



US Army Corps  
of Engineers



## Fargo-Moorhead Metropolitan Feasibility Study

### Overview:

The Fargo-Moorhead Metropolitan Feasibility Study is a cooperative effort between the communities of Fargo and Moorhead, with the US Army Corps of Engineers St. Paul District office. This handout is designed to give a summary of the study and include details of what the scope of the study is, and the timeline in which the study will follow.

### Study Goals:

- Understand the flood problems in the greater Fargo-Moorhead Metropolitan area
- Develop a regional system to reduce flood risk.
- Determine the Federal Government's role in implementing flood risk reduction measures
- Document study findings in a Feasibility Report and a National Environmental Policy Act (NEPA) Environmental Impact Statement.
- If appropriate, recommend implementation of a federal project to U.S. Congress.

### Problems and Opportunities:

The primary problem in the study area is a high risk of flood damage to urban infrastructure from the Red River of the North, the Wild Rice River (ND), the Buffalo River, and the Sheyenne River. There are opportunities in the study area to increase and improve wildlife habitat and provide recreational amenities.

### Planning Objectives:

Planning objectives describe desired positive changes. The national objectives for federal water resource projects are to maximize national economic development and restore ecosystem functions.

The following planning objectives support the national objectives:

1. Reduce flood risk and flood damages in the Fargo-Moorhead metropolitan area.
2. Restore or improve degraded riverine and riparian habitat in and along the Red River of the North, Wild Rice River (North Dakota), Sheyenne River (North Dakota), and Buffalo River (Minnesota).
3. Provide additional wetland habitat in conjunction with other project features.
4. Provide recreational opportunities in conjunction with other project features.

## **Planning Constraints:**

Planning constraints describe restrictions that should not be violated. The following planning constraints have been identified for this study:

1. Avoid increasing peak Red River flood stages, either upstream or downstream
2. Comply with the Boundary Waters Treaty of 1909 and other pertinent international agreements.
3. Avoid negatively impacting the Buffalo Aquifer in Minnesota.

## **Summary Description of Flooding History:**

The Fargo-Moorhead metropolitan area has a relatively high risk of flooding. The highest river stages usually occur as a result of spring snowmelt, but summer rainfall events have also caused significant flood damages. The Red River of the North has exceeded the National Weather Service flood stage of 17 feet in 51 of the past 107 years, and every year from 1993 through 2009. The study area is between the Wild Rice River, the Sheyenne River, and the Red River of the North; inter basin flows complicate the hydrology of the region and contribute to extensive flooding

Fargo and Moorhead have become accustomed to dealing with flooding. Sufficient time is usually available to prepare for flood fighting because winter snowfall can be monitored to predict unusual spring runoff. Both communities have well documented standard operating procedures for flood fights. Both communities avoided major flood damages in the historic floods of 1997 and 2009 by either raising existing levees or building temporary barriers. Since the 1997 flood, both communities have implemented mitigation measures, including acquisition of almost 100 floodplain homes, raising and stabilizing existing levees, installing permanent pump stations, and improving storm sewer lift stations and the sanitary sewer system. Although emergency measures have been very successful, they may also contribute to an unwarranted sense of security that does not reflect the true flood risk in the area.

## **Array of Plans Considered:**

The feasibility study considered a wide range of plans to meet the planning objectives. These plans were screened down to eliminate those plans that would either not likely meet the planning objectives, would be excessively costly, or would have extreme impacts on the environment.

- No Action: Continue emergency measures
- Nonstructural measures
  - Buy and relocate flood-prone structures
  - Flood proofing
  - Elevate structures
  - Flood warning systems
  - Flood insurance
  - Wetlands
  - Grasslands
- Flood barriers
  - Levees
  - Floodwalls
  - Invisible floodwalls
  - Gate closures

- Pump stations
- Increase conveyance
  - Diversion channels around the study area
    - In Minnesota
    - In North Dakota
  - Increase conveyance in Oakport Coulee
  - Cutoff channels (to short-cut existing meanders)
  - Flattening the slopes on river bank
  - Dredge river deeper and wider
  - Replacing bridges
  - Underground tunnels
  - Interstate 29 viaduct
- Flood storage
  - Large dams upstream
  - Distributed storage
  - Controlled field runoff
  - Storage ponds, also used for water conservation
  - Pay landowners for water retention

### **Initial Screening:**

An initial screening was conducted on the Array of Plans considered. The screening criteria used consisted of:

- ✓ **Effectiveness:** Ability to provide acceptable level of flood risk management
- ✓ **Environmental Effects:** Effects on natural and cultural resources
- ✓ **Social Effects:** Effects on socio-economic resources
- ✓ **Acceptability:** Controversy and potential effects on community
- ✓ **Implementability:** Technical, social, legal or institutional issues
- ✓ **Cost:** The first cost of the project and operations and maintenance.
- ✓ **Risk:** The uncertainties surrounding the project
- ✓ **Separable Mitigation:** Is separable mitigation required and what is the cost
- ✓ **Cost Effectiveness:** Comparison of benefits and costs

A detailed analysis was completed on 2 levee plans [2% chance (50-year) and 1% chance (100-year) events], 9 diversion plans (3 in North Dakota and 6 in Minnesota), and 3 Non-structural plans. The results of this analysis indicated that a diversion channel in Minnesota is the most viable alternative. The North Dakota diversion channel alignments have a number of large uncertainties at this time that could affect the analysis, so further study is needed to determine if a viable North Dakota alignment exists. One levee alternative was also found to be viable, and additional analysis will be necessary to determine the National Economic Development Plan.

The screening resulted in recommendations that the following options be carried forward: (1) **No Action: Continue Emergency Measures**, (2) **Diversion Channels**, and (3) **Levee/Floodwalls**.

The stand alone alternatives of Tunneling, Interstate 29 Viaduct, Dredging and Widening the River, and Cut-Off Channels will no longer be considered. Non-Structural Measures, Flood Storage, Bridge Replacement or Modification, and Wetland and Grassland Restoration will no longer be considered as stand-alone options, but may be incorporated in the overall plan as incrementally justified features.

The alternatives listed in italics and bold below will be carried forward.

Alternative	Cost *	Net Benefits *	B/C Ratio
Levee 2% chance (50-year)	840,000	-5,330	0.88
<b><i>Levee 1% chance (100-year)</i></b>	902,000	<b>7,673</b>	<b>1.17</b>
MN Long Diversion 25K	1,055,000	<b>5,596</b>	<b>1.10</b>
MN Long Diversion 35K	1,260,000	<b>266</b>	<b>1.00</b>
MN Long Diversion 45K	1,459,000	-8,283	0.89
<b><i>MN Short Diversion 25K</i></b>	<b>962,000</b>	<b>11,025</b>	<b>1.22</b>
<b><i>MN Short Diversion 35K</i></b>	1,092,000	<b>9,424</b>	<b>1.17</b>
<b><i>MN Short Diversion 45K</i></b>	1,264,000	<b>2,501</b>	<b>1.04</b>
<b><i>ND East Diversion 35K</i></b>	1,337,000	-3,108	0.95
ND West Diversion 35K	1,363,000	-4,426	0.94
ND West Diversion 45K	1,439,000	-6,718	0.91

\* In thousands of dollars

#### Schedule:

**Jan 2010:** Identify tentatively selected plan  
**Jan 2010:** Public Meeting  
**Mar 2010:** Independent External Peer Review  
**May 2010:** Formal Public Review of Feasibility Report  
**Sep 2010:** Finalize feasibility report  
**Dec 2010:** Transmit recommendation to Congress  
**Jan 2011:** Begin Plans and Specifications  
**Apr 2012:** Begin Construction

#### How to get More Information and stay informed:

Visit the study website at: <http://www.internationalwaterinstitute.org/feasibility>

#### Primary Study Contacts:

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