

Running head: Community Risk Assessment

Community Risk Assessment-City of Largo, Florida

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CERTIFICATION STATEMENT

I hereby certify that this paper constitutes my own product, that where the language of others is set forth, quotation marks so indicate, and that appropriate credit is given where I have used the language, ideas, expressions, or writings of another.

Signed: \_\_\_\_\_

Shelby Willis

### Abstract

Largo Fire Rescue was in the process of updating the emergency operations plan for the City of Largo. It was realized during this process that a comprehensive risk assessment for the community had not been performed for an extended period of time. The problem identified is Largo Fire Rescue currently does not have a community risk assessment policy. The purpose of this applied research project was to identify the components needed for a community risk assessment policy for Largo Fire Rescue. 3 research questions were developed to address this issue; (a) what are the fundamental components of a community risk assessment policy, (b) what is the frequency that a community risk assessment should be performed, and (c) how should hazards within the Largo community be categorized and prioritized in a community risk assessment policy? The descriptive research method was used to identify the standards that will be used to provide guidance and structure to a periodic community-wide risk assessment plan. Research procedures included a thorough review of established standards common to risk assessment plans. Interviews were conducted to garner expert input on criteria needed for a community risk assessment policy. Results of said research did not identify commonalities among risk assessment processes, but offered a variety of criteria to evaluate. Recommendations included the establishment of a community risk assessment policy with defined assessment criteria, a five-year evaluation cycle and a value based point system for hazard identification.

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## Introduction

The fire service has been built on the premise that you call—we come. Emergency response to fire incidents, emergency medical services, life safety, public education, and hazard mitigation are all services that fire service traditionally performs. Additionally, vehicle accidents, hazardous materials spills, swat medic callouts and technical rescues are events that the fire service now plans for, trains for and commits resources to on a regular basis. Disaster mitigation encompasses yet another event the fire service, as well as, other emergency services and city departments attempt to plan, respond to, and mitigate. Disaster's, either man-made or natural, require a tremendous amount of planning, resources, and action on the parts of the responders. Yet planning for every type of disaster or specific situation is next to impossible.

The problem identified for this research project was based upon the fact that Largo Fire Rescue has not conducted a comprehensive community risk assessment in over ten years. Assessments that have occurred were used to deploy apparatus for the purpose of meeting response goals. This type of assessment does not take into consideration many factors. Economic impact, environmental impact, frequency of assessment, a consistent method for conducting the assessment process and documentation for said assessments are all necessary components to a community risk assessment process.

Risk assessment allows for risk management to fall into place. Risk management is not an add-on to the decision making process, but rather an integrated component of the planning and executing process. Risk management helps to retain some control and flexibility for decisive action (Risk Assessment, p. 1). A comprehensive community risk

assessment plan allows for a planning process, an evaluation process, and finally a chance to identify and minimize the impact that a significant event places on the community.

The problem is Largo Fire Rescue currently does not have a community risk assessment policy. The purpose of this applied research project was to identify the components needed in a community risk assessment policy for Largo Fire Rescue. Three research questions were developed to address this issue; (a) what are the fundamental components of a community risk assessment policy, (b) what is the frequency that a community risk assessment should be performed, and (c) how should hazards within the Largo community be categorized and prioritized in a community risk assessment policy? The descriptive research method was used to identify the standards that will be used to provide guidance and structure to a periodic community—wide risk assessment plan.

### Background and Significance

Largo Fire Rescue is centrally located on the gulf coast of Florida. The department resides in Pinellas County, one of the most densely populated counties in the state, with a population of 916,542 (US Census Bureau, 2010, p. 1). Tourism is the major industry in the central Florida area. The City of Largo sits on the west-central portion of this county. The fire protection district serves 30.5 square miles and serves 77,648 citizens (US Census Bureau, 2010, p. 2). Housing demographics for the city includes 29.76% multi-family, 34.82% single family and 27.08% mobile home residents (City of Largo, 2010, p. 2). The cities population is broken down by age with 16% of the residents under the age of 18, 56% of the residents are over the age of 18 but under the age of 65 and 27% of the residents are above the age of 65 (US Census Bureau, 2010, p. 2).

Largo Fire Rescue is an accredited through the Commission on Fire Accreditation

International (CFAI) and maintains a Public Protection Classification (PPC) of Class II from Insurance Services Office, Inc. (ISO). The department has six fire stations staffed by 132 line personnel that provide Advanced Life Support Services (ALS), Hazmat, Technical Rescue and SWAT coverage to the community. Additionally, 15 administrative support personnel assist in the daily operations of the department, as well as, provide public education and fire inspections to the community and logistical support to the department. The command structure for the department includes the Fire Chief, Deputy Fire Chief, four Division Chiefs, and three Assistant Chiefs. Responsibilities begin with the Fire Chief who provides overall budget and management oversight for the department. Next, in line of authority, is the Deputy Fire Chief who manages logistical support for the department, as well as, assists in ensuring the budget remains on pace throughout the fiscal year. The Operations, Fire Prevention, Training, and EMS/Emergency Management Chiefs are the next division of authority with each division assigned an administrative Assistant Chief to help with daily operations. The Operations Chief is the exception; he is assisted by six on-line Districts Chiefs. Line personnel include the six District Chiefs, 21 Fire Lieutenants, and 120 firefighter EMT's and paramedics. Average annual call volume for Largo Fire Rescue tops 21,000 fire and EMS incidents combined (City of Largo, 2010, p. 1).

Largo Fire Rescue's Mission reads; to protect, and enhance the quality of life within the community by providing a range of public services, for the health, safety and welfare of our citizens. Traditionally, the fire service meets the needs of the community by providing emergency response to fire and emergency medical calls, and Largo is no exception. Today, Largo Fire Rescue provides a wide range of services that not only meet the

traditional needs of the community but mitigates just about any challenge found within the community. Additionally, the department looks for ways to meet the changing needs of the community that are not emergent in nature.

Similarly, the United States Fire Administration's (USFA) mission reads; we provide National leadership to foster a solid foundation for our fire and emergency services stakeholders in prevention, preparedness and response (USFA, 2010, p. 12). The USFA has five operational objectives that address their strategic goals for the next five years, 2010-2014. The objectives are: (1) Reduce risk at the local level through planning and mitigation (2) Improve local planning and preparedness (3) Improve fire and emergency services' capabilities for response and recovery from all hazards (4) Improve the fire and emergency services' professional status (5) Lead the Nation's fire and emergency services by establishing and sustaining USFA as a dynamic organization (USFA Strategic Plan 2010, p. 14). These five operational objectives are intended to have a significant impact on the fire concerns in this country over the next 5 years. Operational goal number two directly relate to the issue Largo Fire Rescue is currently facing. As the evolution of the fire service continues, departments must increase their roles in handling emergency response to include comprehensive community assessments within their respective communities. Typically, assessments in the past were performed in an effort to plan response coverage to traditional events—fires and EMS calls. A much needed task, but now in need of expansion. Community risk assessments must now include unexpected events such as natural and man-made disasters. No longer can these events remain unplanned. A community risk assessment is an integral part of planning, mitigation and recovery operations necessary for city leaders to have the opportunity to reduce identified



risks ahead of time. If the first time a community assessment is completed occurs is post event, the opportunity for risk reduction is lost. Risk management is accomplished by identifying recognized threats, analyzing the probability that threat will be realized, and making informed decision to reduce that threat. Additionally, risk management includes taking calculated risk that the probability of that threat being recognized may never come (Risk assessment, p. 1).

This applied research project is part of the National Fire Academy's (NFA) Executive Analysis of Fire Service Operations in Emergency Management course in Emmetsburg, Maryland. The course is designed to expose fire service leaders to the field of emergency management and more importantly community risk assessment. This ARP will specifically look at addressing community risk programs common in the fire service industry.

The problem Largo Fire Rescue currently faces is it does not have a community risk assessment policy. The purpose of this applied research project is to identify the components in a community risk assessment policy. Three research questions were developed to address this issue; (a) what are the fundamental components of a community risk assessment policy, (b) what is the frequency that a community risk assessment should be performed, and (c) how should hazards within the Largo community be categorized and prioritized in a community risk assessment policy? The descriptive research method was used to identify the standards that will be used to provide guidance and structure to a periodic community-wide risk assessment plan.

### Literature Review

Man-made or natural disasters can destroy a community. If a community is lucky enough to survive a disaster, the recovery process can be monumental. The fire service prides itself on the ability to react to any situation, at any time. Much of the focus is placed on response. Response is just a small portion of the job in the fire service. The ability to evaluate a situation, identify the risks associated with that situation, and plan a response almost guarantees a favorable outcome. The ability to evaluate, plan, and analysis is risk assessment.

Risk is identified by both the probability and severity of a potential loss that may result from a hazardous condition (Risk Assessment, p. 1). The importance of evaluating said risk is incalculable. Going one step further, a risk assessment is one component of a risk management analysis. Analysis includes a qualitative, quantitative, value of risk related to a concrete situation and a recognized threat (Risk Assessment, p. 2). The key to managing risk includes the ability to identify the risk, take steps to reduce said risk, and then plan to mitigate that risk once realized (Risk Assessment, p. 2).

The United States Fire Administration (USFA) produced their strategic plan for fiscal years 2010-2014 and detailed in that document is the importance of planning and preparedness as it relates to the fire service. Their mission statement focuses on providing national leadership to develop a solid foundation for our fire and emergency services in the areas of prevention, preparedness, and response." The Department of Homeland Security, and Federal Emergency Management Agency share in this mission. The USFA has identified goals as part of their strategic plan. The first goal states, "Reduce the risk at the

local level through prevention and mitigation". The second goal reads, "Improve local planning and preparedness " (p. 17). The fire service must meet this challenge and respond. The fire service must prepare, plan, and analysis potential threats for the communities in which they serve.

A literature review was conducted to find current information in the area of risk assessment in an effort to answer three research questions; (a) what are the fundamental components of a community risk assessment policy, (b) what is the frequency that a community risk assessment should be performed, and (c) how should hazards within the Largo community be categorized and prioritized in a community risk assessment policy?

Donald Stiteler, of Oaks, Pennsylvania, completed a risk assessment for the Township of Upper Providence. This applied research project detailed the main components found in a community risk assessment plan. Components included the community demographics, evaluation of the community in terms of hazards, the estimation of the levels of risk the community faces with both natural and man-made disasters, and determining an acceptable level of risk that the Township is willing to accept (Stiteler, 2010, p. 10). Edward Kassing of Eau Claire, Wisconsin also completed an applied research project that documents the components of an all hazard disaster management assessment policy. Kassing reports that the most important part of an all hazards assessment plan is the process of performing a damage assessment of the community, post disaster. The assessment process includes categories for debris clearing, emergency protective measures within the community, ensuring functioning road systems, public utilities and water control facilities, and all other buildings and equipment utilized by the community (Kassing, 2002, 13). Gerald Ewers completed an applied research project, in 2006, addressing damage assessment for the

Muscatine Fire Department. Ewers documents the risk assessment process should include a rapid assessment component that is immediately performed post event. The risk assessment process is accomplished through a windshield survey, a preliminary damage assessment that established a dollar amount in relationship to the level of destruction, and finally a detailed assessment that identifies specific sites within the community. The detailed assessment process is most often performed by persons with additional training in this particular area—building officials for example (Ewers, 2006, p. 11).

Vision 20/20, published in March of 2011, is a national campaign supported by the U.S. Department of Homeland Security. The project produced a guide that stressed the importance of prevention of fire loss as it related to fire service duties. The guide details the need to identify risks found in local communities, the importance of prioritizing the identified risks, developing strategies to mitigate identified risks, preparing plans and finally, monitoring and modifying the documented information (Vision 20/20, 2011, p. 9). The United States Army developed a Risk Management Field Manual to be utilized by commanders on deployment. The manual documents the importance of risk management but also defines the risk management process. The Field Manual states that risk management should be used to assist leaders in complying with regulatory requirements, and identifying responsibilities. Leaders must be able to identify where risk assessment begins, as well as, when to begin a risk assessment process (U.S. Army, 1998, p.1-7). The manual further states that risk management does not convey authority to violate law or established standards. Nor does it allow for ignoring regulatory restrictions or bypassing risk controls that involve life safety and fire protection codes. Leaders may not use risk management to alter or bypass legislative intent (U.S. Army, 1998, p. 1-7). The Army

Field Manual details the five step risk management process. Steps include; identifying hazards, assessing the hazards, developing controls and making risk decisions, implementing controls and continually supervising and evaluating the process (U.S. Army, 1998, p. 2-0). The Fire Chiefs Handbook also documents a five-step process to accomplish risk assessment. The first step is to evaluate the community's fire and emergency services systems that are currently in place. The second step is to assess the community itself, followed by the overall response capability to said community. The third step involves the community's response capabilities, and the fourth step identifies the unprotected risk found in the community. Finally, the fifth step addresses developing mitigation strategies based on the information gathered during the assessment process (Barr, Eversole, 2003, p. 1026). Recommendations for fire service members include involving the entire community in this process—participation will only improve the assessment process (Barr, Eversole, 2003, p. 1034).

Fire Technology Magazine, in London, England, published an article entitled "Planning New Standards of Fire Service Emergency Cover." This author documents, a risk assessment plan must begin with an analysis of the community demographics and density of the built environment. Proper mitigation cannot occur without the assessment of the community. The needs of the community must be identified and responses built to suit the demographics and population of that particular area (p. 2). International Fire Protection Magazine produced an article, in 2006, which addressed "Fire Risk Assessments" and the responsibilities as an employer to conduct such an assessment. The author details a five-step process for conducting a risk assessment that follows much of the same ideas previous authors also describe. Step one includes in identification process of all hazards,

step two identified persons at risk within the business, step three includes reducing the identified risks, step four documents the above information and trains personnel to allow for familiarization with the identified risks and procedures to mitigate such risks and finally step five requires continual review and revising of the plan (p. 74-75). Fire Chief's Magazine documents, in 2001, a risk assessment plan that is part of the fire department accreditation process. The Commission on Fire Accreditation International (CFAI), the authority on fire service accreditation, has an eight part assessment plan, when documented is entitled a Standard of Cover Manual. The eight-step process includes current fire service deployment, community expectations for fire service delivery, a comprehensive community risk assessment, a distribution study, concentration study, historical reliability, historical response effectiveness and finally an overall evaluation of the department's capabilities and standard practices (Gary, 2001, p. 2). Standard of Cover manuals are a comprehensive look at fire services capabilities in the community in which they serve. Global Environmental Change Magazine recommends that a risk assessment process must begin with an evaluation of the community. The author's Adger, Brown, and Conway, stress the assessment process should include the use of geographical information. Geographical information contains housing distributions within the community, flood plain information, and evacuation routes. The authors propose the next step is to layer this information graphically to produce a detailed picture of the community. Utilizing GIS mapping allows for community changes to occur in real time. As an event unfolds within a community, information gathered relating to damage, fire, flooding, and injury can be added and an updated representation of the community can be display almost immediately (Adger et al., 2011, p. 144).

Research question two addressed how frequently a community risk assessment should be performed. Much information is found on the components that a risk assessment plan should include, however, few sources report on the frequency for conducting a risk assessment or re-evaluation of a previously documented process. Edward Kassing, in his applied research project, stresses urgency when completing an assessment on the essential facilities found within a community. According to Kassing, the assessment process must occur as soon as possible to determine community needs and request additional resources (Kassing, 2002, 13). Gerald Ewers also addresses, in his applied research project, the time frame a risk assessment process must begin. He states that the assessment must begin immediately following a disaster and should occur in several phases. Ewers further states that the process should not only take place following a disaster, but should take place in the form of pre-plans for target hazards, and critical infrastructure (Ewers, 2006, p. 12).

The Department of Homeland Security suggested, in their 2010 document "Vision 20/20", that the fire service monitor and modify their community risk assessment plans based on several factors; community changes, political issues, and performance measures as they relate to safety procedures. The risk reduction plan does not identify the frequency that is associated with this process (Vision 20/20, 2001, p. 10). The U.S. Army Field Manual addresses frequency as an on-going risk assessment process. The manual stresses that the risk assessment process should not be an afterthought, yet not be treated as a competition among leaders (U.S. Army, 1998, p. 3-2).

The Fire Chief's Handbook addresses the frequency of the assessment process in terms of a pre-plan program. The community assessment is conducted and mitigation strategies are developed and documented in the form of pre-plans. The fire service is very familiar

with this process. As components of the assessment process change, re-evaluation must occur. Growth to the community, occupancy changes, fire flow requirement changes and response capability changes are all components that affect the mitigation strategies. Re-assessment must occur continually to keep pre-plans current and mitigation strategies relevant (Barr, Eversole, 2003, p. 1029).

Finally, Fire Chief's Magazine documents that completing a community risk assessment is a critical process. Fire departments respond to a variety of different risks and different risks have different mitigation needs with different outcomes. The CFAI document, containing the standard of cover, is a document that reflects 5 years of data and evaluation. Re-accreditation requires an annual report to document compliance with regards to operational areas and well as reporting any changes to the original accreditation report. Annual compliance is required for four of the five accreditation cycles. The fifth year requires the process to begin again with a request for re-accreditation and the completion of the accreditation assessment process (Gary, 2001 p. 4).

Research question three attempts to determine how hazards within the Largo community should be categorized and prioritized in a community risk assessment policy. Gerald Ewers, details in his 2006 applied research project, that infrastructure should be categorized by target hazards, critical infrastructure, roads, and remaining structures in that order. This categorization identifies the most critical occupancies in terms of resources, occupancy load, and life safety hazards (Ewers, 2006, p. 12). Kevin Bowman from Tarpon Springs, Florida completed an ARP on Conducting a Community Risk/Capability Assessment and reports that critical hazards should be placed into four categories; natural hazards, technological hazards, target hazards, and national security hazards.



Additionally, he reports that this information should be grouped together and placed into an all-hazard mapping website so that other governmental agencies could share the data (Bowman, 2006 p. 12).

The U.S. Army Field Manual utilized a probability method for hazard identification. The highest category of threats includes hazards that are encountered often, the next level includes threats that are likely to occur, the third level includes hazards that occur sporadically, the fourth level includes hazards that are seldom likely to occur and the final level includes any possible but highly unlikely hazard the military is likely to encounter (U.S. Army, 1998, p. 2-9). Army commanders are able to analysis situations rapidly to develop tactical strategies based upon historical or probability data. Subordinate officers are trained to the same level of hazard identification, this ensures soldiers are able to identify threat levels quickly (U.S. Army, 1998u, p. 3-7). The Fire Chiefs Handbook takes a different approach when performing hazard identification. The authors suggest that the initial process should include identifying the community demographics, identifying the communities past problems, life safety issues, target hazards, and economic impact. Authors Barr and Eversole go on to suggest that fire flows, occupant load, and age and condition of the buildings be evaluated as a critical part of the hazard assessment process (p, 1028).

Fire Technology Magazine suggests, that hazard identification must include the activities of persons residing within that community as it relates to the identified hazard. For example, if flooding is an issue in the east end of the community, the evacuation of the population associated with that flood plain must be included in the hazard identification process. Included in a hazard identification process should be all types of natural and

man-made disasters (Peace, 2002, p. 280). Fire Engineers Journal supports a life risk consequence (LRC) as the method for categorizing structures within a facility or community. Occupancies are placed on one of three categories that include high, medium or low risk values. Each category is scored according to; building construction or structural features, hazards found at the location, occupancy load, emergency procedures for said location, and finally the responder's ability to respond to an emergency at said location (Klein, 1998, p. 7). The Commission on Fire Accreditation International recommends that the community risk assessment include categorizing facilities into four categories; low probability-low consequence, low probability-high consequence, high consequence-low probability, and high consequence-high probability (p. 3). This system is very similar to the U.S. Army's probability method for categorizing hazards.

The conclusion of the literature review found that the U.S. Army, as well as, much of the fire service develop risk assessment plans and categorize hazards in a similar manner. Threats are placed into categories based upon the likelihood a community will be faced with such an event. High-probability, high frequency events would garner greater attention than a threat that is categorized as low-probability, low frequency. The mitigation strategies were also developed according to this probability data. Many of the authors found from the fire service industry to private industry agreed that the basis of risk assessment includes a tiered process that analyzes the community or environment, identifies potential threats, develops mitigation plans, and ensures the ability to evaluate the entire process. Finally, the research did not identify a consistent time frame for the assessment process. Frequency was defined as on-going and the assessment dependant upon knowing changes to the community or situation. Further research is needed to

determine if GIS technology be utilized routinely and applied across the board from the military, to the fire service and private industry.

#### Procedures

A literary review began, in June of 2011, while attending the Executive Analysis of Fire Service Operations in Emergency Management course at the National Fire Academy. The research method used within this applied research project was descriptive research and in the future will be utilized to develop a comprehensive community risk assessment policy for Largo Fire Rescue. Research questions include the following; (a) what are the fundamental components of a community risk assessment policy, (b) what is the frequency that a community risk assessment should be performed, and (c) how should hazards within the Largo community be categorized and prioritized in a community risk assessment policy? In addition to the literary review, personal interviews were conducted to address the issue Largo Fire Rescue is currently experiencing.

As part of the research process, a review was conducted of Executive Fire Officer applied research projects through the Learning Resource Center on campus at the National Fire Academy. Several applied research projects were evaluated to identify essential elements found in an assessment process, as well as, the frequency an assessment process and to determine how critical infrastructure is identified in a risk assessment process.

Further research was completed upon returning from the National Fire Academy and included a literature review of fire and non-fire service sources on the topic of community risk assessments. Federal, state, local, and military risk assessment policies were evaluated for related information. Departmental policies for resource deployment within the community were reviewed, as well as, criteria utilized when determining occupancies that

are deemed target hazards were evaluated.

Additionally, literature was reviewed from magazines, journals, and books to establish the same criteria found through review of the applied research projects. Finally, three interviews were conducted to solicit the expertise of a county Emergency Manager, city Community Development Director and an Assistant City Manager as it relates to the topic of risk assessment.

The first interview was conducted on September 14, 2011 at 1500 hours with Sally Bishop. Ms Bishop is the Emergency Manager for Pinellas County, Florida. Pinellas County is a peninsula that resides on the west coast of Florida. Travel to and from Pinellas County is limited to three bridges and one major roadway. Population in Pinellas County, Florida tops one million citizens, making evacuation, in the event of a disaster, a major concern. The interview took place in Ms Bishop's office located in Clearwater, Florida. Ms Bishop serves as the Emergency Manger for 19 cities that reside within the County. Sally has held the position of Emergency manger since 2007 and previously served as the assistant Emergency Manager for the 2 years prior. Interview questions addressed Sally's background and experience, expectations of a risk assessment plan, and critical areas that are often overlooked in an assessment plan. Ms Bishop was also asked to define critical infrastructure, how quickly damage assessment process should be performed post disaster, and the frequency a risk assessment plan should be re-evaluated. A complete listing of the questions can be found in Appendix A.

A second interview was conducted with the Community Development Director, Carol Stricklin. Carol has been the Director of Community Development for the past 4 years and was the served as the Assistant Director for 2 years prior. Additionally, Carol was the

Assistant Community Development Director in Orange County, Florida for many years prior to coming to work in the City of Largo. The interview took place in Director Stricklin's office September 27, 2011. The interview began by asking Carol to explain her background and experience in the area of community development. Next Director Stricklin was asked to define critical infrastructure and how it should be categorized when completing a risk assessment plan. Carol was also asked to describe the elements that she felt are important in a risk assessment plan, as well as, the frequency a community assessment should be completed. Finally, Director Stricklin was asked to discuss components often not addressed but important to a community risk assessment plan. A complete list of questions can be found in Appendix B.

The third and final interview was conducted with the Assistant City Manager for the City of Largo, Mike Staffopoulos. The interview took place October 6, 2011 and was conducted in person. Mr. Staffopoulos has been the Assistant City Manager with the City of Largo for 4 years. Previously, he was the Director of Community Development, and is an engineer by trade. Mike was also asked to describe his idea of critical infrastructure that is located within the community and how that infrastructure should be categorized in a risk assessment plan. Next, he was asked to address what components he finds are necessary in a risk assessment plan and how often that plan should be up dated. Mr. Staffopoulos was then asked to describe areas in which cities fail when developing a community risk assessment. And finally, he was asked to identify areas of importance he felt that the city should focus on when completing a risk assessment process. A complete listing of the interview questions can be found in Appendix C.

## Limitations

The limitations identified during the research phase of this applied research project included a number of areas that required additional study. Generally, the study of community risk assessment plan produced many types of evaluations or processes. Research question number one attempted to identify the critical components common in a community risk assessment process. Commonalities were found in the research that included an evaluation of the community's demographics, response capabilities within the community, hazards located within the community, strategies to mitigate risks, and an evaluation process once the assessment is completed. Much information was found on post damage assessment procedures but limited information was found with regard to risk assessment policies that integrate GIS mapping as part of the process.

Three interviews were conducted to determine the expert's opinions on risk community assessments and although all participants agreed that the community must be assessed, they could agree on a method for this assessment. Nor did they agree on a reference for guidance.

Research collected for question number two found very limited information. The ability to determine the frequency a community risk assessment process should be performed was varied or non-existent. The United States Army's Field Manual suggested assessments occur as an on-going process. Information that related to the fire service was not any more specific. The Commission on Fire Accreditation was the only source that specific a time frame for the assessment process—5 year plan. .

Finally, research question number three found a variety of methods for categorizing hazards found within a community. Research evaluated within the fire service did not

provide a consistent method for identification. Methods identified included; value point systems, degrees of risk, and the probability of encountering risks. Additionally, definitions of critical infrastructure varied as found during the interviews of the Assistant City Manager and the Community Development Director for the City of Largo. Both experts regularly determine city policy and guide major changes within the community but did not agree on the definition of critical infrastructure or the method for classification for hazards located within their community. Lastly, GIS capability was found in few community assessment procedures. This resource has yet to be used regularly to assist in the assessment process. Future benefits and wider acceptance of this technology will drive the use of this data.

### Results

Research questions were developed in an effort to determine standards that exist relating to community risk assessment programs. The first research question was designed to identify what are the fundamental components of a community risk assessment policy? Research showed various opinions on this criterion dependant upon when the process actually was performed.

The United States Army developed a field manual that details a five step process for performing a risk assessment. Although this manual was developed for commanders while on deployment, the process is non-specific and can be applied to non-military events. Steps include; identifying known hazards, assessing the hazards, developing controls and making mitigation decisions, implementing established controls and continually supervising and evaluating the process (U.S. Army, 1998, p. 2-0). The International Fire Protection Magazine produced an article, in 2006, which addressed "Fire Risk

Assessments" and the employer responsibility to conduct such an assessment. Similarly, the author also details a five-step process for conducting a risk assessment. Step one includes a hazard identification process, next is identification of persons at risk associated with the identified hazards, the third step includes mitigation of the identified risks, step four requires documentation of the assembled information and step five allows for a continual review and revising of the plan (p. 74-75). Both the Unities Sates Army's plan and the Fire Risk Assessment are very similar in nature. Both assessment processes attempt to identify known hazards, evaluate, and determine ways to reduce the identified risks, establish some controls for these risks, and continue to evaluate the assessment process. Additionally, both processes are intended to take place before an event occurs.

Donald Stiteler, of Oaks, Pennsylvania, completed an applied research project that detailed community risk assessment components. Stiteler's process was also designed to occur in the pre-event phase. The components analyze community demographics, evaluation of threats to the community, the estimation of the levels of risk the community faces with both natural and man-made disasters, and determining an acceptable level of risk that the community is willing to accept (Stiteler, 2010, p.10). Planning New Standards of Fire Service Emergency Cover, an article published by Fire Technology Magazine, suggests that evaluations of community demographics are an essential element of a risk assessment plan. The author adds to this process the importance of including population densities of the community must be included as part of the assessment process. What is not included in the process is mitigation or further evaluation once the initial assessment is completed (Peace, 2001, p. 280). This plan strictly analyzes the community and leaves planning phase out of the process.



Similar to the U.S. Army's Field Manual and the Fire Risk Assessment article written by International Fire Protection magazine, the Fire Chiefs Handbook also documents a five-step process to accomplish risk assessment. This process, however, begins by determining the general abilities of the local fire service as it related to response coverage. Next, an assessment of the community is performed followed by a combination of both the previous steps—determining the fire service response capability within the community. The handbook suggests that the assessment move toward identification of the unprotected risk and finally developing mitigation strategies based on the information gathered (Barr, Eversole, 2003, p. 1026). The Fire Chief's Handbook details a comprehensive plan that not only evaluated the community but also includes an analysis of the emergency services' ability to service the community. Fire Chief's Magazine described a community risk assessment plan that is part of the fire department accreditation process. The Commission on Fire Accreditation International (CFAI) also details a risk assessment process that includes current deployment of fire units within the community, community expectations for fire service response, a comprehensive community risk assessment, a distribution study, concentration study, historical reliability, historical response effectiveness, and finally an overall evaluation of the departments' capabilities (Gary, 2001, p. 2). Comparatively, the CFAI's process includes a community assessment, as well as, an evaluation of the fire services response capabilities included in the assessment process. How this plan differs from the Fire Chief's Handbook is it includes historical evaluations, and measures effectiveness of established service delivery. This is by far the most comprehensive risk assessment plan identified thus far.

Global Environmental Change Magazine details a community assessment process looks

to identify specific information not previously identified in other research. The author's Adger, Brown, and Conway, stress that geographical information must be included when developing a community assessment plan. Geographical information should be used to identify flood plains, evacuation routes and pre-identified areas within the community that need additional resources should a disaster hit. When this information is displayed graphically it provides a very detailed picture of the vulnerabilities of the assessed community (Adger et al., 2011, p. 144). Utilizing GIS mapping as part of the initial assessment process allows for real time updated information to be displayed when an event is unfolding. Real time information that is easily reviewed and understood is critical when mitigating risk.

Edward Kassing of Eau Claire, Wisconsin also completed an applied research project that focuses on damage assessment. Kassing's plan begins post event and included categories for debris clearing, emergency protective measures once a disaster has hit, clearing of road systems, ensuring water control facilities and public utilities are functioning, and finally the assessment of buildings and equipment to determine the level damage found (Kassing, 2002, 13). Similarly, Gerald Ewers applied research project also details a plan for conducting a risk assessment that focuses on the post event phase of a disaster. This criterion includes; a windshield survey, a preliminary damage assessment that established a dollar amount in relationship to the destruction, and finally a detailed assessment that identifies specific sites (Ewers, 2006, p. 11). Both Kassing and Ewers describe assessment plans that begin after an event has occurred. Little to no information is addressed in the pre-event phase.

Finally, three interviews were conducted to gather expert opinions in their respective

fields as it related to community risk assessment process. All three experts were asked to describe areas they found important when developing a community risk assessment plan. Additionally, the participants were asked to describe areas that are frequently overlooked but are necessary to consider. The first interview was with the Emergency Manager for Pinellas County, Florida, Sally Bishop. Ms. Bishop did not offer specific criteria for an assessment process, but did report that often she finds municipalities are reinventing the wheel when producing emergency management documents. Sally states, “Pinellas County utilizes the Local Mitigation Plan (LMS) to drive the county’s risk assessment process; cities should use this local mitigation plan when developing their process.” Additionally, Ms. Bishop suggests that municipalities make mistakes when the first time they evaluate their communities is post event—trying to determine which areas are under insured, or have no insurance is a huge mistake once disaster hits. Sally felt it is not possible to do an accurate assessment of a community in 24 hour period of time—communities need to be assessed ahead of the disaster. She further added that municipalities should plan to harden facilities like police and fire stations before disaster strikes. Planning ahead is easier and cheaper than once in recovery mode—less money is spent being proactive.

Carol Stricklin, the Director of Community Development for the City of Largo, was the second person interviewed. Carol reported that an assessment plan should be event orientated and include departmental readiness, maps, and information on how to utilize personnel and equipment during a disaster. She reports that a community assessment plan should include time lines for specific tasks. For example, her staff will search the city for on-going construction projects 7 days out from a storms approach to ensure all construction equipment is secured. As a storm approaches, the crews searches private construction

projects and ensures unnecessary equipment is removed from the site and all remaining equipments secured in effort to render the community safer. When asked to describe what areas are often overlooked when developing an assessment plan, she answered, “terrorism is an area where I think we all fall short. This is an area pretty new to us, it has only been in the last 10 years that we have taken that threat seriously.” She concluded by saying, “storms and natural systems do not respect city boundaries. We need to ensure we know what critical infrastructure we rely on that is located outside our boundaries. Landfills, public utilities, shelters and other critical buildings we rely on daily yet have zero control over.” Finally, she agreed with Sally Bishop that city administrative staff continues to re-invent the wheel when developing emergency management plans. The level of emergency preparation a city commits to is dependant upon the current leadership. Emergency management is a priority one year and not the next, people change positions, retire, and the information is lost. No one documents information and saves it in a public venue. Information is constantly lost and the wheel is re-invented.

Mike Staffopoulos was the final person interviewed. Mike serves as an Assistant City Manager and was formerly the Community Development Director for the City of Largo. Mike was also asked what he considers important to include in a risk assessment plan. Mr. Staffopoulos answered that it is important to categorize the high risk facilities, and to identify the economic and environmental impact a disaster can have on a community. He added, “I think about the facility in Japan. They had to evacuate people for 10 miles. And if that happens can our workers handle this type of disaster if radiation was leaking?” Mike also was asked to identify a particular area when cities fail to meet the expectations when developing or implementing a community risk assessment plan. He explained he felt that

environmental impact was the specific area often overlooked. Mr. Staffopoulos' concern is that most of the homes located within the City of Largo were built in the 1950's to the 1970's and were not built to withstand a major hurricane with high wind loads. He further explains that homeowners are not forced to upgrade their residential structures. Although, Florida requires certain upgrades to the home if a homeowner is renovating, structural hardening is not requirement under normal circumstances. As a lead administrator for the City his major worry is how to compensate for the loss of housing for all the cities residents should a major disaster destroy their homes. Thousands of residents will be homeless.

The results for determining specific criteria necessary for a risk assessment process produces a variety of options. Criteria identified included processes that began in the pre event phase, as well as, processes that were specifically designed for the post event phase. Additional information deemed important included; the analysis of historical data relating to past community events, fire service deployment capabilities, available community resources, and economic data should a community become damaged as a result of a disaster.

The second research question was developed to determine the frequency that a community risk assessment should be performed? The research collected showed similar results yet did not sufficiently answer the research question. The only published source that clearly documents a specific time frame for an assessment or re-assessment process to occur was Fire Chief's Magazine. The Commission on Fire Accreditation International (CFAI) was featured in Fire Chiefs Magazine as a comprehensive risk assessment plan. This process is reflective of 5 years of data and evaluation. The actual accreditation process looks at several important features that detail the fire departments ability to provide

services to their respective community over a 5 year period of time. Once completed, the re-accreditation process begins. Requirements for re-accreditation include an annual report that documents changes to the original accreditation document. Any areas found to be deficient must be addressed annually, and this compliance is expected for 4 years. The 5th year requires the comprehensive assessment process to be completed again (Gary, 2001 p. 4). The accreditation process required by the Commission on Fire Accreditation International was the only process that specifies a pre-determined time frame for an initial assessment and continued assessments of fire departments capabilities as they relate to the community in which they serve.

Surprisingly, all three experts interviewed clearly agreed with the Commission on Fire Accreditation that a 5 year time frame as a goal for community assessment program. Sally Bishop, Emergency Manager for Pinellas County, stated that a reassessment plan should be updated every 5 years. She relays that the county in which she lives and works is built up and not much change occurs. Reassessment is not necessary on a continual basis. Carol Stricklin also agrees with Sally, as does Mike Staffopoulos. Both stated that a 5 year process was appropriate as long as the assessment process has the ability to monitor new construction and changes with occupancies within the community.

The Fire Chief's Handbook bases the frequency of the assessment process on specific factors, much like the Vision 20/20 plan. The Handbook suggests that evaluation must occur with the growth to the community. Other factors like occupancy changes, fire flow requirement changes and response capability changes are all components that affect the mitigation strategies and prompt the reassessment process (Barr, Eversole, 2033, p. 1029). The Department of Homeland Security documents, in their Vision 20/20 plan, that the fire

service must monitor and modify community risk assessment plans based on specific factors, but does not identify the frequency that is associated with said process (Vision 20/20, 2011, p. 10). Finally, the U.S. Army Field Manual addresses frequency as a continual on-going risk assessment process (U.S. Army, 1998, p. 3-2). All three sources document frequency as an on-going process, but so not identify a specific time frame associated with the assessment.

Edward Kassing stresses urgency when completing a post disaster assessment on critical infrastructure within the community, in his applied research project. Kassing documents that the assessment must occur as soon as possible to determine community needs and request additional resources (Kassing, 2002, 13). Gerald Ewers also completed an applied research project on risk assessment and concurs with Edward Kassing as to the importance of completing a risk assessment immediately following a disaster. Ewers further suggests that the post disaster assessment should occur in phases (Ewers, 2006, p. 12). Both writers have developed processes that begin post event and stress the importance of beginning an assessment as soon as the event allows for that process to begin. The timeframe associated with that risk assessment process continues until the assessment is complete and the communities' needs are met. Both Kassing and Ewer's plans are not comprehensive in nature and do not address the assessment process in a pre-event environment.

As preciously stated, the research did not answer the question, "what is the frequency that an assessment process should be performed?" With the exception of the Commission on Fire Accreditation, almost all of the sources reference considered the assessment process an on-going process and did not offer specific time frames for an assessment

process.

The third research question was developed to determine how hazards, within the Largo community, should be categorized and prioritized in a community risk assessment policy. The results showed a variety of options from a point system designed to categorize levels of hazards to the use of a probability system that relies on data to determine the frequency a specific threat is realized.

Fire Engineers Journal recommends a hazard identification system entitled “The Life Risk Consequence” or LRC. The LRC assigns a point value to occupancies that places them into one of three categories. Categories are then defined as high, medium or low risk. Components of the scoring process include construction or structural features, hazards found at the location, occupancy load, emergency procedures for said location, and finally, ability to respond to an emergency at said location (Klein, 1998, p. 7). Carol Strickin also feels a point system is the best way to evaluate and categorize hazards found in the community assessment plan. She cautions, however, that the process must be simple enough that most persons can understand it and therefore use it. Carol relays that past experience provided an opportunity to utilize a point system that was too elaborate for anyone to use or understand. The process became an exercise in itself, and was not utilized, causing the process to fail.

Gerald Ewers details, in his 2006 applied research project, the critical occupancies within the community should be categorized in terms of the structure and its resources, the occupancy load of that structure, and the life safety hazards associated with that occupancy. Critical occupancies are further identified as target hazards, critical infrastructure, roads, and finally all other remaining structure, in that order (Ewers, 2006,



p. 12). Kevin Bowman followed a similar approach when completing an ARP on Conducting a Community Risk/Capability Assessment. Bowman documents critical hazards should be placed into four categories that include natural hazards, technological hazards, target hazards, and national security hazards (Bowman, 2006 p. 12). Bowman does not detail if any one category is more hazardous or requires more resources for mitigation. Although Ewers has a more detailed plan, neither research project clearly identifies known hazards or provides enough information to determine the risk associated with that identified structure.

The Assistant City Manager, Mike Staffopoulos, was asked what he finds important when identifying hazards within his community. Mike began by stating he would like to view all the known hazards graphically on large maps. He explained that as the Assistant City Manager he needs to quickly reference many things at once—flood plains at 2 feet, 4 feet, 6 feet, evacuation rings for specific hazards and evacuation routes those citizens would utilize are a few of the examples he provided. Mike finished answering the question by stating, “all hazards should be represented in the GIS system, different layers that represent storm surges, utilities, financially impacted areas, and relocation areas are needed information for city staff members.”

The U.S. Army Field Manual addresses hazard identification based upon the frequency the hazard could be encountered. Frequency is broken down into categories based upon the likelihood that a hazard is realized. Categories include risks that are encountered often, hazards or threats that are likely to occur, hazards that are encountered sporadically, hazards that are seldom found likely to occur and finally hazards the military might encounter but is highly unlikely to find (U.S. Army, 1998, p. 2-9). The Commission on

Fire Accreditation International also uses probability to determine hazard identification. CFAI 's method is very similar to the method the U.S. Army proposes. Recommendations include placing facilities into four categories: "low probability-low consequence, low probability-high consequence, high consequence-low probability, and high consequence-high probability (p. 3). Once again the likelihood the threat is realized determines the priority that it is given.

The Fire Chiefs Handbook addresses hazard identification much differently than the U.S. Army. Hazard identification includes an analysis of the communities past problems, life safety issues, target hazards, required fire flows, occupancy loads, and economic impact to the community in the event a disaster occurs (Barr, Eversole, 2003, p. 1028). This process is very similar to the process required by the Commission on Fire Accreditation.

Fire Technology Magazine suggests that a hazard identification process should include activities of persons residing in or near the identified hazard. The article places major importance on life safety identification, but does not identify any criteria for the actual identification process (Peace, 2002, p. 280).

The results for specific criteria to manage a hazard identification process produced a variety of options that were designed to meet the needs of the assessor. Value or point based systems establish a numerical value that categorizes each occupancy based on specific criteria. The process is time consuming, very detailed, and requires highly trained personnel to complete the assessment process. Probability systems categorize threats based on historical evidence that a specific threat has been encountered. This system relies heavily on historical data, and for threats that have never been encountered an educated

decision must be made to determine the possibility of such an occurrence. Finally, hazard identification plans that graphically represent identified data are a unique way to quickly reference information gathered in an assessment process. However, GIS mapping is a highly specialized skill that requires not only the personnel to perform the assessment but also the equipment to create the graphical references.

### Discussion

Fire departments across the nation evaluate their community in an effort to identify hazards, located access roads, calculate fire flows and determine response capabilities well ahead of time—this is considered part of the mitigation process for the fire service. Risk mitigation management, similarly, is the ability to identify risk, develop plans to reduce the identified risk, then create steps to mitigate the risk that remains (Risk Assessment, p. 2). Risk management is practiced every day by the fire service without the use of documented plans. The fire service must meet the challenge and prepare, analysis, and plan for the community in which they serve.

The purpose of this research project was to identify critical components of a community risk assessment. The first research question was designed to identify the fundamental components of a community risk assessment policy?

The Department of Homeland Security published in March of 2011, Vision 20/20. This national campaign stresses the importance of prevention of fire loss. The guide suggests fire departments identify risks found in their respective communities, prioritize those risks, and developing strategies to mitigate the identified risks (Vision 20/20, 2011, p. 9). I find this concept ensures an assessment is accomplished before an event actually occurs but is limited on information relating to categorizing and prioritizing identified risks. The United

States Army Field Manual documents the importance of risk management and details the specific criteria that a risk management process should include. The Field Manual outlines a five step process that includes identifying the known hazards, assessing those hazards, developing controls and making risk decisions, implementing process controls and continually supervising and evaluating the established process (U.S. Army, 1998, p. 2-0). The Field Manual is a comprehensive risk assessment tool that documents the assessment process in specific detail. The manual is intended for U.S. Army commanders that are on deployment but could relate easily to the fire service.

Fire Technology Magazine, published an article entitled "Planning New Standards of Fire Service Emergency Cover." This author purports that the essential element in a risk assessment plan must include evaluating the communities' demographics and density of that built environment. He further suggests that proper mitigation cannot occur without the assessment of the community. The needs of the community must be identified and responses built to suit the demographics and population of that particular area (p. 2). International Fire Protection Magazine produced an article, in 2006, which addressed "Fire Risk Assessments." The author details a five step process for conducting a risk assessment that follows many of the same ideas as previously outlined by other writers. Step one includes an identification process of all hazards, step two attempts to identify persons at risk within that business, step three includes reducing identified risks, step four documents the above information and trains personnel to ensure familiarization of the identified risks and mitigation procedures and finally step five requires continual review and revising of the plan (p. 74-75). Both of these concepts are similar in nature and are utilized by Largo Fire Rescue when completing the fire accreditation process. Additionally, this type of

analysis is commonly, used by emergency services to determine response capabilities for the communities they serve.

Donald Stiteler, executive fire officer candidate, included identification of the communities' demographics in terms of hazards as part of his assessment plan. He included the importance of evaluating the levels of risk the community is exposed to and the need to determine an acceptable level of risk the community can accept (Stiteler, 2010, p. 10). Stiteler's plan follows the same concept as the article published in Fire Technology magazine. Both plans place the analysis of community demographics as key to the assessment process. While I concur with the importance placed on the assessment of the community I believe that the identification process cannot be complete without knowing the capabilities of the critical services the city government must provide—police, fire, public works and environmental services.

The Fire Chiefs Handbook and The Commission on Fire Accreditation International (CFAI) produce documents that create comprehensive assessments that include the fire services' ability to serve their respective communities. The Fire Chiefs Hand Book documents a five step process for accomplishing risk assessments that begins the assessment process with the current fire and emergency services capabilities. The assessment then moves on to the community itself. The remaining steps include, the response capabilities within the community, identification of unprotected risk found in the community, and finally the development of mitigation strategies based on the information gathered during the assessment process (Barr, Eversole, 2003, p. 1026). Fire Chief's Magazine published an article that details the fire service accreditation process. The Commission on Fire Accreditation International (CFAI) endorses an eight step process that

includes current fire resource deployment, community expectations of emergency services, a comprehensive community risk assessment, a distribution study, concentration study, historical reliability, historical response effectiveness and finally an overall evaluation of the department's capabilities and standard practices (Gary, 2001, p. 2). Thus by far the most comprehensive plan identified, yet, the Standard of Cover does not address a damage assessment process post disaster.

Global Environmental Change Magazine agrees with many of the previously identified authors that a risk assessment process must include an evaluation of the community. The author's Adger, Brown, and Conway, stress several components must be included when completing an assessment of the community. The assessment process should include geographical information, distribution within the community and vulnerability of the community. This document is then layered with flood plain information, evacuation routes and pre-identified areas in the community that will need additional resources displayed graphically. Utilizing GIS mapping to assist with the assessment process is a critical step in reducing risk at the community level (Adger et al., 2011, p. 144). Largo Fire Rescue is striving to be able to incorporate this information into a community assessment process once developed.

Edward Kassing of Eau Claire, Wisconsin documents in his applied research project, one of the most important parts of an all hazards assessment plan is the process of performing a damage assessment of the community, post disaster. The documented process has many categories that include debris clearing, emergency protective measures that are put in place post event, evaluation of roadways, assessing public utilities and water control facilities, and the assessment of all other buildings and equipment located in the

community (Kassing, 2002, 13). While this plan assesses the community, it does so after the event has occurred. Kassing's plan does not identify key tasks that must occur prior to an event. Finally, Gerald Ewers completed an applied research project on damage assessment for the Muscatine Fire Department. Ewers, much like Kassing, discuss damage assessment criteria that is accomplished post event, but is not considered a priority in the pre-event phase. Ewers suggest that the assessment components should include a rapid windshield survey, a preliminary damage assessment that establishes a dollar amount and associated damage and then a detailed assessment of the entire community (Ewers, 2006, p. 11). Largo Fire Rescue follows Gerald Ewer's model for a damage assessment process. However, keeping with this model, when the first community assessment is performed post-event, important information will not be available and the ability to identify areas of concern will be lost.

Three experts in their respective fields were interviewed to determine their perspective on critical components necessary for a risk assessment plan. Sally Bishop, the Emergency Manager for Pinellas County, Florida, does not identify specific components for a risk assessment plan, but reports municipalities should utilize established dates. The countywide mitigation plan, the LMS, is a general plan that addresses disaster mitigation at a basic level. Sally reports that often cities re-invent the process over and over again when they could modify existing documents to meet their needs. She does state that the Local Mitigation Strategy (LMS) is generic in nature and does not address specific acts of terrorism—an area local governments need to prepare to mitigate. Carol Stricklin, the Community Development Director for the City of Largo, expects an assessment plan to be event orientated and include maps to display city readiness and utilization of personnel and

equipment. Additionally, she would like to see, graphically, areas that are prone to flooding, and the locations of vulnerable populations. Carol offers that an analysis of the economic impact to a community that is impacted by a disaster must be a part of the community assessment plan. Mike Staffopoulos agrees with Carol, but adds environmental impact to the list of important criteria to include. Together, all three local experts identify specific areas not discussed by other authors, yet do not identify a comprehensive plan.

The second research question was designed to determine the frequency a community risk assessment should be performed. Much information is found on the specific components that should be included in a risk assessment plan, however, few sources report or suggest a time frame for conducting a community risk assessment. Fire Chief's Magazine states that completing a community risk assessment is a critical process. Fire departments respond to a variety of different risks and different risks have different mitigation needs with different outcomes. The CFAI document, containing the standard of cover, is a document that reflects five years of data and evaluation. Re-accreditation requires an annual report to document compliance with regards to operational areas, as well as, reporting any changes to the original accreditation report. Annual compliance is required for four of the five accreditation cycles. The fifth year requires the process to begin again with request for re-accreditation and the completion of the accreditation assessment process (Gary, 2001 p. 4). The CFAI process is the only source that established a time frame associated with the risk assessment process.

Sally Bishop stated in her interview that the Office of Emergency Management updates their plan every 5 years. She relays, because the county is so built up, not much changes, so



it is not necessary to continually reassess the community. Carol Stricklin also agrees that 5 years is an appropriate length of time, as long as, new construction or occupancy changes are reviewed as they occur. And finally, Assistant City Manager Mike Staffopoulos concurs with the previous two interviews that a 5 years assessment process works well. He adds one suggestion that the changes that occur within the community are monitored and then are added in an addendum to the plan annually. Largo Fire Rescue follows the 5 year accreditation process. The department fails when monitoring changes that occur in the community and maintaining current information. The assessment process is conducted only once every 5 years to comply with accreditation.

The Fire Chief's Handbook addresses the frequency of an assessment process in terms of a pre-plan program. The community assessment is conducted and mitigation strategies are developed and documented in the form of pre-plans. The fire service is very familiar with this process. As components of the assessment process change, re-evaluation must occur. Growth in the community, occupancy changes, fire flow requirement changes and response capability changes are all components that affect the mitigation strategies. Re-assessment must occur to keep pre-plans current and mitigation strategies relevant (Barr, Eversole, 2003, p. 1029). The Department of Homeland Security suggested, in their 2010 document "Vision 20/20", that the fire service monitor and modify their community risk assessment plans based on several factors; community changes, political issues, and performance measures as they relate to safety procedures. The risk reduction plan does not identify the frequency that is associated with this process (Vision 20/20, 2001, p. 10). The U.S. Army Field Manual stresses that the risk assessment process should not be an afterthought, yet not be treated as a competition among leaders. Frequency is addressed

only as an on-going process (U.S. Army, 1998, p. 3-2).

Gerald Ewers also addresses, in his applied research project, the time frame a risk assessment process must begin. He states that the assessment must begin immediately following a disaster and occurs in several phases. Ewers further states that the process should not only take place following a disaster, but should take place prior to an event in the form of pre-plans for target hazards, and critical infrastructure (Ewers, 2006, p. 12).

Edward Kassing, in his applied research project, stresses the need to complete an assessment on essential facilities found in the community immediately post event.

According to Kassing, this assessment must occur as soon as possible to determine community needs and request additional resources once an event has occurred (Kassing, 2002, 13). A valid point, community assessment has to occur before and after an event.

Assessments that occur on a scheduled basis allows for the preparation and development of mitigation strategies. A damage assessment that occurs post event must determine the additional needs of the community and allows for the request for additional resources to meet those needs.

Research question three attempts to determine how hazards within the Largo community should be categorized and prioritized in a community risk assessment policy. Fire Engineers Journal supports a life risk consequence (LRC) as the method for categorizing structures within a facility or community. Occupancies are placed on one of three categories that include high, medium or low risk values. Components of the scoring process include building construction or structural features, hazards found at the location, occupancy load, emergency procedures in place at said location, and finally, the ability to respond to an emergency at the hazard location (Klein, 1998, p. 7). This writer finds the

LRC method is an objective method for categorizing occupancies within a community as well as determining the resources necessary for mitigation should that become necessary. Objective criteria can then be easily applied to any occupancy to determine a risk value for the structure. Carol Stricklin, the Director of Community Development, reported that she also prefers a value point system of some sort, but cautions the use of such a process. Previous to her employment with the City of Largo, she worked for the Orange County government in Orlando, Florida. Orange County also utilized a point value classification system, but the process was too elaborate for anyone to use or understand. Carol reports that it became an exercise in itself. She advised that before a system is developed it should be simple enough that most persons can use it and understand it. She concludes by suggesting an identification system cannot be subjective, it must only utilize pre-determined objective criteria.

Gerald Ewers details, in his 2006 applied research project, that infrastructure should be categorized as target hazards, critical infrastructure, roads, and remaining structures, in that order. According to the writer, this categorization identifies critical occupancies in terms of resources, occupancy load, and life safety hazards (Ewers, 2006, p. 12). Largo Fire Rescue utilizes an approach that resembles the above process. The difficulty occurs when determining exactly what is identified as a target hazard, or critical infrastructure. The determination is often subjective.

Kevin Bowman from Tarpon Springs, Florida completed an ARP on Conducting a Community Risk/Capability Assessment and reports that critical hazards should be placed into four categories; natural hazards, technological hazards, target hazards, and national security hazards. Additionally he reports that this information should be grouped together

and placed into an all-hazard mapping website so that other governmental agencies could share the data (Bowman, 2006 p. 12). Bowman does not identify a particular website or location for the actual data storage.

Mike Staffopoulos was asked in a recent interview what is important to the Assistant City Manager in terms of hazard identification. He replied that he would like to see the information displayed graphically. His request is to develop large maps that have the ability to display many things—flood plain at 2 feet, 4 feet, 6 feet, and evacuation rings for identified hazards. Mr. Staffopoulos states this type of display allows city administrators to view the community and its risks quickly. He adds, "all hazards should be represented in the GIS system, different layers that represent storm surges, utilities, etc." Additionally, in a post event situation, he would like to be able to identify financially hit areas, and relocation areas easily. Currently, the City of Largo has GIS capabilities but does not have a process that coordinates efforts between individual departments to create or display this type of information.

The U.S. Army Field Manual addresses hazard identification based upon the frequency the hazard could be encountered. The highest category of risk includes risks that are encountered often, the next level includes threats that are likely to occur, the third level includes hazards that occur sporadically, the fourth level includes hazards that are seldom likely to occur and the final level includes any hazard the military is likely to encounter (U.S. Army, 1998, p. 2-9). Army commanders are able to utilize this hazard assessment quickly to develop tactical strategies while on deployment. Subordinate officers are also trained to the same level of hazard identification to ensure soldiers are able to identify risks in a rapid manner (U.S. Army, 1998, p. 3-7). Finally, The Commission on Fire

Accreditation International recommends that the community risk assessment include categorizing facilities into four categories: low probability-low consequence, low probability-high consequence, high consequence-low probability, and high consequence-high probability (p. 3). This system is very similar to the U.S. Army's criteria for categorizing hazards. Currently this type of historical analysis is not considered when determining hazard identification in the City of Largo.

The Fire Chiefs Handbook takes a different approach when addressing the issue of hazard identification. The authors suggest that an initial assessment include identifying the community demographics, identifying the communities past problems, life safety issues, target hazards, and economic impact. Barr and Eversole go on to suggest that fire flows, occupant load, and age and condition of the buildings be identified as a critical part of the hazard assessment process (p, 1028).

Fire Technology Magazine suggests, that as part of the hazard identification process, the evaluation must include the activities of the persons residing within that community as it relates to the identified hazard. For example, if flooding is an issue in the east end of the community, the evacuation of the population associated with that flood plain must be included in the hazard identification process. Risks from all types of natural and man-made disasters should be identified during the assessment process (Peace, 2002, p. 280).

### Recommendations

After reviewing the current research, the assessment process Largo Fire Rescue performs, as well as the suggested information from the Assist City Manager, this writer will suggest the Largo Fire Rescue establish a comprehensive risk assessment program. Although, recommendations listed below are provided for Largo Fire Rescue and the City

of Largo administrative staff, the recommendations can be evaluated by fire service organizations in general.

The problem identified for this applied research project was that LFR currently does not have a community risk assessment policy. It is this researcher's recommendation that Largo Fire Rescue develop a comprehensive community assessment plan for the City of Largo that once completed is incorporated in the cities emergency operations plan. Currently, LFR has a damage assessment policy but procedures are limited to post disaster situations.

Recommendations for a community risk assessment policy include the evaluation of the communities demographics; analysis of historical and current risks that threaten the community, an analysis of the resources currently provided by the City of Largo, and finally the needed resources for mitigation post disaster.

Additionally, it is recommended that a 5 year assessment cycle be utilized for the performance of a critical risk assessment program. It is also recommended that once the initial community risk assessment is completed, the City of Largo establish a monitoring system that notifies key departments within the city that an occupancy has changed or been newly established.

Finally, it is recommended that a value point system be utilized by the City of Largo to ensure all infrastructure, target hazards, and other community occupancies are evaluated according to specified criteria. Life safety concerns, occupancy loads, economic impact, and needed resources must be incorporated into the evaluation criteria.

Recommendations for fire service personnel conducting research in this area, includes the development and implementation of a comprehensive risk assessment program. This

process should include an evaluation of the community in a pre event environment.

Additionally, recommendations include soliciting input from the municipal leaders, and city leaders as to the communities' needs and expectations.

Recommendations for future researchers include evaluating other systems to determine if innovative work in the field of GIS mapping is successfully being utilized in the fire service.

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## Appendix A:

## INTERVIEW WITH SALLY BISHOP, EMERGENCY MANAGER FOR PINELLAS COUNTY, FLORIDA

1. *Background. What is your title and background?*

I am the Emergency Manger for Pinellas County, Florida. I have held this position since 2007 and was the assistant to the Emergency Manager from 2005 to 2007.

2. *What do you consider as critical infrastructure within the county?*

Critical infrastructure is difficult to define. We try to follow what the federal government reports as critical infrastructures, tier I, tier II, etc.

3. *How is critical infrastructure defined or identified?*

The sheriff's office handled this task many years ago and utilized a software program that identified specific criteria. Now that task has been given to Homeland Security. Not sure that is a better plan. What is more important is what is critical to the cities. The goal is to end the emergency and get businesses functioning again. If your businesses are not up and running you will lose your tax revenue and your city will fold.

4. *What do you, as the emergency manager, expect from city municipalities regarding their risk assessment plan? What makes a good plan?*

I would not reinvent the wheel. The county utilizes the LMS Plan, the local mitigation plan, that is what we hope to see from our cities.

5. *What is the time line your offices utilize for reassessment of your hazards and how often is your plan updated?*

We update the plan every 5 years. Because the county is so built up, not much changes, so it is not necessary to continually reassess the community, so every couple of years.

*6. Can you identify a particular area where cities fail to meet the expectation for developing/implementing their plan?*

Not really, it is well done countywide. I think the plan we all fall short is in the area of terrorism. That is pretty new to use, it has only been in the last 10 years that we have taken that threat seriously, so that is the one place we do not plan well. Administratively, we continually re-invent the wheel. For a number of years the city/county leaders make emergency management a priority and we develop every kind of plan imaginable. Then for a number of years it is no longer a priority, people change positions, retire, and the information is lost. No one documents information and saves it in a public venue. So we are constantly re-inventing the wheel.

*7. Once in recovery mode, post event, what is your desired time line for a community assessment for damage and needs?*

24 to 48 hours in the time frame we need information by. We have to send information to the state to get assistance and resources. The sooner we can paint the picture the better. With 24 cities in this county information is slow to come into the EOC. This is a problem.

*8. With that said are there any pitfalls you can think of that would preclude us from receiving assistance?*

Certainly, for instance, trying to identify your community post event and determine which areas are under insured, or have no insurance is a huge mistake. It is not possible at that point to do an accurate assessment of your community in 24 hours. You need to know your community ahead of the disaster. Also you have to be ready to mitigate. Do not just react to the event. Plan ahead of time, where your administration will relocate, should that be necessary, plan to harden facilities like police and fire stations now. It is easier and cheaper

to do that now and not in recovery mode. You will spend less money being proactive.

9. *Is there any other needs or information you could offer?*

The last idea I would like to leave you with is the idea of what happens once the local, state, and federal government has done their job and are now leaving. At this point Health and Human Services should take over and bridge the gap for the citizens to offer assistance for other needs that has not been met. For example, United Way has offered to assist local charities and faith-based groups and handle donations of goods, services or money.

Additionally, they have offered to act as case managers to help provide long term care to citizens who need it. Most people feel it is the federal government's job, but it is not.

#### Appendix B:

#### INTERVIEW WITH CAROL STRICKLIN, DIRECTOR OF COMMUNITY

#### DEVELOPMENT FOR CITY OF LARGO, FLORIDA

1. *Background: What is your title and level of experience?*

I have worked as the director of community development for the past 4 year and served as the assistant director for 2 years prior to that. Additionally, I served as the assistant director in Orange County, Florida.

2. *What do you consider critical infrastructure in the City of Largo?*

Critical infrastructure is essential services to the city, for example wastewater treatment plant, fire stations, police stations, critical public services, major roadway and bridges, hospitals, either public or private. We were planning on relocating a fire station (39) and could not because the land was in a flood plain and you cannot build critical infrastructure in a flood plain.

3. *How should critical infrastructure defined or identified?*

A value point system of some sort. Orange County utilized a point system that was too elaborate for anyone to use or understand. It became an exercise in itself. That should not be the goal. It should be simple enough that most persons can use it and understand it, yet it cannot be subjective.

4. *What do you, as the director of community development, expect from city municipalities regarding their risk assessment plan? What makes a good plan?*

The plan or assessment should be event orientated and include readiness, maps, how we utilize personnel and equipment. The plan should include time lines for tasks, for example our department will search the city for on-going construction products 7 days out from a storm. They will ensure all equipment is secured. Then 1-3 days out they will search private construction projects and ensure the equipment is secured and unnecessary equipment is removed from the site.

5. *In your opinion how often should the community be reassessed and the plan updated?*

I would think every 5 years is appropriate as long as new construction or when a business changes occupancies is assessed.

6. *Can you identify a particular area where cities fail to meet the expectation for developing/implementing their plan?*

Yes, economic impact is often over looked. Another area that is overlooked is determining if our critical infrastructure is in a flood plain, what happens if the sewer plant gets flooded? How can we ensure service to our customers? We have no plan for these issues. We also need to include mapping our community as part of our risk assessment process. Which areas are prone to flooding, where is the vulnerable population.

7. *Once in recovery mode, post event, what is your desired time line for a community*

*assessment for damage and needs?*

Recovery is on going. I should begin with the initial damage assessment that should take days. Then we start short term recovery plans, during the first week, then at the one month mark we are looking at emergency housing needs, then within the 6 month mark we are looking at long term recovery plans. Where do we rebuild, do we change ordinances to ensure we do not rebuild residential homes in prone flood areas, that type of thing.

*8. Is there any other needs or information you could offer?*

Sure, storms and natural systems do not respect city boundaries. We need to ensure we know what critical infrastructure lies outside our boundaries that we rely on. For example the county landfill, we rely on this, if for some reason it was unusable, we would need to have another option.

## Appendix C

### INTERVIEW WITH MIKE STAFFOPOULOS ASSISTANT CITY MANAGER FOR CITY OF LARGO, FLORIDA

*1. Background: What is your title and level of experience?*

I am currently the Assistant to the City Manager for the City of Largo and have done so for 4 years. Prior to that I was the Director of Community Development and held that position for 4 years and am a civil engineer by trade.

*2. What do you consider critical infrastructure in the City of Largo?*

Physically, critical infrastructure includes critical roadways, drainage access, emergency response capabilities, potable water, shelter space, which is limited in Pinellas County. During Hurricane Jean Northern Florida received 65-70 mph winds and zero rain. The wind caused flooding in the streets just from moving bodies of water around. As for

organizational concerns, public facilities withstanding the storm, computer systems that run critical programs, and finally the people. Are they safe staying in the facility we are expecting them to remain in during the storm?

3. *What do you, as the Assistant City Manager, expect from city municipalities regarding their risk assessment plan? What makes a good plan?*

Categorize high risk facilities, identify economic and environmental impact. I think about the facility in Japan. They had to evacuate people for 10 miles. And then can our workers handle the radiation that was leaking?

4. *In your opinion how often should the community be reassessed and the plan updated?*

I believe that every 5 years is fine, as long as, the changes are added in an addendum annually and then added to the main document every 5 years.

5. *Can you identify a particular area where cities fail to meet the expectation for developing/implementing their plan?*

Environmental impact. What is our existing housing stock? Most of our homes were built in the 50's-70's and they cannot take the wind load. Currently we do not force upgrades to residential structures. Florida requires certain upgrades to the home if a homeowner is replacing windows. But what happens if the homeowner never upgrades, their homes will not withstand a major wind event. Then how do you compensate for the loss of housing for these residents?

6. *Once in recovery mode, post event, what is your desired time line for a community assessment for damage and needs?*

12-24 hours we need an initial assessment of the community. Less than 1 week we need a very detailed assessment. Now reality, we will be lucky if we are driving around our

community in the first few days post event. Even luckier if we could get a helicopter to fly over.

*7. How should critical infrastructure defined or identified?*

Graphically, large maps that display many things, flood plains at 2 feet, 4 feet, 6 feet, show evacuation rings for specific hazards. Be able to view the community and its risks quickly. All hazards should be represented in the GIS system, different layers that represent storm surges, utilities. Also, be able to identify financially hit areas, relocation areas, and have a mitigation plan ahead of time.

*8. Is there any other needs or information you could offer?*

I worry about a direct hit from a hurricane, not just for us, but for the entire county and the surrounding counties. If the storm has an impact area that covers 30-60 miles, we will not see assistance, aid, or have any place to relocate our residents. The demand for resources will be huge and we will be talking about 3-4 million people. Bridges will not be used, roadways will be damaged, no electricity and we have a million plus people in our county alone.

Think of this, 65 mile per hour winds caused 115 homes to receive structural damage. 105 were mobile homes and the majority were red tagged and uninhabitable. This occurred in 2004. Today 1/3 of our residential housing is a mobile home in Largo. That houses 10,000 residents and we can expect 1500-2000 residents will not leave and will get hurt or killed. And the rest won't have a home to come back to, and that is just Largo. In our county, hundreds of thousands of people will not have a home to return to and then they won't come back.