

**GREEN MEADOW WATERSHED**  
**Wild Rice Watershed District**  
**Purpose and Need for Action – Review Point No. 2**  
**DRAFT (1/25/2017)**

The Wild Rice Watershed District (WRWD) encompasses the drainage basins of the Wild Rice and Marsh Rivers in northwestern Minnesota. The WRWD includes parts of Norman, Mahnomen, Clay, Polk, Clearwater, and Becker Counties. The Green Meadow Watershed is a sub-watershed with the Marsh River basin. **Figure 1** shows the 70-square mile sub-watershed drainage area with respect to the overall Wild Rice Watershed District drainage area. In 2015, the Wild Rice Watershed District entered in to an agreement with the Natural Resource Conservation Service (NRCS) as part of the Regional Conservation Partnership Program (RCPP). Studies with funds obtained through the RCPP are required to conform to the Watershed Protection and Flood Prevention Act (Public Law 83-566) and the National Environmental Policy Act (NEPA) requirements which will result in an Environmental Assessment. This document is intended to meet the requirement of the National Watershed Program Manual (NWPM) Section 501.34.

### **Purpose and Need**

This project is intended to meet both flood risk reduction and natural resource enhancement.

The primary flood risk reduction purpose of the project is to provide sustainable and reliable long-term flood damage reduction within the Green Meadow Watershed associated with spring snow melt and rains, while not increasing contributions to flooding further downstream. The need for the project is the protection of life and property by reducing flood damage risk within the watershed. Flooding in the watershed results in damages to crop land due to field erosion and deposition, channel erosion and deposition, delayed planting, prevented planting, and prolonged inundation. Flooding also results in damage to the rural transportation system and disruptions to local commerce. The secondary flood risk reduction purpose of this project is to assist in meeting the Red River Basin Commission's (RRBC) Long Term Flood Solutions goal of providing a 20% peak flow reduction goal along the Red River of the North Main stem.

The primary natural resource enhancement purpose of the project is to reduce sediment loading and improve the hydrologic conditions within the watershed. The aquatic resources, limited to a series of artificial and altered watercourses, are subject to continued degradation from sediment loading and altered hydrologic conditions. In addition, the remaining wetland resources in this watershed are degraded due to sediment loading and altered hydrologic conditions. There is a need for a project that will reduce sediment loading to these resources and reduces the flood peaks and flashiness of the hydrology throughout the watershed.

### **Flood Risk Watershed Setting**

#### **Public Safety**

The Green Meadow Dam was constructed in approximately 1973 and is currently under the jurisdiction of the Wild Rice Watershed. The dam was constructed to have an approximately 13,000-ft of embankment (2.5 miles) with approximately 2,200 ac-ft of flood storage. The dam provides significant flood risk reduction and public safety by reducing runoff from the upstream

\_\_\_\_\_ square miles of drainage area. The location of the current Green Meadow relative to the Green Meadow Subwatershed is shown in **Figure X**. Currently, the dam has exceeded its' design life and the structural integrity uncertain.

There are \_\_\_\_\_residences, \_\_\_\_\_roadways, any approximately \_\_\_\_\_ acres of agricultural land that could be impacted by a dam failure. Area most at risk from a failure of the current structure are shown in **Figure X**.

In the foreseeable future, the Wild Rice Watershed will likely be required to either complete improvements to meet current safety standards or to decommission the structure.

**Agricultural**

Flooding within the Green Meadow Watershed impacts crop land on several levels. Flooding induced by severe spring rains often results in delayed planting, prevented planting, and top soil loss from prepared seedbed. When severe summer rains occur, prolonged inundation can result in damages to growing crops. Total inundated acres and associated agricultural damages are estimated during various flood events are as follows. Maps of the locations of these potential agricultural damage areas are show in **Figure X**.

**Table XX** – Inundated Lands Summary

Runoff Event	Rainfall Depth*	Total Inundated Acres	Agriculture* Inundated Acres
2-year			
5-year			
10-year			
25-year			
50-year			
100-year			

*\*Estimated from National Land Cover Dataset GIS data layer*

Although not included in the table above, runoff from the Green Meadow subwatershed also contributes to agricultural flooding downstream along the Marsh and Red Rivers.

**Public Infrastructure – Transportation**

Based on information from the county and township road officials, road and culvert damages occurred at approximately 41 locations in the Green Meadow subwatershed during the floods of 200X, 200X, and 200X as shown in **Figure X**. Road damages primarily occur in the upper reaches of the subwatershed and include approximately 7 miles of MN Highway 32 and 2 miles of county road damages near the CR 24/149 intersection.

**Public Infrastructure – Public Drainage Systems**

Flooding in the Green Meadow Watershed impacts the Wild Rice Watershed Project No. 30 public drainage system, by causing extensive erosion and channel/bank failure associated with

the setback levees in the middle reaches (downstream of the Green Meadow Dam) and along the lower (channelized) reaches. The reaches that have been susceptible to erosion and channel bank failures are showing in **Figure X**.

### **Regional/Red River Basin**

The flood risk in the Wild Rice Watershed, particularly in Norman Counties, has been a persistent problem for the region. The community of Shelly, MN is located downstream of the confluences of the Green Meadow Watershed along the Wild Rice River. A substantial portion of Shelly is located within the regulatory 100 and 500-year flood plains. In addition, flooding along the Marsh River results in significant agriculture losses being experienced.

The Wild Rice and Marsh Rivers are tributary to the Red River Basin. The Red River Basin is an international, multi-jurisdictional watershed of approximately 45,000 square miles, with 80% of the Basin contained within the United States, and the remaining 20% of the Basin located in Canada. The region is frequently impacted by flooding along the Red River and its tributaries. Impacts experienced along the Red River mainstem are a result of combined tributary subwatershed contributions, which includes the Wild Rice Watershed.

The Red River Basin Commission's (RRBC) Long Term Flood Solutions Plan identifies a 20% peak flow reduction goal along the Red River of the North Main stem that includes flow reduction goals for the Wild Rice Watershed District. Project(s) in the Green Meadow Subwatershed should assist in addressing the goals for the WRWD established as part of the RRBC plan.

### **Natural Resources Watershed Setting**

#### **Altered hydrology**

Hydrologic conditions in the watershed are considered "flashy" with high peak flows followed by fast return to low flows. Almost all land within the watershed is in agricultural production and little surface water storage remains in the watershed due to drainage resulting in increased annual runoff, higher flood peaks, and extended periods of extreme low flow or no flow conditions in watercourses compared to conditions found historically. These hydrologic conditions reduce the quality of available habitat and generally reduce the biological integrity of watercourses in the lower portions of the watershed.

#### **Increased Sediment Loading to Watercourse and Wetlands**

Sediment delivery to watercourses and remaining wetlands is high in portions of the watershed due to land use and intensive surface water drainage. This loading contributes to the need for ditch maintenance and can reduce the integrity of existing wetlands.

#### **Degraded soil health**

Soils in many areas of the Green Meadow Subwatershed are compacted, and have low organic matter content resulting in increased runoff and pollution/sedimentation on rivers and streams which stress existing aquatic biota.