



**US Army Corps
of Engineers®**
St. Paul District

Appendix K: Environmental

Fargo Moorhead Metropolitan Area
Flood Risk Management Project

Reach 7 – Maple River Aqueduct

Engineering and Design Phase

P2# 370365

Doc Version: PER Submittal

12 June 2015

This page is intentionally left blank

Appendix K: Environmental

Table of Contents

K.1	SUMMARY OF IMPACTS	1
K.1.1	Aquatic Habitat	1
K.1.2	Fish Passage and Connectivity	1
K.1.3	Floodplain Forest.....	1
K.1.4	Wetlands	1
K.1.5	Cultural Resources	2
K.2	OVERALL MITIGATION FEATURES	2
K.2.1	Aquatic Habitat Mitigation Features.....	2
K.2.2	Fish Passage and Connectivity	2
K.2.3	Floodplain Forest.....	2
K.2.4	Wetlands	3
K.2.5	Cultural.....	3
K.3	Inlet structure MITIGATION FEATURES.....	3
K.3.1	Fish Passage at Outlet Structure – <i>Not applicable to this reach</i>	3
K.3.2	Wetland Planting Guidelines	3
K.4	CULTURAL RESOURCES	3
K.5	ENVIRONMENTAL SURVEYS AND MONITORING.....	5
K.6	NEPA COMPLIANCE	5

ATTACHMENTS

Attachment K-1. MFR Guidelines for Planting Plan of the Fargo Moorhead Diversion Channel

This page is intentionally left blank

Appendix K: Environmental

K.1 SUMMARY OF IMPACTS

Impacts identified in the 2011 Fargo-Moorhead Metropolitan Area Flood Risk Management Feasibility Report and Environmental Impact Statement, and the Supplemental Environmental Assessment September 2013 includes impacts to aquatic habitat, fish passage and connectivity, floodplain forest, wetland resources, and cultural resources.

K.1.1 Aquatic Habitat

Impacts to aquatic habitat includes riverine habitat directly affected by individual project features to include the Red River Control Structure, Red River Outlet Structure, Wild Rice River Control Structure, Sheyenne River Aqueduct, Maple River Aqueduct, and the abandonment of 5 miles of channel on the Rush and Lower Rush Rivers.

K.1.2 Fish Passage and Connectivity

Impacts to fish passage and connectivity result from staging water during operation of the flood control project, reducing connectivity.

K.1.3 Floodplain Forest

The project will result in a loss of 131 acres of forested land consisting of floodplain forest, shelterbelts and small pockets of trees around farmsteads.

K.1.4 Wetlands

Wetlands delineation for project as described in Supplemental Environmental Assessment.

Wetlands delineation. Wetland Type	Acres
Open Water	0.69
Seasonally Flooded Basin	1476.97
Shallow Marsh	106.38
Shrub-Carr	1.32
Wet Meadow	119.85

Total Acres	1705.20
--------------------	----------------

In general, the majority of the wetlands impacted are low functioning farmed, seasonally flooded type.

K.1.5 Cultural Resources

Phase I cultural resources surveys of the Reach 7/Maple River structure area were conducted in 2010 and 2011 (Tucker et al. 2012). Nine archeological sites were identified within the construction work limits on the north side of the Maple River, with two more sites adjacent to the west-side work limit. Two archeological sites were identified within the construction work limits on the south side of the Maple River. Phase II testing was conducted at the two sites on the south side of the river in 2012 and at the eleven sites on the north side of the Maple River in 2013 (Jones et al. 2014). Sites 32CS5127 and 32CS5146 were determined eligible to the National Register of Historic Places. Sites 32CS5138, 32CS5139 and 32CS5141 need additional testing to determine whether archeological materials are located at buried A (topsoil) horizons at their locations. The remaining eight sites (32CS5140, 32CS5142, 32CS5143, 32CS5144, 32CSX332, 32CSX339, 32CSX346 and 32CSX350) have been determined not eligible to the National Register.

K.2 OVERALL MITIGATION FEATURES

K.2.1 Aquatic Habitat Mitigation Features

Measures considered for aquatic habitat mitigation include performing full stream restoration, stream improvement via riparian corridor restoration, designing portions of the low-flow channel to meander, and construction of fish passage.

K.2.2 Fish Passage and Connectivity

Fish Passage and connectivity impacts will be mitigated for by designing the outlet structure to be passable to fish, providing fish passage at the Rush River inlet, and providing fish passages at other existing dams in the region to include Drayton Dam and Wild Rice Dam. The aqueducts for the Maple River crossing and the Sheyenne River Crossing will be designed to ensure fish passage over through the aqueducts at least up through bank full events.

Agencies have supported the idea that fish passage be provided across the widest range of conditions practicable. For example, fish passage during floods is important as fish often move in response to pulse events, particularly during spring floods. The Fargo-Moorhead project has strived to provide fish passage during all but the largest flood events.

K.2.3 Floodplain Forest

Mitigation to offset the impacts to floodplain forest includes converting 262 acres of floodplain farmland or pastured land into floodplain forest.

K.2.4 Wetlands

The channel will be planted with native wetland species on the bottom and the fringe of the side slopes of the channel, with the remainder of the side slopes being planted as a prairie swale type community. A buffer strip of several hundred feet on either side of the diversion channel up to the embankment top will help limit encroachment from agricultural activities and will provide filtering of surface runoff into the diversion channel wetlands. In consultation with several plant experts, planting guidelines and seed mixes for various zones of the channel cross section have been developed that ensure project objectives are met (Attachment K-1).

K.2.5 Cultural

Cultural resources mitigation for each Reach or feature must be completed prior to the start of construction of the Reach or feature. Mitigation will be necessary at Reach 7/Maple River structure. Monitoring for deeply buried archeological sites not visible on the ground surface will be needed for the Reach 7/Maple River construction.

K.3 REACH 7 MAPLE RIVER MITIGATION FEATURES

The environmental consideration for mitigation for this feature includes providing planting guidance to facilitate wetlands in the bottom of the diversion channel. These efforts are discussed in the Feasibility Report and Environmental Impact Statement (EIS).

K.3.1 Fish Passage

K.3.1.1 Fish Passage from the diversion channel to the Maple River is not required.

K.3.1.2 Fish Passage through aqueduct - The aqueducts for the Maple River crossing and the Shyenne River Crossing will be designed to ensure fish passage over through the aqueducts at least up through bank full events.

K.3.2 Wetland Planting Guidelines

To meet the mitigation requirements for planting the diversion channel with wetland species the vegetation establishment guidelines for the diversion channel was established and are attached as attachment K-1. Goals of the planting plan are to limit the potential for the establishment of undesirable species (such as cattails, willow, etc.), be compatible with Conveyance criteria (resulting in a Manning's roughness n value of .03 or less), provide adequate wetland mitigation, and will be resilient to maintenance activities.

K.4 CULTURAL RESOURCES

One National Register of Historic Places-eligible archeological site (32CS5127) is located in the Reach 7/Maple River construction area on the south side of the river. A second National Register-eligible archeological site (32CS5146) is located within 70 meters (230 feet) of the western work limit on the

north side of the river. Use of the Section 22/23 section line as an access corridor will impact this site. Three other sites on the north side of the river (32CS5138, 32CS5139, 32CS5141), which are partially or wholly within the construction work limits, need additional deep shovel testing or one-meter by one-meter excavation units to determine if there are any archeological materials at the buried topsoil horizons at their locations. If such materials are present, project impacts to these three sites may also need to be mitigated prior to construction. If access to the ice control structure upstream of the aqueduct is on the north side of the Maple River, it may impact additional portions of site 32CS5139.

Based on the results of the Phase II testing at their locations, no further cultural resources work is necessary at archeological sites 32CS5140, 32CS5142, 32CS5143, 32CS5144, 32CSX332, 32CSX346 and 32CSX350 on the north side of the Maple River and archeological site 32CSX339 on the south side of the Maple River prior to construction as they have been determined not eligible to the National Register.

Based on coordination of the viewshed analysis with the North Dakota SHPO, the North Dakota SHPO has agreed with the Corps determination that EMBs and other above ground structures (Maple River aqueduct) that are 20 feet tall or less above the ground surface would not have a visual impact at over one-eighth mile. The EMBs are being designed to be 20 feet or less (21 feet allowing for subsidence) to avoid all but minor visual impacts. Where the EMBs or other features have to be over 20 feet above the ground, we will have to determine what if any National Register of Historic Places eligible or listed properties (historic properties) are within one-half mile of that taller feature and just what the extent of the visual impact would be (none, minor, moderate, or major) on a case by case basis. Visual impacts which cannot be avoided can be minimized by such things as trees, prairie grasses, and other plants breaking up the view of the structure or blending the structure in with the adjacent landscape.

The Maple River aqueduct will be ... (max height of any feature elements over 20 feet)

There are no National Register eligible or listed buildings or structures within one-half mile of the Maple River aqueduct structure. There are two farmsteads and three rural residences between one-half mile and one mile of the aqueduct. The Stuart Johnson farmstead is 3/4-mile to the northwest and there are three residences on the west side and a farmstead on the east side of 26th Street NW just north of the Maple River. There are seven farmsteads, one rural residence, and the Maple-Sheyenne Church and cemetery between one mile and 1½-miles from the aqueduct. The Libbrecht farmstead (32CS5171) is approximately 1¼-mile to the west-northwest and has been recommended as not eligible to the National Register (Tucker et al. 2012). All these buildings and structures are outside of the diversion channel/Maple River aqueduct alignment and construction work limits so they will not be directly affected, but may be subject to visual impacts.

Compliance with Section 106 of the NHPA is being accomplished for the FMM Project in general and the Reach 7/Maple River structure in particular based on the stipulations in the Programmatic Agreement for the project and Amendment No. 1 to that Programmatic Agreement.

K.5 ENVIRONMENTAL SURVEYS AND MONITORING

Plantings in the diversion channel will be monitored to ensure it meets requirements to be considered an acceptable mitigation for wetlands. There may be some type of monitoring to ensure that fish are able to pass through/over the aqueduct during bank full events.

K.6 NEPA COMPLIANCE

The proposed plan for the project was discussed in the 2011 Fargo-Moorhead Metropolitan Area Flood Risk Management Final Feasibility Report and Environmental Impact Statement. A Supplemental Environmental Assessment, Design Modifications to the Fargo Moorhead Metropolitan Flood Risk Management Project, dated September 2013 was prepared to address changes in impacts caused by alignment changes, construction of levees in-town to provide the opportunity to allow more flow through town, and the construction of a levee around the communities of Hickson, Bakke, and Oxbow. Included in this EA is a description of the inlet structure indicating that gates be added to this structure. The Finding of No Significant Impact (FONSI) was signed on 19 September 2011.

Further NEPA may be necessary for the structure depending on final design, there were commitments made in the FEIS to ensure that the aqueduct is passable for fish at least up through bank full events. A review will have to be done on the quantities of fill being placed below ordinary High water mark to ensure the existing 404 is still accurate. Finally a review of the final heights of the structure are less than 20 feet above existing ground, otherwise a view shed analysis will have to be completed.

References

Jones, Rhiannon, Jennifer R. Haas and Jennifer Picard. 2014. *Phase II Evaluation of Thirteen Archaeological Sites, Fargo-Moorhead Metro Flood Risk Management Project Diversion Channel Alignment, Cass County, North Dakota*. Great Lakes Archaeological Research Center, Inc., Milwaukee, Wisconsin.

Tucker, Gordon C., Jr., Marcia Meier, Brian Shaw, Melissa Dolin, Julie M. Gallagher, Juston Fariello, Kenneth Bedingfield, Joshua McNutt, Kem Zielinski and Joe Rigley. 2012. *The Fargo-Moorhead Flood Risk Management Project, Cass County, North Dakota and Clay County, Minnesota: Results of Phase I Cultural Resources Investigations, 2010-2011*. URS Corporation, Denver, Colorado.