

February 10, 2014

Fargo-Moorhead Flood Risk Management Project

Final Scoping Decision

1 INTRODUCTION AND PURPOSE

This Final Scoping Decision Document (FSDD) has been prepared for the Fargo-Moorhead Flood Risk Management Project (Project). It follows the Draft Scoping Decision Document (DSDD) and Scoping Environmental Assessment Worksheet (SEAW), which were released for public comment on April 15, 2013, and considers the public comments on those documents. The purpose of the FSDD is to identify the environmental effects and project alternatives that will be assessed in the Environmental Impact Statement (EIS). A tentative schedule for the environmental review process is included.

1.1 BACKGROUND

The Minnesota Department of Natural Resources (DNR) will prepare an EIS for the Project as proposed by the Project Proposer, the Flood Diversion Board of Authority (Diversion Authority). Diversion Authority members include the City of Fargo and the City of Moorhead; Cass County in North Dakota, Clay County in Minnesota; the Cass County Joint Water Resources District; and the Buffalo-Red River Watershed District. It operates under a joint powers agreement to develop the Project. The U.S. Army Corps of Engineers (USACE) has partnered with the Diversion Authority to plan, secure funding for, and construct the Project. Operation of the Project would be the responsibility of the Diversion Authority. The DNR will evaluate the Project in accordance with the Minnesota Environmental Policy Act (MEPA) (*Minnesota Statutes* Chapter 116D).

The Project would be located in the Fargo-Moorhead Metropolitan Area, within the area from approximately 12 miles west to 6 miles east of the Red River and from 20 miles north to 20 miles south of Interstate Highway 94. The Project consists of a diversion channel system including, but not limited to: excavated channels; a channel inlet control structure; tie-back levee/dam embankments; river control structures on the Red and Wild Rice (ND) Rivers; an upstream floodwater staging area (staging area); hydraulic structures on tributaries; levees and floodwalls in the Fargo-Moorhead Metropolitan Area and the upstream staging area; non-structural features (such as buy-out, relocation, or raising individual structures); recreational features (such as multipurpose trails and pedestrian bridges); and environmental mitigation projects located inside and outside the Project area. Additional Project information is provided in Section 2.1 and will be included in the EIS.

In July 2011 the USACE, with cooperation from the City of Fargo and the City of Moorhead (the local sponsors), issued a Final Feasibility Report and Environmental Impact Statement (FFREIS) for the Project. The USACE's Record of Decision (ROD) was issued in April 2012. The USACE designated the Locally Preferred Plan (LPP) as its Selected Plan. The DNR submitted comments on the federal Draft EIS, federal Supplemental Draft EIS and the FFREIS. Those DNR comments have helped to inform the scope of the state EIS.

The local sponsors initially selected the LPP as their preferred alternative. However, a number of design changes have since been recommended by the USACE with Diversion Authority endorsement. On October 11, 2012, the Diversion Authority endorsed two design changes proposed by the USACE to reduce potential impacts of the Project. These changes add adjustable gates on the diversion inlet channel and increase the Red River flows through the Fargo-Moorhead downtowns to a Fargo stage of 35 feet, before project operation, by constructing new levees and floodwalls and improving existing levees. The increase to a Fargo stage of 35 feet reduces the frequency of operation of the Project by limiting operation to flood flows in the Red River in excess of 17,000 cubic feet per second (cfs). A third USACE-proposed change was endorsed by the Diversion Authority on November 8, 2012. This change revised the diversion channel alignment and associated features to achieve cost savings and reduce the number of impacted residential structures. The Diversion Authority incorporated these changes into its October 24 and December 24, 2012, Scoping EAW Data Submittals, and the DNR considered them in the draft scoping documents as part of the Project for study in the EIS.

The USACE issued a Draft Supplemental Environmental Assessment (EA) for the Project on June 13, 2013. On September 19, 2013, the USACE signed a 'Finding of No Significant Impact' and issued a final version of the supplemental EA. The EA considers how Project design changes influence the potential impacts relative to the LPP. In addition to the Project changes summarized above, the Supplemental EA describes a ring levee around the communities of Hickson and Bakke and part of Oxbow, N.D.

The Project is still subject to modification in response to factors such as public comment, detailed design work, changes in impact predictions, development of mitigation measures and cost savings. Such changes will be incorporated into the scope of the EIS and if any change leads to significant differences in impacts the DNR will issue a notice of the change in scope (*Minnesota Rules* part 4410.2100, subp. 8). If, after completion of the EIS, there are substantial changes to the Project that significantly affect the environmental analysis as described in *Minnesota Rules* part 4410.3000, the DNR will evaluate the need to issue an addendum or supplement to the EIS.

According to Federal Emergency Management Agency (FEMA) regulations there is a requirement to perform mitigation when a proposed flood risk reduction project would increase the Base (1-percent-annual-chance) Flood Elevation (BFE). National Flood Insurance Program (NFIP) regulations (44 C.F.R. 65.12) require revisions to flood insurance rate maps to reflect BFE and/or floodway changes caused by encroachments permitted by an NFIP participating community and requires mitigation to impacted structures. DNR hydrologists have participated in meetings between FEMA and the USACE aimed at defining specific requirements for the Project. In the EIS the DNR will assess whether the mitigation plan is consistent with applicable state and federal flood plain requirements (see Section 3.3.2). In addition, Executive Order 11988 directs federal agencies to consider impacts to existing flood plain and to consider alternatives to avoid adverse impacts and incompatible development in the flood plain. The DNR will consider both FEMA requirements and the requirements of Executive Order 11988 in its evaluation of the Project and alternatives to the Project.

1.1.1 Concurrent State and Federal Review

As explained in Section 1.2, below, the DNR will utilize information from the FFREIS, the Supplemental EA and available supporting data when practical.

There are differences in the way that the state and federal processes consider project alternatives, mitigation actions and existing conditions that will influence the scope of the state documents. For example, as stated in Section 2.2, below, the DNR's "base no action" alternative includes the potential flood risk reduction impact of already completed and currently funded projects such as levee construction and property buyouts. The "no action (with emergency measures)" alternative assumes that emergency measures currently being pursued in the Project area would continue to be implemented as necessary due to flooding. The federal definition of the "future without a project" does not include the measures taken since 2009 and did not include future measures that had a reasonable basis of expectation. This may lead to differing conclusions when the DNR develops alternatives and mitigation measures and compares them to the Project as proposed or to the existing conditions.

The DNR and the USACE have agreed to coordinate public communication in a way that helps minimize confusion between the goals and content of state and federal environmental review documents that will be made available for public review.

1.2 NEED FOR STATE EIS AND SELECTION OF APPROPRIATE ENVIRONMENTAL REVIEW DOCUMENT

Under the State's Dam Safety permitting rules (*Minnesota Rules* part 6115.0340) the DNR has determined that the proposed water control structure on the Red River would meet the definition of a Class I Dam. Any embankment upstream of the control structure that is at or below the elevation of the top of the dam and impounds water due to the presence of the control structure would be considered to be part of the dam. The DNR must produce an Environmental Impact Statement (EIS) for the Project as required by *Minnesota Rules* part 4410.4400, subpart 18, which places construction of a Class I dam in the mandatory EIS category with the DNR as the Responsible Governmental Unit (RGU). The EIS will meet applicable requirements of *Minnesota Rules* Chapter 4410 (Environmental Quality Board; Environmental Review Program) that govern Environmental Review in Minnesota. The DNR has retained the services of an environmental consultant to assist in EIS preparation while retaining responsibility for EIS content and procedure.

As the USACE has prepared a federal Environmental Impact Statement (i.e., the FFREIS) for the LPP, which addressed many of the issues that would need to be addressed in a Minnesota State EIS, the DNR will rely on the federal document to the extent that it adequately addresses the scoped issues and complies with the content requirements of a Minnesota State EIS. Similarly, the DNR will utilize the Supplemental EA and the information used to support that document to the extent they meet the scope and content requirements of the State EIS.

As stated in *Minnesota Rules* part 4410.0300, subpart 4(E), one objective of the environmental review rules is to eliminate duplication of effort. Therefore, as required by *Minnesota Rules* part 4410.3900, subpart 1, the DNR will cooperate with the USACE in development of information

and will incorporate the results from the federal documents to the extent that the documents satisfy the State's content and procedural requirements. The USACE has continued to follow the procedural requirements of the National Environmental Policy Act (NEPA) by developing environmental assessments to assess recent changes to the Project and to assess mitigation actions in development, such as the Drayton Dam mitigation project.

1.3 PURPOSE AND NEED OF THE PROJECT

When assessing the viability of various alternatives, the DNR will consider the fundamental need for the Project in addition to the environmental and socioeconomic merits of each alternative. The purpose and need statements have been developed by the Project Proposer to meet the needs of the state environmental review process and are not the same as used in the FFREIS.

1.3.1 Purpose of the Project

The purpose of the Project is to reduce flood risk, flood damages and flood protection costs related to flooding in the Fargo-Moorhead Metropolitan Area. To the extent technically and fiscally feasible, the Project will:

- Reduce flood risk potential associated with a long history of frequent flooding on local streams including the Red River of the North, Sheyenne, Wild Rice (ND) Maple, Rush and Lower Rush Rivers passing through or into the metropolitan area;
- Qualify substantial portions of the metropolitan area for 100-year flood accreditation by the Federal Emergency Management Agency (FEMA) under the National Flood Insurance Program (NFIP); and
- Reduce flood risk for floods exceeding the 1 percent event (100-year flood or greater), given the importance of the metropolitan area to the region and recent frequencies of potentially catastrophic flood events.

1.3.2 Need for the Project

The Fargo-Moorhead Metropolitan Area is located within the area from approximately 12 miles west to 6 miles east of the Red River and from 20 miles north to 20 miles south of Interstate Highway 94. This area has a high risk of flooding. The Red River, Wild Rice River (ND), Sheyenne River, Maple River, Lower Rush River, and the Rush River all contribute to the flood risk. Average annual national economic flood damages in the metropolitan area are estimated to be more than \$194.8 million¹, and a failure of emergency flood measures could result in loss of life. Flooding in Fargo-Moorhead typically occurs in late March and early April as a result of spring snowmelt. Flooding poses a significant risk of damage to urban and rural infrastructure and disrupts transportation throughout the metropolitan area. The Fargo-Moorhead area is a regional center for healthcare, education, government, and commerce. Infrastructure at risk in the Fargo-Moorhead area includes several regional medical centers, three college campuses, and city and county government headquarters offices.

¹ FFREIS, Section 2.3, History and Future Without Project Conditions.

The Red River has exceeded the National Weather Service flood stage of 18 feet at the U.S. Geological Survey (USGS) gage in Fargo (the Fargo gage) in 50 of the past 112 years (1902 through 2013), and recently every year except 2012 from 1993 through 2013. The record-setting Red River flood stage in 2009 at Fargo was 40.82 feet on the Fargo gage. Official estimates vary for the 1-percent chance event flow and stage. The hydrologic record of the Red River shows a trend of increasing magnitude and frequency of flooding in recent decades.

1.4 THE SCOPING PROCESS

Public review of and comment on the Scoping EAW and Draft Scoping Decision Document was conducted in accordance with *Minnesota Rules* part 4410.2100. The scoping documents were made available for public comment from April 15 to May 15, 2013, with a notice of availability in the April 15, 2013, EQB Monitor. A public information meeting was held in Moorhead on May 8, 2013. The DNR has considered all substantive comments received and developed this FSDD. The potential issues that are part of the state scoping process have been compared to the FFREIS to determine which, if any, additional scoped issues require further evaluation as part of the Minnesota State EIS. A notice of availability of this FSDD will be published in the EQB monitor.

2 PROJECT ALTERNATIVES

Minnesota Rules part 4410.2300(G) requires that – in addition to a no-action alternative – an EIS include at least one alternative of each of the following types, or provide an explanation of why no alternative is included in the EIS: alternative sites, alternative technologies, modified designs or layouts, modified scale or magnitude, and alternatives incorporating reasonable mitigation measures identified through comments received during the EIS scoping and draft EIS comment periods.

In addition, *Minnesota Rules* part 4410.2300(G) directs that an alternative may be excluded from the analysis in the EIS if “it would not meet the underlying need for or purpose of the project, it would likely not have any significant environmental benefit compared to the project as proposed, or another alternative, of any type, that will be analyzed in the EIS would likely have similar environmental benefits but substantially less adverse economic, employment, or sociological impacts.”

The DNR instructed its EIS contractor, Wenck Associates, Inc., to produce an Alternatives Screening Report² for DNR review. The report evaluated the potential benefits of a series of project alternatives in various categories and applied screening criteria developed by DNR pursuant to *Minnesota Rules* part 4410.2300(G). Since the report was near completion at the time the design changes were adopted by the Diversion Authority in October and November 2012, the report was based on the LPP being the proposed Project. The Project as defined at the date of the draft scoping documents was evaluated as a potential alternative in the Alternatives Screening Report and recommended for evaluation in the EIS. The recommendations of the report have been considered by the DNR in the drafting of the FSDD, with adjustments as

² Draft Alternatives Screening Report Fargo-Moorhead Metropolitan Area Flood Risk Management Project (Wenck Associates, December 2012).

needed to reflect that the Project as now proposed is a modified design as compared to the LPP. The alternatives carried forward for additional analysis are listed below.

To-date alternatives will be measured against the project purpose. Inclusion or dismissal of those alternatives will be documented in the EIS.

2.1 PROPOSED PROJECT

The Project would be located in the Fargo-Moorhead Metropolitan Area, within the area from approximately 12 miles west to 6 miles east of the Red River and from 20 miles north to 20 miles south of Interstate Highway 94. The Project consists of a diversion channel system including, but not limited to: excavated channels; a channel inlet control structure; tie-back levee/dam embankments; river control structures on the Red and Wild Rice (ND) Rivers; an upstream staging area; hydraulic structures on tributaries; levees and floodwalls in the Fargo-Moorhead Metropolitan Area and the upstream staging area; non-structural features (such as buy-out, relocation, or raising individual structures); recreational features; and environmental mitigation projects located inside and outside the Project area.

As proposed, the Project would create a 30-mile long, diversion channel on the North Dakota side of the metropolitan area with an upstream floodwater staging area. There would be a 6-mile long connecting channel between the Red River and the diversion inlet control structure. The Project would go into operation when it becomes known that a stage of 35.0 would be exceeded at the USGS gage in Fargo (the Fargo gage). At this stage, the flow through Fargo would be approximately 17,000 cfs. A flow of 17,000 cfs at the Fargo gage is approximately a 10 percent chance or 10-year flood event. Operation begins with partially closing the gates at the Red River and Wild Rice River hydraulic control structures. Once the gates are partially closed, water would begin to inundate the upstream staging area.

A maximum stage of 35.0 feet would be maintained at the Fargo gage until the upstream staging elevation reaches 922.2 North American Vertical Datum (NAVD) 88 (the staging elevation would just reach elevation 922.2 for the 1 percent (100-year) event). Once the upstream staging elevation reaches 922.2, the Red River and Wild Rice River hydraulic control structure gates would be opened as necessary to maintain the upstream staging elevation of 922.2 while not exceeding a stage of 40.0 feet at the Fargo gage (a stage of 40.0 feet would occur for the expected 0.2 percent (500-yr) event). Once a stage of 40.0 feet is achieved at the Fargo gage, a stage of 40.0 feet would be maintained by first allowing more flow down the diversion and then allowing flow to exit the staging area over the overflow embankment along the west side of the staging area. Flow exiting the staging area via the overflow embankment would flow overland into the Sheyenne River basin.

Emergency measures would be employed within the metropolitan area to reduce flood damages when the stage is between 35.0 and 40.0 feet. If the upstream staging water surface elevation is forecasted to reach the point of minimum acceptable freeboard, an evacuation order would be issued for the metropolitan area. Once water is flowing over the overflow embankment and the upstream staging elevation reaches the point of minimum acceptable freeboard, the Red River and Wild Rice River control structure gates would be opened further to maintain the minimum freeboard, and stages would rise above 40.0 feet at the Fargo gage.

The control structure on the Red River would require a Dam Safety permit from the DNR. Since the Wild Rice River structure would be located wholly in North Dakota, a Minnesota Dam Safety permit is not needed. However, this structure is part of the Project and has the potential to cause resulting impacts (e.g., impacts to fisheries; connectivity) in the state of Minnesota, and therefore will be evaluated in the EIS.

The EIS will describe the Project in more detail and will discuss the potential environmental and socioeconomic effects outlined in Section 3.0.

2.2 NO ACTION ALTERNATIVES

The EIS will describe two No Action alternatives: 1) Base No Action Alternative; and 2) No Action Alternative (with Emergency Measures). As stated in Section 1.1.1, above, the DNR's "base no action" alternative includes the potential flood risk reduction impact of already completed and currently funded projects such as levee construction and property buyouts. The base no action alternative is described because emergency measures have the possibility of failure; therefore, understanding the risks associated with that possibility should be evaluated. The "no action (with emergency measures)" alternative assumes that emergency measures currently being pursued in the Project area would continue to be implemented as necessary due to flooding.

2.2.1 Base No Action Alternative

The EIS will describe the expected condition if the Project is not developed, with respect to the potential environmental and socioeconomic effects outlined in Section 3.0.

The Base No Action Alternative will include the potential flood risk reduction impact of already completed and currently funded projects such as levee construction and property buyouts. This option does not include emergency measures currently being pursued in the Project area as necessary due to flooding. These include raising levees, constructing temporary levees and floodwalls in various areas, and sandbagging.

2.2.2 No Action Alternative (with Emergency Measures)

The EIS will describe the expected condition if the Project is not developed, with respect to the potential environmental and socioeconomic effects outlined in Section 3.0.

The No Action Alternative (with Emergency Measures) will include the potential flood risk reduction impact of already completed and currently funded projects such as levee construction and property buyouts. It will also assume that emergency measures currently being pursued in the Project area would continue to be implemented as necessary due to flooding. These include raising levees, constructing temporary levees and floodwalls in various areas, and sandbagging. This alternative would include the definition of flood fighting measures identified in the FFREIS No Action Alternative as well as incorporate projects that have been completed and that are identified to be completed through an existing dedicated funding source.

2.3 SITE ALTERNATIVES

Minnesota rules allow the RGU to exclude alternative sites if other sites do not have any significant environmental benefit compared to the project as proposed or if other sites do not meet the underlying need for and purpose of the project. The Minnesota Environmental Quality Board's (MEQB) *Guide to Minnesota Environmental Review Rules* (2010)³ lists a number of factors for the RGU to consider when deciding whether alternative sites would meet the underlying need for or purpose of the project.

The DNR conducted an independent assessment of alternative sites for a diversion, considering the alternatives discussed in the federal EIS process and combining other measures with those alternatives. As part of the scoping, the DNR prepared an Alternatives Screening Report. This report determined that the reasonably available alternate diversions in Minnesota and/or North Dakota do not produce benefits for environmental resources or socioeconomic factors.

Therefore the EIS will not evaluate site alternatives.

2.4 TECHNOLOGY ALTERNATIVES

Six potential technology alternatives were studied in the Alternatives Screening Report. Two of these alternatives, tunneling and I-29 Viaduct, had a similar effectiveness to the Project but did not present a significant environmental benefit. In addition, they are expected to transfer potential impacts of the Project downstream, and they have excessive capital costs, and therefore will not be evaluated in the EIS

The remaining alternative technologies (non-structural measures; flood barriers; flood storage; and flood storage combined with a control structure) did not effectively meet the Project purpose by themselves. However, a combination of these alternatives could potentially meet the project purpose and present increased environmental benefit. Therefore the "Distributed Storage" alternative, which is principally a modified design alternative that incorporates these alternative technology aspects, will be evaluated in the EIS (see Section 2.5.1 below).

The EIS will not evaluate technology alternatives alone but will consider technology alternatives within the modified design alternative identified below.

2.5 MODIFIED DESIGNS OR LAYOUTS

While no reasonably available modified design or layout alternative on its own has been found to be sufficiently effective to be evaluated in the EIS, the following alternative, a distributed storage measure that also incorporates alternative technologies, will be analyzed in the EIS.

2.5.1 Distributed Storage

³ Available at [Environmental Quality Board website: Minnesota Environmental Review Rules Guide](#)

This alternative would include flood barriers, watershed flood storage, wetland/grassland restoration, and non-structural measures to achieve the desired flood protection without a control structure or diversion channel. These measures would be combined and configured to maximize flood protection in the Fargo-Moorhead Metropolitan Area. The DNR will determine the degree to which the alternative meets the project purpose and provides environmental or socioeconomic benefits. This alternative was not evaluated in the FFREIS.

The details of this alternative will be developed as part of the EIS as the DNR progresses through the steps outlined below. The results of each step will be evaluated before proceeding with other steps.

- Use available information to evaluate both the feasibility and effectiveness of distributed upstream flood water retention to achieve flood damage reduction benefits on the Red River mainstem. Information currently being developed by the Red River Basin Commission as part of their Halstad Upstream Retention study (referenced in Section 6.2) is expected to provide the basis for this evaluation.
- Identify the maximum level of protection that a system of flood barriers could potentially achieve, and the associated benefits, impacts and residual flood risk. Data developed during the FFREIS Phase 2 screening process will be used to the extent possible. As appropriate, Phase 2 data will be updated using the latest hydraulic models. Levees and flood walls recently constructed within the Fargo-Moorhead area will be integrated into the analysis. Alternative flood barrier alignments will be considered in order to minimize adverse impacts, including the number of structures that would need to be purchased and/or relocated.
- Determine whether the combined effect of the upstream storage with the maximum level of protection potentially provided by a system of flood barriers could achieve the project purpose as described in Section 1.3.1. If the project could potentially achieve its intended purpose, the DNR will assess the potential for this alternative to reduce adverse impacts and will apply the alternatives screening criteria in *Minnesota Rules* part 4410.2300(G).
- If the maximum peak flow reduction identified by the Red River Basin Commission (RRBC) combined with a system of barriers does not meet the project purpose, then consideration will be given as to whether the cumulative benefit of additional flood reductions measures, such as buyouts, wetland/grassland restoration, additional distributed (e.g., “waffle”) storage, and emergency flood fighting measures could meet the project purpose.

The Alternatives Screening Report suggested that environmental benefits could be realized in comparison to the Project and that this combination of measures without a diversion channel and associated control structure has the potential for effectiveness up to the 100-year event. The evaluation process outlined will be used to assess the potential effectiveness of the alternative.

If the analysis indicates that the alternative would meet the Project purpose and need and that it would provide environmental and/or socioeconomic benefits, the DNR will evaluate the land use impacts and any potentially adverse impacts of the various elements of the alternative. A quantitative assessment will be included where specific locations can be identified and data is available. Where specific locations are not known or have not been delineated, a qualitative assessment will be included.

2.5.2 Northern Alignment Alternative

This alternative would move the Southern Alignment north of the alignment in the proposed Project. This has the potential to lessen social impacts in and around Comstock, Richland County and Wilkin County, but it would increase social impacts between the proposed alignment and the Northern Alignment Alternative. Additionally, it has the potential to increase the implementability of the Project by reducing the number of government entities affected by the FEMA Conditional Letter of Map Revision (CLOMR) concurrence form. This alternative may also reduce the amount of land removed from the existing floodplain, which is a factor that the DNR needs to consider when considering Executive Order 11988 goals during the state's permitting process. The DNR will determine if this alternative meets the project purpose and provides environmental or socioeconomic benefits.

As part of the Supplemental EA, the USACE conducted a Value Engineering Study after the FFREIS had been completed. Proposal number 13 (VE-13) from the study was developed for further analysis with two alternate alignments, Options A and C, along with a number of other alternatives. Both options eliminated the Wolverton Creek structure and Storage Area 1. Option A was proposed by the USACE after applying its engineering criteria, based in part on considering the number of structures impacted under each option.

The DNR will assess the potential for an alignment alternative to the north (between Option A and C) to reduce adverse impacts and will apply the alternatives screening criteria in *Minnesota Rules* part 4410.2300(G) rather than utilizing the engineering criteria adopted by the USACE. If further analysis shows that the alternative would meet the purpose and need of the project and would provide environmental and/or socioeconomic benefits, the potentially adverse impacts of the alternative (such as flooding of structures that would be protected by the proposed Project) will be considered and weighed against the potential benefits to determine the overall level of benefit. The DNR will use the USACE's Draft EA and the Value Engineering study to explore alignment shift options.

The structure count information in Appendix I (Assessment Factors) of the report titled "Final Technical Memorandum, FM Diversion Post-Feasibility Southern Alignment Analysis: VE-13, North Of Wild Rice River, South Of Oxbow; Final - October 10, 2012" will be utilized. The information will be updated to reflect the most recent design of the Project and will be used to compare structural impacts to the proposed Project and other alternatives included in the scope of the EIS. Using Phase 7 methodology, a floodplain map with and without the alternative, and a similar map for the proposed Project, will be used to show the change in floodplain acres between the proposed Project and the alternative.

2.6 SCALE OR MAGNITUDE ALTERNATIVES

The DNR will not evaluate a scale or magnitude alternative in the EIS. While an alternative with reduced staging and increased reliance on flood fighting could offer significant flood protection this alternative would have similar environmental impacts to the Project while also transferring additional impacts to downstream structures.

2.7 INCORPORATION OF MITIGATION MEASURES IDENTIFIED THROUGH

PUBLIC COMMENTS

During the alternatives screening process, the DNR defined an alternative (Proposed Project Combined with Flood Barriers) which was identified in comments on the USACE's FFREIS. The alternative appeared to offer environmental benefits compared to the LPP and would have been carried forward into the EIS. The primary design elements of this alternative have been incorporated into the Project as described in the Supplemental EA. This configuration will be studied in the EIS as the Project rather than as an alternative.

The DNR has considered all other alternatives and mitigation measures identified during the comment period on the draft scoping documents. These suggested mitigation measures were considered against the exclusionary criteria identified in *Minnesota Rules* part 4410.2300(G).

The alternative described in Section 2.5.2 of this document has been added based on a number of comments received.

Another alternative, which suggested retaining the diversion to take flow from the Wild Rice River and relying on levees for flood protection from the Red River, was considered and screened out. This alternative could eliminate the Class I dam on the Red River and the staging area, but, with available data, would likely not provide greater than 100-year flood protection. This alternative would not be as effective as the proposed Project and would not offer any significant environmental benefit over the other alternatives proposed for additional study. Additionally, USACE alternatives studies have documented that operating a diversion without a control structure and staging area is likely to result in far reaching unacceptable increases in downstream impacts (some modeled impacts extended almost to Canada). Therefore this alternative does not meet the screening criteria established by the DNR pursuant to *Minnesota Rules* 4410.2300(G).

2.7.1 Monitoring and Mitigation Identified During Public Comment Period

The following mitigation and monitoring suggestions have been incorporated into the scope of the EIS after all suggestions were evaluated against the exclusionary criteria in *Minnesota Rules* part 4410.2300(G):

The EIS will assess the Project operating plan to ensure that drawdown in the diversion channel is monitored and timed to allow fish in the diversion to back out with declining discharge and that drawdown in the staging area is monitored and timed to ensure that fish in the floodplain upstream of the structure have a chance to escape receding waters. (See Section 3.2.3.1)

The EIS will summarize invasive species concerns in the area of the Project. The EIS will describe monitoring and mitigation strategies that can be incorporated into the Project operating plan. (See Section 3.2.3.3)

Existing indexes of biological integrity (IBIs) will be reviewed for their potential to inform future monitoring efforts related to the potential for water in the aqueducts associated with the Maple River and Sheyenne River to freeze in low-flow or no-flow conditions. Monitoring will be suggested to verify predictions and to inform future mitigation efforts. (See Section 3.3.1.3)

The EIS will assess the need for groundwater monitoring (e.g., piezometers) as part of the Adaptive Management & Monitoring Plan. (See Section 7)

3 EIS ISSUES

Potential environmental and socioeconomic effects were identified and described in the Scoping EAW based on (1) DNR-reviewed information submitted by the project proposer in its Data Submittal documents submitted on October 24, 2012, and December 24, 2012, and supplemental information submitted in response to DNR comments on those documents; (2) DNR review and comment on the FFREIS; and (3) DNR review of the Project and changes to the Project following the USACE Record of Decision of April 2012. They were categorized in the DSDD by significance and amount of additional analysis required in the EIS. This information has been updated in the FSDD based on public comments and information available in the federal Supplemental EA. Mitigation measures that could reasonably be applied to eliminate or minimize adverse environmental effects will be identified in the EIS.

3.1 TOPIC HAS BEEN ADEQUATELY ANALYZED IN THE FFREIS, THE SUPPLEMENTAL EA AND THE DNR'S SCOPING EAW, INCLUDING DOCUMENTATION SUBMITTED BY THE PROJECT PROPOSER OR THE USACE AFTER THE USACE RECORD OF DECISION. EITHER THE TOPIC IS NOT RELEVANT OR SO MINOR THAT IT WILL NOT BE ADDRESSED IN THE EIS, OR THE TOPIC IS SIGNIFICANT BUT THE FFREIS ADEQUATELY ADDRESSES THE DNR'S CONCERNS. THE SCOPING EAW WILL BE APPENDED TO THE EIS FOR REFERENCE; THE RELEVANT EAW NUMBER IS PROVIDED IN PARENTHESES AFTER EACH TOPIC.

3.1.1 Topic is not relevant or so minor that it will not be addressed in the EIS

- 3.1.1.1 Water surface use (Item 15)
- 3.1.1.2 Vehicle related air emissions (Item 22)
- 3.1.1.3 Stationary source air emissions (Item 23)

3.1.2 Topic is potentially significant but the FFREIS adequately addresses the DNR's concerns

- 3.1.2.1 Water use (Item 13)
- 3.1.2.2 Erosion and sedimentation from construction activities (Item 16)
- 3.1.2.3 Water quality: surface water runoff (Item 17)
- 3.1.2.4 Water quality: wastewaters (Item 18)
- 3.1.2.5 Geological hazards and soil conditions (Item 19)
- 3.1.2.6 Solid wastes, hazardous wastes, storage tanks (Item 20)
- 3.1.2.7 Traffic (Item 21)
- 3.1.2.8 Odors, noise and dust (Item 24)
- 3.1.2.9 Visual impacts (Item 26)

3.2 SIGNIFICANT IMPACTS ARE NOT EXPECTED BUT INFORMATION BEYOND THAT IN THE FFREIS, SUPPLEMENTAL EA AND SCOPING EAW WILL BE

INCLUDED IN THE EIS.

3.2.1 Potential environmental hazards due to past site uses (Item 9)

As documented in Section 4.3 of the Supplemental EA, the USACE identified a number of Recognized Environmental Conditions (RECs) during Phase I Environmental Site Assessments (ESAs) conducted for the FFREIS and will conduct a limited Phase II ESA soil investigation for these locations. In addition, Phase I ESAs will be completed for the in-town levees, the western alignment shift, southern alignment shift and any mitigation measures.

The results and conclusions of Phase I and II ESA's will be summarized in the EIS to the extent they are completed and available. Additional analysis and development of mitigation measures will be conducted if the results of completed or future surveys indicate potentially significant adverse impacts. As mentioned in Section 1.1, "If, after completion of the EIS, there are substantial changes to the Project that significantly affect the environmental analysis as described in *Minnesota Rules* part 4410.3000, the DNR will evaluate the need to issue an addendum or supplement to the EIS."

3.2.2 Cover types (Item 10)

Changes in cover types, including direct changes in wetland acreage attributable to alignment changes in the diversion channel and changes due to construction of levees and operation of the upstream staging area will be quantified and included in the EIS. The most recently available data will be reviewed by the DNR and included in the EIS.

3.2.3 Fish, wildlife and ecologically sensitive resources (Item 11)

3.2.3.1 Fish Passage and Mortality

The reduction in frequency of operation, inclusion of mitigation measures, and specific operation and monitoring plan components together are expected to reduce both direct and indirect impacts to lake sturgeon and other important fish species but will not eliminate the impacts altogether. Likewise, to better understand these potential impacts and whether additional mitigation measures are needed; the state EIS will include the following assessments specific to fish passage and mortality:

- The FFREIS, the Supplemental EA and other available information will be reviewed to determine if significant impacts to lake sturgeon or other important fish species are expected. This includes confirming the reduced usage of the diversion due to recent Project changes.
 - The USACE's separate EA on the Drayton Dam Mitigation Project will be reviewed along with other available information to determine the effectiveness of the mitigation project in improving overall fish passage in the Red River between Drayton and the project area. The EIS will provide further assessment as needed based on the review of the EA. In order to address any uncertainty

in the anticipated effectiveness of mitigation measures, the EIS will consider long term monitoring stations (upstream, downstream and through the project area) to determine long term impacts of the project. Monitoring should be initiated prior to project construction.

- Potential fluvial geomorphology impacts of the diversion (staging area and through town) will be assessed to determine the potential impact on the fish and invertebrate community of the Red River and its tributaries.
- Existing IBIs will be reviewed and assessed for their potential to inform future monitoring efforts. An IBI does not provide a basis from which to predict and quantify future impacts so the potential future impacts will be discussed in a qualitative manner, with monitoring suggested to verify predictions and to inform future mitigation efforts.
- The EIS will assess the potential to adopt mitigation strategies to minimize impacts to important fish species, including establishment of construction exclusion dates based on spawning periods.
- The potential for loss of fish due to stranding in the diversion channel and in the staging area is uncertain but is not expected to be significant. The EIS will assess the need for specific operation plan components to minimize stranding impacts. As an example, the drawdown in the diversion channel and staging area could be monitored and timed to allow fish to back out with declining discharge.

3.2.3.2 State Listed Species and Special Status Species

The analyses of Minnesota State Listed Species and North Dakota Special Status Species will be updated and assessed with current information to determine whether the conclusions from the 2009 analyses used in the FFREIS remain unchanged or need to be updated.

3.2.3.3 Impacts to Wildlife and Wildlife Habitat from Staging Area Utilization

The EIS will assess impacts to wildlife with a focus on wildlife which utilize the wooded riparian corridor. These areas provide some of the only habitat of that type in the area, and that habitat would be unusable during operation resulting in displacement. The State Wildlife Action Plan (SWAP) will be referenced to identify key habitats and the species of greatest conservation need. This information will be compared against existing data and figures on staging area inundation frequency, extent and duration to provide an estimate of impacts. Impacts estimates will be based on existing literature and professional experience.

The EIS will summarize invasive species concerns in the area of the Project. The EIS will describe monitoring and mitigation strategies that can be incorporated into the project proposer's operation and monitoring plan for the Project.

3.2.4 Nearby resources (Item 25)

3.2.4.1 Archaeology/cultural resources

The USACE conducted Phase II Cultural Resource Testing and Evaluation at several locations along the proposed diversion alignment between October 2012 and November 2013. The test sites were identified during the Phase I Cultural Resources investigation which took place from 2009-2012. The purpose of Phase II testing is to evaluate whether an archeological site is eligible for the National Register of Historic Places. For a prehistoric archaeological site to be eligible, it has to have portions which have not been disturbed, and it has to contain artifacts or features that can be used to date when the site was used and provide important information on the actual past use of the site. To the extent available and complete, the results and conclusions of this testing will be summarized in the EIS. Additional analysis and development of mitigation measures will be conducted if the results of these surveys indicate potentially significant adverse environmental or socioeconomic impacts.

3.2.5 Compatibility with plans and land use regulations (Item 27)

The EIS will identify and briefly describe relevant county and city land use plans and regulations as well as other flood damage reduction plans prepared for the area. Any inconsistencies or issues with the Project will be identified.

3.2.6 Impact on infrastructure and public services (Item 28)

The DNR will review available information to assess and describe the impacts of the diversion channel, associated bridgework, pumping stations, water control structures and diversion channel operations on infrastructure and public services in the Fargo-Moorhead Metropolitan Area. Although some of these structures are wholly located in the state of North Dakota, they are part of the Project and have the potential to cause resulting impacts (e.g., impacts to fisheries; connectivity) in the state of Minnesota, and therefore will be evaluated in the EIS.

3.2.7 Cumulative Potential Effects (Item 29)

The EIS evaluation will include identification of reasonable foreseeable projects, for which a basis of expectation has been laid, that are likely to have overlapping environmental effects in the same relevant spatial and temporal scale as the Project. Environmental effects from these projects will be evaluated along with environmental effects of the Project to determine significance and identify potential mitigation measures. Cumulative impacts identified from sections of the FFREIS and Supplemental EA will be reevaluated in the EIS applying state criteria.

Significant cumulative effects are generally not anticipated. There is however a potential for cumulative potential effects to the floodplain water-related land use management district from the Project and other flood mitigation and flood damage reduction projects. The specific nature or extent of these effects has not yet been identified. Further information on this topic is proposed as part of the EIS.

3.2.8 Other (Item 30)

3.2.8.1 Project Hydrology

The hydrologic record of the Red River at Fargo shows a trend of increasing magnitude and frequency of flooding in recent decades. During preparation of the FFREIS, a panel of experts (Expert Opinion Elicitation Panel) in hydrology and climate change was convened to elicit opinions on how to appropriately reflect this trend⁴. The panel concluded that the hydrologic record showed a “dry” period in the early decades of the 20th century and a “wet” period in later years continuing to the present and recommended developing revised flow frequency curves separately for the dry and wet periods. The revised flow frequency curves showed the 1-percent chance event flow to be approximately 34,700 cfs at present; 32,900 cfs in 2035; and 31,300 cfs in 2060. The hydraulic modeling developed for the Supplemental EA indicated that a flow of 34,700 cfs at the Fargo gage would produce a stage of 42.1 feet⁵. The referenced flood level is based on modeling that assumes permanent and emergency flood protection measures that confine flow to the main river channel are implemented during the flood event. The analyses described in the FFREIS were based upon the Expert Opinion Elicitation Panel’s hydrologic recommendations, which result in significantly higher stages for the 1-percent chance event than what FEMA has adopted in Minnesota and is proposing to use in North Dakota for the National Flood Insurance Program. The DNR concurs with this approach and will utilize the recommendations of the Expert Opinion Elicitation Panel in the EIS.

The DNR will assess the Project with consideration given to the most recent information on duration of storage. The EIS will use the USACE unsteady model, which is anticipated to show the depth duration for the flood events modeled.

It should be noted that the hydrologic and hydraulic (H&H) models developed for the FFREIS do not incorporate several modifications and mitigation measures recommended by the Diversion Authority and USACE since the USACE’s ROD was issued in April 2012. The H&H information will be updated to reflect the proposed configuration and alternatives under consideration.

⁴ FFREIS Appendix A, Hydrology.

⁵ Supplemental EA Appendix D, Hydraulics and Hydrology.

The EIS will include an evaluation of the rating curve data and will verify the underlying data in order to understand how it was compiled, what limitations apply, and how the data may be better presented, if applicable.

3.2.8.2 Socioeconomic Analysis

The EIS will provide information on the social and economic effects of reducing flood risk within the Fargo-Moorhead Metropolitan Area and increasing flood impacts in the rural area within the staging area. This information will satisfy the State's contextual requirements to assess social and economic factors as they relate to the Project and project alternatives (*Minnesota Rules* part 4410.2300H) and address public comments received regarding the socioeconomic effects of the Project.

The socioeconomic impacts will quantitatively identify the costs of the Project (including mitigation) as well as the flood damage reduction benefits arising from operation of the Project. The EIS will also qualitatively disclose the social implications of the Project.

As noted above, the proposed analysis will incorporate new and updated H&H information and regional and local benefits in addition to what was incorporated into existing models developed for the FFREIS. Therefore, the EIS model outputs will not provide a side-by-side comparison of model outputs developed for the FFREIS and will not be compared to model outputs that were presented in the FFREIS.

The model outputs for inclusion in the EIS will be quantitative costs/benefits for different flood frequencies for all alternatives found to meet the purpose and need of the Project and carried forward in analysis. Social impacts such as property buyouts will be described in monetary terms where possible and qualitatively disclosed where the impact is not quantifiable. If possible, the flood damages/fighting, development and qualitative social outputs will also be displayed geographically indicating North Dakota versus Minnesota and metropolitan versus rural.

3.2.8.3 Dam Safety

The EIS will discuss the meaning of a Class I, or high hazard, dam classification and the regulatory implications of this designation. The dam would need to be designed to meet Minnesota dam safety criteria, and the DNR would require that a dam breach analysis and emergency action plan be developed as part of the permitting process for the Project. To the extent that pertinent permit-related studies have been completed, they will be summarized in the EIS.

3.3 POTENTIALLY SIGNIFICANT IMPACTS MAY RESULT; INFORMATION BEYOND WHAT WAS IN THE FFREIS, SUPPLEMENTAL EA AND SCOPING EAW WILL BE INCLUDED IN THE EIS. THIS CATEGORY OF POTENTIAL IMPACTS WILL HAVE THE GREATEST INFLUENCE ON THE NEED FOR

PROJECT ALTERNATIVES AND MITIGATION MEASURES TO BE DEVELOPED.

3.3.1 Physical impacts on water resources (Item 12)

The Project involves diverting the Red, Wild Rice, Sheyenne, and Maple Rivers during flood times and the Lower Rush and Rush Rivers permanently. Wolverton Creek would experience changes while the Project is in operation due to water being staged.

3.3.1.1 Stream Stability

The DNR believes that the Project may result in potential significant geomorphology (stream stability) impacts to the Red River and the tributaries noted above, in the Project area. The DNR will review the October 25, 2012, report produced by West Consultants, Inc., for the USACE, titled, “Geomorphology Study of the Fargo, ND and Moorhead, MN Flood Risk Management Project” as well any other available and relevant information on sediment transport and deposition. Specific components of this evaluation will include:

- Evaluating channel shape and riparian conditions in the staging area to identify potential areas for stream bank failure.
- Evaluating potential for river bed scour in the area of the water control structures on the Red and Wild Rice Rivers and the confluence of the diversion channel and the Red River.
- Evaluating susceptibility of river segments to geomorphological changes such as loss of stability and incision. Specific river segments include, but are not necessarily limited to:
 - Wild Rice River from the connecting channel to the Red River;
 - Sheyenne River from the diversion to the Red River;
 - Red River from the water control structure to the confluence with the Wild Rice River;
 - Red River from the confluence of the Wild Rice River to the confluence of the Sheyenne River;
 - Red River from the confluence of the Sheyenne River to the diversion outlet; and
 - Red River downstream of the diversion outlet.
- Identifying necessary monitoring locations to track potential impacts of Project features and their operation as part of a scientifically valid and integrated monitoring design, developing measurement criteria and significance thresholds for impacts that require action or mitigation on the part of the Diversion Authority, and developing a range of preventative and corrective actions. These monitoring, reporting and action steps will be included in the project mitigation plan identified below in Section 7.0.

3.3.1.2 Wetlands

Indirect Impacts

Flooding from the Red River, laden with very fine sediments, contributes to sediment loads deposited in floodplain wetland basins during flooding. Use of the staging area will lengthen the inundation times of areas already inundated (under no project) as well as inundate new areas. The EIS will assess whether or not there is a potential for significant impact to these wetland resources from both individual operations and cumulatively over time within the staging area.

This will involve conducting an evaluation of depressional wetland areas within the staging area that have the potential, over time, for sediment deposition to change the wetland function and potentially convert the wetland to an upland condition. This will also include a comparison of existing and predicted future flood plain maps.

Direct Impacts

The EIS will contain additional detailed information on direct wetland impact and the suitability of the diversion channel as mitigation. Coordination will occur with Minnesota and North Dakota governmental units responsible for wetland regulation to ensure acceptable mitigation is identified.

3.3.1.3 Cold Weather Impacts on Aqueduct Function

There is a potential for water in the aqueducts associated with the Maple River and Sheyenne River to freeze in low-flow or no-flow conditions. The impacts to operation of the Project and to water and water-dependent resources will be assessed in the EIS using existing IBIs, which will be reviewed for their potential to inform future monitoring efforts. An IBI does not provide a basis from which to predict and quantify future impacts so the potential future impacts will be discussed in a qualitative manner, with monitoring suggested to verify predictions and to inform future mitigation efforts.

The USACE's Cold Regions Research and Engineering Laboratory (CRREL) will complete a report on the Maple River Aqueduct's technical features and disclose functional impacts from cold weather, snow and ice. The results and conclusions of CRREL's report will be summarized in the EIS to the extent it is completed and available.

The EIS will disclose the potential for freezing and any resulting operational and biological impacts.

3.3.2 Water-related land use management district (Item 14)

The Project would modify the 100-year flood plain within the Fargo-Moorhead Metropolitan Area and the surrounding region. The Project has been and will continue to be coordinated with local government units responsible for flood plain management and with FEMA.

The Diversion Authority has developed a Land Management Plan (Plan) that provides guidance toward mitigation of parcels impacted by flood stage increases. The current Plan identifies flood level thresholds at the 0-1, 1-3, and 3+ foot levels for mitigation decision making. These guides are subject to further evaluation in future versions of the Plan.

The EIS will disclose how the Project will meet FEMA regulations, such as those codified in 44 CFR 65.12, which includes the CLOMR requirement to mitigate the impact to any existing insurable structure if the proposed Project is expected to cause a flood stage increase greater than 0.00 feet. The exact manner of compliance with FEMA regulations is subject to ongoing discussion between FEMA and the USACE. The EIS will also assess whether the Project and the proposed mitigation actions within the Plan are consistent with state regulations regarding flood plain management. The Diversion Authority, the USACE, and FEMA are currently coordinating FEMA's CLOMR requirements. The EIS will identify measures needed or planned to address any compliance issues that are identified in the CLOMR process.

3.3.3 Other (Item 30)

The EIS will evaluate the effectiveness of mitigation as applied in the FFREIS process and whether additional mitigation is needed. (See Section 7.0, below, and Section 3.3.1, above).

4 IDENTIFICATION OF PHASED OR CONNECTED ACTIONS

There are no phased or connected actions associated with this Project.

5 EIS SCHEDULE (TENTATIVE) CHECK DATES

Date	Task or Milestone
April 15, 2013	Scoping EAW and Draft Scoping Decision issued for public review (public information meeting occurred May 8, 2013)
February 2014	Final Scoping Decision Document
February 2014	EIS Preparation Notice Published
August 2014	Draft EIS issued for public review
November 2014	Final EIS Issued
December 2014	EIS Adequacy Determined

6 SPECIAL STUDIES OR RESEARCH

Various reports and studies will be developed to support the assessment of environmental impacts from the Project. The project proposer and/or the USACE will provide the following reports to the DNR for review and incorporation into the EIS. The content of these will be independently reviewed and confirmed by the DNR and/or the EIS contractor prior to being incorporated into the EIS.

6.1 ASSESSMENT OF SOCIOECONOMIC MODELING USED IN FFREIS

The hydrologic and hydraulic (H&H) models developed for the FFREIS will be updated to reflect the proposed configurations and alternatives under consideration. Model outputs for inclusion in the EIS will be quantitative cost/benefits for five different flood frequencies (10, 25, 50, 100, and 500-year) for the Base No Action, No Action Alternative (with Emergency Measures), proposed Project, Northern Alignment Alternative and the Distributed Storage Alternative (if this alternative is determined to meet the project purpose). Flood elevations from the updated H&H will be used to populate a model to quantify flood related costs and benefits. These costs and benefits will be compiled with other costs and benefits from the Corp's Regional Economic Development (RED) account. The RED information will be updated or revised as appropriate to incorporate modifications.

6.2 DIVERSION AUTHORITY-FUNDED RESEARCH INTO RETENTION PROJECTS

In September 2012 the Diversion Authority announced that it is committing \$25 Million to investment in retention projects, with the funding in three categories: (1) 85 percent for construction of retention projects; (2) 10 percent for design of retention projects; and (3) 5 percent for studies leading to retention projects or enhancing regional retention initiatives. The purpose of the study component of this project is to identify and prioritize a system of upstream retention sites that would provide local flood damage reduction, and help achieve the 20 percent reduction in peak flood flow goal along the Red River as identified in the RRBC's Long Term Flood Solution (LTFS) report. The RRBC is under contract to the Diversion Authority to complete this study.

The LTFS report identifies actions needed to reach the overall 20 percent reduction goal for the Red River Mainstem. The subwatershed retention targets were developed at a general planning level of detail for the LTFS.

The DNR supports the collaborative nature of this study as the local water managers are in the best position to identify feasible retention actions. The results of this study should provide adequate information for the DNR to assess the distributed storage alternative during one potential 100-year flood event at Fargo, ND. Additional analysis may be required to better understand the implications of non-uniform runoff and floods of increased or lesser magnitude.

Summary of Studies to be used in EIS

Description	Applicable Topic(s)
Compilation of completed and currently funded flood risk reduction projects since FFREIS	Section 2.2 (No Action Alternative)
Evaluation of potential reduction in flood peaks achievable using flood water retention	Section 2.5.1 (Project Alternative)

Description	Applicable Topic(s)
Identify maximum level of protection that a system of flood barriers could potentially achieve.	Section 2.5.1 (Project Alternative)
Indexes of biologic integrity	Sections 3.2.3.1 (Fish Passage and Mortality) and 3.3.1.3 (Cold Weather impacts on Aqueduct Function)
CRREL cold weather, ice and snow impact	3.3.1.3 (Cold Weather impacts on Aqueduct Function)
Phase I and Phase II Environmental Site Assessments (ESAs)	Section 3.2.1 (Potential environmental hazards due to past site uses)
Changes in wetland impacts due to Project alignment changes	Section 3.2.2 (Cover Types)
Analysis of impacts to Minnesota and North Dakota listed and special status species	Section 3.2.3.2 (State Listed Species and Special Status Species)
Summary of invasive species concerns in area of the Project	Section 3.2.3.3 (Impacts to Wildlife and Wildlife Habitat from Staging Area Utilization)
Phase I and Phase II Cultural Resource survey results	Section 3.2.4.1 (Archaeology / cultural resources)
County and city land use plans (relevant portions)	Section 3.2.5 (Compatibility with plans and land use regulations)
Analysis of hydrologic rating curve	Section 3.2.8.1 (Project Hydrology)
Socioeconomic analysis – costs and benefits of the Project, including mitigation	Section 3.2.8.2 (Socioeconomic Impacts)
Evaluation of existing conditions and potential for river bed scour and geomorphological changes	Section 3.3.1.1 (Stream Stability)
Evaluation of depressional wetland areas within staging area for impact of sediment on wetland function	Section 3.3.1.2 (Wetlands)

Description	Applicable Topic(s)
Evaluation of environmental and land use mitigation strategies included in proposed Project	General

7 MITIGATION AND MONITORING

Minnesota Rules part 4410.2300 identifies that the EIS shall include mitigation measures that could reasonably eliminate or minimize any adverse environmental, economic, employment, or sociological effects of the project. To meet this requirement the EIS will evaluate and discuss mitigation measures to address adverse effects identified as a result of analyses proposed in Section 3.2 and 3.3 of the FSDD.

Specific mitigation measures have been identified, such as the low flow channel within the diversion and the Oxbow/Hickson/Bakke ring levee, and other mitigation measures are still conceptual, such as forest replacement. In some cases there is not complete agreement on whether or not mitigation is needed or if proposed mitigation is suitable. The table below identifies some mitigation actions that have been discussed or proposed. The USACE has proposed the use of an adaptive management program to address the potential uncertainty of environmental effects.

A successful adaptive management program identifies specific monitoring and reporting requirements with triggers or standards that indicate when adaptation is needed. For example, the DNR will consider the recommendation of piezometer monitoring for groundwater impacts as part of the Adaptive Management & Monitoring Plan. In addition, specific adaptations or menus of adaptations are needed as well as identification of responsible parties for all aspects of the adaptive management plan. The availability of financial assurance for mitigation actions will also be considered.

7.1 ENVIRONMENTAL IMPACTS AND PROPOSED MITIGATION ACTIONS

The following table summarizes currently known impacts and proposed mitigation measures. These measures and any others added to the Project during EIS development will be evaluated in the EIS and supplemented as needed to achieve environmental benefit.

Resource	Impact Type	Impact	Mitigation Action Category
Red River	Aquatic Footprint	14 acres	Stream Restoration / Aquatic Habitat
Wild Rice River	Aquatic Footprint	11 acres	Stream Restoration / Aquatic Habitat

Resource	Impact Type	Impact	Mitigation Action Category
Sheyenne River	Aquatic Footprint	8 to 9 acres	Stream Restoration / Aquatic Habitat
Maple River	Aquatic Footprint	11 acres	Stream Restoration / Aquatic Habitat
Rush River	Channel Abandonment	2.3 miles abandoned from where the diversion starts on the west side to the Sheyenne River	Sinuuous low-flow channel in the diversion channel
Lower Rush River	Channel Abandonment	2.7 miles abandoned from where the diversion starts on the west side to the Sheyenne River	Sinuuous low-flow channel in the diversion channel
Red River	Connectivity	Portions of hydrograph w/ complete disconnect	Biotic Connectivity -Reduce frequency of operation by constructing in-town levees.
Red River	Connectivity	Hydrograph for floods above 17,000 cfs at least partially impeded	Biotic Connectivity - Construct Drayton Dam Fish Passage. Reduce frequency of operation by constructing in-town levees.
Wild Rice	Connectivity	Portions of hydrograph w/ partial or complete disconnect	Biotic Connectivity - Construct Wild Rice Dam Fish Passage.
Project area	Wetlands	1,700 acres	Wetland Creation
Project area	Forest	131 acres	Floodplain Forest Restoration

7.2 LAND MANAGEMENT MITIGATION

The following table is a Summary of Land Management Mitigation in the defined staging area by Impact Category.

Resource Type/Impact Category	Identified Mitigation Actions	Notes
Residential Properties		
Residential - Flood Depth Greater than 3 feet	Acquisition or relocation of homes	In manner consistent with federal guidelines and applicable state eminent domain law
Residential - Flood Depth Between 1 and 3 feet	Evaluate for non-structural measures, such as ring levees, relocation, or elevating structures. Acquisition may be considered in areas where risk and safety analysis indicated remaining in place may be inappropriate.	
Residential - Flood Depth Less than 1 foot	Purchase flowage easements	FEMA's CLOMR requires mitigation for existing insurable structures with any stage increase greater than 0.00 feet.
Agricultural Properties and Lands		
Farmstead - Flood Depth Greater than 3 feet	Similar process to residential. However, offer buyout of property prior to consideration of other options.	Farmsteads are tied to their existing location, so nonstructural measures will be considered if it is feasible to remain on site.
Farmstead - Flood Depth Between 1 and 3 feet	Evaluate for non-structural measures, such as ring levees, relocation, or elevating structures. Acquisition may be considered in areas where risk and safety analysis indicated remaining in place may be inappropriate.	
Farmstead - Flood Depth Less than 1 foot	Purchase flowage easements planned	FEMA's CLOMR requires mitigation for existing structures with any stage increase greater than 0.00 feet.

Resource Type/Impact Category	Identified Mitigation Actions	Notes
Agricultural Lands	Acquisition of flowage easements planned and supplemental crop insurance	Lands within the staging area will be analyzed on a property-by-property basis. All agricultural land not directly impacted by the project can continue to be farmed.

The EIS will also provide information about the types of monitoring needed to verify predictions made in the EIS and ensure compliance with permit conditions. Specific monitoring plans will be developed and included in the permitting process, which may or may not occur simultaneously with preparation of the EIS. To the extent that specific monitoring plans are available, they will be included as part of the EIS. If a specific monitoring plan is not available, and has been recognized in the EIS process as needed, a conceptual monitoring plan will be developed as part of the EIS. Monitoring programs will provide a means to identify non-compliance with permit requirements, so that corrective action can be developed to minimize unforeseen impacts from the Project.

The concept of an adaptive management plan will be evaluated as part of the EIS. The EIS will assess the potential uncertainty of various environmental effects and determine the suitability of adaptive management as a mechanism to deal with this uncertainty. If an adaptive management program is determined suitable the details of monitoring, reporting, consultation and corrective action will be developed.

8 GOVERNMENT PERMITS AND APPROVALS (ITEM 8)

The EIS will identify all known permits and approvals that may be required for the Project. Some permit information may be collected concurrently and some permit application review may occur concurrently with EIS preparation. However, the EIS will not necessarily contain all information required for a decision on those permits. No permits have been designated to have all information developed concurrently with the preparation of the EIS nor will any require a record of decision pursuant to *Minnesota Rules* Part 4410.2100, subpart 6.D.