

# LOCAL EMERGENCY PLANNING COMMITTEE (LEPC) SUB-COMMITTEE

## Flooding Mitigation

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### Recommendations to Elected Officials

#### Sub-Committee Members

City Commissioner – Mike Waldner  
City Engineer - Chad Comes  
City Fire Chief - Randy Minnaert  
City Public Works - Fred Snoderly  
Emergency Medical Services - Ron Jorgensen  
Lake Co Commissioner - Kelli Wollmann  
Lake Co Emergency Management – Donald Thomson  
Lake Co Environmental Protection Office - John Maursetter  
Lake Co Planning/Zoning - Deb Reinicke  
LEPC-Wentworth Fire Dept - Kory Reck  
Manitou/Gehl Manufacturing - Jeff Wieman

**Original Located at: Lake County Emergency Management**

**30 January 2013**

The recommendations provided within this document consist of primary and secondary recommendations and considerations related to flooding within the county. It also provides possible funding solutions.

A. SUMMARY:

History of flooding is common within Lake County area and should not be taken lightly because of the impact that it has on the infrastructure and residential areas. In the past 30 years, Lake County has encountered more than 15 events, some of which have resulted in federal declarations. Flooding events ranged from temporary high waters that topped banks to extensive damages to homes, businesses, and infrastructure.

**1984** Flooding

**1985** Heavy snows with spring runoff

**1986** May 3rd heavy rains

**1992** July 2nd flooding

**1993** July 3rd Flooding

**1994** May 26 flooding

**1995** Flooding

**1997** flooding spring runoff

**1998** June 1st flooding

**2001** Spring flooding and storms

**2004** July 20th flooding

**2007** May 5th flooding

**2010** March Spring runoff and flooding

**2011** May 13, July 3rd, July 8th flooding storms

**2012** May 5th flooding

Causes of these flooding events do not follow any particular pattern, other than they occur during the spring and summer months with runoffs or heavy rains. The amounts of rains all depend on where and when they fall.

The 1993 flooding was a result of water-saturated grounds from the previous winter and spring. This event also affected a wide spread area and affected several counties in the eastern half of South Dakota. On July 3, approximately 6 inches of rain fell in Madison in a short period.

On May 5, 2012, approximately 7.43 inches of rain fell in Madison in two separate rains. There was also 10-13 inches of rain in the Junius, SD area during the May 2012 storms. The grounds were relatively dry in the area and the rainstorm followed a narrow path through the area affecting seven counties (Davison, Sanborn, Miner, Lake, Hanson, Brookings, and Moody). The heaviest rains fell in an area that followed SD Highway 34 east into Minnesota.

After the 1993 flood, Banner Associates conducted a Drainage Basin Storage and Soil Erosion Prevention Study for the City of Madison and Lake County (aka: 1995 Banner Study). Additional committees and studies were organized and conducted to study the impact of areas such as the Vermillion River East fork flow, Lake Madison Watershed and Sediment (Barr Study).

Several recommendations were provided within the studies. Some of the recommendations in these studies were tabled due to funding issues. However, several of the smaller projects were also completed or are still on-going to mitigate the flooding. The completion of these projects was instrumental in reducing the impact of the May 2012 flooding.

The LEPC subcommittee has reviewed over 50 suggestions from the recent and past impacts of the flooding and discussed the actions taken over the past 20 years. These recommendations were developed with the existing data available and do not include a technical, feasibility, or environmental analyses and consideration of such analysis is recommended to provide appropriate information for consideration. The LEPC Sub-Committee is submitting the following recommendations to the elected officials in Lake County.

Primary Recommendation:

1. The flow of floodwaters from the north tributaries into the City of Madison has been identified as the primary cause for most flooding within the City of Madison. The following items have been considered and are likely to decrease the stress on the city drainage system and reduce flooding.
  - a. Possible solutions:
    - i. Raise the two township roads at 230th and 231st street. Elevation of roads would have to be determined to be effective and reduce the impact upstream. This would result in the County, City, and Township working together to reduce the cost. This is an option that may be the most cost effective.
    - ii. Construction of a detention dam north of Madison in the vicinity of 15th street or 232nd street. If built in conjunction with the township grade raise on 230 and 231 streets it may be able to be reduced in size. This would create a 3 tier detention system to slow the water flow. If it were built as part of North 15th street running from North Washington Ave to US Highway 81 it may also help reduce the traffic congestion on North Washington Ave and create more development opportunities. This dam may be able to be constructed on the 15<sup>th</sup> street existing statutory right-of-way (ROW) provided it does not unduly complicate any FEMA certification(s). All of the above referenced 2 mile portion of 15<sup>th</sup> street, except 1,000 feet, is currently entirely outside of city limits. The 1,000 foot portion ROW is half City half County.
    - iii. Omit the above options and construct the 1995 planned retention dam. Due to simple inflation, cost for the 1995 plan will be much higher than what it was originally estimated. The cost factor alone could prevent this project from becoming a reality but should still be considered.
    - iv. Replace Railroad Bridge in the Southeast quarter of city. The bridge current length is 70 feet. Should any of the above flow reduction options be completed, this should be reevaluated to determine the benefits with the reduced flow levels.

Note: Implementation of the above 4 recommendations will create a revised floodplain through the City of Madison and downstream areas. This will generate a required Letter of Map Amendment (LOMA) approval by FEMA. The process of seeking approval of a LOMA is a lengthy and a costly process.
    - v. Continue with the stream cleaning of waterway within the City limits. This should be considered as an annual maintenance requirement through the city.
    - vi. Continue with plans to replace the bridge on South Garfield Avenue in 2018.
    - vii. Study and Develop a Bank Stabilization Plan for waterways, such as Silver Creek, Park Creek, Bull Creek, Battle Creek, and Buffalo Creek. This is an area that will require further studies to determine the best method of stabilizing masonry retaining walls and banks for creeks within the city limits, as well as the major

waterways in the county. Continued undermining could result in retaining walls and roads collapsing.

- b. For each and every improvement a specific hydraulic analysis will need to be conducted to ensure the effects and compliance with floodplain regulations. Coordination and agreements between County, City, Township, and landowners will be required.
2. The Town of Wentworth will need to consider an alternate drainage system under or around the railroad system. A collection well could be constructed at a low point and a pump system could be installed as needed to handle excess water levels. An automated system would be the preferred choice.

#### B. Secondary Recommendations and Considerations

1. Lake Herman Spillway and territorial road. There are no recommendations at this time for raising the grade of territorial road. The impact to the South Dakota State Park, Camp Lakotia, and residential areas would have a negative impact. The current road grade elevation is at 1675 feet, which was recommended by the Banner study. The spillway was replaced in October 2012 to maintain the same water levels and flows.
2. North and West of Lake Herman. The 1995 Banner study recommended a detention dam to be located west and north of Lake Herman off highway 81/34. It is recommended that this be restudied due to the changes to the water flows made up stream. It may be possible that they are no longer needed due to the changes in that area.
3. A water flow study should be completed that includes Lake Herman, Lake Madison, Brant (Brandt) Lake, Bourne Slough, Redfield Slough, and Long Lake. This study should be incorporated with all other studies to help make factual decisions on plans and recommendations. It should also include the affects of current drainage tiling into tributaries and lakes. This would provide a better understanding of long term flooding from a hydraulic and hydrologic perspective only.
  - a. Bourne Slough. It is recommended that this be evaluated by an engineer study to determine if maintenance is required or if a design change is required to reduce downstream issues.
  - b. Redfield Slough / 465th Ave. This road should be considered for a grade raise due to the number of times that it is inaccessible after spring runoff and heavy rains. By raising this road, it could delay the impact of the water flow downstream into Lake Madison and Brant Lake from the west.

#### C. Additional Considerations

1. In conjunction with, in lieu of, or in an appropriate combination with the Primary Recommendations, additionally consider the Development of the Greenway Plan through the City of Madison as outlined in the 2008 Comprehensive Plan, which contemplates managing the 100-year floodplain. This should also include opportunities for further flood buy out options for homes and businesses within the floodway.

2. Wetland Enhancements / Developments. Several areas have been developed into wetland areas in Lake County. It is the landowner's responsibility to maintain these areas. Due to the land values and crop prices, more land has been converted into cropland. Over time, more wetland areas may be converted to farmland. This could result in heavier runoffs during the spring. The Corps of Engineers Section 22 program appears that it could assist with the proper actions.
3. Lake Madison Spillway currently is capable of handling the existing water flow that it was designed for, however the flow is restricted by the channel. Changes to the spillway would affect both upstream and downstream areas negatively. This area will require monitoring after storms and during runoffs to ensure that the spillway is clear of debris and obstructions. Since the spillway is part of the County road system, the spillway/bridge will be replaced as inspections deem necessary. The spillway channel, which is owned by the landowners on each side of the channel, requires regular maintenance to ensure that the flow width is not restricting the flow of the spillway structure. The Lake Madison Development Association along with the landowners, State of South Dakota, and Corps of Engineer should develop a maintenance plan for the channel.
4. Brant Lake Spillway. There are no recommendations or suggestions at this time.
5. Erosion control measures – Lake front properties. This will require the landowners to develop control measures that will prevent wind and water erosion on the beachfront properties. All property owners should have flood insurance or additional homeowner insurance coverage to protect their properties each year. This could also be a Development Association effort to develop a common plan for homeowners to reduce erosion.

#### D. Warning Systems / Public Education

1. National studies have concluded that there is no perfect warning system. New technologies along with a wide range of demographic groups make it difficult to provide a specific warning tool that works for the majority. An All-Hazard weather radio is still the preferred method of providing alerts and warnings to the public. This can also be considered as a personal responsibility, similar to warning systems such as a smoke detector or fire extinguisher. There are several current warning systems and tools utilized in Lake County which consist of:
  - a. NOAA all hazards weather radios (24/7)
  - b. Sirens for Severe weather and fires (24/7)
  - c. Weather Spotters (As required)
  - d. City of Madison E-Mail alert System (Used for early outlooks and information)
  - e. NIXLE (Used for early outlooks and information)
  - f. Twitter (in development & minimal use)
  - g. Facebook (in development & in minimal use by the EM and PD)
  - h. Smartphone and Text Messaging options (several applications available)
2. There are numerous awareness campaigns/programs available through federal and state departments, like Storm Ready, B-Ready, Ready-Set-Go, and Weather Ready Nation. These programs are promoted by Local agencies. The continuations of these programs and similar safety awareness programs are recommended as on-going efforts within the county. Getting the public actively involved with these programs starts in the school systems but needs additional

encouragement in homes and businesses. An on-going effort to keep the public informed of the current outlooks situations will continue at the local levels. An additional consideration would be to have the City and County entities increase Public Service Announcements (PSA) during March/April of each year to remind residents of the dangers of flooding and severe weather. These PSA's could be conducted in conjunction with the National Weather Service Severe Weather Awareness week each year.

3. Because of the wide diversity of the demographic groups within Lake County, the goal will be to keep as many informed and involved with as many methods possible that will reach out to the largest numbers of citizen and organizations. Changes in technologies and those that use them will also be an on-going issue to determine what is suited for this area.
4. Encouragement to and education of the public on the benefits of their pursuing installation of sanitary sewer check valves needs to be emphasized each year. This should be considered as part of their personal responsibility to protect their property when they are at risk or have experienced previous loss(es) during flood events.

E. Funding options / recommendations

1. Silver Jacket Program. This is a new technical assistance non-funding program in which several federal and state entities work together with local counties to help mitigate flooding and waterway projects. The County and communities should apply for this program for 2013 to assist with the above recommendations. This program appears to have the potential of helping with several issues within the area. It may be possible that sources of funding for construction/improvements could be identified during the course of participating in this program.
2. Corps of Engineer assistance.
  - a. The Corps of Engineer has been working with the LEPC sub-committee and has provided assistance in suggesting programs to assist the communities and county with the flooding issues. The Corps has provided and suggested that the County and City request assistance through the Section 22 and 206 programs available through their office.
  - b. The Section 22 Planning assistance program is a 50/50 match program for planning that would allow in-kind matches to fund the program. This appears to be an excellent starting point for completing the planning actions for flooding mitigation. Initial actions for this program were requested in November 2012 through a joint letter from the County and City of Madison.
  - c. The Section 206 program is a flood plain management service program that can develop a flood loss potential program and helps prepare analyses for the mitigation of damages. This program has several items that would benefit Lake County and its communities in flooding issues. The program is a 100 percent federally funded program. It is recommended that the City and County apply for this at the earliest possible time.
3. Banner Engineer Study. At this time, the City and County should plan to budget for a comprehensive study update to the 1995 Banner Study beginning in 2014. This would be required if the Corps of Engineer and Silver Jacket programs are not able to provide the assistance needed to

mitigate the flooding. The current Banner study needs to be updated to be able to obtain a more comprehensive idea of the affects of any recommendations as well as the affects of the completed projects from the original study.

4. Mitigation grants. All though not available at this time, the City and County should take advantage of disaster mitigation funds that become available after a disaster. Pre-Disaster mitigation funds can be requested for several types of studies and projects. These funds are a 75/25 matching grant in which the local 25% match can be completed with in-kind funding opportunities. This is the only possible project-funding source for construction/improvements contemplated in this document.
5. Pre-Disaster Mitigation Plan. Lake County has been working on updating the Local Pre-Disaster Mitigation Plan for the past 3 years. This plan is required for federal funding that is directed to mitigation or disaster type projects. It is anticipated that the plan will be updated by the end of 2012 calendar year and approved by FEMA in early 2013. The updated plan will include all flooding projects identified by the LEPC Sub-committee. This will allow for federal funding consideration for these projects at a later date. Additional projects can be added or removed once the plan is completed. This plan also has a requirement to be updated every 5 years.

## **Conclusion**

Flooding mitigation is a vital element in maintaining the infrastructure, protecting property, and saving lives. Every step forward in reducing the impact is a step towards a more resilience community and county. The recommendations submitted to the elected officials of Lake County is only an updated listing of what the sub-committee feels is the course of action that should be taken at this time. This type of review and update should be conducted at least every 5 to 10 years to ensure that projects are being completed or when efforts need to be redirected towards other projects.

Alternative projects and funding opportunities should always be considered when available. Funding will always be an issue, however, the cost of a life should always be considered.

Donald E Thomson  
LEPC Sub-Committee Chairperson

Encl  
Listing of all suggested projects  
Corps of Engr Sec 22 flyer  
Corps of Engr Sec 206 flyer  
Silver Jacket flyer

The following listing of projects were reviewed by the LEPC Sub-Committee. Not all projects were recommended to be completed at this time, however, listing remain intact for further review at a later date.

#	CONSOLIDATED LISTINGS OF SUGGESTED PROJECTS - 2012
1	Berm construction along Park creek south of 2nd Street
2	Berm construction North of Bethel Home
3	Berm construction North of Gehl/Manitou
4	Bridge Railroad concrete embankments and wing walls
5	Bridge Railroad Replace with 200' span bridge
6	Bridge Railroad waterway Cleanout restoration
7	Bridge Replacement North Blanche Ave (700 block)
8	Bridge Replacement South Garfield Ave (2018)
9	Building Code changes – restrictions to finished basements
10	Check valves – Residential and Business buildings
11	Check valves – storm system drainage into creek areas
12	Cleaning and grading of Streams scheduled
13	Culvert / Pipe North Josephine Ave additional arch pipe
14	Dam Restoration County Road 41/237th Street (Reynolds Slough)
15	Detention/Retention Pond NW of Hwy 81/Madison (Park Tributary)
16	Detention/Retention pond only 15th Street
17	Detention/Retention Pond west of Lake Herman
18	Detention/Retention ponds north of Lake Herman
19	Drain Tiling SE quarter of Madison (48", 62" tiles around/under RR tracks)
20	Drainage Issues – NW 9th Street Culvert not large enough
21	Drainage Issues – SD Hwy 34 & 456th Ave reroute drainage (John Deere)
22	Drainage Issues – South Washington Ave drainage issues
23	Drainage Issues – Storm sewer improvements
24	Drainage Issues – Sump pumps in sewage system
25	Drainage issues – west of Junius Hwy 81/34 between 447 and 448 Ave
26	Grade Raise road – 230th and 231st Street (Includes box culvert enlargement)
27	Grade Raise road 453 Ave
28	Grade Raise road 453A Ave (south Farmers Ave)
29	Grade Raise South Highland Ave
30	Grade Raise Territorial Road
31	Public Awareness Training - Weather Radios, individual responsibilities
32	Public Awareness Training on Tiling
33	Reynolds Slough cleaning / wetland restoration
34	Road Construction 15th Street Construction
35	Spillway Replacement / Upgrade Lake Madison
36	Township Roads mitigation from repetitive damages
37	Vermillion River East Fork
38	Warning System enhancements
39	Wentworth City drainage issues – north of tracks

40	Wetland Enhancement along Battle Creek
41	Wetland Enhancement North of Junius
42	Wetland Enhancement North of Madison 230th and 231st Street
43	Wetland enhancement NW of Madison
44	Wetland Enhancement Redfield Slough
45	Wetland Enhancement South of Ramona
46	Bank Stabilization Memorial creek from NW 9th Str to SE 4th Str
47	Bank Stabilization Silver Creek S Highland Ave to S Garfield Ave
48	Bank Stabilization Lake Madison
49	Bank Stabilization Creek S of Madison to 235th Str (CR40)
50	Bank Stabilization Lake Herman Inlets
51	Bank stabilization from west ave thru memorial creek
51	Channel modifications where Park Creek enters Silver Creek
52	Raise Grade – retention area near junction of Hwys 81 and 28(228th Str)
53	Increase Public Service Announcements (PSA) during March/April of each year to remind residents of the dangers of flooding and severe weather.



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## Section 22

# Planning Assistance to States and Tribes

Section 22 of the Water Resources Development Act of 1974, as amended

### Authority and Scope:

Section 22 of the Water Resources Development Act of 1974, as amended, provides authority for the Corps of Engineers to assist states, local governments, federally-recognized Indian Tribes and other non-federal entities in the preparation of comprehensive plans for the development, utilization and conservation of water and related land resources.

### What the Corps of Engineers Can Do:

Under the Section 22 Program, the Corps of Engineers can provide technical planning assistance in all areas related to water resources development. The needed planning assistance is determined by the individual states and Tribes. Every year, each state and eligible Native American Indian Tribe provides the Corps of Engineers its request for studies under the program, and the Corps then accommodates as many studies as possible within the funding allotment.

Typical studies are only planning level of detail; they do not include detailed design for project construction. The studies generally involve the analysis of existing data for planning purposes using standard engineering techniques, although some data collection is often necessary. Most studies become the basis for state, Tribal, or local planning decisions.

The program can encompass many types of studies dealing with water resource issues. Types of studies conducted under Section 22 include, but are not limited to:

- flood damage reduction studies
- bank stabilization studies
- water quality studies
- sedimentation studies
- fish and wildlife studies
- cultural resource studies
- ecosystem and watershed planning studies

### Program Costs:

Section 22 is funded annually by Congress. Assistance is limited to \$500,000 in federal funds per state or Tribe per year. Individual studies, of which there may be more than one per state or Tribe per year, generally range in cost from \$25,000 to over \$100,000. These studies are cost-shared on a 50/50 basis (50 percent federal/50 percent non-federal sponsor). The study sponsor has the option of providing in-kind services for up to 100 percent of its share of the study cost.

### Requesting Assistance:

For additional information or to request assistance under the Section 22 Program, please send requests to:

U.S. Army Corps of Engineers, Omaha District  
CENWO-PM-AA  
Attn: Chief, Plan Formulation Section  
1616 Capitol Avenue  
Omaha, NE 68102

Sample request letters can be found at [www.nwo.usace.army.mil/html/pd-p/Plan\\_Formulation/TAP/TAP\\_22\\_letter.html](http://www.nwo.usace.army.mil/html/pd-p/Plan_Formulation/TAP/TAP_22_letter.html)

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## Section 206

# Flood Plain Management Services Program

Section 206 of the Flood Control Act of 1960, as amended

### Authority and Scope:

Section 206 of the Flood Control Act of 1960, as amended, provides authority for the Corps of Engineers to provide a full range of flood risk information, technical services and planning guidance to support and promote effective flood risk and floodplain management.

### What the Corps of Engineers Can Do:

Under Section 206, the Corps of Engineers can provide technical services, planning assistance and guides and pamphlets for floodplain management. The purpose of floodplain management is to help prevent or reduce flood damage by using either structural or nonstructural mitigation measures or a combination of the two.

**Structural measures** are physical modifications designed to reduce the frequency of damaging levels of flood inundation by changing the character of the flood. These measures include dams and reservoirs, channel modifications, levees or floodwalls.

**Nonstructural measures** reduce flood damages without significantly altering the nature or extent of the flooding by adapting to the floodplain. These measures include modifying homes, businesses and other facilities to reduce flood damages by elevating the structures or relocating them from the floodplain, dry flood proofing, wet flood proofing, small berms and floodwalls. Remaining land can be used for ecosystem restoration, outdoor recreation or natural open space. Flood warning systems and flood evacuations are also considered nonstructural measures. For additional information on nonstructural measures, visit [www.usace.army.mil/missions/civilworks/projectplanning/nfpc.aspx](http://www.usace.army.mil/missions/civilworks/projectplanning/nfpc.aspx).

The Omaha District's Flood Plain Management Services Program can provide the following services:

- develop flood loss potentials before and after implementation of floodplain management;
- prepare nonstructural floodplain analyses for the mitigation of damages to residential, commercial and industrial structures;
- conduct digital flood insurance studies for the Federal Emergency Management Agency (FEMA);
- review regulatory permit actions to ensure compliance with Executive Order 11988;
- provide state and local officials with guidance on floodplain regulations and technical assistance in delineating regulatory floodways; and
- provide flood hazard information on individual sites and reaches of streams in response to requests from federal, state and local officials and Native American Tribes.

### Program Costs:

All Flood Plain Management Services Program activities provided to state, regional and local governments or other non-federal public agencies are 100 percent federally funded, within program funding limits. Program services can also be provided with 100 percent of the funds coming from the requesting entity. Federal agencies, private entities and non-governmental organizations are required to provide funds to cover 100 percent of the cost of services provided.

### Requesting Assistance:

For additional information or to request assistance from the Flood Plain Management Services Program, please send requests to:

U.S. Army Corps of Engineers, Omaha District  
CENWO-ED-HB  
Attn: Chief, Flood Risk and Floodplain Management Section  
1616 Capitol Avenue, Ste 9000  
Omaha, NE 68102-4901  
(402) 995-2322  
[dll-cenwo-nfpc@usace.army.mil](mailto:dll-cenwo-nfpc@usace.army.mil)

June 2012

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## The Silver Jackets Program

*“Silver Jackets allows the State and Federal partners to work seamlessly...and anticipate needs during disaster events. The Silver Jackets program maximizes the funding available... and allows the team members to work together in a synergistic manner, tapping into one another’s needs and capabilities, thus creating... services that otherwise would not be available. The program allows the partner agencies to look ahead and identify potential challenges and identify solutions to address those challenges before they happen.”*

*Manuela Johnson, Indiana Dept of Homeland Security*

Silver Jackets teams are collaborative state-led interagency teams, continuously working together to reduce flood risk at the state level. Through the Silver Jackets program, the U.S. Army Corps of Engineers, the Federal Emergency Management Agency, additional federal, state and sometimes local and Tribal agencies provide a unified approach to addressing a state’s priorities. Often, no single agency has the complete solution, but each may have one or more pieces to contribute. The Silver Jackets team is the forum where all relevant agencies come together with the state to collaboratively plan and implement that interagency solution. Through partnerships, Silver Jackets optimizes the multi-agency utilization of federal resources by leveraging state/local/Tribal resources, including data/information, talent and funding, and preventing duplication among agencies.

The primary goals of the Silver Jackets program are to:

- Facilitate strategic **life-cycle** flood risk reduction,
- Create or supplement a **continuous** mechanism to **collaboratively** solve state-prioritized issues and implement or recommend those solutions,
- **Improve** processes, identifying and resolving gaps and counteractive programs,
- Leverage and **optimize** resources,
- Improve and increase **flood risk communication** and present a unified interagency message, and
- Establish close relationships to facilitate **integrated post-disaster recovery** solutions.

Currently there are twenty-two states with an active intergovernmental flood risk management team. Efforts to offer a team the remaining 28 states are ongoing, with the ultimate goal of supporting an interagency team in every state. Team focal areas vary, as state priorities vary. The intent is not to duplicate existing teams, but to supplement and strengthen current efforts, and establish relationships where they do not yet exist.

