

Developing a Critical Infrastructure and Key Resources
Identification and Mapping Process in Mason County

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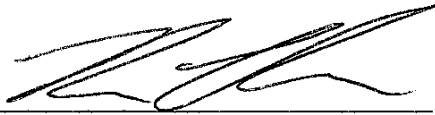
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CERTIFICATION STATEMENT

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Abstract

The United States Federal Government has formally recognized that the United States is made up of an integrated network of critical infrastructure and key resources (CIKR's). As a result of significant disaster events and acts of terrorism the Government has found that this network is vulnerable to outside threat. The Government, through several Presidential Directives, has outlined steps to be taken to reduce vulnerability and protect the nation's CIKR's. Due in part to the immense size of the network, these directives have stressed the need for partnerships at the Federal, state and local level of government, as well as with the private sector, in identifying and protecting the nation's CIKR's.

Mason County maintains a significant number of CIKR's within its jurisdiction that are vital to both local and national interests. The problem is that the lack of critical infrastructure and key resource identification and mapping in Mason County reduces the County's level of preparedness for human caused and natural disaster events. In this paper the researcher used an action methodology to identify CIKR's in Mason County and developed a program guideline for CIKR identification for mapping in Mason County that enhances life safety, property protection and disaster preparedness. The research within the project addressed the following questions; (a) what critical infrastructure and key resources exist in Mason County; (b) what action steps can be taken to design and implement program goals and objectives for a CIKR identification and mapping program in Mason County; (c) what resource and capability requirements will critical infrastructure and key resource identification and mapping in Mason County require; (d) and what options are available to Mason County in obtaining the necessary resources for conducting a critical infrastructure and key resource identification and mapping program?

The researcher produced a program guideline for the identification, mapping and protection of CIKR's in Mason County. Through the use of literature review, formal survey and structured interviews the researcher identified nearly 600 CIKR sites in Mason County. The researcher also produced a current analysis of CIKR protection efforts in Mason County and identified several outside resource opportunities that could assist Mason County with conducting those efforts. The information contained within this project can be used by other organizations to strengthen CIKR protection efforts within their respective communities.

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Introduction

The United States is comprised of a complicated matrix of critical infrastructure and key resource (CIKR) capability and capacity. The nation's critical infrastructure and key resources serve as the cornerstones from which the nation's security, safety, health and economy arise (DHS, 2013). Critical infrastructure and key resources vary in form and function but they are classified by the United States Federal Government into 18 separate categories or sectors (Hart & Ramsey, 2011). A sampling of these categories includes the nation's economic, transportation, public protection and energy systems.

The United States' reliance on its CIKR's cannot be understated. As a result their vulnerability and potential for catastrophic failure has received considerable evaluation and review. The focus on CIKR vulnerability assessment, protection and emergency preparedness has escalated over several decades as dependence on them has increased.

President Clinton's 1998 Presidential Decision Directive 63 (PDD63), established both formal policy and a framework for critical infrastructure protection. In response to several acts of terrorism, most notably the 2001 World Trade Center attacks, PDD63 was replaced in 2003 by President Bush's Presidential Directive 7 (PD7). PD7 further emphasized and expanded CIKR protection efforts and in 2006 created the National Infrastructure Protection Plan (Hart & Ramsey, 2011). In 2013 PD 7 was revoked by Presidential Directive 21; however the majority of PD7 plans were kept in place unless they were specifically revoked by Presidential Order (Obama, 2013).

At the center of CIKR vulnerability assessment and emergency preparedness is a vital network of relationships between both the public and private sector. The Federal Government further stresses the importance of public sector working relationships among federal, state and

local governments to identify and prepare for the protection of the nation's CIKR's (FEMA, 2008). The Federal Government has recognized that effective CIKR protection will far exceed its capabilities. Reliance on outside resources is essential.

In Mason County, Washington, there are numerous CIKR's that are vital to both local and national well-being. While Mason County may be described from a national perspective as rural and remote, a significant number of CIKR's reside within the County. Mason County maintains numerous CIKR's that fall within the 18 Federally recognized sectors. These are sectors that the Department of Homeland Security describes as "so vital that the incapacity or destruction of such may have a debilitating impact on the security, economy, public health or safety, environment, or any combination of these matters, across any Federal, state, regional, territorial, or local jurisdiction" (Hart & Ramsay, 2011).

Several CIKR's in Mason County have received Federal and state identification, assessment, mapping and preparedness measures. Unfortunately Mason County has been limited in its ability to conduct similar comprehensive efforts at the local level.

The problem is that the lack of critical infrastructure and key resource identification and mapping in Mason County reduces the County's level of preparedness for human caused and natural disaster events. For this paper the researcher used an action methodology to identify CIKR's in Mason County and to develop a program guideline for CIKR identification and mapping in Mason County that enhances life safety, property protection and disaster preparedness. The research within the project addresses the following questions; (a) what critical infrastructure and key resources exist in Mason County; (b) what action steps can be taken to design and implement program goals and objectives for a CIKR identification and mapping program in Mason County; (c) what resource and capability requirements will critical

infrastructure and key resource identification and mapping in Mason County require (d) and what options are available to Mason County in obtaining the necessary resources for conducting a critical infrastructure and key resource identification and mapping program?

Background and Significance

The North Mason Regional Fire Authority (NMRFA) is an all hazards emergency response agency in Mason County, Washington. With 24 career emergency response personnel, over 100 volunteer personnel and a \$4.1 million dollar annual operating budget, the Authority provides fire and EMS protection to a population of nearly 22,000 residents spread over 136 square miles of jurisdictional territory. A small portion of the Authority resides in neighboring Kitsap County as a result of a partial merger process in 2011.

The Authority is led by an elected five member Board of Fire Commissioners, fire chief and three additional administrative personnel. The Authority is a political subdivision of the state of Washington and is one of fourteen fire and EMS protections agencies in Mason County.

The NMRFA works closely with Mason County government for emergency service provision. Mason County government is tasked with emergency management within the County per Washington State statute. Mason County employs an Emergency Manager and two assisting personnel to carry out the functions of emergency management.

Mason County is just over 1000 square miles in size and it maintains a resident population of just over 65,000 citizens. This population can nearly double in the summertime as the County serves as a recreational community for the Seattle-Tacoma metropolitan area. Mason County has numerous fresh and salt waterways and maintains more miles of shoreline than any other county in Washington State. The largest body of water is the Hood Canal. The County also maintains a significant portion of the Olympic National Forest and Olympic National Park within

its boundaries. The County has one incorporated city and three County designated urban growth areas.

At the time of this project, Mason County has not undergone a formal process of identification and mapping of its numerous critical infrastructures and key resources. The United States Department of Homeland Security has created the National Infrastructure Protection Plan (NIPP) which provides federal, state, local and private agencies with guidance on how to create critical infrastructure protection programs (San Diego County OES, 2008). This includes the critical need for identification, assessment and mapping of the nation's critical infrastructure and key resources. But resource challenges and preparedness prioritization has limited Mason County's ability to take advantage of the guidance given.

The Department of Homeland Security defines critical infrastructure as, "the assets, systems, and networks, whether physical or virtual, so vital to the United States that their incapacitation or destruction would have a debilitating effect on security, national economic security, national public health or safety, or any combination thereof" (DHS, 2013). The NIPP defines key resources as "publicly or privately controlled resources essential to minimal operation of the economy and the government" (FEMA, 2008).

CIKR's are organized into 18 sectors that together provide essential functions and services supporting various aspects of the U.S. Government, economy, and society (FEMA, 2008). The NIPP and its associated CIKR Sector-Specific Plans work to provide a foundation for CIKR preparedness, protection, response, and recovery efforts in an all-hazards context (FEMA, 2008).

Mason County maintains numerous CIKR's within its boundaries that meet Federal government definition. Notable samples include the Shelton National Airport and the Lake

Cushman power dam. Both Federal and state governments have taken steps to identify, assess and map many of the Mason County CIKR's that attract national and regional attention.

Numerous other CIKR's exist within Mason County which have not received formal identification, assessment and mapping processes. This increases the threat and vulnerability to CIKR's in Mason County and impacts federal, state and local emergency preparedness, protection and response capacity.

This research project is significant because it proposes to improve emergency preparedness and CIKR protection for all CIKR's in Mason County. The project provides a feasible process, defined objectives and resource options for CIKR identification, assessment and mapping in Mason County. The research also provides ways in which to collect and process information on identified CIKR's, thus improving emergency preparedness at all levels of government. In turn, preparedness will increase life safety, decrease property loss, reduce disaster vulnerability and strengthen all levels of community infrastructure.

The research contained within this project is consistent with meeting NIPP objectives and directives. The project's research also provides data and information that targets the United States Fire Administration's strategic framework goal of reducing risk at the local level through prevention and mitigation (USFA, 2010).

Literature Review

The protection of the nation's critical infrastructure and key resources is an action that is directed by the United States Federal Government. As such, the majority of the literature that addresses CIKR protection is produced by the Federal Government, most notably the Federal Department of Homeland Security.

The first formal directive seeking to protect the nation's CIKR's came in May 1998 with the issuance of Presidential Decision Directive 63 (PDD 63). In Section 1 of the directive President Bill Clinton addressed the issue of CIKR vulnerability in stating that:

“Critical infrastructures are those physical and cyber-based systems essential to the minimum operations of the economy and government. They include, but are not limited to, telecommunications, energy, banking and finance, transportation, water systems and emergency services, both governmental and private. Many of the nation's critical infrastructures have historically been physically and logically separate systems that had little interdependence. As a result of advances in information technology and the necessity of improved efficiency, however, these infrastructures have become increasingly automated and interlinked. These same advances have created new vulnerabilities to equipment failure, human error, weather and other natural causes, and physical and cyber-attacks. Addressing these vulnerabilities will necessarily require flexible, evolutionary approaches that span both the public and private sectors, and protect both domestic and international security.”

Section 3 of President Clinton's PDD 63 set out to establish a national goal in the protection of the nation's CIKR's in stating that;

“No later than the year 2000, the United States shall have achieved an initial operating capability and no later than five years from today the United States shall have achieved and shall maintain the ability to protect the nation's critical infrastructures from intentional acts that would significantly diminish the abilities of: (1) the Federal Government to perform essential national security missions and to ensure the general public health and safety; (2) state and local governments to maintain order and to deliver

minimum essential public services; (3) the private sector to ensure the orderly functioning of the economy and the delivery of essential telecommunications, energy, financial and transportation services. Any interruptions or manipulations of these critical functions must be brief, infrequent, manageable, geographically isolated and minimally detrimental to the welfare of the United States.”

PPD 63 also established eight critical infrastructure sectors that the nation would focus to protect (Hart, Ramsay, 2011).

As work got underway to achieve the goals set by PPD 63, in 2001 the United States experienced the September 11th, 2001 terrorist attacks. The attacks highlighted the vulnerabilities described in PPD 63 and led to the issuance of President George Bush’s Homeland Security Presidential Directive 7 (HSPD 7) in December, 2003. HSPD 7 focused on protecting the nation’s critical infrastructure and key resources from a terrorist attack(s). Its stated purpose was to establish “a national policy for Federal departments and agencies to identify and prioritize United States critical infrastructure and key resources and to protect them from terrorist attacks” (Bush, 2003).

HSPD 7 went on to further define critical infrastructure and key resources as items, “so vital that the incapacity or destruction of such may have a debilitating impact on the security, economy, public health or safety, environment, or any combination of these matters, across any Federal, state, regional, territorial, or local jurisdiction” (Hart & Ramsay, 2011).

HSPD 7 expanded the original eight infrastructure protection sectors to thirteen and added five key resources. HSPD 7 also led to the first publication of the National Infrastructure Protection Plan (NIPP) in 2006. According to the Department of Homeland Security (2015) the NIPP “provides the foundation for an integrated and collaborative approach to achieve the vision

of a Nation in which physical and cyber critical infrastructure remain secure and resilient, with vulnerabilities reduced, consequences minimized, threats identified and disrupted, and response and recovery hastened.” The NIPP was revised in 2009 and again in 2013.

Pertinent to this research project, HSPD 7 makes several references to the instrumental need for assistance and cooperation at the Federal, state, and local levels, and the private sector, in order to accomplish the directive’s objectives. Specifically Section 17 of HSPD 7 states that, “The Secretary will work closely with other Federal departments and agencies, state and local governments, and the private sector in accomplishing the objectives of this directive” (Bush, 2003).

In March of 2011, President Barak Obama implemented Presidential Policy Directive 8 (PPD 8). While PPD 8 was technically a replacement for HSPD 7, it left many of the components of HSPD 7 in place, unless specifically altered by the contents of PPD 8 or other Federal directives. PPD 8 established a National Preparedness Goal and implemented a National Preparedness System. It also established several National Preparedness Frameworks, and it required an annual report on achievement towards meeting the National Preparedness Goal (FEMA, 2015). In the Federal Emergency Management Agency’s (FEMA) 2015 overview of PPD 8 it states that:

“At its core, PPD 8 requires the involvement of everyone—not just the government—in a systematic effort to keep the nation safe from harm and resilient when struck by hazards, such as natural disasters, acts of terrorism and pandemics. This policy directive calls on federal departments and agencies to work with the whole community to develop a national preparedness goal and a series of frameworks and plans related to reaching the goal.”

PPD 8 was further strengthened by Presidential Policy Directive 21 (PPD 21) signed by President Obama in 2013. PPD 21 “advances a national unity of effort to strengthen and maintain secure, functioning, and resilient critical infrastructure” (Obama, 2013).

In response to the Presidential directives issued, the Federal Government and associated Federal agencies have initiated tremendous amounts of resource support as well as literature that assists with national preparedness and CIKR protection efforts. The lead Federal organizations on this initiative include the Department of Homeland Security and the subordinate Federal Emergency Management Agency (FEMA).

FEMA has published the 2006 book, *Homeland Security: Protecting America’s Targets*. This book provides specific information on how to prepare and protect the interests within all of the federally recognized CIKR protection sectors. FEMA has also published the 2008 support document titled, *Critical Infrastructure and Key Resources Support Annex*. According to FEMA, the document “describes policies, roles and responsibilities, and the concept of operations for assessing, prioritizing, protecting, and restoring critical infrastructure and key resources (CIKR) of the United States and its territories and possessions during actual or potential domestic incidents. The annex details processes to ensure coordination and integration of CIKR-related activities among a wide array of public and private incident managers and CIKR security partners within immediate incident areas as well as at the regional and national levels (FEMA, 2015).

The Department of Homeland of Security has created the CIKR Information Sharing Environment (CIKR ISE). According to DHS:

“The CIKR ISE is a trusted and vetted community of public and private sector partners who coordinate, collaborate, and share information on critical infrastructure threats, risks

and vulnerabilities. The CIKR ISE provides all participants with a unified framework to efficiently exchange CIKR information and conduct incident as well as routine communication and collaboration within each CIKR sector and across the sectors and geographic spaces” (DHS, 2015).

The DHS has also created the Homeland Security Information Network-Critical Infrastructure. The Homeland Security Information Network:

“is the trusted network for homeland security mission operations to share Sensitive But Unclassified (SBU) information. The Critical Infrastructure community on HSIN (HSIN-CI) is the primary system through which private sector owners and operators, DHS, and other federal, state, and local government agencies collaborate to protect the nation’s critical infrastructure” (DHS, 2015).

The Department of Homeland Security has also created the Office of Infrastructure Protection. According to the DHS:

“The Office of Infrastructure Protection (IP) leads and coordinates national programs and policies on critical infrastructure security and resilience and has established strong partnerships across government and the private sector. The office conducts and facilitates vulnerability and consequence assessments to help critical infrastructure owners and operators and state, local, tribal, and territorial partners understand and address risks to critical infrastructure. IP provides information on emerging threats and hazards so that appropriate actions can be taken. The office also offers tools and training to partners to help them manage the risks to their assets, systems, and networks” (DHS, 2015).

To assist with CIKR protection, the National Academy of Sciences produced the 2007 report titled, *Successful Response Starts with a Map*. This report provides twelve recommendations on how geospatial information and mapping could and should be used to enhance emergency preparedness and CIKR protection. The information contained in this report provides assistance with electronic mapping and how to effectively implement it.

The most relevant and comprehensive Federal Government document that provides guidance on CIKR protection is the 2008 Department of Homeland Security document titled, *A Guide to Critical Infrastructure and Key Resources Protection at the State, Regional, Local, Tribal, and Territorial Level*. The guide provides Federal, state and local agencies with the information necessary to create and incorporate a CIKR protection plan along with instruction on agency cooperation and program formation. It also provides detail on CIKR risk and vulnerability assessment tools and guidance on CIKR protection plan assessment, management and progress tracking. The executive summary of the guide states that:

“This document is not intended to be prescriptive or to impose requirements on the states, communities, or other CIKR partners. Rather, it suggests various strategies and approaches, and leaves it to the discretion of each state, region, or locality to determine which approach or combination of approaches, if any, might be suited to their specific needs, operating environments, and risk landscapes.”

The subject of CIKR identification and mapping has been researched by other participants within the National Fire Academy’s Executive Fire Officer Program (EFOP). In his 2012 Applied Research Project titled, *Critical Infrastructure and Key Resource Mapping Development in East Lake Tarpon Special Fire Protection District*, author Jason Gennaro conducts an actual CIKR identification and mapping process for the community of Lake Tarpon.

His compiled CIKR information database is designed for use by fire officers. Gennaro identifies and maps 57 CIKR's within his community and provides details on steps used for information collection and mapping procedures. The researcher paid specific attention to Gennaro's procedure step in which he collected existing community CIKR information from numerous sources to compile into a single database and mapping set (Gennaro, 2012). He does not reinvent the wheel when soliciting CIKR information for his research and mapping process.

CIKR identification and mapping is also researched by EFOP author Scott Johnson in his 2011 Applied Research Project titled, *Mapping Critical Infrastructure and Key Resources in the City of Irving*. In his research Johnson identifies, maps and provides an information database for 771 CIKR's within the city. In Johnson's procedural steps, CIRK information is again obtained from outside agencies such as the city's emergency management department and Google Maps. Collected information was compiled into a single database set enabling information sharing and use both relevant and practical for emergency response commanders and personnel (Johnson, 2011). Again the wheel is not reinvented when collecting and mapping CIKR information. It is also noteworthy that both Gennaro and Johnson make reference to the sensitivity of sharing collected CIKR information with the general public in their projects.

The review of literature for this paper identified sample CIKR mapping projects and data sets at the state and local level. It should be noted that public literature reviews on CIRK project data sets is limited due in part to the sensitivity associated with the information contained within.

A review of the 2013 *Biennial Report on Critical Energy Infrastructure and Key Resources, Washington State* by the Washington State Energy Coordinating Council (WSECC) indicates that significant state level CIRK identification and mapping within the energy sector has taken place. It is important to note that the report also indicates that there is a tremendous

amount of work left to do regarding CIKR mapping and identification within the sector. The report provides perspective on the massive size and scope that is associated with effective CIKR disaster preparation efforts. According to the WSECC, “The plan identifies ten issue areas with problems to address, and recommends subsequent mitigation and evaluation programs. The report provides a brief description of those programs and their status. As this is the initial report, addressing a short reporting period, significant elements of the SSP remain to be implemented” (WSECC, 2013).

Perhaps the most relevant and insightful document obtained and reviewed for the current research project was the 2008 *San Diego Operational Area Critical Infrastructure Plan*, authored by the San Diego County Office of Emergency Services. The in-depth plan does not map nor provides specific CIKR information; rather it describes in detail the steps taken to protect critical infrastructure in a major metropolitan area. Following the review of the federally presented goals and guidelines regarding CIKR protection, the San Diego Area Plan is a document that serves as a shining example of guideline adherence and goal achievement.

According to the San Diego County Office of Emergency Services:

“The purpose of developing the San Diego Operational Area (OA) Critical Infrastructure Protection (CIP) Plan is to protect those regional assets that are essential to the OA’s well-being and current way of life, from all hazards. The CIP Plan was developed in support of the OA CIPP. The CIP Plan was initiated to collect the necessary information to develop a justifiable investment strategy for the OA. This program included identifying sector specific essential functions, associated assets and the sector interdependencies of these assets as well as performing high level risk and vulnerabilities assessments on the identified CI/KR. The ultimate goal of the CIPP, and this Plan, is to reduce or eliminate the risks to the OA’s CI/KR through a

series of sequential steps designed to evaluate risks, vulnerabilities and consequences and implement protective measures. The CIP Plan is not a response plan. The overall goal is to ensure that CI/KR is protected, prior to any event that may affect them, in an effort to lessen any effect from natural or man-made hazards. Therefore, it does not address response or recovery efforts when such assets are affected” (San Diego County OES, 2008)

In the interest of benefitting future readers and those interested in conducting a comprehensive CIKR identification and mapping program in their communities, the researcher strongly encourages a review of the San Diego County Plan. While some readers may find the scale and scope of the steps taken in San Diego to be far too excessive for local community use, it can serve as a foundational model in which a custom community plan can emerge.

Procedures

The first step of the current research process was to determine that an action research method would be used to produce a CIKR identification and mapping program guide that could assist Mason County with establishing such a program. This was followed by a critical review of the project’s research questions, which would aid in establishing program guidance and mitigating the problem presented. Procedures were then created in a way to directly and concisely produce relevant data for the questions presented. The research questions were as follows: (a) what critical infrastructure and key resources exist in Mason County; (b) what action steps can be taken to design and implement program objectives and procedures for a CIKR mapping program in Mason County; (c) what resource and capability requirements will critical infrastructure and key resource mapping in Mason County require; (d) and what options are available to Mason County for obtaining the necessary resources to complete a critical infrastructure and key resource mapping process?

Nearly all of the research conducted depended on a common and communicated definition for what was a critical infrastructure and key resource in Mason County. For the purpose of structuring the research procedures, critical infrastructure was defined using the Department of Homeland Security's 2013 definition previously presented in this project. Key resources were defined using the FEMA 2008 definition, also previously presented in the project.

In response to research question (a), an interview was held with Mason County Department of Emergency Management (DEM) Manager Ross McDowell and DEM Assistant Manager Tammi Wright on May 5, 2015 at the Mason County Public Works building in Shelton, Washington. Mr. McDowell and Mrs. Wright were presented with several interview questions, found in Appendix A. These questions attempted to determine whether any sort of CIKR identification and mapping had been conducted in Mason County, and if so to what degree? The interview also attempted to elicit Mr. McDowell's and Mrs. Wright's personal experience with CIKR mapping in Mason County and to identify CIKR's that they may have identified on behalf of Mason County and the Department of Emergency Management.

Mason County Graphic Information Services (GIS) Mapping Coordinator Jason Wells was also interviewed on May 5, 2015 to inquire about the status of current CIKR mapping efforts in Mason County. Structured interview questions were posed to Mr. Wells to assess the capabilities of the Mason County GIS department and to determine whether their assistance could be included in a procedural guide. A list of structured interview questions posed to Mr. Wells can be found in Appendix B.

Known Mason County utilities were queried via phone conversation on the location of utility CIKR assets in Mason County. The utility groups queried included Public Utility Districts 1 and 3, Century Link, Inland Telephone, Cascade Natural Gas, Hood Canal Communications,

the Bonneville Power Administration and Tacoma Power. A list of questions presented to each utility is provided in Appendix C.

The current research was further expanded to elicit CIKR identification information from local area experts. Mason County is divided into 14 separate fire protection agencies which range from 11 square miles in size to nearly 160 square miles in size. Each district is headed by a Fire Chief who is responsible for identifying potential risks and hazards within their fire protection jurisdiction. This researcher's intent was to engage each Fire Chief or his or her designee in a survey that could provide CIKR information from the local expert, the Fire Chief, within his or her primary response jurisdiction. On March 13, 2015 a 17-question survey was created using the online tool Survey Monkey. The survey was designed in a manner that provided participants with an overview of the survey's intent as well as survey instructions. In addition participants with the previously stated CIKR definitions. Questions one through 16 of the survey were designed to elicit information from the local expert that would help to identify local critical infrastructures. Each of the 16 questions asked for the respondent to identify the name, type and general location for critical infrastructure that could be classified within 16 of the Federally identified critical infrastructure sectors. Question 17 of the survey asked respondents to identify all of the key resources that resided within the boundaries of his or her fire protection jurisdiction.

There were several limitations noted with the use of the survey tool. It was noted that due to the vague and subjective nature of the Federal definitions provided for critical infrastructure and key resources, there would be differing interpretations of a CIKR. Several CIKR's may have fallen in or out from identification by the respondent as a result. The

researcher also realized that not all invited respondents would participate in the survey which would limit the potential for CIKR identification in those areas.

In response to the limitations identified, the research was expanded to include a review of Mason County's GIS maps, and Google Earth satellite maps for potential Mason County CIKR's. While the entirety of Mason County was reviewed for possible CIKR identification, special review emphasis was placed on areas in which a survey response was not received by the local Fire Chief and/or their designee. For Mason County areas in which a survey response was not provided the research was expanded further. The researcher spent June 13th, 20th and 21st driving the jurisdiction's roads in which local area CIKR's would most likely exist. The name, type and location for each identified CIKR was documented for identification purposes. Limitations on this procedure exist in because it was not possible to travel and explore all roads thus creating a potential that several CIKR's remain outside of project identification.

For research questions (b), (c) and (d), the researcher took the opportunity to study the procedural action steps, resource requirements and outside assistance opportunities that were presented and taken by outside agencies. The information obtained from this research was used to develop a procedural guide document for CIKR identification, assessment, and mapping in Mason County.

The most notable document used for providing guidance for the projects research procedures was, *A Guide to Critical Infrastructure and Key Resources Protection at the State, Regional, Local, Tribal, and Territorial Level* produced in September, 2008 by the Federal Department of Homeland Security.

The action steps and resource requirements documented by Jason Gennaro in his 2012 Executive Fire Officer Program (EFOP) Applied Research Project (ARP) titled *Critical*

Infrastructure and Key Resource Mapping Develop at East Lake Tarpon Special Fire Control District were also reviewed for potential application within Mason County. The action steps and resource requirements documented by Scott Johnson in his 2011 EFOP ARP titled *Critical Infrastructure and Key Resource Mapping for the City of Irving* were also reviewed for potential application. Action steps and resource requirements required by the San Diego County Office of Emergency Services to produce the 2008 *San Diego Operational Area Critical Infrastructure Protection Plan* were also reviewed for Mason County application.

Results

The results of the research focused on the questions posed are presented as follows:

- (a) What critical infrastructure and key resources exist in Mason County?

A formal survey was sent to the Chief Officers of 13 individual Fire District's requesting an identification of critical infrastructure and key resources within their respective jurisdictions. Of those surveyed, a total of 4 responses were received. The survey identified a total of 89 locations that were identified as either a critical infrastructure or key resource.

The survey helped to identify 75 individual locations as critical infrastructure and 14 locations at key resources in Mason County. A list of these locations can be found in Appendix D. In addition, a review of the 2010 Mason County Hazard Mitigation Plan, Section 6, identified an additional 88 Mason County locations as Critical Infrastructure. A copy of Section 6 of the 2010 Mason County Natural Hazard Mitigation Plan, and its identified CIKR locations can be found in Appendix E.

A review the 2015 document titled *Inventory of Dams in the State of Washington*, from the Washington State Department of Ecology, Water Resource Dam Safety Section identified 20 water dams in Mason County that are identified as critical infrastructure.

A structured telephone interview with Mason County PUD #3 and a review of their service territory found on their website (MCPUD#3, 2014), identified 11 power stations and substations, a major regional power line system (Bonneville Power Administration), 695 miles of overhead power line and 1080 miles of underground power lines in Mason County. All of these items are identified as Mason County critical infrastructure. The Mason County PUD #3 review also identified 451 miles of local and regional fiber optic communication line in Mason County. See Appendix F for a PUD #3 area service map.

A review the 2012 Environmental Health Report produced by the organization Mason Matters, identified 232 individual Class A water systems in Mason County. Class A water systems are identified by the state of Washington as community water systems that have 15 or more connections used by year round residents (Mason Matters, 2012). The report also identified 24,497 acres of commercial shellfish harvesting area, as of 2010, critical to the County's economic vitality. This report can be found in Appendix G.

A review of the Mason County Department of Public Works, *2014 Annual Bridge Report*, indicates that Mason County and the City of Shelton collectively maintain 57 public bridges in Mason County. A review of mapping data submitted by the Mason County Department of Graphic Information Services expands this inventory to 66 bridges in Mason County. The GIS data also indicates that Mason County is home to 20 private bridges on the Union and Tahuya Rivers. A map of Mason County bridge locations can be found in Appendix H.

Where information was not obtained from the head of the local fire jurisdiction, the locations were surveyed by this researcher driving through the areas and conducting online research. Using this process an additional 173 locations were identified as either a critical

infrastructure or key resource. A comprehensive list of the identified locations can be found in Appendix I.

(b) What action steps can be taken to design and implement program objectives and procedures for a CIKR mapping program in Mason County?

In an interview with Mason County Department of Emergency Management Manager Ross McDowell, he identified three distinct action steps were identified to design and implement CIKR program objectives and procedures in Mason County. The steps were CIKR identification prioritization, resource collaboration, and resource identification.

Mr. McDowell stated that Mason County is required to submit a Mason County Hazard Mitigation Plan in order to be eligible for several state and Federal emergency management and hazard mitigation funding opportunities. An approved County Hazard Mitigation Plan must contain, in part, a listing of the critical infrastructure and key resources located within the county. Mr. McDowell explained that Mason County has created such a list in Section 6 of the current 2010 Mitigation Plan, but that this list is far from comprehensive and is grossly out of date. The County is currently under a deadline for a plan renewal in July, 2015 and Mr. McDowell expects his department to request an extension for the plan's update submission, as work and data for the update will not be complete by this deadline.

Mr. McDowell stated that the 2010 *Mason County Natural Hazard Mitigation Plan* and its required update submissions could serve as the foundation from which to prioritize and execute a comprehensive Mason County CIKR identification and mapping program. Mr. McDowell suggested that a meeting should take place amongst Mason County staff and officials, tribal officials and staff, and emergency response agencies for program design, resource coordination and creation of a county wide program and associated procedures. He expanded on

this by stating that a consistent understanding and definition of what constitutes a Mason County critical infrastructure and key resource does not exist. Creating a standard definition would be a first step among involved officials in getting underway with developing program objectives and procedures.

Mr. McDowell was clear to point out that the scope and scale of a truly comprehensive identification and mapping program is beyond the current resource status of his department. He highlighted the need for such a program to be multijurisdictional in its approach and he discussed several steps that could be taken in which multijurisdictional assistance could be obtained. He stated that in order for government agencies in the county to be eligible for federal and state mitigation project funding they must have an approved Natural Hazard Mitigation Plan. Creating such a plan is too intensive and resource demanding for most local non-county and non-city government agencies. McDowell noted that the law does allow for these agencies to be included in the County's plan, but in order to do so they must participate in the plan's creation in some capacity. Mr. McDowell suggested that Mason County invite outside local government agencies to be included in the plan. In exchange, agencies need to be willing to participate and assist with creating CIKR program goals and objectives and implementing a CIKR identification and mapping program.

Mr. McDowell also acknowledged that much of the information that is needed for an effective CIKR program has been documented and is available from outside agencies. Mr. McDowell provided reference for several agencies that could provide relevant CIKR information for documentation in the plan. Mr. McDowell listed a sampling of these agencies to include the Washington State Department of Ecology, Mason County GIS and the Red Cross.

Mr. McDowell also advised that an action step to identify a program funding source and to increase human resource capacity should also be taken in order to carry out the leg work of the program. Several grant opportunities are available and should be explored.

(c) What resource and capability requirements will critical infrastructure and key resource mapping in Mason County require?

In my interview with Mr. McDowell, his Assistant Mrs. Wright and Mason County Interim GIS Coordinator Jason Wells, it was clearly stated that the resource requirements to design and implement a comprehensive CIKR identification and mapping program far exceeds current Mason County resource capacity. During the interview, two program approaches were discussed. The first approach involved the Mason County Department of Emergency Management which could oversee and coordinate the efforts of numerous agencies to gather CIKR identification. This information would be submitted to Mason County GIS for mapping as time and resources allow. Mr. McDowell and Mr. Wells identified numerous weaknesses in this approach which would lead to inconsistent data capture and delayed mapping procedures, as prioritized county mapping requests work would take precedent.

The second approach involved the Mason County Department of Emergency Management increasing resource capacity to administer and conduct the work associated with the CIKR project. Volunteer personnel were discussed, but the matter of inconsistent data remained. It was suggested by Mr. McDowell that the County could take advantage of a grant opportunity and bring on personnel in DEM and GIS to work solely on the project ad hoc. Mr. McDowell determined that a truly comprehensive program would require a minimum of 8 to 9 months to complete. The program would also require the use of two full time personnel for CIKR identification and pertinent information gathering, and a half time person for GIS data

entry. The cost of this project to Mason County was estimated at nearly \$80,000 if alternative resource opportunities were not explored.

(d) What options are available to Mason County in obtaining the necessary resources for completing a critical infrastructure and key resource mapping process?

In the interview Mr. McDowell was queried about potential resources available that may assist Mason County with conducting a CIKR identification and mapping program in Mason County. The bulk of his response centered on funding resources that could be used to supply human resources for the project.

Mr. McDowell first referenced the Hazard Mitigation Grant Program administered by the Washington State Emergency Management Division. Funding for the program is applied for within a region in which a Federally declared disaster took place. In the event of a disaster event in which the Federal Government supplies relief funding, there is an attached portion of funding that is designated for local area hazard mitigation projects. This funding is applied for and distributed within the entire region surrounding the impacted area. Mason County has currently applied for and is awaiting potential award for a \$69,000 hazard mitigation grant. This is as a result of the March, 2014 Oso landslide in nearby Snohomish County. Mr. McDowell explained that this money has been requested by Mason County to conduct work necessary for the impending county hazard mitigation update. It was suggested that a portion of this funding could be used for a comprehensive CIKR identification and mapping program, as it is a requirement of the plan.

Mr. McDowell and Mrs. Wright also presented a funding opportunity through the FEMA Pre-disaster Mitigation Program. They stated that this program is open to local agencies on a

competitive basis and is aimed at reducing risk before an event. A CIKR identification and mapping program falls well within the requirements for this grant opportunity

In regard to an increase in human resources, Mr. Wells described an opportunity in GIS in which the department accepts interns from the local community college to work on County sponsored projects. Mr. Wells himself received a job within the department following an extensive program internship. Mr. Wells discussed the potential of acquiring the assistance of an intern to perform the mapping functions of the CIKR program.

Mr. McDowell also suggested use of the Washington State Service Corps (WSC) grant program, as a means to increase human resource capacity for conducting elements of the program. The WSC Grant program enlists the assistance of individuals between the ages of 18 and 25 in four defined service areas, one of which is community disaster preparedness. In exchange for 40 hours per week of volunteer work over a ten month period, the enlisted members receive an hourly stipend, health insurance and a \$5,500 college scholarship. There is a matching grant cost of \$6,300 per individual, per year for the hosting agency. It was discussed that Mason County could enlist the assistance of two WSC members to conduct the CIKR identification and information gathering process for the program.

Discussion

This researcher identified a significant number of CIKR's in Mason County. The CIKR's identified meet Federal definition. Mason County is home to a significant number of sites that are "so vital that the incapacity or destruction of such may have a debilitating impact on the security, economy, public health or safety, environment, or any combination of these matters, across any Federal, state, regional, territorial, or local jurisdiction" (Hart & Ramsay, 2011).

The process of identifying and mapping CIKR's in Mason County meets the stated goals found within Presidential Directives 7 and 8, and the National Infrastructure Protection Plan. Mason County CIKR protection is critical for life safety, property protection, and national wellbeing.

This researcher found that several Federal, state and local agencies, who are working towards established national CIKR protection goals, have already compiled a tremendous amount of information on identified CIKR's in Mason County. Unfortunately this information is fragmented and not part of a single database set. A significant portion of a Mason County CIKR identification and mapping process would entail a thorough analysis and compilation of this information. The primary goal of the analysis and compilation process would be infrastructure protection.

The number of identified Mason County CIKR's gives indication to the scale and scope of a full identification and mapping program. The identified CIKR's contained in this report were obtained in almost identical fashion to that of Gennaro (2012) and Johnson (2011), in their executive research. Database and information sets from outside agencies were reviewed, and relevant data was collected to produce data sets that could assist with local CIKR' program and subsequent protection efforts. The number of CIKR's identified in Mason County far surpasses those found by Gennaro in East Lake Tarpon, and is on par with the number of CIKR's found by Johnson in the City of Irving.

The immense number of CIKR's in Mason County shows that a successful identification and mapping program will take time and work, but the researcher does not feel that a compressive program exceeds Mason County's capacity potential. Yes, additional resources will be necessary, but as Mr. McDowell identified, these resources are readily available. National

goals and directives document that CIKR protection efforts at all levels of government are critical, and as such, financial and other resources have been made available.

The Department of Homeland Security and Federal Emergency Management Agency have prioritized CIKR protection within their work, and they have readily acknowledged that successful protection efforts will take significant agency collaboration. Mason County has an opportunity to be a vital part of that collaboration.

The DHS and FEMA have taken the lead to provide numerous programs and guidance materials to assist others agencies with CIKR protection. Mason County can take advantage of this assistance and look to program examples, like those in San Diego and other emergency departments, to implement a CIKR identification and mapping program that will increase life safety, property protection, and national wellbeing.

Recommendations

While Mason County may be viewed as small when compared to neighboring King and Pierce counties, the data produced by this research indicates that there is a tremendous presence of critical resources and key resources within the County. Accompanying the CIKR identification list is a large data set that should be accurately captured if a CIKR identification and mapping program is to be resourceful and relevant for disaster preparation and response.

It is clear that Mason County is limited in its current resource capacity. Through mandate, the Mason County Department of Emergency Management and Department of Graphic Information Systems have been able to produce a minimal data set that meets minimum requirements for competitive funding processes. The research presented in this report indicates that there is far more that needs to be done to expand on existing Mason County efforts. Current resource limitations prohibit work on the project at the time of this report, but the following

recommendations should be explored in order to implement an effective Mason County CIKR identification and mapping program.

It should be noted that the project should not attempt to reinvent the wheel. As this research has demonstrated, the information collection required for a successful program has, in large part, already been conducted by a multitude of outside agencies. A majority of the leg work required for this program should be centered on combining this information into a singular data base and mapping set that is both accessible and relevant for disaster prevention, mitigation and emergency response.

The first recommended step for establishing a CIKR identification and mapping program is, with the assistance of the information contained in this project's research, to conduct a formal needs assessment and situational analysis. The analysis should identify efforts taken to date, current resource limitations, and program resource requirements.

The second recommended step of this process is to conduct a stakeholder analysis and to produce a logic model that identifies the desired outcomes, outputs and resource requirements of a successful program. The stakeholder analysis will assist with identifying potential partners who may assist with the project. Whereas logic modeling will help to clearly demonstrate the program's intended target and purpose and help to prioritize efforts within the Mason County overall work load.

The third recommended step is to secure outside funding for the project. Funding is required for the resource demands of data collection, analysis, and mapping. The research contained in this report has identified several potential outside funding source opportunities. Each of these sources should be explored either through grant submission or direct requests for funding. To maximize capitalization of outside funding opportunities it is recommended that a

Mason County CIKR mapping and identification plan be formally identified as a Federal Hazard Mitigation Project and be included as a part of the Mason County Hazard Mitigation Plan Update mandate.

The action methodology of this research has produced a program guideline which may be used to implement a future program in Mason County. This guideline can be found in Appendix J. This guideline presents program objectives, resource recommendations, agency assignments and a project timeline. This guideline should be reviewed and revised as necessary by a collective Mason County stakeholder group.

It is also recommended that the Mason County Department of Emergency Management (MCDEM) should explore the Washington Service Corps (WSC) grant opportunity. This grant would provide human resource assistance for the initial stages of the project. The grant should be explored for attracting and obtaining two volunteers who, with Mason County DEM oversight, can conduct data collection, analysis and presentation for the project. These individuals would serve a ten month period and would require a financial outlay of just over \$13,000 for the hosting agency (MCDEM). The parameters and outputs of the project are nearly identical to WSC grant goals and requirements.

The Mason County Department of Graphic Information Services should solicit intern opportunities to provide for mapping assistance for the project. Nearby Olympic, Tacoma and South Puget Sound Community colleges and the University of Washington may be able to assist with this endeavor.

The final recommendations are to determine project sustainability, distribution, training and security plans. The information, data, and mapping set that are a part of this project are extremely fluid and out of date soon after presentation. The stakeholder group should develop a

plan that identifies procedures and resource allocation for continual CIKR identification and mapping project update and review.

Upon the completion of this project's initial identification and mapping processes and subsequent updates there is heavy potential for this information to remain hidden in a notebook or collect dust on a bookshelf. The stakeholder group should develop a distribution and training plan that eliminates this potential. Program outputs should be shared in a timely fashion with appropriate stakeholders. Training on these outputs should also be conducted in a way that maximizes their impact and resourcefulness with CIKR protection. The stakeholder group should also develop a plan that protects and secures the sensitive information that will be contained in the project's outputs.

For future readers of this ARP, it is recommended that a resource and needs analysis unique to one's own organization be conducted in an effort to guide steps for future program creation. Most communities will find remarkable similarities to the challenges, limitations and opportunities presented in Mason County, but project scale and scope will change based on community size, location and complexity. Scale and scope must first be identified through analysis. This researcher again suggests to any future reader that the majority of CIKR information has already been compiled by other agencies. The majority of effort should be spent on collecting, compiling and mapping this already collected information. Do not reinvent the wheel.

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Appendix A

Structured interview questions posed to Mason County Department of Emergency Management

Director Ross McDowell and assistant Tammi Wright.

1. How many people currently work within the Mason County Department of Emergency Management?
2. Does Mason County have any mandate to identify critical infrastructure and key resources (CIKR's) in Mason County?
3. Has Mason County taken steps to identify and map CIRK's in Mason County?
4. What CIKR identification requirements are contained in the federal Hazard Mitigation planning process for Mason County?
5. Does Mason County currently have the resources available to conduct a comprehensive CIKR identification mapping process?
6. Are you aware of outside resources in which CIRK information in Mason County may be maintained and accessed?
7. Are you aware of outside resources that are available to assist Mason County with a comprehensive CIKR identification and mapping program?
8. Does Mason County properly prioritize CIKR identification and mapping in Mason County?

Appendix B

Structured interview questions posed to Mason County Graphic Information Services (GIS)

Director Jason Wells.

1. How many people currently work in the Mason County GIS department?
2. Has Mason County taken steps to identify and digitally map CIKR locations in Mason County?
3. Does Mason County have mapping information available on potential CIKR sites in Mason County which may be contained in other mapping projects? This may include bridges, highways, utilities, etc.?
4. Does the Mason County GIS department currently have the resources necessary to undertake a comprehensive CIRK mapping process in Mason County?
5. What additional resource requirements would be necessary for CIKR mapping in Mason County?
6. Are there options available in which additional resources may be obtained within the GIS department to conduct a comprehensive CIRK mapping process?

Appendix C

Structured telephone interview questions posed to Mason County utilities.

1. Does your utility provide service to areas within Mason County?
2. Have any of your utility components been formally recognized as federal, state or local critical infrastructure or as a federal, state or local key resource?
3. Are you aware of any regulations that mandate or promote the identification and mapping of CIKR's in Mason County?
4. Have you or any outside agency conducted any emergency planning on CIKR sites in Mason County? This may include data collection and formal mapping.
5. Is information on utility CIKR's available to the public via website or other medium?

Appendix D

Formal Survey results: Mason County Critical infrastructure and key resource identification.

- PUD 3 Headqtrs-Johns Prairie Rd
- Simpson Lumber Mill - Mill St
- Olympic Panal - Mill St
- Mason General Hospital
- Walmart
- Mason County Courthouse
- Shelton City Hall
- MACECOM
- Lake Limerick Dam
- Shipyard Railroad
- Mason County Sheriff's Office
- City of Shelton City Hall and
- Shelton Public Works
- PUD 3 Headquarters
- PUD 3 Substations (3)
- Banks - Several within the City of Shelton
- Century Link Substation – Railroad and 8th St
- Hood Canal Communication - Mt. View
- PUD 3 Fiber Main
- Fruit Leather Factory - Hwy 3 Allyn, WA
- Mason County Courthouse 5th and Cedar to 7th and Cedar
- Mason County Health Dept. 5th and Cedar
- Mason Transit Facilities John Prairie and Franklin St, Hwy 101 from Gillis Ford to the Airport, Hwy 3 from 101 to Belfair
- Mason County Waste Treatment - Reclaimration Ridge
- City of Shelton Waste Water Front Street and 7th
- Mason County Jail,
- Mason County Court House all at 5th and Cedar Streets
- Shelton Schools
- Pioneer School
- Grapeview School
- North Mason Middle and High School
- Shelton Christian School
- Shelton Civic Center, PUD 3

- Railway downtown and through the District to PSNS
- Ferrell gas storage site on Hwy 101
- Bonneville power lines and TPU lines thru district
- Several cell phone towers
- Skokomish valley farm area
- Skokomish Tribal Clinic & Dental Office
- Two bridges on Skokomish River on Hwy 101 & Hwy 106, main link to 101 north
- Skokomish tribal water system
- Hood canal school
- Skokomish tribal center
- Tacoma Power has high tension power lines running through Union following Manzanita rd. into NMRFA.
- Union is home to the main office of Hood Canal Communications. Telephone and internet services. Dalby Road
- Highway 106

*Appendix E**Mason County Natural Hazard Mitigation Plan, Section 6***SECTION 6: CRITICAL FACILITIES****CHANGES TO THE CRITICAL FACILITIES SECTION (CHAPTER 1; SECTION 6 OF ORIGINAL PLAN)**

The HMPW reviewed the critical facilities identified in the original plan. The group determined that all the facilities are still current and shall remain in the updated plan. The critical facilities for the City of Shelton and the Squaxin Tribe have been removed since they are not participating in the plan at this time. The selection process below is the process the group used to identify the critical facilities in the original plan.

IDENTIFICATION OF CRITICAL FACILITIES

In reviewing the facilities in unincorporated Mason County (to be identified throughout the Plan as "County"), the Task Force first looked at the types of facilities that could be considered "critical" to the citizens. These included a broad spectrum including:

- Assisted living facilities, rehabilitation centers, group homes and special population living centers
- Communication centers including towers
- Large employers
- Critical community suppliers; i.e., grocery stores (including "Mom and Pop" stores serving a relatively small population of the county), and pharmacies
- Emergency Operations Centers or pre-designated command centers
- Fire, rescue, and police stations
- Energy facilities including power station, switchyards, transmission lines, gas lines, and fuel storage areas
- Government offices
- Facilities identified as having hazardous materials present
- Major roads and waterways designated as transportation routes, evacuation routes, and primary access/egress routes
- Physicians' offices, clinics, mental health and counseling centers
- Museums, cultural centers, and historical sites
- Public works facilities including equipment storage yards
- Religious facilities
- Schools and libraries
- Airports, marine ports, and bus and train stations
- Waste water facilities including sewer lines, lift stations, and treatment plants, as well as intakes and pipelines

It was determined the best approach was to divide these facilities into those considered "critical" to day-to-day living, those "essential" but not absolutely necessary, and "hazards". State and federal highways as well as the Washington Correction Center were removed from the list since they are overseen by outside agencies. Some facilities are sensitive in nature and so are designated "confidential".

Essential facilities included those where certain activities are housed, i.e., fire and law enforcement sub-stations where emergency vehicles may be housed but those vehicles could continue to function from any location. For example Mason County is protected in

rural areas by unmanned fire stations containing one or more response apparatus, but the station itself is not critical to the response.

Following are the facilities as identified. They are listed by jurisdiction and for simplicity they are listed in alphabetical order, not to be misconstrued as order of importance.

CRITICAL FACILITIES

Alderbrook Water System
Belfair Water District
Harstene Retreat Water System
Hood Canal Water System
Hoodsport Water System
Lake Arrowhead Water System
Mason County Fire District 1 – one station
Mason County Fire District 2 – three stations
Mason County Fire District 3 – one station
Mason County Fire District 4 – one station
Mason County Fire District 5 – two stations
Mason County Fire District 6 – one station
Mason County Fire District 12 – one station
Mason County Fire District 13 – one station
Mason County Fire District 18 – one station
Mason County Shop
North Mason Medical Center
Pirates Cove Water System
PUD #1 Operations Center
PUD #3 Operations Center
Tiger Lake Terrace Tracts Water System
Union Water System
View Ridge Heights Water System

CONFIDENTIAL CRITICAL FACILITIES

Benson Radio Tower
Bloomfield Tower
Division of Emergency Management Emergency Operations Center
FireComm
Kamilche Peak Transmitter
PUD #3 Warehouse – Belfair
Union Heights Tower
Union Heights Tower/Transmission Site

ESSENTIAL FACILITIES

AT&T Cellular Towers
Belfair Assembly of God Church
Belfair Baptist Church

MASON COUNTY HAZARD MITIGATION PLAN UPDATE
JULY 2010

Cingular Wireless Cellular Phone Tower
Fair Harbor Marina
Gospel Lighthouse
Grapeview School District
Hood Canal Community Church
Hood Canal School District
Hoodsport Timberland Library
LDS Church
Mary M. Knight School District
Mason County Christian School
Mason County Fire District 2, Station 2-6
Mason County Fire District 8
Mason County Fire District 11
Mason County Fire District 16
Mason County Fire District 17
Mason County Garbage
North Mason School District
North Mason Timberland Library
Pioneer School District
Port of Allyn Administration Building
Port of Allyn Dock
Port of Allyn Dock North Shore Dock
Prince of Peace Catholic Church
Qwest Telecommunications
Seventh Day Adventist School
Southside School District
Sprint Cellular Phone Tower
St. Hugh Episcopal Church
Taylor Shellfish
United Methodist Church

HAZARDS

Anderson Dam
Bennetsen Lake Dam
Buck Lake Dam
Christine Lake Dam
Cranberry Lake Stormwater Detention Dam
Cushman Dam #1
Cushman Dam #1 – Spillway Headworks
Cushman Dam #2
Fawn Lake Dam
Haven Lake Dam
Lake Limerick Dam
Lakeland Village Pond #1
Leprechaun Lake Dam
Little Twin Lakes Dam
Melbourne Lake Dam

MASON COUNTY HAZARD MITIGATION PLAN UPDATE
JULY 2010

Natural Gas Line
Rosand Dam
Timberlake Dam
Trask Lake Dam
Uddenberg Lake Dam
West Lake Dam

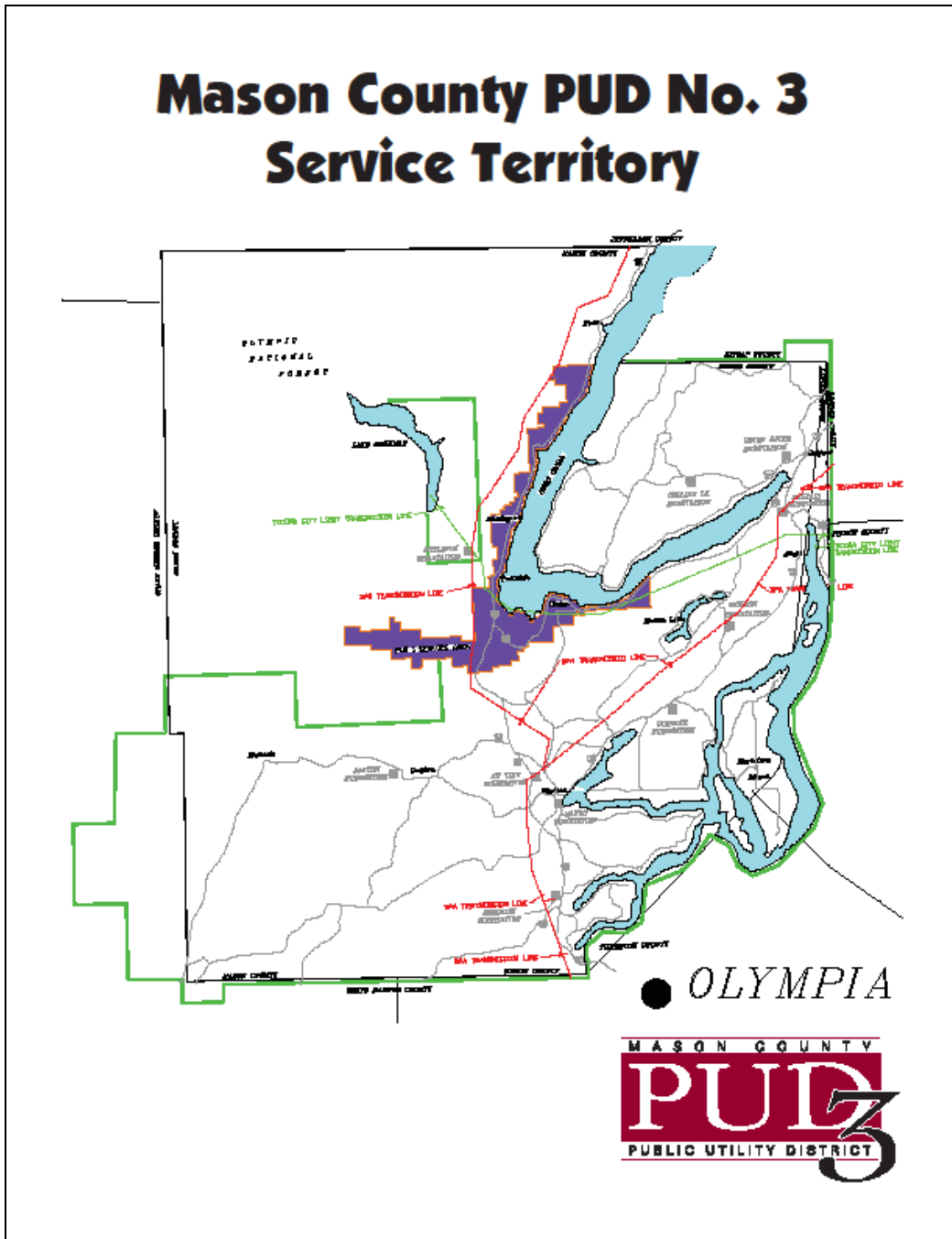
MASON COUNTY HAZARD MITIGATION PLAN UPDATE
JULY 2010

SECTION 8: CRITICAL FACILITIES

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Appendix F:

Mason County Public Utilities District 3 Service Territory Map



Appendix G

Mason Matters 2012 Environmental Health Report

Environmental Health

Mason County Data Series

Drinking Water

Mason County residents receive their drinking water from from of three sources: Community Group A systems, Community Group B systems, or private wells. The state requires Community Group A and B systems to meet regular water quality monitoring standards. Homeowners, who rely on private wells, are responsible for monitoring their own drinking water systems. (D1-2)

Community Group A Drinking Water Systems Testing Results 2003-2010

Parameter	2003	2005	2010
Number of systems	98	220	232
# of Green Permit systems	91	153	180
% of all Group A systems with Green Permits	93%	70%	78%
# of Yellow Operating Permit systems	NA	63	1
# of Blue Operating Permit systems	NA	4	51
% of Red Operating Permit systems	4	0	0

Notes

- Green Operating Permit: in substantial compliance with ALL state requirements
- Yellow Operating Permit: in compliance with all requirements, except water system has not satisfied planning requirement and/or has a state significant non-complier violation
- Blue Operating Permit: in compliance with requirements, except system does not meet design approval requirements
- Red Operating Permit: substantial non-compliance with state water quality requirements.

Community Group B Drinking Water Systems Testing Results 2003-2010

Parameter	2003	2005	2010*
Number of systems	600	576	-
# completed drinking water testing	317	361	-
% completed drinking water testing	53%	63%	-
# not complying with testing standards	283	215	-
% not complying with testing standards	47%	37%	-
# with major violations	5	7	-
% tested with major violations	1%	1%	-

Note

- 2010 data is not yet available at time of publication.

Air Quality

As a rural county, the greatest contributor to poor air quality and poor air quality days is burning of organic materials, such as wood burning stoves and outdoor burning. The poorest air quality days usually occur during the winter months. (D3)

Number of Poor Air Quality Days 2006-10

Air Quality Status	2006	2007	2008	2009	2010
Moderate	22	32	14	28	7
Unhealthy for Sensitive Groups	1	3	6	7	3

Note:

The weather, temperature and inversion layers, accounts for some of the yearly variation.

Mason County has 218 miles of shoreline, accounting for 9% of the total Puget Sound Shoreline. The Puget Sound and the Hood Canal account for 10% of Mason County's total area. (D4)

A Group A public water system has 15 or more service connections used by year round residents or regularly serving at least 25 year round residents. Year round is defined at 180 or more days within a calendar year. A Group B public water system is constructed to serve less than 15 residential services or an average nonresidential population of less than 25 per day for sixty or more days within a calendar year.

In 2010, Mason County's Environmental Health staff completed sanitary inspections on 46 Group A water systems. (D5)

In 2010, Mason County's Environmental Health staff ensured that 74 new water supply wells were properly constructed. (D5)

In 2010, Mason County's Environmental Health staff conducted 8 well decommissioning inspections, thus removing them from service. (D5)

In 2010, Mason County exceeded WA Depart. of Ecology's standard for healthy air quality days. This standard was met 99% of the time.

The definition of a healthy air quality day is less than 2.0 ug/m3 of particular matter less than 2.5 microns in size across a 24 hour period. (D6)

Environmental Health continued...

Mason County - Page 2

Commercial Shellfish Harvest Areas

The commercial shellfish industry is one of the largest contributors to Mason County economic health. (D7)

Status of Commercial Shellfish Harvest Areas 2002-2010

Status	# acres in 2002	# acres in 2005	% in 2005	# acres in 2010	% in 2010	% Change 2002-2010
Open	18,502	19,971	85%	21,359	87%	↑ 15%
Conditional	1,516	1,452	6%	1,540	6%	↑ 2%
Prohibited	2,054	2,177	9%	1,598	7%	↓ 22%
Total Area	22,072	23,600	-	24,497	-	↑ 11%

Notes:

- In 2002, Open category included "Open" and "Open, but threatened or concerned"
- In 2005 Conditional category includes "Conditional" and "Restricted"

Recreational Shellfish Harvest Areas

Mason County provides 218 miles of marine shoreline. In 2010, there were a total of 32 public beaches available to recreational shellfish harvesting. (D8)

Status of Recreational Shellfish Harvest Areas 2005-2010

Status	% in 2005*	# in 2010**	% in 2010
Approved	30%	21	66%
Conditional	20%	7	22%
Closed	3%	4	13%
Unclassified	48%		

Note:

The State Department of Health change the way they measure/identify recreational shellfish areas. In 2005 it was measured as acreage, while 2010 is measured as number of areas. Thus, trend data is not available.

On-site Septic Sewage

The Mason County Environmental Health began its O&M (Operations and Management) program in 2004. The purpose of the O&M program is to assist homeowners with proper maintenance of individual on-site septic systems. (D5) In 2010, 94% of identified septic system failures had a corrective action initiated within two weeks. This rate has increased from 76% in 2008. (D6)

Mason County's O&M program activities and On-site Sewage Permits

Activity	# in 2004	# in 2005	# in 2010	% Change 2005-10
Participation in O&M Program	5,000	14,500	25,297	↑ 75%
On-site systems maintained		2,566	3,913	↑ 52%
On-site sewage permits issued	709	967	301	-

In 2002, the Commercial shellfish industry contributed more than \$32 million to the Mason County economy. (D9)

The Commercial Shellfish industry contributes more than \$17 millions in payroll in Mason County. (D9)

The Commercial Shellfish industry produces more than 500 direct full-time jobs in Mason County. (D9)

In 2010, three commercial shellfish growing areas, representing 255 acres were upgraded to approved. (D10)

Two of these areas, Harstine East and Pickering Passage were previously classified as prohibited. (D10)

Another area in Pickering Passage continues to be listed as 'threatened' by State Department of Health. (D10)

All harvest areas (4) that were downgraded between 2000-10, were upgraded by 2010. (D10)

In 2010, Environmental Health responded to 192 solid waste complaints. 160 were closed, while 69 resulted in civil infractions for violations of health regulations.

22 cases were sent to Mason County Hearing Examiner. (D5)

Environmental Health continued...

Mason County - Page 3

Fresh and Marine Waters

Under federal law, Washington State is required to identify bodies of water that do not meet water quality standards. Water bodies, whose beneficial uses such as for drinking, recreation, aquatic habitat, and industrial use are impaired by pollutants are placed in the polluted water category on the water quality assessment. (D11)

Waterbodies listed on the 2008* 303(d) list as Category 5 Impaired

Parameter	2002-04 Draft 303d List	2004 Final 303d List	2008 Final 303d List
Water courses failing fecal Coliform Bacteria (FCB) standards	21	23	10
Water courses failing temperature standards	7	7	7
Water courses failing acidity level (pH) standards	2	4	5
Water courses failing dissolved oxygen level standards	1	5	5
Unhealthy chemicals	NA	NA	5
Invasive Species	NA	NA	5

Notes: * The Clean Water Act requires the EPA to assess marine and fresh water bodies on a two year, rotating basis. The 2010 Assessment is scheduled to be approved in the fall of 2011.

Active Clean-up Plans on Mason County Impaired Waterbodies, 2011

Parameter	Waterbody
Water courses failing fecal Coliform Bacteria (FCB) standards	Oakland Bay, Totten/Elds Inlets, Skokomish River and tributaries, Skookum Creek
Water courses failing temperature standards	Oakland Bay, Totten/Elds Inlets.
Water courses failing acidity level (pH) standards	
Water courses failing dissolved oxygen level standards	Squaxin, Peale, & Pickering Passages; Case Inlet/Dana Passage; Hood Canal South
Unhealthy chemicals	Squaxin, Peale & Pickering Passages, Case Inlet/Dana Passage; Mason Lake; Haven Lake; & Goldsborough Creek
Sedimentary Studies**	Shelton Harbor & Oakland Bay

Notes: ** Sedimentary Studies - assessment of sediments for chemical contamination persistent with the types of historical industrial activities in the area.

Food Safety

Mason County Public Health issued 2,202 food worker cards in 2010. (D5)
Outcomes of Food Safety Activities

Activity	# in 2004	# in 2005	# in 2010
Routine Food Inspections	401	343	258
Temporary Event Food Permits	128	136	173
Investigated Complaints for food-related illnesses	22	35	5
Confirmed Outbreaks	0	0	0

Five Marine water bodies, 2 large rivers and 12 Small creeks had Clean-up Activities in 2003. (D4)

There are 21 public boat launch sites that open 18 of our community's lakes to public for recreational uses. (D4)

There is public swimming access on 2 of our community's lakes. (D4)

In 2011, 33 of Mason County's lakes are stocked by the Department of Fish and Wildlife, providing opportunities for recreational fishing. (D12)

4 local State Parks provide access to about 20,000 feet of tidal shoreline. (D4)

7 of Mason County's marine beaches are participating in the beach water quality program. (D4)

There are about 800 small farms in Mason County. (D13)

About 130 farms have developed farm plans that include Best Management Practices for improving water quality and wildlife habitat. (D13)

100% of Mason County's permanent food service establishments have code violations of less than 36 critical violations (the state gold standard). This rate is better than the state rate of 95%. (D6)

Data Sources for Environmental Health

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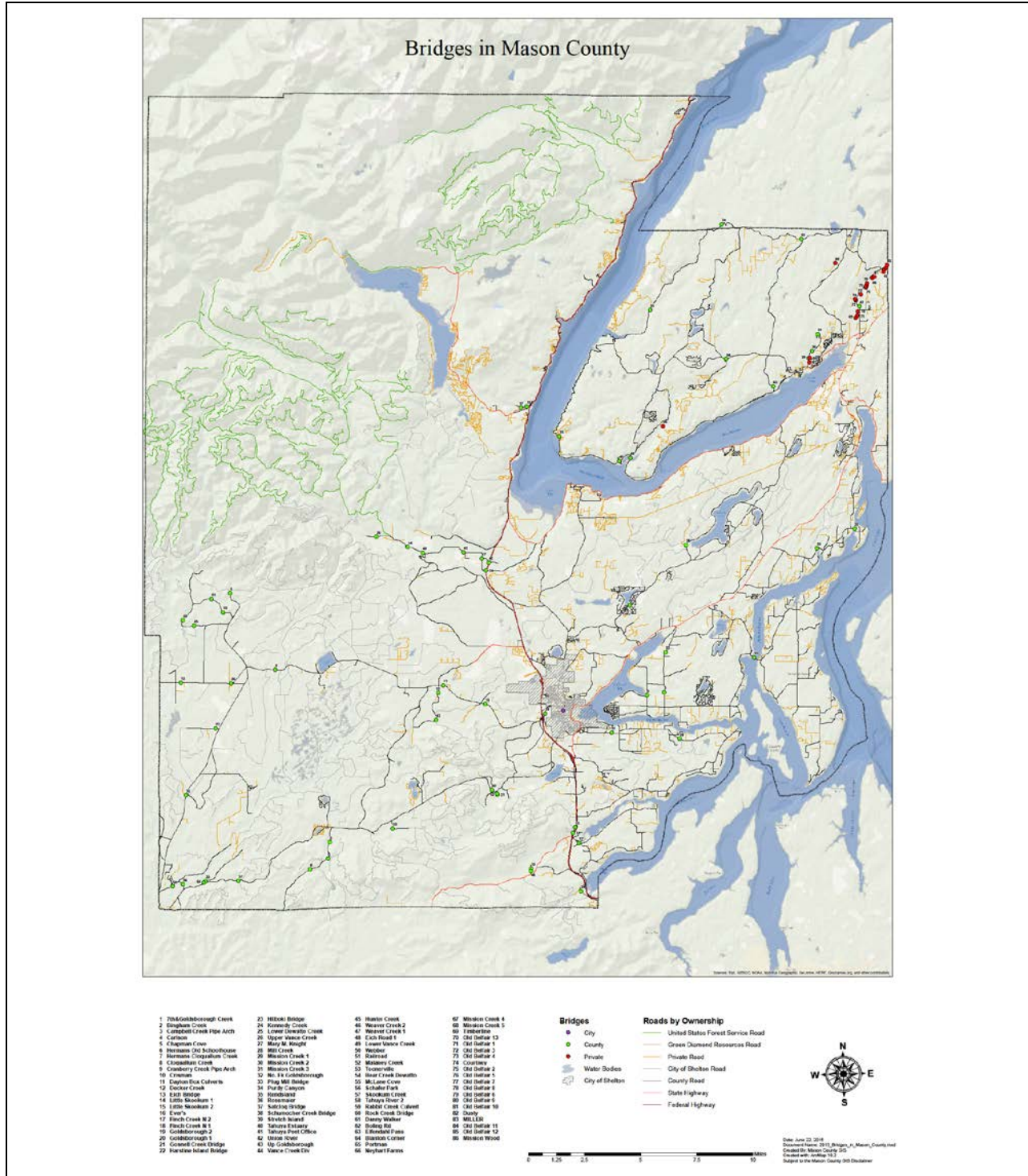
- (D1) "2010 data." Washington State Water Quality Program. www.doh.wa.gov
- (D2) "2005 Mason County Environmental Health Annual Report." Mason County Department of Health Services, Environmental Health Drinking Water Program.
- (D3) Air Quality Reports. ORCAA – Olympia Regional Clean Air Agency. www.orcaa.org
- (D4) "Mason County: A Water County. It's who we are." Mason Matters. www.masonmatters.org
- (D5) "2010 Environmental Health Data." Mason County Department of Health Services – Environmental Health www.co.mason.wa.us/envhealth/index.php
- (D6) "Local Public Health Indicators." Department of Health, State of Washington. File name: Environmental Health <https://fortress.wa.gov/doh/lohi/lohi/Indicator.mvc/IndicatorList>
- (D7) WA Department of Health – Commercial Shellfish Program. www.doh.wa.gov/ehp/sf/recshell.htm
- (D8) WA Department of Health – Recreational Shellfish Program. www.doh.wa.gov/ehp/sf/recshell.htm
- (D9) "Mason County Shellfish Industry Update 2002." Economic Development Council of Mason County. <http://www.masonedc.com/>
- (D10) "2010 Annual Report: Commercial and Recreational Shellfish Areas in Washington State." WA Department of Health. www.doh.wa.gov/ehp/sf/Pubs/annual-inventory.pdf.
- (D11) "2008 Water Quality Assessment – 303(d) Listings." WA Department of Ecology. <http://www.ecy.wa.gov/programs/wq/303d/index.html>
- (D12) "Catchable Trout Plant Reports." Department of Fish and Wildlife. wdfw.wa.gov/fishing/plants/weekly/
- (D13) Mason Conservation District – Best Management Practices Program. <http://www.olwva.net/mcd/index.html>

Questions about the data can be directed to Kim Klint at 360-427-9670 ext. 543
www.masonmatters.org

January 2012

Appendix H

Map of Mason County Bridge Locations



Appendix I:

Comprehensive identification list of critical infrastructure and key resource sites in Mason County.

<ul style="list-style-type: none"> • 1 Hospital Facility • 10 medical facilities • 28 School Facilities • 6 Credit Union Locations • 8 Banking Locations • 51 Fire Stations • 2 Private Ambulance Office Locations • 1 County Public Works Campus (County EOC) • 1 County Administration Campus • 1 City of Shelton Administration Campus-with county 911 dispatch center • 2 Native American Administration Campuses • 2 Gamin Casinos and Conference Centers • 1 County/State Courthouse and Jail Facility • 1 Washington State Department of Corrections State Penitentiary • 1 National Airport • 1 Industrial Campus • 16 Mason County Parks Locations • 6 State Parks • 1 Tribal Park (Skokomish) • 1 National Park (Olympic) • 1 National Forest (Olympic) • 1 Washington State Forest (Tahuya) • 2 Telephone Substations 	<ul style="list-style-type: none"> • 1 Mason County Sheriff Headquarters • 1 Mason County Sheriff’s Substation • 1 Skokomish Tribal Police Headquarters • 1 Squaxin Tribal Police Headquarters • 7 State Highways • 1 Regional Natural Gas Trunk Line • 2 Private Railroad Line Systems • 2 Lumber Mill Industrial Sites • 3 Libraries • 9 Federal Post Offices • 1 Private Communications Center • 2 Public Marinas • 1 County Wide Public Transit System (Mason Transit) • 1 College Campus Satellite
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*Appendix J**Mason County Critical Infrastructure Identification and Mapping Program Guideline***Mason County Critical Infrastructure and Identification and Mapping Program****Program Goal**

Safeguard the critical infrastructure and key resources (CIKR's) in Mason County from outside threat and vulnerability.

Program Objective

By the end of the year 2016 create a single usable database that contains mapping and relevant emergency response information for all critical infrastructure and key resources in Mason County.

Program Performance Goals and Objectives

Program Performance Goal 1: Conduct a current situational analysis on the status of critical infrastructure and key resource identification, mapping and data collection in Mason County.

Performance Goal 1 Objectives

1. By the end of 2015 determine and document the status and extent of Mason County CIRK identification, mapping and data collection.
2. By the end of 2015 determine and document the current resource capacity for conducting a CIKR identification, mapping and data collection program.
3. By the end of 2015 conduct and document a program stakeholder analysis and program

logic model.

Performance Goal 2: Establish program priorities, timelines, budget and measurement criteria

Performance Goal 2 Objectives

1. By the end of 2015 conduct a series of stakeholder meetings to assist with comprehensive program creation and implementation.
2. By February 2015 identify and document program work assignment priorities for Mason County CIKR identification, mapping, and data base creation.
3. By February 2015 establish a timeline for the completion of initial work encompassing Mason County CIKR identification, mapping, and data base creation.
4. By February 2015 establish both an initial and ongoing (annual) program budget.
5. By February 2015 identify, document and communicate program key performance indicators to be used.

Performance Goal 3: Identify and procure program resource requirements and needs.

Performance Goal 3 Objectives

1. By February 2015 identify and document all program finance, human, administrative, technology and equipment resource requirements.
2. By February 2015 identify and procure program database and information collection platforms.
3. By March 2015 identify and apply for all federal, state, local and private resource assistance.
4. By March 2015 conduct an assessment and document resource assistance opportunities

from all identified stakeholders.

5. By March of 2015 identify, document and apply for all federal, state, local and private resource opportunities (grants, etc.).
6. By March of 2015 apply for assistance for two personnel from the Washington Service Corps.
7. By March of 2015 apply for GIS mapping intern assistance from local community colleges and universities.

Performance Goal 4: Identify, map and collect emergency response information for all Mason County CIKR's

Performance Goal 4 Objectives

1. By October 2016 use available resources to document and record the identification, location and pertinent emergency response information for all CIKR's in Mason County
2. Throughout the duration of the program use identified key performance indicators to measure program success.
3. Throughout the duration of the program provide quarterly written reports that properly documents program status.

Performance Goal 5: Actively communicate program deliverables with all interested stakeholders

Performance Goal 5 Objectives:

1. By June 2016 document and implement a communication plan in which collected and

mapped CIKR information is shared with all interested stakeholders

2. Annually conduct training using the CIRK map and database with all interested stakeholders

Performance Goal 6: Establish a program for the continual updating of Mason County CIKR identification, mapping and information collection.

Performance Goal 6 Priorities

1. By March 2015 establish a program plan that identifies new Mason County CIKR's, and updates information contained on existing Mason County CIRK's.
2. By March of 2015 establish a communications plan for CIKR update information which shares updated information with all interested stakeholders.
3. Annually conduct a stakeholders meeting to review program status and effectiveness, and program priorities.