

JEFFERSON COUNTY

2008

BUSINESS FLOOD ASSESSMENT

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Executive Summary

Fifteen years ago, a disastrous flood swept through the Midwest, causing an estimated \$20 billion in flood damage, nearly 50 deaths and untold trauma to the hundreds of thousands whose homes were damaged or destroyed. Today we see the same kind of flooding in many of the same areas. Twenty-four deaths have been attributed to this year's floods (although not in Jefferson County, Wisconsin), and economic damage is escalating into the billions of dollars. The flooding of cropland has already been reflected in rising commodity prices and will soon hit grocery store prices. Tens of thousands of people have seen their homes destroyed.ⁱ

Anita Weier, journalist at the Capital Times, Madison suggests in her article, "Extreme makeover: Violent weather spurs redesign of infrastructure," that according to experts "the heavy rains, strong thunderstorms and fierce tornadoes that have attacked the Midwest in recent weeks are a sign of the future, and communities will have to adapt to more frequent occurrences of extreme weather,"ⁱⁱ.

In Jefferson County residents and business owners have a new understanding of flood disasters in our area after having been intimately involved with the flood disaster of June, 2008. The Jefferson County Economic Development Consortium in its desire to further assist Jefferson County business owners has undertaken a Business Impact Assessment due to the recent flooding.

Floods are the result of a multitude of naturally occurring and human-induced factors, but they all can be defined as the accumulation of too much water in too little time in a specific area. There are various types of floods which include regional floods, flash floods, ice-jam floods, storm-surge floods, dam- and levee-failure floods, and debris, landslide, and mudflow floods.ⁱⁱⁱ

The purpose of this countywide survey is to assess the knowledge, experiences, and impact the flooding had on the business owners of Jefferson County, who own or operate businesses along the Rock and Crawfish Rivers in the communities of Fort Atkinson, Jefferson, Johnson Creek, Lake Mills, Palmyra, Waterloo, and Watertown, Wisconsin.

We believe that our objectives were clear, concise and strictly conceived to address the following objectives.

Objective 1: To assess whether Jefferson County Economic Development Consortium could/can further assist the business community within the county, with additional state and federal funding opportunities and technical assistance. In addition to the assessment which we conducted we did an extensive literature review to discover the background of flooding in Wisconsin for the past one hundred years, in so doing, we have included that information within this material.

Objective 2: To explore and document the damage done to businesses along the Rock and Crawfish Rivers. To research and review the literature on our past flooding in Wisconsin using resources on the internet; such as information presented on federal and state websites, written reports, articles and scholarly papers.

Objective 3: To examine the extent of the damage to and within these communities of Jefferson County.

Objective 4: To provide recovery assistance to the business community and to keep the region's workforce engaged.

The data has been compiled, reviewed and weighed from the collected information of the Business Impact Assessment. We completed a literature and web site review for further information regarding flooding in the United States over the past one hundred years, with particular interest in Wisconsin and Jefferson County.

To this end, we have completed the first such business impact assessment of the 2008 flooding disaster in Jefferson County. It is hoped that this information is relevant and helpful to assist our county residents in gaining further assistance from State and Federal sources.

Further, we have assisted Sauk County in the development of their own Business Impact Assessment by providing copies of our survey questionnaire, cover letter, call log sheet, and a great deal of information regarding the survey methodology we used in our assessment process.

In addition, we have added an Agribusiness Impact Assessment subset by including the University of Wisconsin – Extension Crops and Soils Agent’s agribusiness specific questionnaire, which has been sent to about 1100 individuals throughout the County and contiguous areas. This sampling is presently NOT a part of this report, due to the timing of its dissemination and return. It is doubtful that we will have the information returned prior to our publication date of this report. We will supply an addendum to this report at the time the survey results are returned.

Exhibit 5 is an excerpt from the formidable document, [Floodplain Management 2050](#), a report, which was produced by the Association of State Floodplain Managers, Inc., at their 2007 Assembly of the Gilbert F. White National Flood Policy Forum in Washington, D.C. is included for your review. This report presents concepts for the development of future projects and the understanding of preparation for floods as they continue to occur within our country.

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Introduction and Objectives

Floods have always been part of Wisconsin life. Early French-Canadian residents of Prairie du Chien recalled 1785 as "*l'annee des grandes eaux*" -- the year of the great waters -- from Mississippi River flooding in April of that year.^{iv} According to the Department of Natural Resources (DNR) Wisconsin has more than 12,600 rivers and streams that meander their way through 44,000 miles of varying terrain. About 32,000 miles of these streams perennially run; the remainder flow intermittently during spring and other high water times. The Mississippi River winds its way through about 200 miles of Wisconsin and drains the third largest area of land in the world. With its 250 tributaries and branches, the river drains 41 percent of the country's water from all or part of 31 states.^v

Floods are the most common natural disaster. Just in the last two years, floods have hit homes and businesses in all 50 states. Floods and flash floods kill more people in the United States than any other natural disaster.^{vi} As we are all aware heavy rains can quickly lead to flooding. Floods have a different set of challenges to prepare for than other severe weather events.

Jefferson County experienced such a flood disaster in June 2008, to our knowledge there were not deaths associated with this flooding in our area. Many businesses and citizens of this county have suffered the burden of this flooding disaster and are now rebuilding their lives and businesses.

The purpose of this survey is to assess the knowledge and experiences of the residents of Jefferson County, those who own or operate businesses along the Rock and Crawfish Rivers in the communities of Fort Atkinson, Jefferson, Johnson Creek, Lake Mills, Palmyra, Waterloo, and Watertown, Wisconsin impacted by flooding. The Business Impact Assessment Questionnaires were mailed to our county businesses and telephone interviews were conducted with identified individuals within the business communities of Jefferson County. Our efforts strive to provide information and tools to understand the impact of this environmental disaster and the impact that it has had on the people and business owners of Jefferson County.

Our objectives are clear, concise and were strictly conceived to discover the damages to the county's businesses.

Objective 1: To assess whether Jefferson County Economic Development Consortium could/can further assist the business community within the county, with additional state and federal funding opportunities and technical assistance. In addition to the assessment which we conducted we did an extensive literature review to discover the background of flooding in Wisconsin for the past one hundred years, in so doing, we have included that information within this material.

Objective 2: To explore and document the damage done to businesses along the Rock and Crawfish Rivers.

Objective 3: To examine the extent of the damage to and within these communities.

Objective 4: To provide recovery assistance to the business community and to keep the region's workforce engaged.

In consideration of these objectives the following information has been collected, reviewed, researched and the data assembled for further review and action.

Definition of Survey Research Terms

A list of the terms used in this Business Impact Assessment research project is included for your information.

Judgment Sample: A sample selected on the basis of the researcher's judgment about what units or respondents should and should not be included, as opposed to random selection.

Qualitative research: Research obtaining data in the form of words or other indications that do not lend themselves to quantitative analysis and whose analysis and interpretation depend on subjective judgments by experts.

Quantitative research: Research obtaining data in a form that can be represented by numbers, so that quantities and magnitudes can be measured, assessed, and interpreted with the use of mathematical or statistical manipulation.

Questionnaire: The basic survey instrument containing instructions, questions, or items, response alternative where appropriate, and specific means for recording responses.

Relative frequency: A term that is sometimes used to refer to the percentages listed in a frequency table, indicating the proportion of the sample in each category.

Response Rate: The percentage of those included in the sample who responded to the survey and provided usable, completed questionnaires.

Sample: The number and/or identification of respondents in the population who will be or have been included in the survey.

Sampling design: The specification of the sample frame, sample size, and the system for selecting and contacting individual respondents from the population.

Stratified sampling: A sampling design that divides the population into specific strata containing certain types of respondents, then selects subsamples of the required size for each strata.

Systematic: A relationship or effect that is not random, but rather one that is consistent or in a given “direct.”

Flood Terms used in this Report

Floodplain management includes structural and non-structural measures, flood loss reduction efforts, education, warning, evacuation, insurance, flood mitigation, watershed-based planning and management, and many other approaches. The intent is to focus attention on improving many aspects of the relationship between human activity, the flood hazard, and the flood prone lands, rather than simply on minimizing property damage.^{vii}

Research

Background Comparisons

Federal, state and scholarly flood specific articles were examined in our literature review regarding the flooding in the United States in the last hundred years, the United State Geographical Survey’s article by Charles A. Perry, [Significant floods in the United State During the 20th Century—USGS Measures a Century of Floods](#),^{viii} March, 2000. The second article

reviewed was Lee W. Larson, Chief of the Hydrologic Research Laboratory, Office of Hydrology, National Weather Service, [the Great USA Flood of 1993](#).^{ix}

Perry, in his article, states “during the 20th century, floods were the number-one natural disaster in the United States in terms of the number of lives lost and property damage.” Further the author continues, “thirty-two of the most significant floods (in terms of number of lives lost and (or) property damage) in the United States during the 20th century are listed according to the various types of floods.”^x

A number of websites were reviewed in order to have an understanding of the damaging results of flooding over the last hundred years. These links are included in the flood disaster information ([Attachment F – Flood Resources](#)) and other specific findings. We routinely reviewed the local newspapers and their websites for flood information. State and local newspaper articles were also reviewed within the context of the local flooding in Jefferson County. A particularly interesting U.S. Geological Survey Circular (1245) provided by the USGS online was, [Large Floods in the United States: Where they Happen and Why](#), was also very informative.^{xi} This article is hyperlinked electronically for your review.

Indicative of the seriousness of flooding throughout these United States, the 2007 report of the Gilbert F. White National Flood Policy Forum of the [Association of State Floodplain Managers \(ASFPM\)](#), Floodplain Management 2050, presents several noteworthy issues. A mere 42 years from now. *(1) Building and development standards in 2050 could be targeted toward completely AVOIDING construction in floodplain areas if at all possible – including residual risk areas behind levees and below dams – dramatically reducing the exposure of homes and infrastructure to flood damage. (2) In 2050, Flood insurance could be a part of all-hazards insurance coverage that is mandatory throughout the United States, including in residual risk areas. (3) In the visionary 2050, flood disaster relief would remain a viable back-up mechanism as one component of a comprehensive system of indemnification, but the public would be aware of its limits.* This does provide an insightful and thoughtful presentation of future endeavors.^{xii}

On their web site [FEMA](#) discusses floods and supports our understanding that floods are one of the most common hazards in the United States. Flood effects can be local, impacting a

neighborhood or community, or very large, affecting entire river basins and multiple states. The [Wisconsin DNR](#) has provided an exceptionally informative website for residents of our state which outlines the necessary procedures for response during the time of flooding. It is called “*Coping with Flooding*” and provides very helpful information for those stricken by this natural disaster.^{xiii} A secondary site is “*Coping with Cleanup*” which provides helpful information also.^{xiv}

Jefferson County has had four County Disasters since 1971 according to [Wisconsin Emergency Management](#). Three of these 1973, 1993, and 2004 were Presidential Disaster Declarations of Flooding in Jefferson County. The fourth in 1996 was a flooding/severe storm and was not declared a Presidential Disaster.^{xv} ([Exhibit 3](#))

In October 2007 the following was released by the State Department of Workforce Development, “[Disaster Unemployment Assistance Application Deadline Approaches](#): Secretary Gassman reminds individuals in nine counties hit by August’s storms, severe flooding to apply for benefits by October 8th.”^{xvi} ([Exhibit 4](#))

However, all floods are not alike. [FEMA’s website](#) states, some floods develop slowly, sometimes over a period of days. But flash floods can develop quickly, sometimes in just a few minutes and without any visible signs of rain. Flash floods often have a dangerous wall of roaring water that carries rocks, mud, and other debris and can sweep away most things in its path. Overland flooding occurs outside a defined river or stream, such as when a levee is breached, but still can be destructive. Flooding can also occur when a dam breaks, producing effects similar to flash floods.

FEMA continues, be aware of flood hazards no matter where you live, but especially if you live in a low-lying area, near water or downstream from a dam. Even very small streams, gullies, creeks, culverts, dry streambeds, or low-lying ground that appears harmless in dry weather can flood. Every state is at risk from this hazard.^{xvii}

[Birkland](#) et al, in Natural Hazards, state that “flooding remains the most common and one of the most costly categories of natural hazards in the United States.”^{xviii} Indicative of our survey results a rough estimate of losses to the responding businesses in Jefferson County is approximately \$4.7 million dollars. This rough estimate is only from the responding businesses, others who did not respond are not included in this amount. This amount represents physical structure damage, production and order losses.

Within the past few years Jefferson County has experienced what Perry calls regional flooding which he describes as follows, “some regional floods occur seasonally when winter or spring rains coupled with melting snow fill river basins with too much water too quickly. The ground may be frozen, reducing infiltration into the soil and thereby increasing runoff.” This apparently was part of the problem this year, when floods swept over Blackhawk Island in Fort Atkinson, as they did the year before (2007). Also in evidence of regional flooding is the Crawfish River on State Highway 18 which over flows into several fields when the snow is melting and causes the water to rise to flood conditions. There is no agency which keeps this information in a format that is available to the public other than massive reports of yearly crop damage issues on the USDA – Farm Service Agency crop reports.

Our background research was completed on flood impacted communities within Jefferson County. Our sampling method satisfies our study of flooded businesses due to the needed information being gained from the responses of the business owners with whom we had contact. We will address the results of this study, as well as, summarize and clarify our results of the 2008 flood disaster in Jefferson County.

It is important to understand that flood zones are rated based on the "100-year flood" or the "500-year flood." This is the standard used by most federal and state agencies; it is used by the National Flood Insurance Program (NFIP) as the standard for floodplain management, and is used to determine the need for flood insurance. The "100-year flood" zone means that the area's elevation has a 1% chance of being equaled or exceeded by flooding each year, or a 26% chance of suffering flood damage during the term of a 30-year mortgage.

The "500-year flood" zone means that the area has a lower risk of flooding. However, 25% of all flood insurance claims are from these areas. It is important to understand that this is not saying that we won't have another flood for 100 years rather that according to the NFIP this is the method they use to determine insurance planning. A natural disaster can happen with more frequency due to various reasons, which I believe you will understand upon completion of this report. These are not meteorological determinations, rather they are insurance definitions.

Our survey of the impacted flood areas of Fort Atkinson, Jefferson, Johnson Creek, Lake Mills, Palmyra, Waterloo, and Watertown has been completed and the responses reviewed. Our analysis of the following information is the result of the responses made by the individual who completed the survey questionnaire and the research information from our literature review.

Primary Research Methodology

Primary research gathering was conducted within Jefferson County through the creation and distribution of a mail survey questionnaire. The seven-question survey included open-ended, closed-ended, qualitative, quantitative, and demographic questions. These questions focused on the business owners experience with the flood disaster in Jefferson County along with the impact on the various businesses contacted. A cover letter was created and mailed to each possible survey participant explaining the survey and why the survey questionnaire was being administered, along with including contact information for the Jefferson County Economic Development Consortium for either a return call or how to return a completed survey. A copy of the cover letter can be seen in Appendix A.

The assessment questionnaire was administered via surface mail^{xix}, personal follow up telephone interviewing calls were made, and faxed copies of the questionnaire for those who had misplaced or otherwise had lost the questionnaire; this survey instrument had an original return date of August 15. We lengthened the response time needed to September 10, since calling businesses needed more time. During this time a telephone survey was conducted by our Economic Recovery Assistant.

A judgment or stratified sample was used, because we had physical and geographic areas selected, i.e., the flooded areas of Jefferson County. Therefore, business owners, in flood plain areas, were the targeted respondents to complete the survey, on occasion it was completed by other individuals within the organization. The sample points became the business address of the businesses within a flood plain area. We are more concerned with the impact of the flood upon our businesses and ability to use this information to assist them in recovery, than in the methodology of academic survey research formulation. The Jefferson County area businesses were asked for their response to the questionnaire until a satisfactory number of responses were received. Slightly over 255 businesses were asked to complete the survey, with a useable sampling points of 187 and with a final number of 114 surveys being completed giving an approximate 60% percent response rate. Businesses addresses were chosen specifically for this assessment. A copy of the survey can be found in [Appendix B](#).

Literature Review

The process used for the literature review was included for purposes of educating, developing a setting in which one could understand the issues of flooding, and the responses that have been made to flooding in Wisconsin. We chose to research and review the literature on past flooding in Wisconsin by using resources available on the internet and through federal and state websites as well as written reports available electronically to assist our knowledge base of this serious issue. This information provided a great deal of insight into the common problems that those who live in floodplains have each time a flood occurs. These publications are included in the “references” section at the end of this report.

Secondary Research Methodology

Non-respondent bias became a slight problem since there was a direct correlation between the purposes of the survey and the information needs, on the one hand and the likelihood to respond, on the other.

The sampling method used was a judgment or stratified sample design gained from the various mailing lists including our Jefferson County Economic Development Consortium mailing

list and those provided by organizations, such as, the local Chambers of Commerce. These lists posed problems in survey sampling, due to the fact that there was a large amount of time spent on retracing businesses, phone numbers and correct addresses. Upon removal of the duplicate businesses and contacts, we were able to have an active sample of 215 sample points to contact. These included a sampling from each of the identified cities and towns within the flood plain.

Taking into consideration non responses, those individuals who chose not to return the information requested; or those who were unable to be tracked down through several hours of retracing efforts were removed from the original sample, leaving us with 187 sample points to contact.

Secondary Subset Survey

Farming and Agribusiness Research Subset

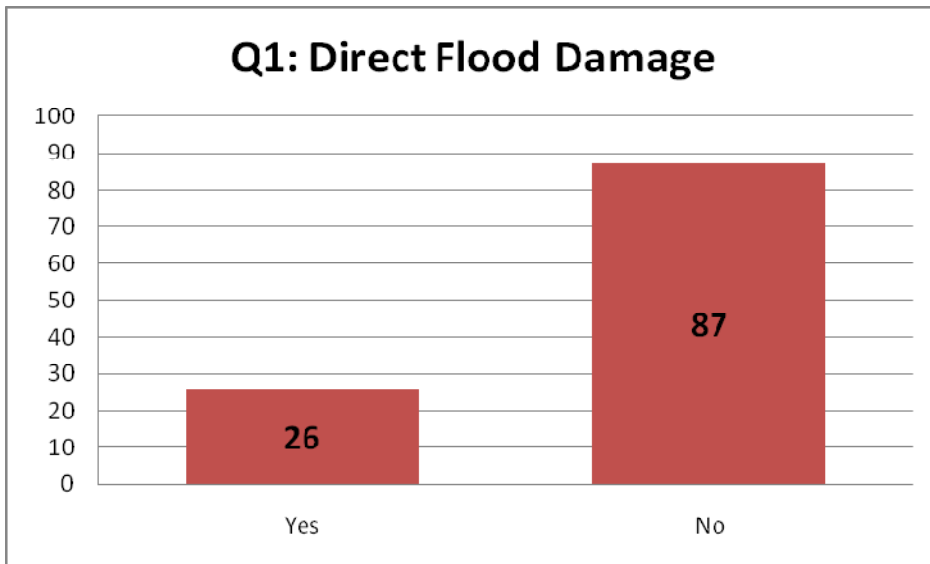
A secondary subset survey questionnaire of the Business Impact Assessment, which was entitled, Agribusiness Impact Assessment, was edited by Joe Bollman, Crop and Soils Agent, UW- Extension – Jefferson County to include the needs of our farming and agribusinesses in Jefferson County This was sent to individuals who are a part of the UW – Extension surface newsletter mailing list. A copy of this subset questionnaire may be found in [Attachment C](#).

Research Findings

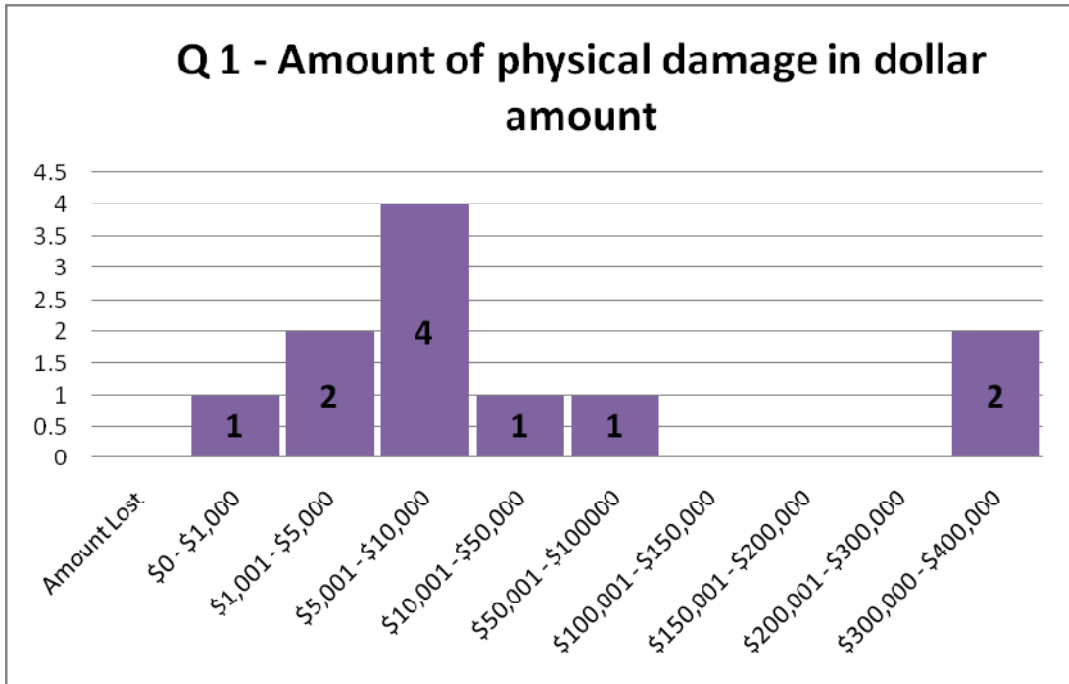
It should be noted that not all respondents answered every question, leaving blanks within the questionnaire, or not marking a specific answer. These are not counted within the context of this data, hence, explaining the different responses made within the research findings below.

Statistical Response Rate Charts

Question 1: Did you have any direct physical flood damage?



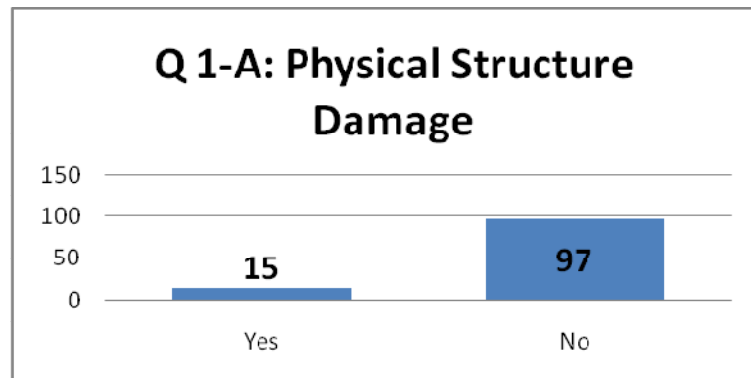
Did you have any direct physical flood damage? Twenty-six respondents answered yes, eighty-seven respondents answered no. This is a response rate of about 27% responding from our completed business impact assessment. A total of 111 businesses respondents answered this question.



This chart reflects the dollar amounts of stated losses due to physical damage to business buildings.

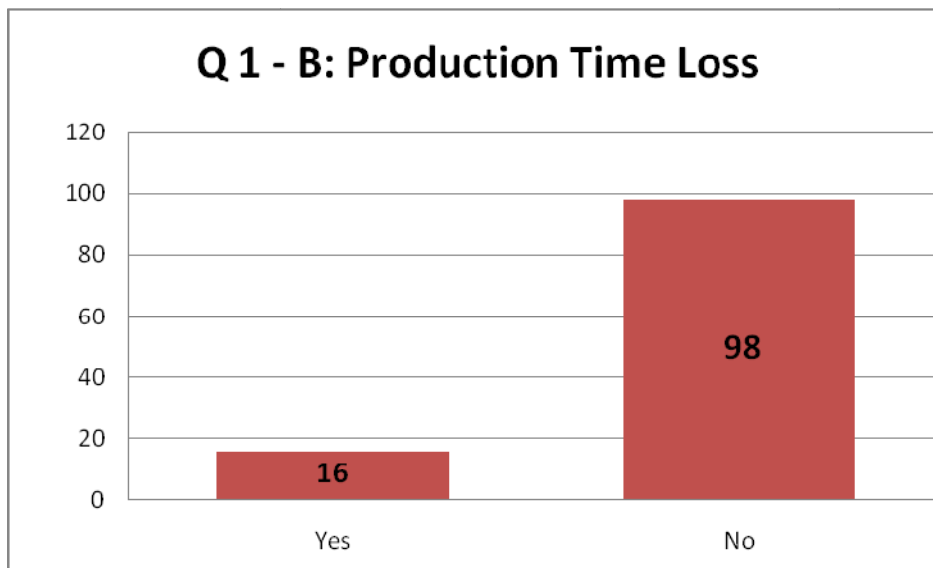
Q1 – A: Dollar amount of physical structure damage. Fifteen respondents answered yes; and 97 respondents answered no. A total of 112 responses were made to this question, with eleven responding with dollar amounts.

Several respondents had yet to determine the actual loss at the point they were contacted. Two respondents lost between \$300 and \$400 thousand dollars in damages to their buildings. The total reported estimates are \$835,681.91.



Question 1 – B. Production time loss

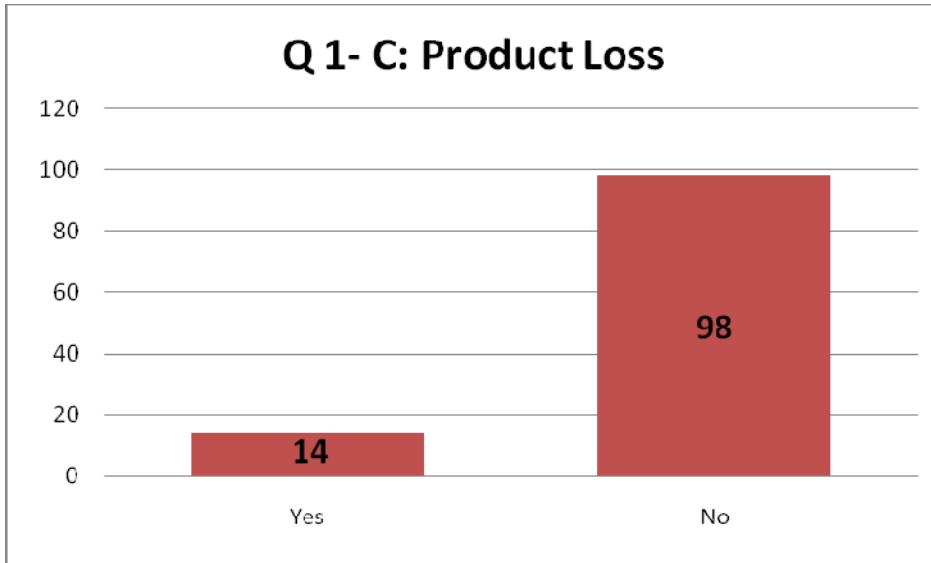
Thirteen respondents answered in the affirmative to loss of production time. Of the thirteen responses regarding loss of production time, these responses varied from two days, to three months. Below this chart is a breakdown of the responses.



<i>RESPONSES MADE BY BUSINESS OWNERS REGARDING PRODUCTION TIME LOSS</i>	
<i>Two days</i>	<i>Ten days without any customers</i>
<i>Two and a half weeks</i>	<i>Three and a half weeks</i>
<i>Closed for five weeks</i>	<i>Three months, six days a week lost</i>
<i>Closed for five weeks and lost upwards of \$40K</i>	<i>Totally out of business for three weeks</i>
<i>Haven't been able to open yet</i>	<i>Closed for eight weeks</i>

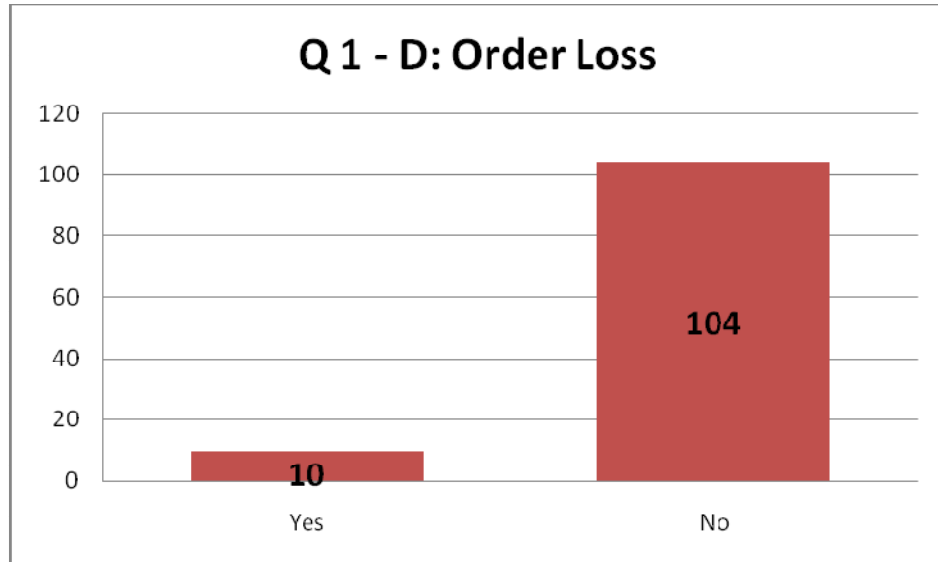
Q1 – C: Product Loss

Twenty-three responses were given for this question, ranging from \$2000 to \$1.3 million in loss product. The approximate loss from the product loss information collected in this survey is Total responses in this category were 112.



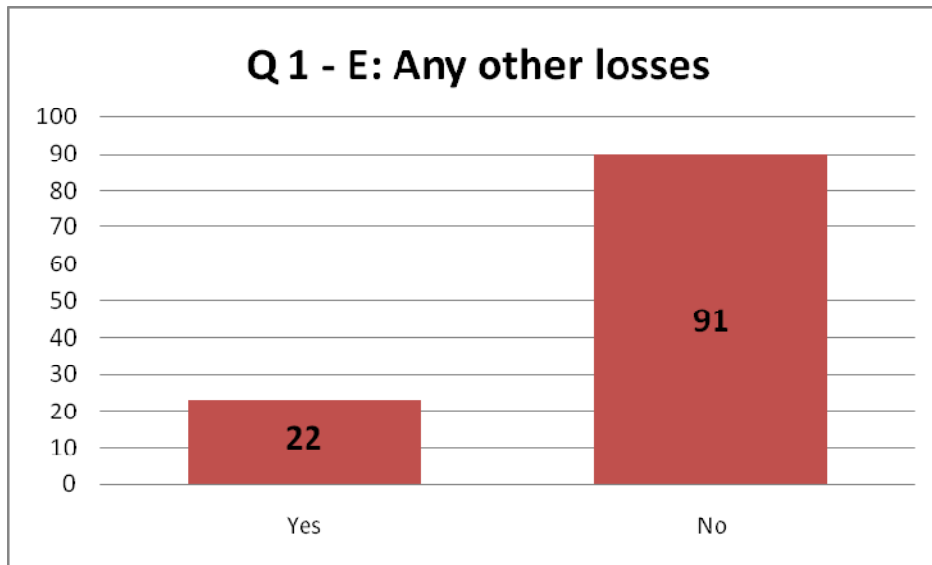
Q1 – D: Order loss

Order losses of reporting businesses ranged from \$2,000.00 to \$1.129 million dollars.



Q1 – E: Any other losses

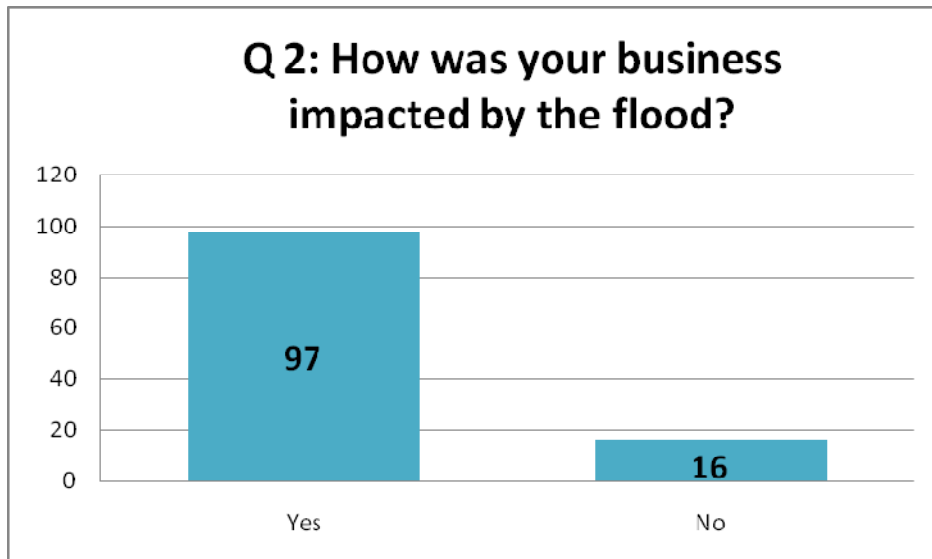
Of the twenty-two responses the losses ranged from \$800 to \$300,000 for six respondents. Other reported percentages business profit loss as sales were off 75% for 2 to 3 weeks. One quarter of my customer base, employees, and I'm still not up and running.



Other comments are below:

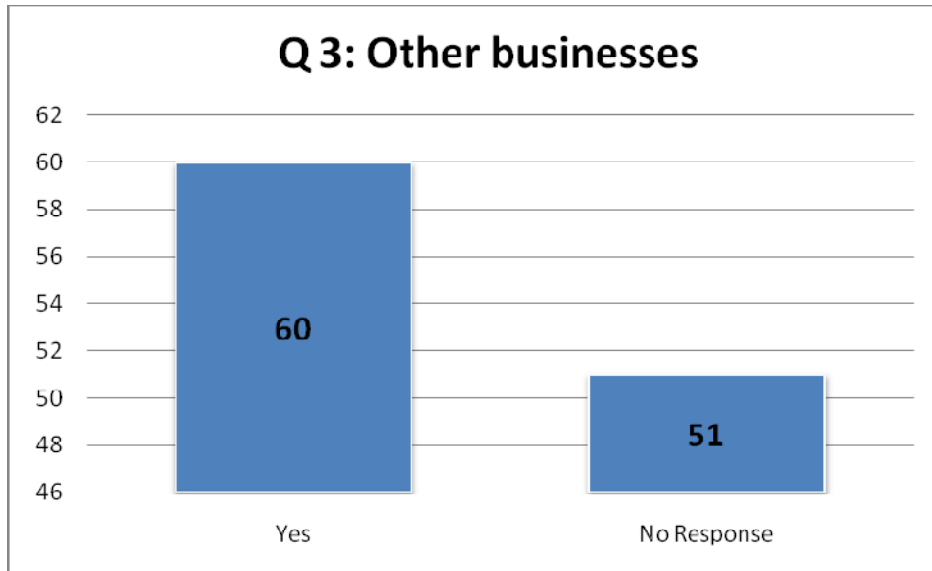
“Still trying to assess the losses, we had water damage in the entrance areas, seepage from the slab floor, walls that needed repair.” “We transferred patients and staff to sister facilities.” “Water in basement; need to replace panelling and carpeting as a result of the ground water damage. Cleaning in room carpeting, pumps & hoses, gas for generators, dumpsters,etc.” “Parking lot crack asphalt.” “There were and are water issues with backup from water, we still need to pump it each day, obviously the watertable is still high. There is also still runoff from the building next door.” “Expenses of manning pumps, equip rental and gasoline, other misc. expenses.” “Other losses are whether or not we will be able to reopen, due to the DNR, the location of the building, bringing up to today's codes. lost whole summer.” “We lost the community room, a record vault, tiling and cabinets are being installed today, we moved our computers but the computer server room was damaged.”

Question 2 – How was your business impacted by the flood?



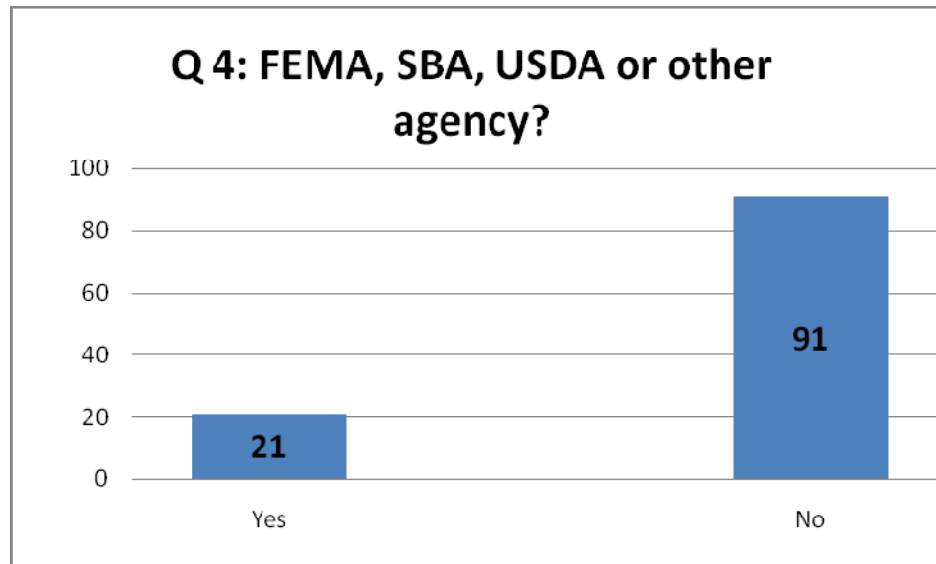
Ninety-seven business owners responded to this question in the affirmative, which is one of the highest responses in the study. The responses to this question ranged from problems with deliveries, business drop and the inability for customers to get to the business, including employee lay offs, billable hours, extra driving time to get to and from work, added mileage, employers picking up their employees, and program closures. Road and bridge closures, business loss was from 10% to 100% from one day to three months, two businesses have yet to reopen. One business lost 17% of the average production, and permanently laid-off 209 employees. This last statement contributes to individual economic decline within Jefferson County.

Question 3: Are you aware of any other business or businesses that sustained flood damage?



Approximately sixty respondents answered this question in the affirmative, not all could answer what businesses were impacted, but that there were many their specific area. This does show an awareness of the flood damage in the county. The ones mention most often were Tyson, River’s Edge Market, Jim’s Burger Corner, NAPA Auto Supply, and Speedway in Jefferson. In Fort Atkinson the majority of those responding said Funky’s, Velvet Lips and Premier Bank. In Waterloo, several respondents mentioned the F & M Bank, Do It Best Hardware, and several bars. There seemed to be less awareness of specific businesses in Watertown, Lake Mills and Johnson Creek. A total of 111 responded.

Question 4: Did you contact FEMA, SBA, USDA or other agency, etc? A total of 112 respondents answered this question.

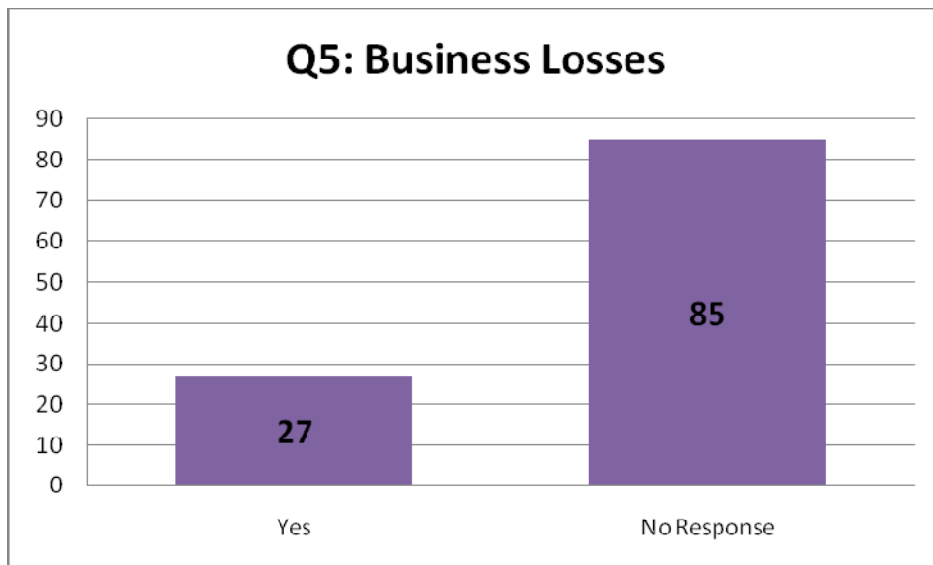


A total of 112 businesses answered this question.

Those twenty-one businesses who responded in the affirmative regarding contacting FEMA, the SBA, USDA or another agency responded "SBA - if they went with just my business maybe I could have gotten something but they went by all of my income and I got nothing except an offer for an 8% loan, I can do better at my bank." "I registered with FEMA, they sent three packets of paperwork for me to complete, then I understand that they weren't giving money to anyone, and I didn't want to take the time or the effort to gather all the information necessary to complete the materials." "Yes, FEMA does not do anything; a low interest rate loan fro SBA - nothing - we have on going mortgage." "SBA loans not enough damage to claim; Checked SBA, IRS would put off paying for a time." "FEMA waste of time, SBA said they would give me a loan but I was hoping for a grant or something of that nature." "I called FEMA and was sent a packet but it was moot, a lot of paper work, loans for furniture, we are concerned about our rental units in the building, and that is why we are repairing the furnance and water heater." "We have a FEMA policy - so we got paid by FEMA." "Yes, FEMA, couldn't do anything for us. We needed to use SBA, it turned into a diaster - 8% rate." "FEMA stopped, it took 2

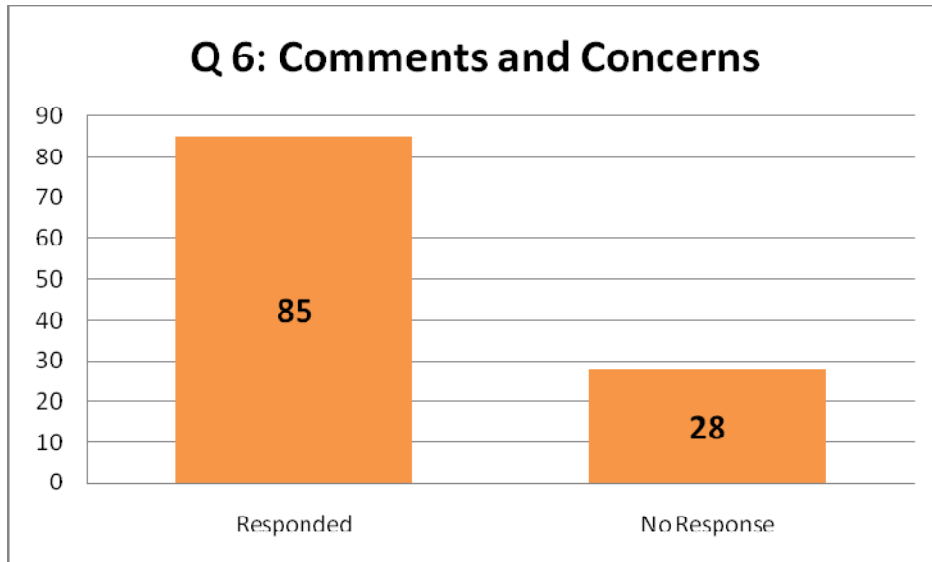
people deliver a piece of paper. I looked at their website (FEMA) and also the small business loan, we had no structural damage, only supplies, so I did not apply.” “Not yet, will do so.” “Yes, FEMA couldn't help me, Did not contact SBA.” “Applied to FEMA online, received rejection next day applied to SBA.”

Question 5: Do you have any business losses not covered by insurance, grants, reimbursements, or other sources?



One business is self insured and as yet catastrophic insurance claims are unknown.

Question 6: Comments and Concerns regarding the recent flooding in Jefferson County.



Fifty-nine businesses responded to this question with comments, twenty-five answered with an actual “no,” “nothing”, or “none.” A total of 113 businesses responded. Three left the answer blank. Of the responding businesses there were eighteen which felt that the various citizens and city officials did an outstanding job. Comments such as these are “City handled extremely well – Jefferson County website was very helpful and so was the Fort Chamber website regarding the routing of traffic and flooding information.” “Very impressed with the way in which Waterloo handled this very difficult situation.” “Jefferson County pulled together to ensure the safety and well being of everyone affected by the flooding.” “It was great to see people helping each other.” “The City officials in Jefferson did an outstanding job!”

Some suggestions for improvement were included by several individuals also who responded, “Let's see helping with sandbag could have been better organized; I don't know -- emergency groups - could contact people sooner. Try and have a local emergency plan, and with reviewed annually, and we probably do have them but having worked for the state for as long as I have, there needs to be a yearly update and review of the emergency plan.” “An SBA loan at 8% is not very helpful with interest rate where they are; I can get 6% from our bank.” “I just wonder why they are giving all the businesses so much grief about rebuilding.” “FEMA

should come out with what they cover and not cover. Small loans from FEMA, at a high rate; it was a Natural Disaster - we did what we could, I donated water, sandwiches, etc. the community pulled together.” “Immeasurable - Will this flood make or break businesses in Jefferson, yes, it has, I am very upset and frustrated by the fact that Milwaukee got money handed out to them, but in Jefferson County we only had loans, every where else free money was given.”

These comments are available upon request by contacting Jefferson County Economic Development Consortium with all the identifying information suppressed.

Recommendations

1. The first recommendation that bears immediate attention is that the Emergency Management Group of Jefferson County continues their hard work and exceptional abilities through continued development of their skills and abilities in dealing with natural disasters. The County was served well by this highly trained group. It is important to keep this group on the cutting edge of new technology, responses, training, and to provide the needed funding to do so.
2. Provide access to resources to assist in unmet needs such as emergency operating and equipment leading programs. To increase the available funding pool from various state and federal recovery programs.
3. Jefferson County's Administration will continue their smarter planning and zoning as an essential exercise for the next few years. It is our recommendation that further and continued comprehensive training funding is included for them to further understand and meet the needs of the citizens of Jefferson County before, during and after natural disasters.
4. The report developed by the Union of Concerned Scientists and the Ecological Society of America, "Confronting Climate Change in the Great Lakes Region,"^{xx} which predicted that cities will be subject to more extreme storms and floods, exacerbated by stream channeling and more paved surfaces, resulting in "greater property damage, heavier burdens on emergency management, and increased cleanup and rebuilding costs supports the further and continued training of county administrators. We must remember that "flooding is also exacerbated by construction of roads, buildings, and other impervious surfaces that prevent water from infiltrating the soil."^{xxi} The key to this understanding is a well developed and well trained group of individuals who administer Jefferson County at all levels. Funding may be set aside for this continued education and development.

5. [Jefferson County Managed Response Plan](#) includes exceptional information regarding flooding in our area, it is an exemplary document which contains a massive amount of information. This response plan can be used to educate the citizens about disasters in our community by further dissemination and by offering training to our citizens.
6. Information can be disseminated regarding the floodplain areas within Jefferson County to assist citizens in their understanding of flooding and where water flows during a flood incident. Beginning to work toward a renewed vision of where businesses and homes are built within the county is needed, recognizing and honoring the floodplain that is, protecting our businesses and homes is paramount. Building does not need to occur within dangerous areas. Ongoing flood mitigation and remediation needs to be a concern of the county administration.
7. Further, it appears expedient to provide continuing community education about the damages and consequences of flooding and other natural disasters which could occur in our area. Flood education might include concepts of floodplains, flood insurance, helping people understand its purpose, how it works, and its pros and cons. Information provided to businesses and individuals in Jefferson County would provide further knowledge about flood Insurance – for example, the National Flood Insurance Program (NFIP), which is a federal program enabling property owners in participating communities to purchase insurance protection against losses from flooding.
8. The provision of information in to the citizens of Jefferson County about participation in the NFIP will assist their understanding in the National Flood Insurance Program. During times of natural disaster, environmental disasters or national and/or civil emergencies, many products and services are needed for relief, clean up and restoration. A good example of a source that can be helpful in times of emergencies is [Disaster and Emergency Vendor](#) database. Vendors that supply products or services that may be needed to support this

effort. They may be considered as potential sources of supply and may be identified in the Disaster and Emergency Operations Vendor Profile database. The Disaster and Emergency Operations Vendor Profile Database is available.

9. [FEMA's Online Resources](#) provide valuable information for businesses and individuals which could be circulated and stocked in the local libraries on a regular basis. Elementary, Middle and High Schools could provide further information and training to its students in the areas of natural disasters and the appropriate responses to them.

Conclusion

This is the first such business impact assessment of the flooding disaster in Jefferson County. It is hoped that it will be a relevant and helpful document to assist our county residents and business owners in gaining further assistance from State and Federal sources.

The data has been reviewed and weighed from the collected information from the Business Impact Assessment. We have completed an extensive literature and web site review for further information regarding flooding in the United States over the past one hundred years also.

For a county the size of Jefferson County, a great deal of damage was done as indicated by the survey data compilation. Over 200 employees were laid off according to our data; with a significant number of individuals not returning to other jobs. This is due to the closing/non re-opening of several businesses to date.

A large amount of money was lost to the flood in physical damage, production and order loss, and infrastructure in the approximate area of \$4.7 million dollars. This number includes only the report approximations of the respondents, and not those which at the time were unknown, by the business survey questionnaire respondent.

Jefferson County has taken a hard hit financially. As evidenced from the literature reviews we must remember that floods are extremely dangerous and financially draining on the populations and businesses in the flooded areas. Floods are the most common natural disaster. Floods are predicted to continue by the flood and disaster authorities. The impact on this county has been monumental.

The collection of this data and the literature reviewed regarding flooding in Wisconsin has been extremely informative and has assisted in the conclusions drawn by this researcher/writer. Emeritus Professor John J. Magnuson, University of Wisconsin – Madison, an internationally known lakes expert suggests that “municipalities in Wisconsin will have to upgrade water-related ^{xxii} infrastructure including levees, sewer pipes and wastewater treatment plants -- in anticipation of more frequent downpours and floods, according to a

2003 report by the Union of Concerned Scientists titled “Confronting Climate Change in the Great Lakes.”

According to the information available on Flood-Zone.net:

You don't have to live near water to become a flood victim. In fact, everyone lives in a flood zone. It's just a matter of how likely it is that a flood will hit your home. And unfortunately, floods are the most common natural disaster.

Flood zones are rated based on the "100-year flood" or the "500-year flood." This is the standard used by most federal and state agencies, is used by the National Flood Insurance Program (NFIP) as the standard for floodplain management, and is used to determine the need for flood insurance.

The "100-year flood" zone means that the area's elevation has a 1% chance of being equaled or exceeded by flooding each year, or a 26% chance of suffering flood damage during the term of a 30-year mortgage. The "500-year flood" zone means that the area has a lower risk of flooding. However, 25% of all flood insurance claims are from these areas.^{xxiii}

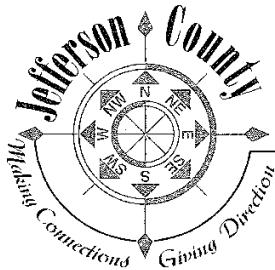
Another of the interesting and insightful concepts is that of human adjustments to flooding. The Floodplain Management 2050 report, suggests an analysis of the world in which floodplains are managed today – will need to be managed tomorrow – suggests the need to add four adjustments to White’s^{xxiv} original list: (1) room for rivers, oceans, and adjacent land areas; (2) personal responsibility; (3) geographic interdependence; and (4) awareness and education.^{xxv} Implicit in White’s analysis of ways for humans to adjust to flooding was the “no action” option, that is, to choose not to occupy the flood prone areas at all and thus both avoid the hazard as well as preclude any unintended adverse impacts on the ecosystem. Today, however, advances in engineering and technology along with increased material wealth have made possible human encroachment on even the most sensitive and hazardous sites—with dire consequences. It is now necessary to make explicit among our range of adjustments to flooding the option of routinely putting some distance between humans and our waterways and oceans, due to the seriousness of the flooding predicted to continued occurrences.^{xxvi} These are further developed throughout the report. The authors of this report outline six action guidelines which

bear some thoughtful response. These are included on page *xii* and *xiii* of the report and are available for review in [Exhibit 5](#). The development of a continued understanding of flooding in our area is primary for our ability to withstand other disasters.

Floods are the natural disaster that costs the most – both in loss of lives and property. Due to the length of time floods can span, floods take an immeasurable toll on loss of jobs and communities. In the future, we can, however, make a positive impact regarding this natural disaster. The most effective way to accomplish this is through construction requirements in the building codes that address proper design and construction in flood areas, thus substantially reducing the effects floods can have on the health, safety, and welfare of a community.^{xxvii}

It is apparent from the literature and statistical materials, which have been used in this report, that Jefferson County has a large task before it to protect and care for the citizens of this county. The information reviewed leads to continued commitment to emergency management within the county which includes active recovery assistance such as financial assistance to businesses impacted by the disaster. The future focus of Jefferson County's Administration is on the development of the necessary systems to forewarn its citizens and business community regarding the dangers of disasters and the need to be proactive in prevention. One exceptional proactive method is continued education and training of all ages of residents of Jefferson County. This can be accomplished through community meetings, education programs, and the schools that our children attend.

Appendix A – Cover Letter



Economic Development Consortium

864 Collins Road, Suite 111
Jefferson, WI 53549

August 7, 2008

Dear Business Owner/Operator:

As you maybe aware, Jefferson County Economic Development Consortium will continue assisting businesses and our contacts to businesses in our Disaster-Business Impact Analysis efforts. The information obtained will guide and shape our recovery actions. I have been in contact with various State and Federal agencies and departments for additional financial and technical aid to assist our business community in recovery. Our goal is to provide recovery assistance to the business community and to keep the region's workforce engaged.

You will be hearing from our Economic Recovery Assistant, Will Smith within the next few weeks. He will be calling to gather the information needed for our business impact assessment as a result of the recent flooding. Please plan to spend about 10 minutes with him on the phone when he calls. We do not want to take up a lot of your valuable time, but do want and need your input. Alternatively, you may complete the enclosed survey and return it, no later than August 15, via fax **920.674.7575** or standard mail to:

Jefferson County Economic Development Consortium– **Economic Recovery**,
864 Collins Road, Suite 111, Jefferson, WI 53549

If you need another copy of the survey, you can find it on our website:
www.jcedc.net/pdf/Flood_Survey_2008.pdf

Your prompt attention will provide us with the needed time to complete the analysis of this information.

We are gathering this information to continue our assessment of unmet losses (i.e., insurance, deductibles, grants, reimbursements, losses not covered by grants or loans, etc.), if any, and to review what we can do in providing available resources for you. We also plan to provide you with a resources links list.

If you wish to call Will upon receipt of this letter, his number is (920) 674-8777. He is available from 8:15 AM until 4:30 PM Monday through Friday to assist you. He will assist you to complete the form over the phone.

Sincerely,

Dennis Heling
Executive Director

Phone (920) 674-8711 • Fax (920) 674-7575 • Website www.jcedc.net • Email info@jcedc.net

Appendix B – Business Impact Assessment Questionnaire

Business Impact Assessment due to Recent Flooding

Please complete the information requested below and return by fax (920) 674-7575 or by mail to:

Jefferson County Economic Development Consortium – Economic Recovery,
864 Collins Road, Suite 111, Jefferson, WI 53549

Date _____ Interviewed _____

Business Name		
Address		
City, State, Zip		
Phone		
Fax		
Contact Person		
Email/web information		
Type of Business		
Product/Services Offered		
Number of Employees	Full time:	Part time:

Questions: Please feel free to add additional information as you feel important to assist us in providing the best possible customer service to you. You may use additional pages as needed, please number each page with your company name and page number in the upper right hand corner.

1. Did you have any direct physical flood damage?
If yes, extent of damage: If NO, check here
- A. Dollar amount of physical structure damage
- B. Production time loss
- C. Product loss
- D. Order loss
- E. Any other losses

2. How was your business impacted by the flood? Such as employee layoff, orders lost, production change, etc.

3. Are you aware of any other business or businesses that sustained flood damage? If yes, please provide us with their name, address and phone number. We would like to include them in this project for economic assistance information.

4. Did you contact FEMA, SBA, USDA or other agency, etc?

If Yes, who did you contact and what were the results

If No, why not?

5. Do you have any business losses not covered by, insurance, grants, reimbursements, or other sources?

If, Yes please describe If No, check here

6. Please share any other comments or concerns regarding the recent flooding in Jefferson County which you believe would be helpful.

7. I would like to have a follow-up phone call from the Jefferson County Economic Development Office. A good time to call is: _____. I would like to discuss:

Thank you for completing this informational survey. If you have questions regarding this survey, please feel free to call (920) 674-8777 and speak with our Economic Recovery Assistant, Will Smith. Please complete the information requested below and return by fax (920) 674-7575 or by mail to: Jefferson County Economic Development Consortium – Economic Recovery, 864 Collins Road, Suite 111, Jefferson, WI 53549

Appendix C – Agribusiness Impact Assessment Questionnaire

Agribusiness Impact Assessment due to Recent Flooding

Please complete the information requested below and return by fax (920) 647-7575 or by mail to:

Jefferson County Economic Development Consortium- Economic Recovery,
864 Collins Road, Suite 111, Jefferson, WI 53549

Date _____ Name/Farm Name _____

Address		
City, State, Zip		
Phone		
Fax		
Contact Person		
Email/web information		
Type of Business		
# of Employees	Full time employees:	Part time employees:

Questions: Please feel free to add additional information as you feel important to assist us in providing the best possible customer service to you. You may use additional pages as needed, please number each page with your name and page number in the upper right hand corner.

1. Did you have any direct physical flood damage?

If yes, extent of damage:

A. \$ amount of physical structure damage _____

B. Production loss

Crop	Total acres planted	Acres lost to flooding	Estimated Economic Loss
Corn			
Soybeans			
Wheat			
Alfalfa			
Other (list)			

2. How was your agribusiness impacted by the flood? Such as employee layoff, unable to meet grain contracts, unable to ship produce, lost dairy production, purchase of additional feed/forage/ fertilizer, etc. Estimate any additional losses/costs not listed in question number 1.

3. Did you contact FSA, FEMA, SBA, etc?

Yes, who did you contact and what were the results _____

No, why not? _____

4. Do you have any business losses not covered by: insurance, grants, reimbursements, or other sources? If yes, please describe. If no, check here

5. Please share any other comments or concerns regarding the recent flooding in Jefferson County which you believe would be helpful? _____

6. Are you aware of any other farmers that sustained flood damage? If yes, please provide us with their name. We would like to include them in this project for economic assistance information.

7. Would you like to have a follow-up call from the Jefferson County Economic Development Office?

_____ If so, a good time to call is: _____ I would like to discuss:

Thank you for completing this informational survey. If you have any questions regarding this survey, please feel free to call (920) 674-8777 and speak with our Economic Recovery Assistant, Will Smith.

Appendix D - Floods



Appendix E – Significant Floods of the 20th Century

Significant Floods of the 20th Century

[M, million; B, billion]

Flood type	Map no.	Date	Area or stream with flooding	Reported deaths	Approximate cost (uninflated)	Comments
Regional flood	1	Mar.–Apr. 1913	Ohio, statewide	467	\$143M	Excessive regional rain.
	2	Apr.–May 1927	Mississippi River from Missouri to Louisiana	unknown	\$230M	Record discharge downstream from Cairo, Illinois.
	3	Mar. 1936	New England	150+	\$300M	Excessive rainfall on snow.
	4	July 1951	Kansas and Neosho River Basins in Kansas	15	\$800M	Excessive regional rain.
	5	Dec. 1964–Jan. 1965	Pacific Northwest	47	\$430M	Excessive rainfall on snow.
	6	June 1965	South Platte and Arkansas Rivers in Colorado	24	\$570M	14 inches of rain in a few hours in eastern Colorado.
	7	June 1972	Northeastern United States	117	\$3.2B	Extratropical remnants of Hurricane Agnes.
	8	Apr.–June 1983	Shoreline of Great Salt Lake, Utah	unknown	\$621M	In June 1983, the Great Salt Lake reached its highest elevation and caused \$268M more in property damage.
	9	May 1983	Central and northeast Mississippi	1	\$500M	Excessive regional rain.
	10	Nov. 1985	Shenandoah, James, and Roanoke Rivers in Virginia and West Virginia	69	\$1.25B	Excessive regional rain.
	11	Apr. 1990	Trinity, Arkansas, and Red Rivers in Texas, Arkansas, and Oklahoma	17	\$1B	Recurring intense thunderstorms.
	12	Jan. 1993	Gila, Salt, and Santa Cruz Rivers in Arizona	unknown	\$400M	Persistent winter precipitation.
	13	May–Sept. 1993	Mississippi River Basin in central United States	48	\$20B	Long period of excessive rainfall.
	14	May 1995	South-central United States	32	\$5–6B	Rain from recurring thunderstorms.
	15	Jan.–Mar. 1995	California	27	\$3B	Frequent winter storms.
	16	Feb. 1996	Pacific Northwest and western Montana	9	\$1B	Torrential rains and snowmelt.
	17	Dec. 1996–Jan. 1997	Pacific Northwest and Montana	36	\$2–3B	Torrential rains and snowmelt.
	18	Mar. 1997	Ohio River and tributaries	50+	\$500M	Slow-moving frontal system.
	19	Apr.–May 1997	Red River of the North in North Dakota and Minnesota	8	\$2B	Very rapid snowmelt.
	20	Sept. 1999	Eastern North Carolina	42	\$6B	Slow-moving Hurricane Floyd.
Flash flood	21	June 14, 1903	Willow Creek in Oregon	225	unknown	City of Heppner, Oregon, destroyed.
	22	June 9–10, 1972	Rapid City, South Dakota	237	\$160M	15 inches of rain in 5 hours.
	23	July 31, 1976	Big Thompson and Cache la Poudre Rivers in Colorado	144	\$39M	Rash flood in canyon after excessive rainfall.
	24	July 19–20, 1977	Conemaugh River in Pennsylvania	78	\$300M	12 inches of rain in 6–8 hours.
Ice-jam flood	25	May 1992	Yukon River in Alaska	0	unknown	100-year flood on Yukon River.
Storm-surge flood	26	Sept. 1900	Galveston, Texas	6,000+	unknown	Hurricane.
	27	Sept. 1938	Northeast United States	494	\$306M	Hurricane.
	28	Aug. 1969	Gulf Coast, Mississippi and Louisiana	259	\$1.4B	Hurricane Camille.
Dam-failure flood	29	Feb. 2, 1972	Buffalo Creek in West Virginia	125	\$60M	Dam failure after excessive rainfall.
	30	June 5, 1976	Teton River in Idaho	11	\$400M	Earth dam breached.
	31	Nov. 8, 1977	Toxoca Creek in Georgia	39	\$2.8M	Dam failure after excessive rainfall.
Mudflow flood	32	May 18, 1980	Touche and lower Cowlitz Rivers in Washington	60	unknown	Result of eruption of Mt. St. Helens.

Appendix F - Flood Resources

Flood Insurance	http://www.fema.gov/library/frnfip.htm
Dam Safety	http://www.usbr.gov/laws/damguide.html
Hurricane Safety	http://www.nws.noaa.gov/om/nh-hurr.htm
Flash-Flood Safety	http://www.nws.noaa.gov/om/nh-flsfld.htm
Regional Flood Safety	http://www.nws.noaa.gov/om/nh-flood.htm
River Forecast Centers	http://info.abrfc.noaa.gov/rfc_wfo.html
U.S. Army Corps of Engineers regional sites and districts	http://www.usace.army.mil/inet/organization/actlist2.htm
USGS Stream flow Data	
Historical	http://waterdata.usgs.gov/nwis-w/US/
Peak flow	http://h2o.usgs.gov/public/realtime.htm
Other web links for review	
Flood Preparedness and Survival	http://survivalkitsonline.com/floodpreparedness.html
Flood Preparedness	http://www.urbansurvivaltools.com/flood.html
UW - Madison's WisconsinView program	http://www.news.wisc.edu/15388
Jefferson County Links	
County Press Releases	http://www.co.jefferson.wi.us/jc/public/jchome.php?page_id=1258
Emergency Management Plan, Draft	http://www.co.jefferson.wi.us/UserFiles/Emergency%20Management/files/Draft%20Four.pdf

Exhibit 1 - UW Map Shows Range of Flooding Devastation

Wednesday, July 16, 2008

The Capital Times

A new map produced by the University of Wisconsin-Madison's WisconsinView program shows just how much the water from flooding last month had a widespread and devastating impact across southern and central Wisconsin.

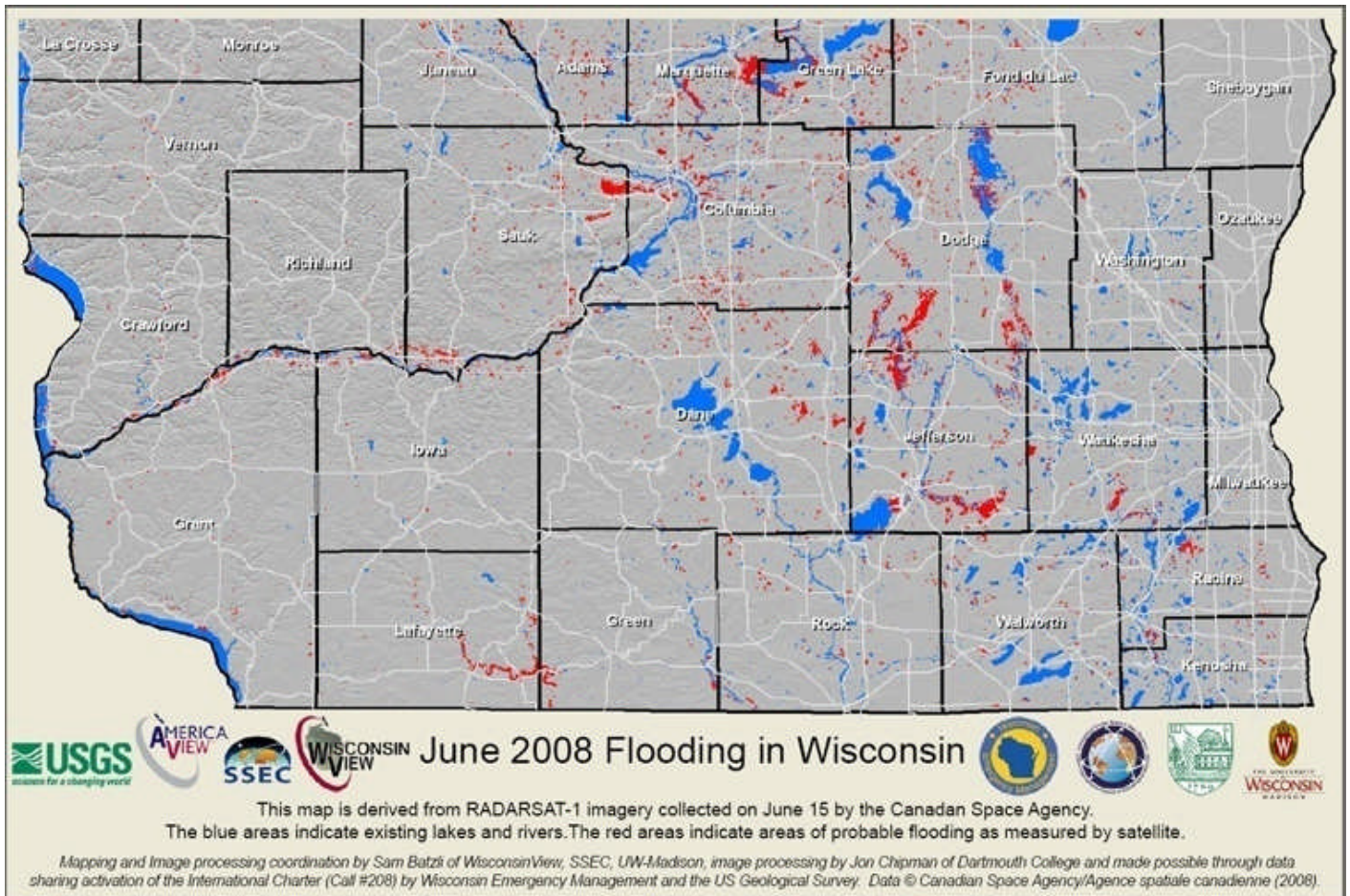
To view the map, visit <http://www.news.wisc.edu/15388>.

The image is a June 15 snapshot of the flooding that WisconsinView developed for Wisconsin Emergency Management, a state agency involved in response and recovery efforts. The blue areas indicate existing lakes and rivers; the red areas indicate areas of probable flooding as measured by satellite imagery collected by the Canadian Space Agency.

WisconsinView is a federally funded program that offers a free Web service for easy access to a variety of statewide images and data. For more information about the map and WisconsinView, contact program director Sam Batzli at 608-263-3126 or sabatzi@wisc.edu.

Please, scroll down for map view.

Exhibit 2 – WisconsinView – June Flooding 2008



WisconsinView – June 15, 2008

The blue areas indicate existing lakes and rivers; the red areas indicate areas of probable flooding as measured by satellite imagery collected by the Canadian Space Agency.

Exhibit 3 – County Disasters Since 1971

County Disasters since 1971

Jefferson County

1973 - Flooding - Presidential Disaster Declaration

1976 - Ice Storm - Presidential Disaster Declared

1976 - Drought - Presidential Emergency Declared

1977 - Tornado

1991 - Severe Storms - Presidential Disaster Declaration

1993 - Flooding - Presidential Disaster Declared

1996 - Flooding/Severe Storms

1998 - High Winds/Severe Storms

2004 - Severe Storms/Flooding - Presidential Disaster Declaration

Exhibit 4 - 2007 Disaster Unemployment Assistance

FOR IMMEDIATE RELEASE

Tuesday, October 2, 2007

CONTACT: Jessica Erickson, Communications Director, 608-266-6753

Disaster Unemployment Assistance

Application Deadline Approaches

Secretary Gassman Reminds Individuals in Nine Counties Hit By

August's Storms, Severe Flooding to Apply for Benefits by October 8

MADISON – Wisconsin Department of Workforce Development (DWD) Secretary Roberta Gassman today reminded workers in Columbia, Dane, Grant, Green, Iowa, Jefferson, Kenosha, Racine, and Rock counties who lost their employment due to flooding and severe storms in August that they must apply for Disaster Unemployment Assistance (DUA) by Monday, October 8, 2007.

Disaster Unemployment Assistance is a federal program that provides financial assistance to workers, including self-employed farm and non-farm workers, who lost work and wages as a direct result of a disaster. Individuals may be eligible for DUA benefits if, as a direct result of the flooding, they were unable to reach their place of employment, lost work because of an injury, or became the major support of a household because the head of the household died as a result of the storm. DUA benefits are not payable if the individual qualifies for regular unemployment benefits.

DUA benefits are based on a person's earnings for the most recent tax year. As a result, applicants will be asked to furnish earnings data from their 2006 federal tax return when filing a claim. The DUA benefit, depending upon yearly income and loss of wages, can range from \$132 to \$355 per week.

Applications must be filed by telephone by calling the state Unemployment Insurance Division in Madison at (608) 232-0678, in Milwaukee at (414) 438-7700, or toll free at (800) 822-5246. A special (TTY) number for the hearing impaired is also available at (888) 393-8914.

After flooding and severe storms hit southern Wisconsin beginning August 18, Governor Doyle announced the nine counties were declared federal disaster areas for individual assistance, which means DUA benefits are available to workers who qualify.

http://dwd.wisconsin.gov/dwd/newsreleases/2007/1002_dua_benefit_deadline.pdf

Exhibit 5 - Floodplain Management 2050

Action Guidelines

All the technical and programmatic steps essential to sustainable management of our water resources and related hazards described above can be condensed into six critical action guidelines.

These guiding principles capsule the new ways of thinking and operating that will be needed to achieve safe and sustainable relationships with our water resources. If decision makers, professionals in floodplain management, households, businesses, and others keep these guiding principles in mind, then our individual and collective actions will operate to remedy past errors and move the United States toward a safe and sustainable future.

1. Make room for rivers, oceans, and adjacent lands. These places are inherently both dangerous and environmentally sensitive. Avoiding them when contemplating future development or repairing or replacing infrastructure will be the most foolproof way to minimize flood losses and protect water-based resources. A gradual pattern of voluntary resettlement of people away from certain of these areas needs to be initiated.

2. Reverse perverse incentives in government programs. Too many federal—and corresponding state and local—public policies and activities for water-related resources and hazards operate at cross purposes and even foster activities that undermine safety and environmental quality. The culprits need to be identified and the varying objectives reconciled. Laws and policies that are already on the books need to be revived and enforced.

3. Restore and enhance the natural, beneficial functions of riverine and coastal areas. Even if these risky and environmentally sensitive areas are not subject to development in the future, past degradation of them needs to be remedied. It should be a national priority to reclaim lost riparian and coastal resources wherever possible, including dunes, bottomland forests, estuaries, and marshes. This will help restore natural buffers to storms and floods, supply open space and recreational opportunities for a burgeoning population, and prevent some ecosystems from further deterioration.

4. Generate a renaissance in water resources governance. Too many decades have passed in which the nation has struggled to manage its water resources without a clear, integrated vision and policy. Both are essential and should include legislation establishing a

national floodplain management policy and a national riparian and coastal areas policy, as well as consideration of an official shift to make SUSTAINABILITY of water resources our paramount concern, rather than DEVELOPMENT of them. National programs and investment decisions should be adapted quickly to account for expected trends and impacts associated with the collision of intensified human development and climate change.

5. Identify risks and resources and communicate at public and individual levels. Communication, education, and outreach efforts should be intensified immediately. Individuals, communities, and decision makers at the highest levels all need concrete, easy-to-understand information about flood risks and about environmental degradation. With computer modeling and digital technology it is possible to generate and depict nationwide scenario-based assessments of risk that take into consideration alternative conditions of climate, population density, sea level rise, infrastructure placement, and more.

6. Assume personal and public responsibility. We need to move quickly to revive our ancestral ethic of land and water stewardship. The nation needs a framework that will foster localized responsibility for flood risk, water-related resources, and wise use of flood prone lands.

Incentives need to be institutionalized to ensure that individuals and communities that act responsibly receive benefits while those that do not manage their risks and resources wisely cannot externalize the resulting losses and costs to federal taxpayers. All properties should be covered by actuarially based, all-hazards insurance that has a strong loss-reduction (mitigation) component.

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Suggested Reading

Enterprise Community Partners, Inc. and the National Center for Healthy Housing. (2008). *Creating a healthy home: A field guide for clean-up of flooded homes*

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Floodplain Management Publications

- [Above the Flood: Elevating Your Flood prone House](#), FEMA 347
- [Addressing Your Community's Flood Problems](#), FEMA 309
- [Adoption of Flood Insurance Rate Maps by Participating Communities](#) FEMA 495
- [After a Flood: The First Steps](#), FEMA L-198 / ARC 4476
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Endnotes

- ⁱ Galloway, Gerald E., A Flood of Unheeded Warnings, Wednesday, June 25, 2008; Page A13
<http://www.washingtonpost.com/wp-dyn/content/article/2008/06/24/AR2008062401213.html>
- ⁱⁱ Weier, Anita
- ⁱⁱⁱ Perry, Charles E.
Morton, W. E. et. al., the Wisconsin centennial story of disasters and other unfortunate events. 1848-1948.
- ^v Wisconsin Department of Natural Resources: <http://www.dnr.wisconsin.gov/org/water/division/yow/rivers.htm>
- ^{vi} www.flood-zone.net website
- ^{vii} This term is used within the context of other literature reviewed.
- ^{viii} Significant floods in the United State During the 20th Century—USGS Measures a Century of Floods, <http://ks.water.usgs.gov/Kansas/pubs/fact-sheets/fs.024-00.pdf>
- ^{ix} Ibid, Presented at IAHS Conference, Destructive Water: Water-Caused Disasters – Their Abatement and Control, Anaheim, California, June 1996
- ^x The Great USA Flood of 1993; http://www.nwrfc.noaa.gov/floods/papers/oh_2/great.htm
- ^{xi} <http://pubs.usgs.gov/circ/2003/circ1245/pdf/circ1245.pdf>
- ^{xii} Plasencia, D., & et al. editors. (2007). *FLOODPLAIN MANAGEMENT 2050*, Association of State Floodplain Managers, Inc.
- ^{xiii} http://dnr.wi.gov/emergency/current_flood.html
- ^{xiv} Ibid.
- ^{xv} http://emergencymanagement.wi.gov/sublink_print.asp?linksubcatid=53&linksubcatid=87
- ^{xvi} http://dwd.wisconsin.gov/dwd/newsreleases/2007/1002_dua_benefit_deadline.pdf
- ^{xvii} The Federal Emergency Management Agency – Floods: <http://www.fema.gov/hazard/flood/index.shtm>
- ^{xviii} River Ecology and Flood Hazard Mitigation, Thomas A. Birkland, Raymond J. Burby, David Conrad, Hanna Cortner, and William K. Michener, *Natural Hazards Rev.* 4, 46 (2003), DOI:10.1061/(ASCE)1527-6988(2003)4:1(46)
- ^{xix} According to Alreck and Settle, *The Survey Research Handbook*, “the single most serious limitation to direct mail data collection is the relatively low response rate. This has been our experience in the collection of data for this survey. We asked individual businesses to return the mailed assessment form back to us, to fax it back, or to complete when our economic recovery assistant called to complete on the phone. This has given us a response rate (RR) of 63 percent.
- ^{xx} Kling, George W., et al. *Confronting climate change in the Great Lakes*, 2003, page 26.
- ^{xxi} Ibid, page 16
- ^{xxii} Ibid.
- ^{xxiii} [Flood-Zone.net](http://www.flood-zone.net)
- ^{xxiv} Gilbert Fowler White (November 26, 1911 in Chicago – October 5, 2006 in Boulder, Colorado) was a prominent American geographer, sometimes termed the "father of floodplain management" and the "leading environmental geographer of the 20th century" (Wescoat, 2006). White is known predominantly for his work on natural hazards, particularly flooding, and the importance of sound water management in contemporary society. He was raised in Chicago in the Hyde Park neighborhood; he earned his B.S. at the University of Chicago in 1932 and his PhD in 1942. From 1946 to 1955 he was President of Haverford College. He then returned to Chicago as a professor of geography, where he was the central figure in the "Chicago school" of natural hazards research. In 1970, he moved to the University of Colorado, before retiring after ten years there. Having published his first paper in 1935, he was still publishing into his 90s (Wescoat and White, 2003). http://en.wikipedia.org/wiki/Gilbert_F._White
- ^{xxv} Plasencia, D., & et al. editors. (2007).

^{xxvi} *Ibid, page ix*

^{xxvii} Anderson, M. (2007), Flood Provisions and the International Codes In 2050, Part 6. Elevation, Building Standards, Background reading for the Gilbert F. White National Flood Policy Forum 2007 Assembly - Floodplain Management 2050, page 96.