		36