



Fargo-Moorhead Metropolitan Feasibility Study

Overview:

The Fargo-Moorhead Metropolitan Feasibility Study is a cooperative effort between the communities of Fargo, ND and Moorhead, MN, with the U.S. Army Corps of Engineers St. Paul District. This handout is designed to give a summary of the study, its preliminary findings and the timeline for completion.

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 the U.S. Congress.

Problems and opportunities:

The primary problem identified 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 and its tributaries. Flooding also causes damage to rural infrastructure and agricultural crop land and disrupts transportation and access to properties within the study area. There are opportunities to increase and improve wildlife habitat and to increase recreation in conjunction with measures to reduce flood risk.

Flooding history:

The Fargo-Moorhead metropolitan area has a relatively high risk of flooding. The Red River has exceeded the National Weather Service flood stage of 18 feet in 46 of the past 107 years, and every year from 1993 through 2009. The study area includes 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. The 2009 flood was the flood of record with a peak stage of 40.8 feet on the Fargo gage. Average annual flood damages in the Fargo-Moorhead metropolitan area are currently estimated at more than \$77 million. Most communities in the region avoided major flood damages in the historic floods of 1997 and 2009 by either raising existing levees or building temporary barriers. 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.

Planning process:

This feasibility study began in September 2008. A wide array of potential measures was identified early in the study and expanded with input from the public. From September 2008 through May 2009, the study team gathered information to assess existing conditions in the study area and worked to understand the potential for economic justification of a large regional flood risk management project. In the wake of the 2009 flood, local, state and Congressional officials requested an aggressive schedule to

Key considerations:

The following considerations are critical to decision-makers at this time:

- Information presented to date is preliminary, pending review and approval by the Corps.
- Downstream impacts are still being assessed, but are greater for ND plans.
- Environmental impacts are still being assessed, but are greater for ND plans.
- Cost estimates may increase pending a cost and schedule risk analysis.
- The ND plans are much more complex than the MN plans; if a ND plan is selected, more time will be needed to resolve technical and environmental issues.
- The NED plan may be smaller and lower cost than the MN 20,000 cfs plan.
- Federal policy caps the federal cost for a locally preferred plan at 65 percent of the NED plan; all costs in excess of the NED plan are 100 percent local responsibility.
- Approval of a locally preferred plan by Corps Headquarters and ASA(CW) is not guaranteed.

Recommended path forward:

- Study smaller MN plans to conclusively determine the NED plan.
- Continue to assess environmental and downstream impacts.
- Corps and non-federal sponsors work together to determine a locally preferred plan considering all identified risks. (Sponsors' written request for a locally preferred plan is needed by April 15, 2010, to stay on schedule.)

Schedule:

Feb 2010: Identify tentatively selected plan
 Feb 2010: Corps of Engineers agency technical review
 Mar 2010: Independent External Peer Review
 Apr 2010: Sponsors request locally preferred plan in writing
 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>

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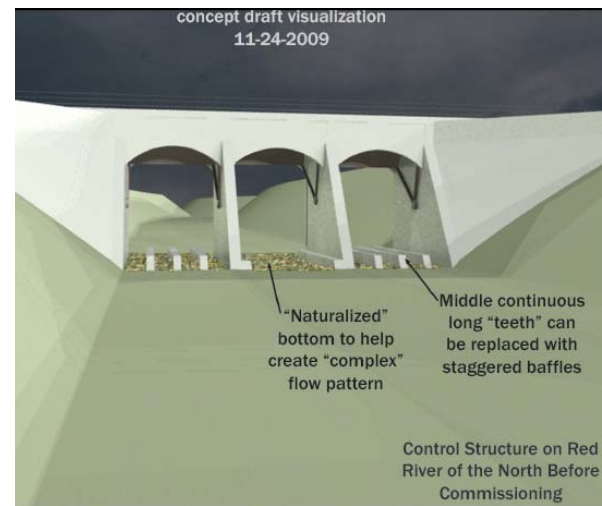
complete the study by December 2010. From June 2009 through October 2009, the study team performed cursory technical analysis of all proposed measures. The team also developed screening criteria to be used in selecting a plan. Using the preliminary technical information, the team applied professional judgment in order to assess the measures against the screening criteria. Several different scales of flood storage, nonstructural measures, flood barriers and diversion channels were evaluated in more detail during this phase of study. Using all of the information developed, the team compared the alternatives to identify the best plans for further study. The preliminary screening results, released in October 2009, indicated that the most cost-effective plan would likely be a diversion on the Minnesota side, but further study was needed to determine the optimal capacity. The non-federal sponsors requested that two North Dakota diversion plans (30,000 and 35,000 cfs) and a 35,000 cfs Minnesota diversion plan be retained as potential locally preferred plans. The “no action,” Minnesota Short Diversion and North Dakota East Diversion alternatives were retained for further analysis, and all other concepts were dropped from consideration as stand-alone plans. Non-structural measures (raising, relocating or buying out structures) were considered for portions of the study area not benefited by the diversions.

Description of diversion plans:

Between October 2009 and February 2010, the diversion channel plans were refined in order to determine the most cost-effective plan and to develop a potential locally preferred plan. The Minnesota Short 20, 25, 30 and 35,000 cubic feet per second (cfs) and the North Dakota East 30 and 35,000 cfs plans were analyzed. Nonstructural measures were considered as additional features in the areas immediately upstream of the diversions and in the areas near the downstream end of the diversions, where the diversions provided little or no benefit.

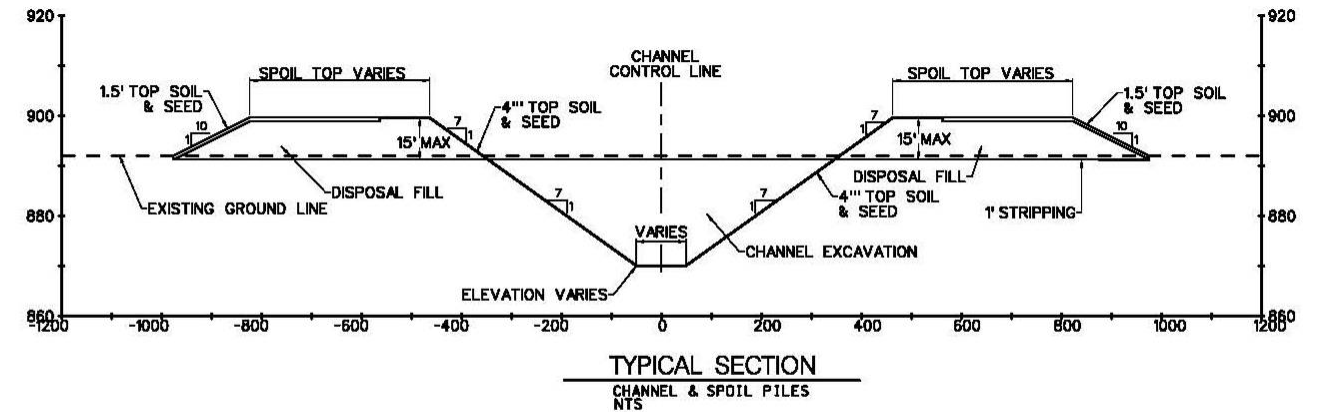
A diversion channel would reduce flood stages by limiting the amount of water that could flow in the natural river channel through town. A gated structure on the Red River would be operated during floods larger than the 20 percent chance event (5-year flood).

A portion of the flood water would be diverted into a channel around the urban area, either through Minnesota or North Dakota. The diversion would not increase the amount of water passing Fargo-Moorhead, but it would slightly alter the timing and magnitude of the peak flow downstream.



The Minnesota plans would be 25 miles long with a maximum bottom width of 360 feet and a maximum excavation depth of 30 feet. The Minnesota plans include a control structure on the Red River, 20 highway bridges and four railroad bridges.

The North Dakota plans would be 36 miles long and cross five tributaries: the Wild Rice, Sheyenne, Maple, Lower Rush and Rush rivers. The North Dakota plans have a maximum channel bottom width of 300 feet and a maximum excavation depth of 32 feet. The North Dakota plans include control structures on the Red River and Wild Rice River, two tributary crossing structures, two tributary drop/diversion structures, 18 highway bridges and four railroad bridges.



Comparison of plans:

The costs and benefits of each plan were determined in order to identify the plan that maximizes net benefits, which is called the National Economic Development (NED) plan. The federal cost share for construction of any plan is limited to 65 percent of the NED plan. No plan with negative net benefits or a benefit/cost ratio less than 1.0 can be recommended. The following table shows the cost and economic data for each of the diversion plans considered in the latest analyses:

Screened Alternatives Ranked by Net Benefits					
Alternative	Cost *	Avg Annual Net Benefits *	Residual Damages *	B/C Ratio	Local Share*
MN Short Diversion 20K	\$787	\$24.3	\$22.7	1.59	\$275
MN Short Diversion 25K	\$892	\$23.4	\$18.1	1.50	\$380
MN Short Diversion 30K	\$959	\$23.3	\$14.8	1.47	\$447
MN Short Diversion 35K	\$1,049	\$20.1	\$13.3	1.37	\$537
ND East Diversion 30K	\$1,109	\$19.1	\$11.4	1.33	\$597
ND East Diversion 35K	\$1,168	\$17.7	\$9.7	1.29	\$656

* In millions of dollars
 ** Local share calculations assume that the NED plan will be MN 20K
 Note: Expected average annual damages without a project are \$77.1 million.

Effectiveness of plans:

The following tables show the effects of the various diversion plans on the 2 percent, 1 percent and 0.2 percent chance floods at the Fargo gage and the estimated stage increases for the 35,000 cfs plans:

	Stage at Fargo Gage (ft)		
	2% Chance (50-year)	1% Chance (100-year)	0.2% Chance (500-year)
Existing Condition	37.8	39.5	43.9
MN Alignment			
20K	30.8	32.8	40.6
25K	29.8	31.4	38.9
30K	29.8	31.1	36.9
35K	29.8	30.3	34.9
ND Alignment			
30K	29.3	29.4	37.0
35K	28.8	29.3	34.9

Location	Stage increase without emergency levees (inches)	Stage increase with emergency levees (inches)
Minnesota Short 35K - 100 Year		
Halstad Gage	4.6	3.7
Hendrum	9.4	6.8
Perley	6.0	4.2
Georgetown	7.7	5.3
North Dakota 35K - 100 Year		
Halstad Gage	5.3	4.4
Hendrum	10.4	7.9
Perley	5.4	3.6
Georgetown	7.6	5.2