Fargo-Moorhead Area Diversion Project

- Federally Authorized Project
- Completed Environmental Impact Statement of all alternatives
- 1,600 ft wide Diversion Channel in ND with 150,000 acre-feet of Upstream Staging
- Outlet near Georgetown, MN
- Inlet SE of Horace, ND
- Provides 100-year Flood Risk Reduction
- Extreme Events are Flood-Fightable
Finding the Right Project

Interstate 29
25th Street South
Cass Co Hwy 81
Wild Rice River
Fargo
Red River
Moorhead
Starting the Search Locally

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997</td>
<td>Cass County initiates Flood Mitigation Study</td>
</tr>
<tr>
<td>2001</td>
<td>Study recommends Southside Flood Protection Project</td>
</tr>
<tr>
<td></td>
<td>Receives $9.5 Million FEMA Grant</td>
</tr>
<tr>
<td>2002</td>
<td>Project/Funds transferred to City of Fargo</td>
</tr>
<tr>
<td>2006</td>
<td>4 alternatives presented to public</td>
</tr>
<tr>
<td>2008</td>
<td>5 alternatives presented to public</td>
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<tr>
<td></td>
<td>60+ small group meetings</td>
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<tr>
<td></td>
<td>Public meeting about the plan</td>
</tr>
</tbody>
</table>
Southside Flood Protection Plan

- Wild Rice River levee
- Drain extensions
- Internal storage areas
- A small diversion
- Channel extensions (in North Dakota and Minnesota)
Trying to Solve the Solution Locally

- Multiple local alternatives considered
  - Levees with channel extension in North Dakota and Minnesota with supplemental storage
2009 Emergency Flood Fight

Peak 40.82 Feet
March 28, 2009

69 Miles of Emergency Measures
42 Miles of Temporary Levee
8 Miles of Hesco
0.3 Miles of Porta-Dam
19 Miles of Sandbag

7.3+ Million Sandbags Used
Do you plan for past or future floods?

The 2009 flood is the largest flood on record.

Approximate Major Flood Stage

Source: USGS river flow data from USGS Station
Understanding the flood threat

The real threat
A 100 year or 500 year event, the size of which we have never seen before

Minot 2011
~450-year event

Grand Forks 1997
~250-year event
Moorhead Floodplain Risk

- **Pre-2012 FEMA Floodplain**
  - 38.5 ft river gage (29,300 cfs)
  - 256 impacted structures (prior to post-2009 acquisitions)

- **2012 FEMA Floodplain**
  - 39.4 ft river gage (29,300 cfs)
  - 178 impacted structures (after post-2009 acquisitions)
  - 129 removed by LOMRs

- **Future FEMA Floodplain**
  - 41.1 ft river gage (34,700 cfs)
  - Existing levees lose FEMA accreditation
  - 820 impacted structures

Fargo Floodplain Risk

- **Pre-2015 FEMA Floodplain**
  - 38.5 Feet River Gage (29,300 cfs)
  - 475 Impacted Structures

- **2015 FEMA Floodplain**
  - 39.4 Feet River Gage (29,300 cfs)
  - Approx. 2,300 Impacted Structures

- **Future FEMA Floodplain**
  - 41.1 River Gage (34,700 cfs)
  - Approx. 11,000 Primary Structures
  - 16,000 total structures
By the numbers: Flood Insurance

11,000 homes impacted by future FEMA floodplain

$3,000-$5,000 per family average annual flood insurance premium per home

In total, annual flood insurance premiums:

~$30 to $50 million

In total, annual flood insurance premiums

Average annual flood insurance premium per home

$3,000-$5,000 per family
More than 100-Year Protection Needed!

Red River Basin Commission Long-term Flood Solution Goals

- 500-year protection recommended for large metro areas
- Only Winnipeg meets this recommendation
  - Red River Floodway
- Bigger floods have happened
  - Minot, Grand Forks
- FM Area Diversion Project goals
  - 100-year protection
  - Ability to fight larger floods

Red River Floodway near Winnipeg
Federal Involvement
The need for a Federal Partner

► Comprehensive look at alternatives
  ► No Action (Continued emergency measures)
  ► Non-structural (Example: Restoring wetlands)
  ► Levees / Floodwalls
  ► Diversion channels
  ► Upstream storage / Retention
  ► Combination of options

► Cost share

► Technical Expertise

US Army Corps of Engineers®
Numerous Alternatives

<table>
<thead>
<tr>
<th>Distributed Storage</th>
<th><strong>ND West Diversion</strong> 45K</th>
<th><strong>ND West Diversion</strong> 35K</th>
<th><strong>MN Short Diversion</strong> 25K</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Action</td>
<td><strong>ND East Diversion</strong> 35K</td>
<td><strong>MN Short Diversion</strong> 35K</td>
<td><strong>MN Long Diversion</strong> 25K</td>
</tr>
<tr>
<td>Levee 2% chance</td>
<td><strong>Levee 1% chance</strong></td>
<td><strong>MN Short Diversion</strong> 45K</td>
<td><strong>MN Long Diversion</strong> 45K</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>MN Long Diversion</strong> 35K</td>
<td></td>
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</table>
Levee Alternative

► Cannot alone achieve FEMA certifiable 100-year flood protection
  ► Over $300M worth of levees completed to date
  ► 50-year level - $900M
► No high ground on North Dakota side
► Levees also have upstream impacts
Why Not Distributed Storage/Retention?

- Diversion Project includes a retention area (150,000 AF) where it is most effective and efficient
  - Location of runoff could limit effectiveness
- 270,000 AF of storage needed to provide 2 ft reduction during 1997 flood (<50-year) (RRBC)
- Distributed storage alone cannot provide the level of protection needed
Over 8 Years of Study of Permanent Flood Protection for Fargo-Moorhead

- 2008-2011: Federal Feasibility Study
- 2012: Post Feasibility Southern Alignment Analysis
- 2013: Supplemental Environmental Assessment

Project Purpose:
…to reduce flood risk potential on local streams, qualify substantial portions of the F-M urban area for 100-year flood accreditation, and reduce flood risk for floods exceeding the 100-year flood or greater.
Federal NEPA, including Public Involvement

During feasibility study, 51 Public meetings held to inform and gather input from Nov 2008 to Jun 2011

► (4) Scoping meetings
► (3) Metro Flood Management Committee
► (5) Public information
► (11) NEPA public review
► (1) 404(b) hearing
► (27) Metro Flood Work Group

► 430 Agencies and members of the public commented on the Study
► 1600 pages of comments were responded to
Diversion Projects Work
Proven Track Record in the Red River Basin

- In place since 1969
  - Expanded from 90-year to 700-year flood protection
- Has operated more than 20 times
- Prevented $32 Billion in flood damages
- Other Diversions in West Fargo, Wahpeton/Breckenridge, & Grand Forks
Some Criteria for Evaluating Alternatives

- Cost
- Level of Protection
- Impact

- Structures and Homes
- Farm Land Impacted
- Cleanup after flood event
- Infrastructure
- Economic Impact
- Wetlands
- Flood Insurance
- City Infrastructure
- Build
- Maintain
- Operate
- Structures and Homes
- Lives and Livelihoods
- $ Damages Prevented
- Lives and Livelihoods
Change to Upstream Storage Resulted in No Negative Impacts Downstream

- Downstream impacts were eliminated through use of a staging area immediately upstream of the Project
- Reduced original design’s impacts by over 2-feet
- Original downstream impacts on 4,500 structures
- Minnesota diversion alternative had downstream impacts of 1’, impacts would go to Canada
Other Improvements to the Project

Value Engineering (VE Studies) and Technical Team Discussions

- Southern Alignment Evaluation
- More Flow Through Town/In-Town Levees
- Diversion Inlet Evaluation (Weir vs. Gates)
- Oxbow/Hickson/Bakke Levee
- Channel Realignments
Multiple Southern Alignments Considered

- The diversion alignment was selected for technical reasons:
  - No conflict with the Sheyenne Diversion
  - Horace ND on the benefitted side
  - Minimize the length and cost of the southern embankment
  - Least impact to people and structures
More Flow Through Town / In-town Levees

Purpose:
- Reduced frequency and duration of project operation
- Improves the condition for fish passage on Red and Wild Rice River
- Reduces environmental impacts of project – (connectivity and geomorphology)
- Significantly reduces the probability of summer operation
- Able to achieve 35’ through town with a flow of 17,500 cfs (10-year event)
Significant Efforts In-town

- Over 700 homes have been acquired in Fargo-Moorhead
- Fargo has completed over $200M of in-town levees
- Moorhead has completed over $100M in-town
- Levees lose accreditation if/when floodplain changes
Minnesota DNR’s EIS

DNR’s Technical EIS Study 2011-2014:

► Study included three separate screenings of alternatives to the project

► EIS “did not result in the identification any additional reasonable alternatives to the Project.”

► Study received its Determination of Adequacy in June 2016
Project Receives Federal Approvals

- President Obama signed the Water Resources Reform and Development Act (WRRDA) in June 2014
  - Diversion was 1 of 26 water projects authorized
- Federal Appropriations for Construction received in 2016
  - ‘New Start’ Secured as 1 of 6 New Projects in the Country
- PPA Signed in July 2016
Fargo-Moorhead Flood Impacts

- 230,000 lives
- 150,000 jobs
- $19 Billion in property value
- $5.5 Billion in wages
- $3.5 Billion in annual sales
Fargo-Moorhead Diversion Protects

- 230,000 lives
- 150,000 jobs
- $19 Billion in property value
- $5.5 Billion in wages
- $3.5 Billion in annual sales

With the Project
100-year Event
Corps Construction Award

- Diversion Inlet Control Structure
  - ~$50M Contract Award by USACE to Ames Construction
  - Gated control structure that will control the amount of water that enters the diversion channel from the upstream staging area.
  - Features three 50-foot wide tainter gates
  - Located South of Horace, ND
  - Construction start in Spring 2017
  - Complete in 2020
Transportation Master Plan

Developed with input from:

- County
- Township Officials
- School Districts
- Emergency Services

Maintain Crossings at existing County Roads

- Spacing varied from 1.5 to 4.5 miles
- Average spacing 2.5 to 3.5 miles
Transportation Master Plan

- Township Roadways will terminate at Diversion ROW
  - Input from Landowners and Township
  - Determined During Design
  - Modifications Part of Project
  - Ownership and Maintenance with Township

- Access to all current parcels will be maintained
  - Modifications may be necessary

- Project may improve some Township Roadways
  - Based on Transportation Plan
  - Ensure similar access as exists today
County Road Bridges

- Diversion Authority Responsible for Bridge Maintenance
  - 30 Year O&M through the P3 Contractor
- County Bridges
  - 10 New County Bridges
  - Average Length: 600 ft
  - Width of County Bridges: 42 ft
Typical County Bridge Aesthetics
I-29 Rendering
Diversion Authority Shortlists Four P3 Teams Interested in Constructing the Diversion Project

The Metro Flood Diversion Authority (Diversion Authority) has completed its evaluations and...