

APPENDIX A  
WESTERN PLANNING REGION  
PLANNING SUMMARY

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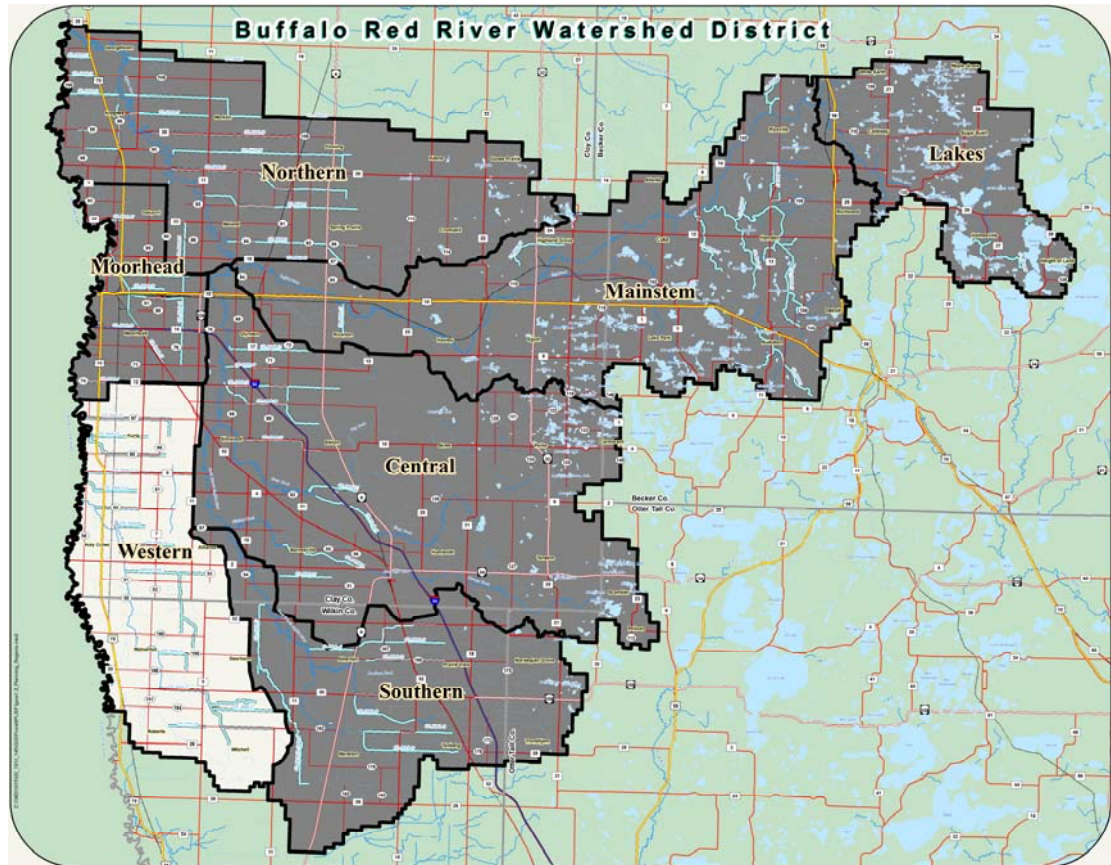
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- A Natural Resource Assessment Goals/Objectives

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# 1. Document Purpose

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The Buffalo-Red River Watershed District (BRRWD) is a local unit of government responsible for water and resource management within portions of Otter Tail, Wilkin, Clay and Becker Counties, in northwestern Minnesota. Operation of the BRRWD is guided by their “Watershed Management Plan” (WMP). Initial development and updates to the plan are required by the Board of Water and Soil Resources (BWSR). Minnesota Statutes 103D provides the required content for a WMP. The BRRWD is also a drainage authority and guided by Minnesota Statutes 103E.

The BRRWD divided the area within their legal boundary into seven distinct planning regions for the purpose of preparing the WMP update. The Planning Regions were

established and based primarily upon hydrologic boundaries. Hydrologic processes are fairly similar within these Planning Regions, which aids in providing focused management of the water and natural resource issues for the BRRWD.

This document provides a description of the physical characteristics of the Western Planning Region, identifies resource issues and problems, describes previous efforts to correct issues and problems and outlines potential solutions. The document also includes information obtained during the public involvement process. The document is not intended to serve as a “stand alone” plan for the Western Planning Region. Rather, this document is intended to serve as a tool for soliciting input about resource issues and problems, identify potential solutions and describe how the Western Planning Region differs from the other Planning Regions. Portions of this document will be used to prepare the main body of the WMP, and this document should be used in conjunction with the main body of the WMP.

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## 2. General Description of the Western Planning Region

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### 2.1 Location, Size and Population Trends

The Western Planning Region covers 105,311 acres, or 164 square miles, and is located in the southwestern part of the BRRWD (**Figure 2.1**). Municipalities within the Western Planning Region include Wolverton, Comstock, and Sabin. The northern part of the Western Planning Region lies in Clay County, while the southern part is located in Wilkin County. Highway 75 runs north-south through the western edge of the Western Planning Region.

Population trends are important because growth affects how water and natural resources are used. The population within the Western Planning Region is currently estimated to be 1,557 people. The population within Clay County has increased by 6.3% from April 2000 to July 2006. Wilkin County population has decreased by 7.1% during that same time period. The trend reflects the fact that rural areas are losing population to urban areas.

## 2.2 Physical Setting

### 2.2.1 Geology

The geology of an area is important because it can be related to the depth water can be reached below the ground surface, affects the movement of water from the land surface into the underlying aquifers, is related to the parent material available for the formation of soil and is important for understanding the structural engineering properties of the surficial layer.

Over twelve thousand years ago, much of the BRRWD was covered by glacial Lake Agassiz. Lake Agassiz was formed by an accumulation of melt waters from the last receding glacier (**Figure 2.2**). The western portions of Clay and Wilkin Counties, which includes the Western Planning Region, are located on this historic lake bed called the Lake Plain ecoregion. The Lake Plain ecoregion is characterized by thick lacustrine sediments (i.e., associated with standing water) formed by the lake underlain by glacial till (**Figure 2.3**).

### 2.2.2 Topography

The topography of the land surface dictates the direction and movement of surface waters, whether drainage is needed for agricultural production and the distribution of plant types. Topography also provides some indication of the movement of surficial ground water.

The Western Planning Region has the flattest topography of all the Planning Regions because it is located on the lake plain of Glacial Lake Agassiz (**Figure 2.2**). The lake bed is characterized by flat, extremely level deposits of lake sediments. Because the area is flat and has heavy soils, drainage considerably enhances agricultural crop yields. Drainage can also result in the ability to plant crops earlier in the growing season and to reduce loss because of the ponding of excess precipitation.

Since the Western Planning Region is flat, it contains fewer lakes and pothole wetlands than neighboring areas. The lakes and wetlands within the Lake Plain ecoregion are generally perched, providing neither for groundwater recharge or discharge. The elevation ranges between 900 and 1,000 feet for the entirety of the Western Planning Region (**Figure 2.4**).

### 2.2.3 Soils

The soils within an area affect the movement of surface water, the need for agricultural drainage and the amount of sediment entering streams, rivers and lakes. The parent material for the soils in the Western Planning Region is comprised of lacustrine sediments

formed by glacial Lake Agassiz. Typical soil types in the Western Planning Region are Fargo-hegner-colvin association, Colvin-bearden-perella association and Glyndon-wheatville-wyndmere association (**Figure 2.5**). Soils of these association types are fine textured and require drainage to be effectively farmed. The soils of the Western Planning Region tend to be clays of low permeability with poor internal drainage, but are very fertile for agriculture. Many of the agricultural fields in the Western Planning Region are drained by surface ditches. Although the soils have high runoff rates due to poor permeability, soil erosion from surface runoff tends to be lower than areas further east in the BRRWD. This is due to the flatness of the topography in the Western Planning Region.

The soils in the Western Planning Region are moderately susceptible to wind erosion, with an erodibility index of 4 or 5 on a scale of 1-8, where the low end of the scale is the most susceptible to wind erosion (**Figure 2.6**).

## 2.2.4 Land Use

The Western Planning Region is the most agriculturally dominated region in the BRRWD (**Table 1A**). The primary land use is cultivated land (94.5%) followed by deciduous forest (2.5%). Because most of the land is cultivated and in agricultural production, many of the resource issues within the Western Planning Region are related to intensive agriculture. Drainage is needed to improve yield and reduce the likelihood of crop loss. Stream channels and creeks have been modified by straightening and/or deepening. Historic wetlands and prairie areas have been converted into agricultural lands.

**Table 1A. Land Use for the Western Planning Region.**

<b>Land Use Category</b>	<b>Acres</b>	<b>Percent</b>
Urban and Industrial	270	0.3
Farmsteads and Rural Residences	832	0.8
Rural Residential Development Complex	50	0.1
Other Rural Developments	181	0.2
Cultivated Land	99,495	94.5
Transitional Agricultural Land	219	0.2
Grassland	1,032	1.0
Grassland-Shrub-Tree (deciduous)	73	0.1
Deciduous Forest	2,678	2.5
Water	310	0.3
Wetlands	155	0.2
Gravel Pits and Open Mines	14	<0.1
Exposed Soil, Sandbars, and Sand Dunes	3	0.00
Outside State or Outside County	<1	0.00
Total	105,311	100.00

## 2.2.5 Land Ownership

Land ownership is important to the BRRWD because during the development of potential projects, the ownership directly dictates the project permitting process, official notifications and how the land may be utilized.

The lands within the Western Planning Region are mostly owned by private landowners and are used for agriculture production. An exception is the Wolverton Wildlife Management Area (WMA), which is a 12 acre parcel of habitat located in the Western Planning Region.

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## 2.3 Fish, Wildlife and Natural Resources

The Minnesota County Biological Survey (MCBS) has identified native plant communities that are important areas for conservation (See **Figure 1A**). Native plant communities (sometimes also referred to as "natural communities") are groups of native plants that interact with each other and their surrounding environment in ways not greatly altered by modern human activity or by introduced plant or animal species. These groups of native species form recognizable units, such as an oak forest, a prairie or a marsh, that tend to repeat across the landscape and over time. Native plant communities are generally classified and described by taking into account vegetation, hydrology, land forms, soils and natural disturbance regimes. The native plant community types and subtypes in this data layer are classified primarily by vegetation and major habitat features. Classification and inventory of native plant communities is an ongoing effort of the MnDNR Natural Heritage and Nongame Research Program and the MCBS. The abstract of this metadata can be found at [http://deli.dnr.state.mn.us/metadata/mcbs\\_npcpy3.html](http://deli.dnr.state.mn.us/metadata/mcbs_npcpy3.html).

The important natural resource features are associated with the remaining natural watercourses within the Western Planning Region, specifically the Red River and Wolverton Creek. Wild turkeys and deer concentrate along water courses, primarily within agricultural fields.

The Wolverton WMA consists of 12 acres of habitat within the Western Planning Region that provides recreation opportunities for hunting deer, small game, pheasant and waterfowl. The southeastern portion of the region directly borders Manston WMA in Wilkin County. The Manston WMA is 1,838 acres and provides recreational hunting of deer, small game, pheasant and waterfowl. (**Figure 1A**).

### 2.3.1 Rare Natural Features and Those Subject to Special Protection

Understanding the type and location of rare natural features is important. Projects and human related activities should be located in a manner that minimizes the physical (i.e., direct) and indirect impacts to rare natural features. A determination of "rare" is primarily

based upon work completed by the MCBS. The goal of the MCBS is to identify significant natural areas and to collect and interpret data on the distribution and ecology of rare plants, animals and native plant communities.

There is one site MCBS site located in the southern half of the Western Planning Region just north of County Road 190. However, this site falls below the minimum biodiversity significance threshold (**Figure 1A**). This means the site lacks good quality occurrences of rare species, native plant communities or functioning landscapes, or moderately disturbed plant communities and landscapes with an opportunity for recovery and rehabilitation.

There are no rare native plant communities documented in the Western Planning Region according to the MCBS. This is largely because the historic, native tall-grass prairie has been replaced by intensive agriculture.

### *2.3.1.1 Calcareous Fens*

Calcareous fens are the rarest wetland plant community type in Minnesota, if not North America. These are plant communities of wet, seepage sites that have an internal flow of groundwater that is rich in calcium and magnesium bicarbonates, and sometimes calcium and magnesium sulfates. There are no known calcareous fens located in the Western Planning Region.

### *2.3.1.2 Federal Threatened and Endangered Species*

The USFWS in the Department of the Interior and the National Oceanic and Atmospheric Administration Service (NOAA) in the Department of Commerce share responsibility for administration of the Endangered Species Preservation Act. Congress passed the Endangered Species Preservation Act in 1966. This law allows listing of only native animal species as endangered and provides limited means for the protection of species so listed. The Departments of Interior, Agriculture, and Defense were to seek to protect listed species, and insofar as consistent with their primary purposes, preserve the habitats of such species. Land acquisition for protection of endangered species is also authorized. The Endangered Species Conservation Act of 1969 was passed to provide additional protection to species in danger of "worldwide extinction". Import of such species is prohibited, as is their subsequent sale within the United States.

The USFWS maintain a list of the species protected and under the Endangered Species Act (<http://www.fws.gov/midwest/endangered/index.html>). The bald eagle (*Haliaeetus leucocephalus*) is listed as threatened within the BRRWD. This is the only "listed" species.

### ***2.3.1.3 Minnesota Species Protected Species and Species of Special Concern***

Minnesota's endangered species law (MS 84.0895) and associated rules (Chapters 6212.1800, 6212.2300 and 6134) impose a variety of restrictions, a permit program and several exemptions pertaining to species designated as endangered, threatened, or species of special concern. The law and rules prohibit taking, purchasing, importing, possessing, transporting or selling endangered or threatened plants or animals, including their parts or seeds, without a permit. For animals, taking includes pursuing, capturing or killing. For plants, taking includes picking, digging or destroying. The law and rules specify conditions under which the commissioner of the Minnesota Department of Natural Resources (MnDNR) may issue permits to allow taking and possession of endangered or threatened species.

A species is considered endangered if the species is threatened with extinction throughout all, or a significant portion, of its range within Minnesota. A species is considered threatened if the species is likely to become endangered within the foreseeable future throughout all, or a significant portion, of its range within Minnesota. A species is considered a species of special concern if, although the species is not endangered or threatened, it is extremely uncommon in Minnesota or has unique or highly specific habitat requirements and deserves careful monitoring of its status. Species on the periphery of their range that are not listed as threatened may be included in this category along with those species that were once threatened or endangered but now have increasing or protected, stable populations.

According to the MnDNR Natural Heritage Program, there are three occurrences of a vertebrate animal along the Red River in the Western Planning Region that is threatened or endangered (**Figure 1A**). Additional data collection and analysis is likely needed in the future to assess the presence of this species on a specific project location.

## **2.3.2 Natural Resources Assessment**

The BRRWD contracted with the Minnesota Center for Environmental Advocacy (MCEA) to provide a watershed-based natural resource assessment of the BRRWD. A copy of the Natural Resource Assessment is provided in **Appendix N**. The Red River Flood Damage Reduction Mediation Agreement requires that the enhancement of natural resources be considered and incorporated into the next generation of WMPs. The purpose the watershed-based natural resource assessment is to identify areas where effort should be made to maintain existing natural resource features and identify opportunities for enhancing natural resources.

The presence of diverse natural resource features on a landscape contributes to a functional landscape. Relatively undisturbed natural resource areas (woodlands, wetlands, grasslands, brushlands, etc) provide important habitat. These areas also provide important recreational opportunities (fishing, hunting, camping, bird watching, etc), potentially enhancing the economy of rural Minnesota. Identifying the locations of these areas may assist in identifying opportunities for projects with both flood damage reduction and natural resource enhancement benefits and also reduces the likelihood of potential land use conflicts.

This MCEA natural resource assessment evaluated several factors in order to identify existing quality natural resources and opportunities for restoration and enhancement. These methods included developing Geographic Information System (GIS) data and using these data to identify areas based upon criteria established by MCEA and resource professionals. County, State and Federal natural resource professionals were consulted to refine the information developed and provide guidance about natural resource enhancement goals, objectives and priorities for various subwatersheds. A summary of Natural Resource goals and objectives for the Western Planning Region, taken directly from the Natural Resource Assessment completed by MCEA, has been provided at the end of this summary appendix as **Exhibit A**. Three resource categories were identified: 1) existing resources; 2) restorable resources; and 3) priority natural resource areas.

### *2.3.2.1 Existing Resources*

The MCEA used a variety of criteria to evaluate existing areas and resources important for plants and animals. The criteria included identifying:

- Large blocks of contiguous wetland (minimum of 100 acres), grassland (minimum of 500 acres) and woodland (minimum of 1000 acres);
- Sensitive species or Species in Greatest Conservation Need (SGCN). These are species considered rare, declining or vulnerable in Minnesota because their populations are identified as being rare, declining or vulnerable in Minnesota for a variety of reasons, including;
  - Dependence upon rare, declining or vulnerable habitats;
  - Vulnerability because of over-exploitation, invasive species, disease, contaminants or a lack of citizen understanding and stewardship (such as killing large snakes thought to be venomous);

- Vulnerability because they require large home ranges or require multiple habitats or ecological processes, like fire, that no longer operate within the natural range of variation;
  - A limited ability to recover on their own due to low dispersal ability or low reproductive rate or have a highly localized or restricted distribution (Endemic);
  - Highly concentrated populations during some time of the year (such as bats clustering in hibernacula and migratory stop-overs);
  - Species whose Minnesota populations are stable, but are declining in a substantial part of their range outside of Minnesota (such as common loon or black tern).
- Key habitats<sup>1</sup> based on the use of habitats by SGCN;
  - Public and conservation lands (those primarily under fee ownership to the Nature Conservancy, the MnDNR, and the USFWS; and
  - Wildlife Conservation Areas identified by resource professionals.

**Figure 2.8** shows existing priority resource areas meeting the criteria for large habitat blocks of wetland, grassland and woodland within the BRRWD and the Western Planning Region. Large blocks of wetland and grassland are absent from the Western Planning Region, while large blocks of woodland are present along the Red River.

There are relatively low numbers of SGCN within the Western Planning Region (**Figure 2.9**). There are generally less than five species per township within the region, likely because of the intensive agricultural land use. **Figure 2.10** identifies existing key habitats within the BRRWD and the Western Planning Region. These are largely habitats upon which SGCN depend. The Red River is the sole key habitat within the Western Planning Region. Resource professionals identified the areas along Wolverton Creek and the Red River as the primary wildlife conservation areas. Few public and conservation lands are located within the Western Planning Region (see **Figure 2A**).

### ***2.3.2.2 Resource Enhancement Opportunities***

Restorable resources are landscape features, such as: 1) partially drained wetlands; 2) drained wetlands indicated by the presence of hydric soils; 3) watercourses including creeks, streams and rivers that lack adjacent buffers (i.e., vegetation) and are unstable

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<sup>1</sup> [http://files.dnr.state.mn.us/assistance/nrplanning/bigpicture/cwcs/chapters\\_appendix/tomorrows\\_habitat\\_ch7.pdf](http://files.dnr.state.mn.us/assistance/nrplanning/bigpicture/cwcs/chapters_appendix/tomorrows_habitat_ch7.pdf)

because of excessive migration and bank erosion; and 4) water bodies listed as impaired by the Minnesota Pollution Control Agency (MPCA).

Partially drained wetland data were available in GIS polygon format from the USFWS through using the National Wetlands Inventory (NWI). These wetlands are identified with a “d” modifier in the database. Partially drained wetlands within the Western Planning Region are shown in **Figure 3A**.

Most watercourses within the Western Planning Region have low amounts of vegetation and, therefore, low buffer ratings. The MnDNR 24K stream layer was used to identify and evaluate buffer condition of segments along watercourses within the BRRWD. These stream segments were compared to 2000 Land Use/Land Cover data by the MCEA to designate each segment as a “low”, “medium”, or “high” buffer category. Those segments with adjacent barren, cropland or urban/industrial land use were designated as “low”. Those segments with adjacent hay land use were designated as “medium”. Those segments with adjacent grassland, shrub, wetland or woodland were designated as “high” buffer segments.

### *2.3.2.3 Priority Habitats*

Priority sites for the protection or restoration of wetland and grassland habitats within the Western Planning Region, as well as Grassland Bird Conservation Areas and other species, were identified (see **Figure 2.8**). These areas are for grassland bird conservation areas, pheasant priority grasslands and shorebird grassland habitats. For grassland bird conservation areas, core priority areas are ranked based upon the size and composition of the grassland area. Further, priority is indicated by an area’s relative value for restoring grasslands based upon relative abundance of wintering habitat (for pheasants) and relative abundance of important habitat (for shorebirds). The priority for these rankings is based upon a scale from 1 to 100. Because the Western Planning Region is dominated by agriculture, it primarily ranks low in the number of priority sites located there.

## 3. Surface Water Resources

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A summary of surface water resources within the Western Planning Region is presented within this section. The intent is to generally describe those rivers, streams, drainage systems and lakes responsible for the conveyance and storage of surface waters.

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### 3.1 Rivers, Streams and Tributaries

The major tributary in the Western Planning Region is Wolverton Creek. Historically, this tributary has been called Wolverton Creek in Wilkin County, and Comstock Coulee in Clay County but they are the same tributary. Wolverton Creek flows northwesterly to the Red River. The Red River is the primary river system within the Western Planning Region. Surface water generally flows to the northwest to the Red River. This can be seen in **Figure 4A**, Water Resources of the Western Planning Region.

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### 3.2 Drainage Systems

There are numerous public and private drainage systems in the Western Planning Region, specifically constructed since the early 1900's to provide agricultural drainage. These ditches generally flow east to west through the Western Planning Region, and are located in the lake plain geomorphic region. The majority of these drainage systems, including Wilkin County Ditch Nos. 26 and 22, and Clay County Ditch Nos. 54, 53, 60, 11-S, 11-N, 33, and Judicial Ditch 1, empty into Wolverton Creek. In the northern part of the Western Planning Region, County Ditch 32 and 9 empty directly into the Red River. The BRRWD has legal jurisdiction over all these ditch systems, with the authority to approve proposed improvements to be made to the ditches. **Figure 4A** shows these ditch systems located in the Western Planning Region.

These drainage systems generally result in improved yields and reduced crop loss. Much of the Western Planning Region is characterized by clayey loam soils that are poorly drained. The region is also flat, as it is in the historic lake plain region, so there is little in

the way of a defined, natural drainage network. Without the drainage network, water would stagnate in the fields and drown crops. The ditch networks have, however, essentially connected areas that would otherwise not be hydrologically connected.

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### 3.3 Floodplains

The Minnesota Legislature enacted the State Floodplain Management Act (Minnesota Statutes, Chapter 103F) in 1969. This Act stresses the need for a comprehensive approach to solving flood problems by emphasizing nonstructural measures, including floodplain zoning regulations, flood insurance, flood-proofing, and flood warning and response planning. By law, Minnesota's flood prone communities are required to adopt floodplain management regulations when adequate technical information is available to identify floodplain areas and enroll and maintain eligibility in the National Flood Insurance Program (NFIP) to ensure the ability to purchase flood insurance.

The MnDNR has promulgated minimum standards for floodplain management titled "Statewide Standards and Criteria for Management of Flood Plain Areas of Minnesota" (Minn. Rules 6120.5000 - 6120.6200). These standards have two direct applications: 1) all local floodplain regulations adopted after June 30, 1970 must be compliant with these standards; and 2) all state agencies and local units of government must comply with Minnesota Regulations in the construction of structures, roads, bridges or other facilities located within floodplain areas delineated by local ordinance. Local floodplain regulatory programs, administered by county government (predominately for the unincorporated areas of a county) and by municipal government (for the incorporated areas of a county) must be compliant with federal and state floodplain management standards. Both federal and state standards identify the 100-year floodplain as the minimum area necessary for regulation at the local level. These regulations are intended to protect new development and modifications to existing development from flood damages when locating in a flood prone area cannot be avoided.

There are areas mapped as 100-year and 500-year floodplain within the Western Planning Region, both along Wolverton Creek and the Red River. The floodplain from the South Branch of the Buffalo River also extends into the eastern edge of the Western Planning Region. These areas can be seen in **Figure 4A**. (Shown on map)

## 3.4 MnDNR Protected Waters

Minnesota Statutes, Chapter 103G, establishes the Protected Waters Permit Program. Under this program, approval must be obtained from the MnDNR, Division of Waters, before work begins on any project that affects the bed of a protected water or wetland. Protected waters within the Western Planning Region can be found in **Figure 4A**.

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## 3.5 Wetlands

Surface waters defined as wetlands are protected by a myriad number of laws. At the state level, counties have responsibilities specified by the Wetland Conservation Act (WCA). Under the direction of the BWSR, counties and other designated local governments are responsible for regulating projects that propose to drain or fill wetlands. Enacted in 1991, the WCA is intended to fill gaps in wetland protection left by other state and federal programs. In addition, the WCA is intended to ensure a “no net loss” in existing wetlands. Under the WCA, the responsible local government is outside of the seven county metropolitan area is a county or a city, and in the seven-county metropolitan area is a city, a town or a water management organization. However, soil and water conservation districts (SWCD) are also involved in the program through landowner assistance and record keeping. Many counties have delegated administration of the WCA to their SWCD. Finally, the State is responsible for applying the WCA to state projects or to activities on state land.

Federal laws also apply to wetlands. Sections 404 and 401 of the Clean Water Act (CWA) provide for the regulation of wetland and water impacts. Section 404 regulates the discharge of dredge or fill material into waters of the United States, making it unlawful to discharge dredged or fill materials without first obtaining a permit. The Environmental Protection Agency (EPA) has overall responsibility for the CWA, but the U.S. Army Corps of Engineers (USACE) has primary responsibility for administering and enforcing section 404.

Section 401 emphasizes water quality and sets up a water quality certification program. Under the guidance of the EPA, the MPCA administers the Minnesota program and reviews section 404 permit applications sent to the USACE that may result in the degradation of water quality in wetlands.

Swampbuster is a program of the 1985 Food Security Act, amended by the 1990, 1996, and 2008 farm bills. Under this program, farmers who impact wetlands become ineligible

for certain federal government price and income support programs. The U.S. Department of Agriculture (USDA), through the Natural Resources Conservation Service (NRCS) and Farm Service Agency (FSA) administer this program.

The Western Planning Region has a total of 1,166 acres of wetlands, which is approximately 1% of the Western Planning Region's area. Palustrine wetlands comprise approximately 830 acres, with the remaining acres being riverine wetlands totaling approximately 336 acres. Wetlands of the Western Planning Region can be found in **Figure 4A**. Note that wetland acreage listed above is based on the National Wetland Inventory. This wetland acreage varies from the wetland acreage listed in the land use Table (1A) in Section 2.2.4 since many of these wetlands are currently being used for agricultural land use purposes. The Western Planning Region falls within Clay and Wilkin Counties. Both of these counties are classified as counties with less than 50% of presettlement wetlands remaining, for the purposes of the State BWSR WCA.

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## 4. Groundwater Resources

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The Buffalo-Red River basin consists of glacial lake deposits, lake shore deposits, till and a small amount of ice-contact deposits overlying the bedrock. Bedrock in the east part of the basin consists of Precambrian, undifferentiated igneous, and metamorphic rock. Bedrock in the west part of the basin consists of a small band of Cretaceous, fine-grained sandstone and shell. Clay and silt lake deposits dominate the Lake Agassiz plain bordering the Red River. A transition zone between the lake plain and the glacial moraine areas is formed by lake shore deposits, delta sand, and gravel.

There are two aquifer systems of note within the Western Planning Region, a deep aquifer and a shallow aquifer. The deep aquifer is the Cretaceous aquifer, and it is located in the northern portion of the region. The shallow aquifer is the Buffalo aquifer, and it is located along the eastern fringe and southern portion of the Western Planning Region. The flow direction of both deep and shallow aquifers is generally towards the west-northwest to the Red River. The location of these aquifer systems can be seen in **Figure 2.12**.

The Buffalo aquifer is entrenched within the lake plain sediments and runs along the South Branch of the Buffalo River. It is an important aquifer, as it is the main source of water for

the villages of Glyndon and Sabin and a secondary water supply source for the City of Moorhead. The Buffalo Aquifer is also used for agricultural irrigation purposes.

A groundwater sensitivity to pollution of the shallow systems in the area was produced by the Minnesota Department of Natural Resources, based upon the water table depths and soil textures, and this is included as **Figure 2.12**. It can be seen that the beach ridge area has the highest sensitivity to pollution, followed by the glacial moraine area, and then the lake plain area. An exception to this is an area in the lake plain called the Buffalo Aquifer.

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## 5. Water Supply and Use and Water Treatment

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### 5.1 Municipal Drinking Water

The Minnesota Department of Health (MDH) has completed source water assessments for all the public water systems in the state, as required by the 1996 amendments to the Federal Safe Drinking Water Act. A source water assessment is a document produced by MDH staff and is intended to provide basic information to the public water suppliers and the general public regarding: 1) where their drinking water comes from and 2) the degree to which it may be impacted by potential sources of contamination. Municipalities in the Western Planning Region derive their drinking water from ground water sources. Further, Minnesota statute 103G.265 requires the MnDNR to manage water resources to ensure an adequate supply to meet long-range seasonal requirements for domestic, agricultural, fish and wildlife, recreational, power, navigation, and quality control purposes. The water appropriation permit program exists to balance competing management objectives that include both development and protection of Minnesota's water resources. Permits are required when the withdrawal of water exceeds 10,000 gallons per day or 1 million gallons per year.

The cities with a MDH source water assessment and MnDNR appropriation water permits are: Comstock, Wolverton and Sabin. Comstock has two municipal water wells, with one well being set in glacial deposits and the other set in bedrock. Reported pumping between the two wells was 2.1 million gallons per year (MGY) for 2005. The glacial deposit well has low susceptibility to contamination, while the bedrock well has a high susceptibility ,

which is due to the well construction. Wolverton has one active municipal water well, which is set in glacial deposits. Pumping was reported as 5.7 MGY for 2005. This well has a low susceptibility to contamination. Sabin has two municipal water wells. Both wells are set in glacial deposits. Reported pumping between the two wells was 14.2 MGY for 2005. These wells have a low susceptibility to contamination.

Wellhead protection is a way to prevent drinking water from becoming polluted by managing potential sources of contamination in the area that supplies water to a public well. The wellhead protection plan is a separate document than the source water assessment, and it is developed by the water system and its wellhead protection planning team. A wellhead protection plan has not been produced by the municipalities in the Western Planning Region yet, but all groundwater based community and nontransient noncommunity public water systems should have begun the wellhead protection planning process by 2006. A Wellhead Protection Area and Source Water Delineation Plan was prepared by Barr Engineering (Barr, 2001) for the City of Moorhead (the largest municipality in the BRRWD). The Wellhead Protection Area (WHPA) for the aquifer is outside the Western Planning Region boundaries. A map showing WHPA's in the BRRWD can be seen as **Figure 2.11**.

The northern portion of the Western Planning Region are included in the City of Moorhead's Source Water Assessment. See Appendix J.

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## 5.2 Water Use

There are five agricultural permittees in the Western Planning Region with MnDNR appropriation water permits. Only two permittees reported withdrawals in 2005, and these were either from pits or quarries. Total pumping was reported as 32.1 MGY between these two permittees, and this pumping was for the purpose of agricultural irrigation.

Other withdrawals not requiring a MnDNR permit also certainly exist, as there are several exemptions to water appropriation permit requirements, which are:

- Domestic uses serving less than 25 persons for general residential purposes;
- Test pumping of a groundwater source;
- Reuse of water already authorized by a permit; or
- Certain agricultural drainage systems

## 5.3 Inventory of Surface Water Dischargers

All of the communities in the Western Planning Region have municipal sewerage systems that are National Pollutant Discharge Elimination System (NPDES) permitted facilities. These are listed here, along with the discharge receiving water, if given.

- City of Wolverton water treatment plant (Red River)
- City of Comstock water treatment plant (Red River via Wolverton Creek via unnamed creek)
- City of Sabin water treatment plant (Red River via County Ditch No. 32)

In much of the BRRWD, construction of individual sewage treatments systems (ISTS) requires care in siting and design, due to the fact that the tight clay soils restrict the percolation of water.

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# 6. Business Sectors

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The landscape within the Western Planning Region is dominated by private lands in agricultural production with intensive row crop agriculture. The farms in the Western Planning Region tend to be very large and concentrate on cash crops rather than on livestock production.

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## 6.1 Agriculture

Principal crops grown include small grains, soybeans, sunflowers, sugar beets, corn, and potatoes. **Figure 2.7** shows the location of prime farmland located within the Western Planning Region. In 2002, 64.5% of farmers reported that farming was their primary occupation in Clay County. In Wilkin County, farming was the primary occupation of 76.1% of farmers, according to the Minnesota Center for Rural Policy and Development. The average farm size in Clay County in 2002 was 685 acres, while in Wilkin County it was 1,025 acres.

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## 6.2 Other Important Industries

Forestry is not a major contributor to the economy in the Western Planning Region. The land use is primarily agricultural. The Western Planning Region has limited processing and manufacturing industries. The main employment industry is agriculture.

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## 6.3 Recreation and Tourism

Recreational areas within the Western Planning Region are limited compared to the other regions located further east. Most of the recreational opportunities are associated with hunting deer, small game, pheasant and waterfowl. The Red River does provide some fishing opportunities for channel catfish, walleye and sauger. The Red River is also a popular canoeing destination.

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# 7. Description of Projects

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Since inception, the BRRWD has implemented a variety of programs, and constructed many projects, to address resource management issues. Projects have been implemented under Minnesota Statutes 103D (Watershed District Law) and Minnesota Statute 103E (Drainage Law). **Table 3A** identifies the projects in the Western Planning Region. The table also identifies projects completed by others. When the BRRWD has served a lead roll in the project's completed.

**Table 3A. Projects in the Western Planning Region**

<b>Management Area</b>	<b>Approximate Location (Planning Region or District-wide)</b>	<b>Issues</b>	<b>Solutions</b>	<b>Project</b>	<b>Est. Budget</b>	<b>Notes</b>
flood damage reduction,	District-wide	flood damage	build ringdikes	Project No. 38, DNR Farmstead Ringdikes	\$294,000	continuing
agricultural drainage systems	Western	ditch system degradation	ditch improvement	Project No. 47, Clay Co. Ditch 53	365,000	Completed in 2003
agricultural drainage systems	Western	ditch system degradation	ditch improvement	Project No. 30, Clay-Wilkin Judicial Ditch No. 1	91,000	Completed in 1980
agricultural drainage systems	Western	ditch system degradation	ditch improvement	Project No. 1, Wilkin Co. Ditch 22	445,000	Completed in 1982
agricultural drainage systems	Western	ditch system degradation	ditch repair/redetermination	Wilkin County Ditch No. 5A	70,000	Completed in 1995
flood damage reduction, flood plan management, water quality	Western	flooding, channel restoration, water quality	outlet improvements, bufferstrips, side inlet control, ISTS, channel survey	Wolverton Creek CWL	290,000	Completed 6/30/2009
agricultural drainage systems	Western	grade line, slope stabilizing	ditch improvement	P. No. 61, Clay County Ditch No. 11 – North	140,000	Scheduled for 2009
Agricultural drainage systems, water quality	Western	Drainage acres	Redetermination of benefits	Clay Co. Ditch Nos. 11, 36, 40, and 60	100,000	In progress
Water quality	Moorhead/Western	Source water assessment	Develop plan	City of Moorhead Source Water Assessment	50,000	Completed in 2002
Natural Resources and Recreation	Western	Fish passage		Christine/Hickson Red River dams	250,000	Under study
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## 8. Assessment of Resource Issues and Problems

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The issues and problems within the Western Planning Region can generally be placed into “management” categories. These categories are:

- Floodplain management;
- Flood damage reduction, rate of runoff, volume of runoff;
- Agricultural drainage systems;
- Water quality;
- Wetlands;
- Natural resources and recreation;
- Groundwater;
- Erosion and sediment control;
- Education;
- Long range work planning and financing; and
- Data Collection and Management

Many information sources were used to identify the resource issues and problems within the Western Planning Region. These information sources include the knowledge of BRRWD staff, Project Team (PT) meetings conducted as part of the Red River Flood Damage Reduction Mediation Agreement process, completed reports and studies, GIS analysis, an analysis of the location of previously completed projects, and public input meetings conducted within the Western Planning Region. Some of the issues and problems are District-wide, while others are specific to the Western Planning Region.

## 8.1 Issues and Problems

A variety of issue and problems have been identified within the Western Planning Region (**Table 4A**). This section presents a summary of these issues and problems by management category. **Figure 5A** shows the location of the resource issues and problem areas within the Western Planning Region. Only Planning Region specific items will be discussed in the summary that follows the table.

**Table 4A. Issues and Problems in the Western Planning Region.**

<b>Management Area</b>	<b>Project Area/Activity</b>	<b>Issues</b>	<b>Potential Solutions</b>	<b>Source</b>	<b>Notes</b>
flood damage reduction	Wolverton Coulee	flood damage	channel improvement and cleaning; channel restoration; bank stabilization measures; buffer strips; water retention; off-channel levees	PT minutes; Regional Meeting; Public Comments	Work will involve multiple agencies, DNR protected waters
flood damage reduction	Cities of Comstock (Wolverton Creek) and Wolverton (Red River)	urban flood damage	coordinate with municipalities on flood control efforts	Staff Assessment	
flood damage reduction	Western Planning Region	roadway flood damages	coordinate with road authorities on areas where floodwaters overtop the roadways	Staff Assessment	
flood damage reduction	Sabin coulee	drainage problems	review road crossing culvert sizes gradeline establishment	Staff Assessment	Coordinate with townships, landowners
agricultural drainage systems	Clay Co. Ditches 11, 36, 40, 60	outdated ditch systems	redetermination of benefits	Public Comments	Complete in 2009
water quality	TMDL process (esp. for Wolverton Creek); RiverWatch program; 319 Grant computer modeling; CWL monitoring	lack of evaluation of impaired waters	investigate and monitor potential impaired water bodies; use of non-point source computer models	MPCA PT minutes	EERC "Upper Red" SWAT product

Management Area	Project Area/Activity	Issues	Potential Solutions	Source	Notes
erosion and sediment control	Wolverton Coulee (esp. in Wolverton twp., sections 15 and 35) and associated ditch systems (esp. Ditches 1, 53, and 11)	erosion and sedimentation; channel degradation	set aside land; ditch improvement and cleaning; channel restoration; in-channel rock stabilization structures; bank stabilization measures; buffer strips; conservation tillage; side inlet controls	PT minutes; Regional Meeting; Public Comments	Partially addressed by CWL grant.
erosion and sediment control	Western Region ditch systems (esp. Ditches 32, 33, and 36)	field and channel erosion; bank stability	increase buffer strips along the ditch systems; water retention; conservation tillage; ditch improvements	Regional Meeting; Public Comments	
erosion and sediment control	Along the Red River	bank stabilization problems	grade stabilization for outlets to the Red River; bank stabilization measures; riparian area restoration	Staff Assessment	
erosion and sediment control	Bufferstrip Initiative; CREP; RIM; CRP; WREP; CP 34; RRBBI; NAWCA	erosion	use federal funding to encourage land owners to set aside land from production	PT minutes	District Wide
natural resources and recreation	Red River Dam/Christine and Hickson Dams	fish passage; river access	retrofit; construction of boat and canoe ramp and road relocation	PT minutes; Regional Meeting	
natural resources and recreation	Western Planning Region	disconnected habitat	establishment and maintenance of the wooded corridor along the Red River	Regional Meeting	Audubon Society Red River Corridor project

<b>Management Area</b>	<b>Project Area/Activity</b>	<b>Issues</b>	<b>Potential Solutions</b>	<b>Source</b>	<b>Notes</b>
education	Water Festival for local schools	lack of awareness of water issues on the part of the general public (importantly, the future generation)	educate students on water resources issues	PT minutes	District Wide
long range work planning and financing		need to update and revise a Watershed Management Plan	hydrologic modeling; plan update process; Systems Approach	PT minutes	District Wide
data collection and management	Wolverton Creek CWL	need to evaluate new projects	Project monitoring and evaluation, WMP	PT minutes	District Wide
data collection and management	Red River Basin Mapping Initiative	lack of high-quality digital elevation data	collect high-quality digital data	PT minutes	Should be completed in next several years District Wide

### 8.1.1 Floodplain Management

Two issues were identified related to floodplain management in the Western Planning Region. First, the inconsistencies of the floodplain maps between Clay and Wilkin Counties need to be resolved in order to facilitate a comprehensive management plan for the Wolverton Creek. These inconsistencies are a result of comparisons between older and more recent floodplain studies. Secondly, the issue of floodplain encroachment along the Red River of the North was also identified. Concerns regarding the protection and expansion of the wooded corridor along the Red River were expressed by CAC and TAC members as well as citizens during the public input meetings.

### 8.1.2 Flood Damage Reduction, Rate of Runoff, Volume of Runoff

Issues or problems related to flood damage reduction, rate of runoff, or the volume of runoff were identified within the Western Planning Region. The issues and problems were categorized as: 1) rural and agricultural flood damages; or 2) urban flooding. Rural and agricultural flood damages were identified as follows:

- Flood damages along Wolverton Coulee;
- The overtopping of various roadways throughout the Planning Region; and
- Adequate agricultural drainage on the “Sabin” Coulee.

The issues or problems related to urban flooding all pertained to providing flood protection for the Cities of Comstock and Wolverton.

### 8.1.3 Agricultural Drainage Systems

A number of issues or problems related to agricultural drainage systems were identified within the Western Planning Region. One issue was the need to finish the redetermination of benefits for Clay County Ditch Nos. 11, 36, 40, and 60. Other issues include sedimentation and erosion problems on Ditch Nos. 22, 1, 53, 11, 33, 40, 60 and 32.

### 8.1.4 Water Quality

Water quality has been brought up repeatedly during planning team meetings. This is a rural area issue, and areas that need to be addressed are the Red River and Wolverton Creek.

The entire Red River in the Western Region is listed on the impaired waters list. The stressor causing impairment is mercury and PCBs. Aquatic consumption is the beneficial use that is affected. The target completion date for the mercury TMDL is 2011, and the target completion date for the PCB TMDL is 2015. There is also a separate portion of the Red River, from Wolverton Creek to the Wild Rice River

(ND) that is listed because of elevated turbidity. In this area, aquatic life is the beneficial use that is affected by elevated turbidity levels. The target completion date for this TMDL is 2015. Wolverton Creek is listed as impaired in the draft 2010 impaired waters list. The impairments are for dissolved oxygen and turbidity. The target completion date for this TMDL is 2018. (see **Figure 3.1**).

### 8.1.5 Wetlands

No issues or problems related to the quantity or quality of wetlands were identified within the Western Planning Region. Resource agencies have generally indicated that efforts related to wetlands should be focused on high priority (geographic) areas elsewhere within the BRRWD.

### 8.1.6 Natural Resources and Recreation

Two issues or problems related to natural resources and recreation were identified within the Western Planning Region. The issues and problems were categorized as: 1) the lack of upstream to downstream ecological connectivity because of a lack of consistent quality habitat, land in permanent cover along streams and rivers, and barriers (primarily culverts and low-head dams) to fish movement; and 2) access to the Red River for recreational purposes. Various local, state, and federal agencies have identified the need to modify dams on the Red River at Christine and Hickson for fish passage. The BRRWD has made a financial commitment to those projects, which should be completed in the next several years.

### 8.1.7 Groundwater

Two issues or problems related to groundwater were identified within the Western Planning Region. These issues or problems were categorized as: 1) protecting groundwater quality and quantity through wellhead protection for the city of Sabin; and 2) preventing impacts to the Buffalo Aquifer, which is considered a major source of water for the future needs of the City of Moorhead.

### 8.1.8 Erosion and Sediment Control

Three issues or problems related to erosion and sediment control were identified within the Western Planning Region. The issues and problems were identified as follows:

- Erosion, sedimentation, and channel degradation in Wolverton Coulee and associated ditch systems;
- Field and channel erosion and bank stabilization in the Western Planning Region ditch systems;
- and Bank stabilization problems along the Red River.

### **8.1.9 Education**

No issues or problems related to education have been identified within the Western Planning Region.

### **8.1.10 Long Range Work Planning and Financing**

No issues or problems were identified relative to Long Range Work Planning and Financing. The BRRWD will continue Long Range Work Planning efforts and will identify outside sources of funding to help finance projects and programs, including creation of a water management district to address problems on Wolverton Creek.

### **8.1.11 Data Collection and Management**

The District, through this planning process, is identifying potential locations called regional assessment locations as future locations for collecting stage, flow, water quality and other relevant information. The need for water quality and quantity measurements on Wolverton Creek has been identified.

## 9. Western Planning Region Goals

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This section presents a summary of goal that are directly linked to the issues and problems by management category.

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### 9.1 Measurable Goals

#### 9.1.1 FDR – Goals ID through Modeling

Flood Damage reduction goals were determined as discussed in Section 7 of the Comprehensive Management Plan. Based on the hydraulic modeling completed for the latest Flood Insurance Study (FIS), the Buffalo River and the South Branch of the Buffalo River have roughly a 5-year capacity. The Buffalo-Red River Watershed District would like to provide 10-year protection to agricultural lands within the District per the goals of the Mediation Agreement. In order to provide this level of protection, there would need to be a 34 percent reduction in existing 10-year peak flows along the South Branch and Buffalo Rivers. This would reduce the existing 10-year flood to the 5-year flood levels.

The Buffalo-Red River Watershed District has adopted a goal to reduce the existing 100-year discharge on the Buffalo River to the existing 50-year flood discharge level. This would require a peak discharge reduction of about 22 percent.

For the Wolverton Creek contributing area, similar goals were adopted. The portion of this runoff volume reduction from the Wolverton Creek subbasin is estimated from 14,000 to 15,000 acre-feet. All runoff volume reduction goal values are based on a 100-year flood event.

The amount of runoff volume reduction (or storage) required within the BRRWD is highly dependent on the type, design, and location of future projects. Therefore, an

estimate of required runoff reduction (or storage) is speculative and based on assumptions of what will be possible, practical, and acceptable. Based on engineering judgment, a preliminary storage (or runoff volume reduction) goal of 120,000 to 135,000 acre-feet has been adopted for the entire BRRWD. Runoff reduction goals should be updated with each new revised watershed management plan revision to reflect additional data and knowledge acquired since the previous management plan update.

Due to the nature of the majority of the Western Planning Region draining relatively directly to the Red River, a goal was adopted to promote projects which would not be anticipated to adversely affect flood levels on the Red River. A storage or runoff reduction target has been set for the Wolverton Creek drainage area only within this planning region. Detailed hydrologic modeling was completed only on the Wolverton Creek contributing area of the Western Planning Region. The remainder of the planning region has not been modeled.

### 9.1.2 NRE Goals

The BRRWD in cooperation with resource agencies have established Natural Resource Enhancement Goals for this planning region as listed in the following table.

**Table 5A. Natural Resource Enhancement Goals for the Western Planning Region**

	Current Condition		Desired Future Condition		Change acres
	acres	percent	acres	percent	
Total acres in the Western Planning Region	105,331	100.0			
Cultivated Land	99,495	94.5	99,285	94.3	-210
Permanent / Planted Cover	4,248	4.0	4,458	4.2	210
All Wetlands	155	0.1	194	0.2	39
Grassland & Grassland Shrub	1,105	1.0	1,125	1.1	20
Wooded Riparian Corridor and Deciduous Forest	2,678	2.5	2,809	2.7	131
Conservation Reserve Program	799	0.8	799	0.8	0
New Buffer Strips (5.0 miles)					20

## 10. Long-Range Work Plan

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The BRRWD has established a long-range work plan for the Western Planning Region in order to provide a framework for solutions addressing problems and issues within the planning region. The long-range work plan is shown in Table 6A.

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## 11. Public Involvement Activities

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### 11.1 Flood Damage Reduction Project Team

In 1997, the Legislature urged formation of the Red River Basin Flood Damage Reduction Work Group (RRBFDRWG) to resolve gridlock over state/federal permitting of flood damage reduction projects in the Red River Valley. The resulting agreement was intended as the framework for a new, collaborative approach to implement both flood damage reduction and natural resource protection and enhancement in ways that benefit all Minnesota citizens. The keys to this new approach were presented as comprehensive watershed planning, clearly identified goals, early consultation and collaboration on flood damage reduction projects among stakeholders, and a cooperative approach to project permitting. The purpose of the Mediation Agreement is:

*To reach consensus agreements on long term solutions for reducing flood damage and for protection and enhancement of natural resources. Such agreements should balance important economic, environmental, and social considerations, and must provide for fair and effective procedures to resolve future conflicts related to flood damage reduction.*

Since 1998, the BRRWD Mediation PT has met on a regular basis. The result of their work has been several multipurpose projects, incorporating both flood damage reduction and natural resource enhancement. Results of the deliberations of the PT can be found at <http://www.rwmb.org/html/info.cfm?ID=10>.

**Table 4A** includes the issues and problems identified by the Project Team within the Western Planning Region. The issues and problems are generally related to:

- The determination of benefits for legal drainage systems;
- Maintenance of legal drainage systems;
- The ability of fish to pass over dams;
- The flooding of agricultural land; and
- Erosion of and sedimentation within stream channels.

The Project Team has also developed, discussed and evaluated potential solutions for many of the problems identified. These potential solutions include:

- Constructing levees;
- Completing diversions;
- Restoring wetlands;
- Completing drainage system maintenance;
- Modifying or removing dams;
- Installing buffers; and
- Stabilizing channels.

A more detailed description of the issues and problems is presented within Section 8.1.

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## 11.2 Regional Planning Meetings

The public involvement process completed by the BRRWD included conducting meetings with key stakeholders within each of the planning regions. The purpose of the first meeting was to convey to the public the purpose of the plan update and to provide a formal opportunity to identify flood damage reduction and natural resource enhancement issues in the specific planning region. The purpose of the second meeting will be to discuss the magnitude of the issue or problem and present and discuss potential solutions.

The first meeting in the Western Planning Region was conducted on April 3, 2007, at the Comstock Community Center. Approximately 50 people were in attendance. The meeting included a discussion of:

- Opportunities for projects through the Clean Water Legacy program, specifically for stabilizing erosion at the outlet of Wolverton Creek;
- An introduction to the planning process being conducted by the BRRWD;
- An overview of the hydrology of the Western Planning Region;
- Staffs' perspective on resource management issues and problems;
- Opportunities for enhancing natural resources; and a
- Small group discussion specific to identifying resource issues and problems.

Meeting minutes were used to summarize the results of the meeting. Issues and problems identified during the meeting were graphically recorded using a map. **Table 4A** includes the issues and problems identified during the Western Planning Region meeting and the public's comments.

**Table 6A.**  
**Western Planning Region**  
**Long-Range Work Plan**  
**Buffalo-Red River Watershed District**

Key to Priority Ranking

- H High to urgent level of priority, action by District likely to be imminent
- M Moderate level of priority, action by District in foreseeable future
- L Low level of priority, action by District may be more prudent at a future time
- C Action is substantially complete and thus holds minimal priority
- IP In progress
- NA Not Applicable

Date Established: 2/11/2008  
 Date Last Updated: 1/25/2010  
 Last Updated by: ESJ

Management Area / Action Item	Plan Policy	Implementation Tools		Priority	Status	Probable Implementation Dates		Dependency?		Estimated Budget	General assumptions/comments
						Begin	End	Yes / No	Whom / What		
<b>(1) Floodplain Management</b>											
1.1 Develop information about peak discharges and runoff volumes reflective of existing land use in support of those responsible for implementing the floodplain management program at the local level (generate values at Regional Assessment Locations).	FM-2	Hydrologic Model		C	Largely Completed	2009	2010	No		\$2,000	
1.2 Develop peak discharges and runoff volumes reflective of ultimate (developed) land use in support of those responsible for implementing the floodplain management program at the local level (generate values at Regional Assessment Locations).	FM-2	Hydrologic Model		M	Pending	2010	2020	Yes	Need zoning and land use plans from the Counties	\$3,000	
1.3 Maintain the most recent FEMA floodplain maps (or a link to those maps) on the District web site for ease of reference by citizens and local units of government.	FM-3	Web site		H	Pending	2010	2011	Yes	FEMA	\$1,000	
1.4 Use the modeling and mapping resources of the District to identify flood prone areas along drainage and natural waterway systems. Use this information to help identify methods to minimize flood damages along drainage systems and natural waterways, including identifying buffer widths, levee set-back distances, and other features.	FM-3	Hydrologic and Hydraulic Models	High Resolution Topographic Data	M	Pending	2011	2020	Yes	IWI - RRBMI data	\$3,000	
1.5 Supplement existing floodplain maps with additional information to indicate areas along drainage systems, streams and river, prone to periodic breakout flows and those areas downstream affected by breakout and subsequent overland flows. Make these available to local units of government using the District web site.	FM-2	Hydrologic and Hydraulic Models	Experience of District Staff	M	Not Started	2011	2020+	No		\$2,000	
1.6 Determine the availability of satellite imagery, which can be used to communicate areas prone to flooding, primarily in those areas lacking flood hazard maps.	FM-1	Web site		M	Not Started	2010	2020	No		\$2,000	
1.7 Place a link to the 1997 flood inundation map on the District web site as a tool to identify areas prone to flooding.	FM-3	Web site		M	Not Started	2010	2012	No		\$1,500	
1.8 Provide technical assistance to local units of government to establish flood elevations within those areas lacking flood hazard maps, on a case-by-case basis.	FM-2	Hydrologic and Hydraulic Models	High Resolution Topographic Data	M	Ongoing	2010	2020+	Yes	Need to work with the local entities	\$5,000	
1.9 Provide technical assistance to local units of government in the development of floodplain maps. Expedite the development of floodplain maps for those areas presently not mapped.	FM-2	Hydrologic and Hydraulic Models	High Resolution Topographic Data	M	Ongoing	2012	2020	Yes	Need to work with the local entities	\$5,000	
1.13 Create a 2009 flood inundation map and place a link to the map on the District web site as a tool to identify areas prone to flooding.	FM-3	Website	High Resolution Topographic Data	M	Not Started	2010	2013	Yes		\$5,000	

Management Area / Action Item	Plan Policy	Implementation Tools	Priority	Status	Probable Implementation Dates		Dependency?		Estimated Budget	General assumptions/comments	
					Begin	End	Yes / No	Whom / What			
<b>(2) Flood Damage Reduction, Rate of Runoff, Volume of Runoff</b>											
2.1 Encourage the preparation of drainage master plans for the cities with the Western Planning Region in accordance with the requirements established by the Rules of the District.	FDR-1	Hydrologic and Hydraulic Models		L	Not Started	2010	2020	No	Wolverton Comstock	\$1,000	Population does not meet current rule criteria.
2.2 Identify the 10-year and 100-year peak rates of runoff and runoff volumes entering the upstream boundaries of cities, for use in their storm water planning efforts.	FDR-1	Hydrologic and Hydraulic Models	Community Drainage Master Plans	L	Not Started	2010	2020+	Yes	Wolverton Comstock	\$1,000	Not required under current BRRWD rules.
2.3 Provide technical assistance to towns needing information about peak discharge and runoff volumes or other hydrology related information.	FDR-1	Hydrologic and Hydraulic Models	Watershed Managemet Plan	M	Pending	2010	2020+	Yes	City Requests	\$2,000	
2.5 Develop a stormwater policy manual to assist Cities with NPDES compliance.	FDR-2			L	Pending	2010	2020+	Yes	City Requests	\$2,000	Presently not required by MPCA.
2.6 Develop a stormwater design standards manual to assist Cities with NPDES compliance.	FDR-2			L	Pending	2010	2020+	Yes	City Requests	\$2,000	Presently not required by MPCA.
2.7 Size stormwater conveyance and detention facilities in accordance with the need to protect infrastructure such as roads and utilities, and maximize safety.	FDR-2	Design Standards	RRBMI	L	Pending	2010	2020+	Yes	City Requests	\$2,000	
2.8 Identify the hydrologic conditions (e.g., peak flow rates, subwatersheds contributing the greatest proportion of the peak discharge) for the areas mapped and at Regional Assessment Locations.	FDR-3	Hydrologic and Hydraulic Models		C	Complete	2009	2010	No		\$3,000	
2.9 Complete hydrologic and hydraulic modeling to assess the relationship between peak discharges, runoff volumes and areas subject to flooding.	FDR-3	Hydrologic and Hydraulic Models	RRBMI	C	Complete	2009	2009	No		\$1,000	Corolate modeling w/RRBMI
2.10 Establish desired future conditions for peak flows and runoff volumes, as goals for reducing the size of areas subject to flooding.	FDR-3	Hydrologic and Hydraulic Models		C	Complete	2009	2010	No		\$5,000	Corolate modeling w/RRBMI
2.11 Identify and preserve critical areas necessary for the temporary storage of runoff. Identify these areas on maps for use in BRRWD decision making.	FDR-3	Floodplain maps	Hydrologic and Hydraulic Models	H	In Progress	2009	2010	Yes	Landowners	\$5,000	
2.12 Identify and preserve critical areas necessary for the conveyance of stormwater and surface runoff.	FDR-3	Floodplain maps	Hydraulic Modes	H	In Progress	2009	2010	Yes	Landowners	\$5,000	
2.13 Develop a design method / standard which can be used to gage the response of natural waterways to the rate of runoff.	FDR-4	Various References		M	Ongoing	2010	2011	No		\$5,000	
2.14 Complete hydrologic modeling to establish target peak discharges for the contribution of the Western Planning Region to the Red River Mainstem.	FDR-6	Various References	Hydrologic and Hydraulic Models	H	In Progress	2010	2020	No		\$5,000	Corolate modeling w/RRBMI
2.15 Use the target peak discharges as an evaluation criteria when planning, developing and designing projects and implementing programs.	FDR-6	Hydrologic and Hydraulic Models		H	Ongoing	2010	2020+	No		\$5,000	
2.16 Use the technical tools developed by the Red River Watershed Management Board or other suitable tools, to evaluate the mainstem value of flood damage reduction projects.	FDR-6	Hydrologic and Hydraulic Models		M	Ongoing	2010	2020+	Yes	RRWMB	\$5,000	
2.17 Develop an implementation plan to address flood damage reduction strategies / natural resoure enhancement.	FDR-5	Hydrologic and Hydraulic Models		M	In Progress	2010	2015	Yes	Mediation PT	\$5,000	
2.19 Investigate potential locations for developing "larger" storage type projects, which incorporate multiple benefits.	FDR-6	Hydrologic and Hydraulic Models		M	Ongoing In Progress	2010	2020+	Yes	IWI LIDAR Survey, Mediation PT	\$10,000	
2.20 Investigate potential off-channel storage projects in the Western Planning Region.	FDR-6	Hydrologic and Hydraulic Models	High Resolution Topographic Data	M	Ongoing	2010	2015	Yes	IWI LIDAR Survey, Mediation PT	\$10,000	
<b>(3) Legal Drainage Systems</b>											
3.1 Establish and / or adopt standards for the repair, maintenance, and design of agricultural drainage systems within Western Planning Region (e.g., NRCS).	LDS-2	Various References		H	Ongoing	2010	2020	Yes	Landowner Petitions	Varies	
3.2 Determine specific technical criteria to be used to quantify the adequacy of an outlet when improving or designing public and private drainage systems.	LDS-2	Hydrologic and Hydraulic Models		H	Ongoing	2010	2020	Yes	Landowner Petitions	Varies	

Management Area / Action Item	Plan Policy	Implementation Tools	Priority	Status	Probable Implementation Dates		Dependency?		Estimated Budget	General assumptions/comments	
					Begin	End	Yes / No	Whom / What			
3.3 Identify legal drainage systems not in compliance with buffer strip requirements and bring these systems into compliance through voluntary or regulatory programs available to the District.	LDS-2	GIS	Maps of Drainage Systems	H	Ongoing	2010	2020	No		Varies	
3.4 Map legal drainage systems including their benefited areas.	LDS-3	GIS	Drainage Records	C	Completed	2008	2008	Yes	BWSR Grant	\$2,000	Maintain Records/future BWSR grants?
3.5 Periodically compare maps of the benefited areas for legal drainage systems and parcel data, to the detailed hydrologic (drainage) boundaries maintained by the District.	LDS-3	Maps of Drainage Systems	Drainage Records	M	Ongoing	2010	2020	No		\$5,000	
3.6 Develop a strategy to systematically redetermine benefits for legal drainage systems within the District.	LDS-3	Maps of Drainage Systems	Drainage Records	H	Ongoing	2010	2020	No		Varies	
3.7 Install side inlet culverts to reduce sediment loads to ditch systems	LDS-2	RRBMI	Local History	M	Ongoing	2010	2020	No		\$50,000	
<b>(4) Water Quality</b>											
4.1 Establish a program and activities for addressing water quality complimentary and consistent with but not duplicative of existing programs.	WQ-1	Water Management District		M	Ongoing	2009	2016	Yes	MPCA	\$5,000	
4.6 Discuss options with the MPCA for leading the completion of TMDLs for impaired waters.	WQ-2	TMDL program		C	Completed	2009	2009	Yes	MPCA	\$1,000	
4.7 Use resources to assist with and confirm listed impaired waters within the Western Planning Region.	WQ-2	Monitoring Program		H	Pending	2010	2020+	Yes	MPCA	\$5,000	Need more water quality data.
4.8 Evaluate MPCA priorities for TMDL completion to ensure consistency with District priorities and establish a mutually agreed priority list.	WQ-2	303(d) list		H	Pending	2010	2010	Yes	MPCA	\$1,000	
4.9 Determine financial considerations for TMDL completion.	WQ-2	TMDL program		H	Ongoing	2010	2020+	Yes	MPCA	\$1,000	
4.10 Investigate the potential of having the MPCA add sites within the bounds of the District for monitoring long-term water quality trends.	WQ-2	Monitoring Program		C	Completed	2009	2010	Yes	MPCA	\$1,000	Regional Assessment locators.
4.12 Establish additional measures necessary to protect unique or high quality water resources within the District.	WQ-3	Monitoring Program		M	Pending	2010	2020	No		\$5,000	Coordinate w/Mediation PT.
4.14 Develop a cost-sharing program to encourage the use of innovative or demonstration technologies.	WQ-4	Monitoring Program		M	Pending	2010	2020	Yes	MPCA, SWCD, NRCS, Others	\$10,000	
4.15 Develop and implement water management districts as a finance mechanism for water quality programs.	WQ-4	Water Management District		H	Pending	2010	2020	No		\$1,000	
4.16 Develop a water quality monitoring program cost sharing document to aid in improving consistency of monitoring efforts and target monitoring efforts towards generating data that will aid in investigating issues in the District.	WQ-4	Monitoring Program		H	Pending	2010	2012	Yes	MPCA, SWCD	\$1,000	
4.17 Use monitoring data to aid in establishing subwatershed annual load values reflective of variability in climate and land use at Regional Assessment Locations.	WQ-5	Monitoring Program		H	Pending	2010	2016	No		\$5,000	
4.19 Consult with those responsible for implementing programs associated with the farm bill to determine the ability to use these programs to protect sensitive areas and implement agricultural conservation practices.	WQ-6	Farm Program		H	Ongoing	2010	2020+	Yes	NRCS, SWCD's	\$2,000	

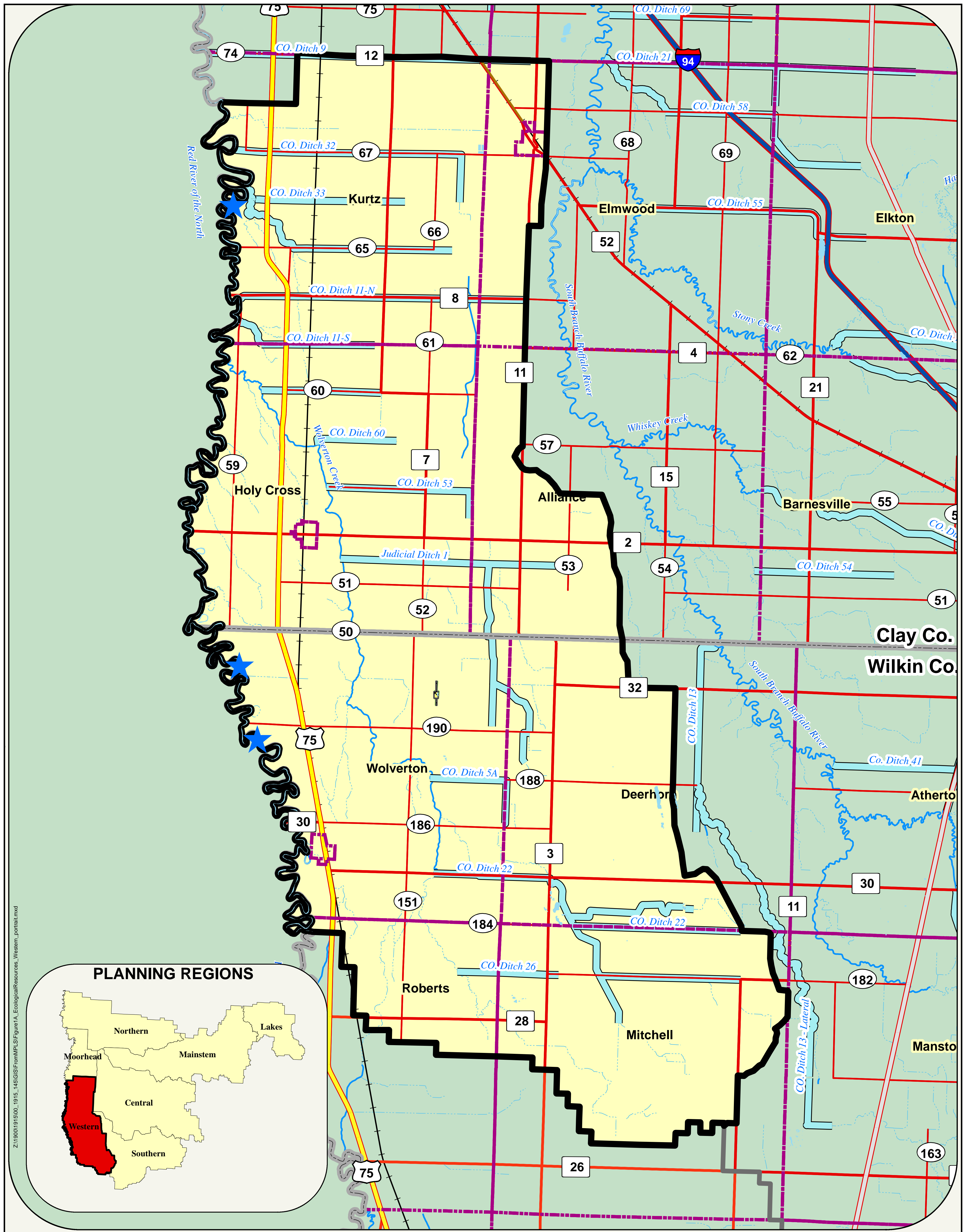
Management Area / Action Item	Plan Policy	Implementation Tools	Priority	Status	Probable Implementation Dates		Dependency?		Estimated Budget	General assumptions/comments	
					Begin	End	Yes / No	Whom / What			
4.20 Develop a cost-sharing program which supplements and is not duplicative of existing programs, for the implementation of agricultural conservation practices to protect these areas.	WQ-6	Monitoring Program		H	Ongoing	2010	2020	Yes	SWCD's	\$2,000	
4.21 Coordinate monitoring locations which supplement efforts of the MPCA to determine impairment, for select resources (e.g., shallow lakes).	WQ-4	Monitoring Program		M	Pending	2010	2020	Yes	MPCA	\$2,000	
<b>(5) Wetlands</b>											
5.2 Inventory the wetland resource and analyze wetland functions and values.	WT-1	National Wetland Inventory	Various Wetland Functional Models	L	Pending	2010	2020+	Yes	NRCS, USFWS, SWCD's	\$2,000	Use RRBMI.
5.3 Assist local wetland LGU in developing a weighting system reflecting importance, based on the values of the District, for the managing wetlands.	WT-1	Comprehensive Wetland Management Plan	Various Wetland Functional Models	L	Pending	2010	2020+	Yes	Local Wetland LGU	\$2,000	
5.4 Identify those wetlands providing important peak flow reduction and needing preservation to maintain flood damage reduction function.	WT-2	Comprehensive Wetland Management Plan		M	Pending	2010	2015	No		\$2,000	
5.6 Assist BWSR with identification of a Wetland Preservation Area.	WT-2	Comprehensive Wetland Management Plan		M	Pending	2010	2010	No		\$1,000	
5.8 Identify, protect, and preserve high priority wetlands.	WT-3	Comprehensive Wetland Management Plan		M	Pending	2010	2015	Yes	USFWS, NRCS	\$5,000	
5.10 Where possible, maintain wetland connections with adjacent undisturbed areas to promote connectivity and linear corridors.	WT-3	Comprehensive Wetland Management Plan		H	Ongoing	2010	2020+	No		\$1,000	
5.11 Establish a priority ranking for potential wetland restoration sites.	WT-4	Comprehensive Wetland Management Plan	Various Wetland Functional Models	H	Ongoing	2010	2012	No		\$1,000	
5.12 Quantify a goal for acres of wetland restoration by planning region, with input from local, state and federal agencies.	WT-4	Comprehensive Wetland Management Plan		H	Complete	2009	2009	NO		\$2,000	
<b>(6) Natural Resources and Recreation</b>											
6.1 Quantify grassland habitat acreage goals by planning region, with input from local, state and federal agencies.	NRR-3	USFWS Technical Support		C	Completed	2009	2009	Yes	USFWS, MPCA, DNR, SWCD's	\$1,000	
6.2 Quantify wetland habitat acreage goals by planning region, with input from local, state and federal agencies.	NRR-3	USFWS Technical Support		C	Completed	2009	2009	Yes	USFWS, MPCA, DNR, SWCD's	\$1,000	
6.3 Develop a natural resource management plan which confirms priority areas presented in this WMP, incorporates criteria for ranking desired lands, identifies desired land areas and establishes costs for maintenance, restoration or preservation.	NRR-3	Natural Resources Management Plan		M	Pending	2010	2020	Yes	USFWS, DNR	\$2,000	
6.4 Define District's role in establishing priority riparian corridors along Public Waters relative to County responsibilities per shoreland requirements, flood damage reduction and stream connectivity.	NRR-2	County Comprehensive Local Water Plans	Shoreland Ordinances	M	Pending	2010	2013	Yes	County Zoning	\$2,000	
6.5 Identify lands that would be included in the priority riparian corridors primarily along the Buffalo and Red Rivers, by applying the criteria	NRR-2	Natural Resources Management Plan		M	Pending	2010	2015			\$1,000	

Management Area / Action Item	Plan Policy	Implementation Tools	Priority	Status	Probable Implementation Dates		Dependency?		Estimated Budget	General assumptions/comments		
					Begin	End	Yes / No	Whom / What				
					6.6	Integrate key natural areas into local plans for recreation or habitat improvement.	NRR-3	Natural Resources Management Plan			County Comprehensive Local Water Plans	M
6.7	Provide support to Natural Resource Enhancement Projects.	NRR-4	BRRWD Funds		M	Ongoing	2010	2020+			\$10,000	
6.15	Complete site selection analyses to identify and prioritize potential large wetland restoration / off channel impoundments sites having flood control value.	NRR-3	Hydrologic and Hydraulic Models	Digital Elevation Model	M	Pending	2010	2015	Yes	IWI, LiDAR Survey	\$4,000	
6.16	Complete a district-wide stream, drainage system and river geomorphic stability assessment (e.g., using Rapid Geomorphic Procedures).	NRR-2	Rapid Geomorphic Assessment Technique		H	Pending	2010	2015	Yes	DNR	\$5,000	
6.17	Investigate the restoration of Wolverton Creek	NRR-3	RRBMI		M	Pending	2010	2015	Yes	DNR	\$30,000	Coordinate w/Mediation PT.
<b>(7) Groundwater</b>												
7.1	Work cooperatively with cities to understand the connection between the Aquifers and the waterways.	GW-1	Wellhead Protection Plans		M	Pending	2010	2020	Yes	MGS, DNR, USGS	\$2,000	
7.2	Assess the extent that ground water and surface water resources are connected within the Western Planning Region.	GW-1	Wellhead Protection Plans	Special Study	M	Pending	2010	2020	Yes	MGS, DNR, USGS	\$2,000	
7.3	Generally identify ground water recharge areas within the District. Map these areas.	GW-1	National Hydrography Database	Hydrologic Atlases	M	Pending	2010	2012	Yes	MGS, DNR	\$1,000	Work with cities to develop and emplement WHP.
7.4	Develop performance specifications for identifying the risk of impacts or degradation of groundwater such as may arise from stormwater and agricultural management practices.	GW-1	Groundwater Sensitivity Maps		M	Pending	2013	2016	No		\$1,000	
7.5	Monitor groundwater quality and condition in cooperation with others for potential impacts from stormwater runoff, agricultural practices and other land use activities.	GW-1	Monitoring Program		M	Pending	2010	2020+	Yes	MGS, DNR, MDH	\$1,000	
7.6	Evaluate the establishment of thresholds for groundwater depletion impacts above which the District will take action in surface water management.	GW-1	Wellhead Protection Plans		M	Pending	2010	2020+	Yes	DNR, MGS	\$1,000	
7.7	Evaluate the need for a cooperative groundwater program to protect domestic and industrial water supplies.	GW-1	Wellhead Protection Plans		M	Pending	2010	2020	Yes	DNR, MES, MDH	\$1,000	
7.8	Identify the locations of groundwater seeps, which provide baseflow, and methods to protect them.	GW-1	Wellhead Protection Plans	Hydrologic Atlases	M	Pending	2010	2020	Yes	DNR, MGS	\$1,000	
<b>(8) Erosion and Sediment Control</b>												
8.1	Establish a template for erosion and sediment control plans that assists cities with the NPDES permit process.	ESC-1	Standard Plates and Typical Details for Plans		L	Not Started	2010	2015	No		\$1,000	Currently not required by MPCA for Wolverton or Comstock.
8.2	Use the criteria within the NPDES Construction General Permit as the minimum acceptable criteria when reviewing project or for District-lead projects.	ESC-1	District Rules		H	Ongoing	2011	2002+	Yes	MPCA - Stormwater Permit Requirements	\$1,000	As required.

Management Area / Action Item	Plan Policy	Implementation Tools		Priority	Status	Probable Implementation Dates		Dependency?		Estimated Budget	General assumptions/comments
						Begin	End	Yes / No	Whom / What		
8.3 Systematically develop sediment budgets for streams, rivers and drainage system at the landscape scale for each planning region, which can be used for multiple purposes. These purposes include determining priority areas (e.g., PLSS sections) for agricultural practices, sources and sinks of sediments, sedimentation rates in streams, rivers and drainage systems, sediment transport capacities in streams, rivers and drainage systems, channel stability and developing implementation strategies.	ESC-1	Water Quality Model	Water Quality Implementation Plan for the District	H	In-Progress	2010	2020	No		\$1,000	
8.4 Develop a watershed district wide water quality computer model, which include sediment as a state variable. Use the model technical information for the District (see 8.3). Use the model to establish "baseline" or "reference" water quality conditions (including unit erosion and sediment delivery rates), and to evaluate implementation strategies to improve water quality.	ESC-1	Water Quality Model		H	Pending	2009	2012	Yes	MPCA	\$100,000	Basin Wide TMDL Study EERC SWAT model
8.5 Estimate sediment loads at key locations (i.e., regional assessment locations) within the Western Planning Region, for the purposes of evaluating the affects of proposed projects, determining trends, and measuring success. Loads may be based either upon monitoring, modeling or both.	ESC-1	Water Quality Model	Water Quality Implementation Plan for the District	IP	In-Progress	2009	2012	No		\$10,000	
8.6 Coordinate and / or cost share with appropriate agencies for practices intended to address erosion and sediment control.	ESC-2	Farm Program	Water Quality Implementation Plan for the District to Prioritize Areas	H	Ongoing	2010	2020+	Yes	MPCA, BWSR, NRCS, SWCD	\$10,000	
8.7 Develop sediment rating curves as key locations(e.g., Regional Assessment Locations) within the Western Planning Region.	ESC-2	Monitoring Program		H	Pending	2010	2014	No		\$2,000	Basin Wide TMDL Study
8.8 Reasonably ensure the stability of streams, rivers and drainage systems, by developing specific methods, procedures and processes, to evaluate the effects of projects on stream stability (for use during the permit process).	ESC-2	District Rules	Standards	M	Ongoing	2012	2015	No		\$2,000	
8.9 Complete sediment modeling to understand the sources and sinks of sediment within the District and to develop specific implementation strategies, which can be incorporated into this WMP and County Local Water Plans.	ESC-2	Water Quality Model	Water Quality Implementation Plan for the District to Prioritize Areas	IP	In-Progress	2009	2012	Yes	MPCA	\$2,000	EERC SWAT model.
8.10 Use modeling to establish benchmark or reference conditions for sediment erosion and loads within the District.	ESC-2	Water Quality Model	Water Quality Implementation Plan for the District to Prioritize Areas	IP	In-Progress	2009	2012	No		\$2,000	
8.11 Use modeling to identify specific implementation activities to reduce sediment erosion and loads to benchmark or reference conditions within the District.	ESC-2	Water Quality Model	Water Quality Implementation Plan for the District to Prioritize Areas	IP	In-Progress	2011	2013	No		\$2,000	
8.12 Establish an accounting-type system for the estimated sediment load reductions for implementation measures funded by the District and others working within the District.	ESC-3	NRCS Technical Guidance	Water Quality Model	H	Pending	2010	2015	No		\$2,000	
8.13 Use accepted NRCS Technical Guidance materials in association with models, as the recommended approach to estimate changes in sediment loads and the effectiveness of implementation measures, as key locations (e.g., Regional Assessment Locations).	ESC-3	NRCS Technical Guidance		H	Ongoing	2010	2020+	No		\$1,000	
8.14 Evaluate a means to establish buffers along streams, rivers and drainage systems per shorland ordinance (public waters) and legal drainage systems per 103E (with side inlets).	ESC-2	NRCS Technical Guidance	Water Quality Model	M	Pending	2010	2020	Yes	103E Requirements	\$1,000	

Management Area / Action Item	Plan Policy	Implementation Tools	Priority	Status	Probable Implementation Dates		Dependency?		Estimated Budget	General assumptions/comments
					Begin	End	Yes / No	Whom / What		
8.15 Use the University of Minnesota sedimentation study and other modeling efforts to assess sedimentation rates in channels, areas of limited channel capacity and priority areas on the land for reducing sediment input reducing channel capacity.	ESC-2		M	In Progress	2009	2011	Yes	319 Grant	\$5,000	103E.021, Subd.6.
8.16 Continue efforts to stabilize erosion and address stability issues on County Ditches and Wolverton Creek.	ESC-1	Field reviews, petitions	H	In Progress	2010	2020+	Yes	Landowner requests	\$10,000	
8.17 Investigate slope stability issues along waterways, especially the Red River	ESC-1		M	Pending	2010	2020+	No		\$10,000	
8.18 Establish vegetative buffers along Wolverton Creek	ESC-2	NRCS Technical Guidance	M	Ongoing	2010	2020+	Yes	MPCA, BWSR, NRCS, SWCD	\$30,000	
<b>(9) Education</b>										
9.1 Implement a web page that includes conveying educational materials.	ED-1	Web Page	IP	Ongoing	2009	2020+	No		\$1,000	
9.2 Develop an education plan that defines the target audiences.	ED-3	Education Plan	Web Page	M	Pending	2010	2015	No	\$1,000	
9.3 Complete and implement a written stakeholder involvement plan specific to District programs and activities.	ED-1	Stakeholder Involvement Plan	Web Page	M	Pending	2010	2015	No	\$2,000	
9.4 Web-enable databases and information collected by the District.	ED-1	Web Page		M	Ongoing	2010	2015	No	\$1,000	
9.5 Provide funding to the River Watch Program or similar entity to develop and implement education programs and materials for improving water quality.	ED-2	Stakeholder Involvement Plan		IP	Ongoing	2010	2020+	No	\$4,000	
9.8 Pursue partnerships between public and private entities within the District, with an emphasis on schools, to implement educational programs and projects.	ED-2	Education Plan	Web Page	IP	Ongoing	2010	2020+	No	\$1,000	
9.9 Organize education outreach opportunities for target audiences.	ED-3	Education Plan	Web Page	IP	Ongoing	2010	2020+	No	\$1,000	
9.10 Elevate the public awareness of significant surface waters and their habitat values.	ED-4	Stakeholder Involvement Plan	Web Page	H	Ongoing	2010	2020+	No	\$1,000	
9.11 Identify high quality landscapes which may be used for education or interpretive activities.	ED-4	Stakeholder Involvement Plan	Web Page	H	Pending	2010	2015	No	\$1,000	
<b>(10) Long Range Work Planning and Financing</b>										
10.1 Initiate contact and dialogue with affected parties to coordinate District projects with City Capital Improvement Plans.	WP-1	Long Range Work Plan	Capital Improvement Programs	H	Ongoing	2010	2020	No	\$2,000	
10.2 Use the Long Range Work Plan to identify and track District activities and measure success (by annually update the Work Plan).		Long Range Work Plan	Self Assessment Process	H	Ongoing	2010	2020	No	\$1,000	
10.3 Use the Long Range Work Plan as the basis for funding needs within Water Management Districts.	WP-3	Long Range Work Plan		H	Pending	2010	2020	No	\$1,000	
10.4 Use the Long Range Work Plan to prioritize District activities in response to changing internal and external pressures.	WP-5	Long Range Work Plan		H	Pending	2010	2020	No	\$1,000	
10.5 Annually review the priorities assigned to the action items within the Long Range Work Plan and reprioritize based on the needs of the District.	WP-5	Long Range Work Plan		H	Pending	2010	2020	No	\$500	
10.6 Use the planning level budget estimate for action items in the Long Range Work Plan to initially establish the annual budget.	WP-5	Long Range Work Plan	Annual Work Plan	H	Pending	2010	2020	No	\$500	
10.7 Use the self assessment procedure within the WMP to assess District progress for reporting in the Annual Work Plan.	WP-5	Annual Work Plan	Self Assessment Process	H	Pending	2010	2020	No	\$500	

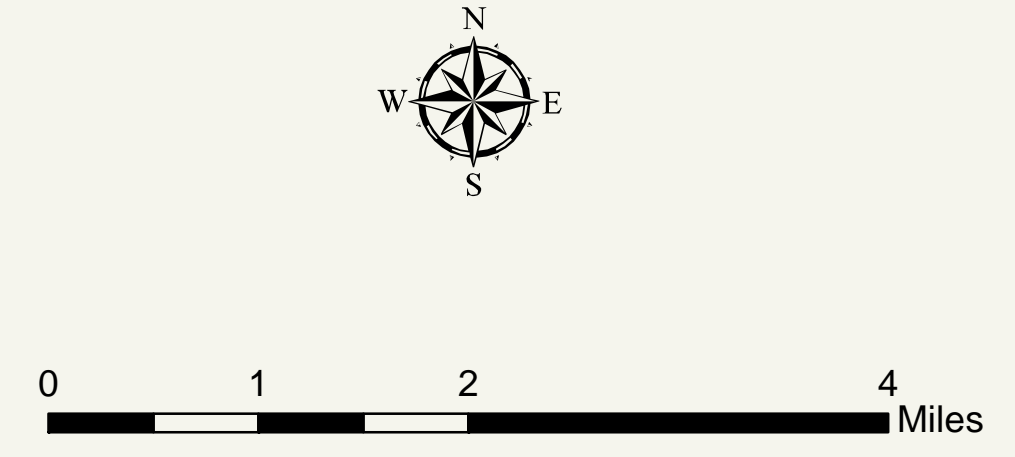
Management Area / Action Item	Plan Policy	Implementation Tools		Priority	Status	Probable Implementation Dates		Dependency?		Estimated Budget	General assumptions/comments
						Begin	End	Yes / No	Whom / What		
10.8 Report activities using the program established within this WMP.	WP-5	Annual Work Plan	Self Assessment Process	H	Pending	2010	2020	No		\$500	
<b>(11) Data Collection and Management</b>											
11.1 Define goals, objectives, and protocols for the data collection program. Develop a Monitoring Program Plan that creates efficiency within the District, reduces redundancy in monitoring programs, defines the Districts monitoring program and provides the data needed to calibrate models, measure effectiveness of programs and determine trends. Establish funding needs within the Monitoring Program Plan.	DCM-3	Monitoring Program Plan		H	Pending	2009	2010	Yes	PCA, DNR, USGS	\$2,000	
11.2 Evaluate current monitoring and data collection efforts within the District and work cooperatively to revise the program to fill gaps or streamline efforts.	DCM-3	Monitoring Program Plan		H	Ongoing	2010	2020+	Yes	PCA, DNR, USGS	\$2,000	
11.3 Collect data to characterize hydrology, surface and ground waters, climate and weather at regional assessment locations within the District.	DCM-2	Monitoring Program Plan		H	Ongoing	2010	2020+	No		\$10,000	
11.4 Post data in electronic format for downloading on the District web page.	DCM-1	Web Page		H	Pending	2010	2020+	Yes		\$1,000	
11.6 Create an electronic bibliography of reports and other technical information pertinent to the District.	DCM-1	Web Page		IP	In-Progress	2010	2010			\$1,000	
11.8 Serve as a source for FEMA boundary information and data.	DCM-1	Web Page		H	Pending	2010	2010			\$1,000	
11.10 Utilize volunteers in collecting lake quality data.	DCM-3	Monitoring Program Plan		L	Pending	2010	2020			\$1,000	No lakes within Western Planning Region.
11.11 Provide standardized input data needed for hydrologic and hydraulic modeling to the cities and counties.	DCM-4	Modeling Specifications Requirements		M	Ongoing	2010	2020			\$1,000	
11.12 Provide standardized input data to others to encourage consistency with regard to information used for modeling within the District.	DCM-4	Modeling Specifications Requirements		M	Ongoing	2010	2020			\$1,000	
11.13 Use the District web page to disseminate technical information to others, including gaged flow rates, stages, runoff volumes, subwatershed boundaries and other information useful in completing technical analyses.	DCM-4	Monitoring Program Plan	Web Page	H	Pending	2010	2020+			\$2,000	
11.14 Use the District web page to disseminate information to others.	DCM-4	Web Page		H	Ongoing	2010	2020+			\$2,000	
11.15 Maintain good drainage system records including benefited areas.	DCM-4	Web Page	Geographic Information System	IP	Ongoing	2010	2020+			\$2,000	



- Rare Natural Features**
- ★ Vertebrate Animal
  - ★ Community
  - ★ Invertebrate Animal
  - ★ Nonvascular Plant
  - ★ Vascular Plant
  - ★ Animal Assemblage
  - ★ Geologic
  - Scientific Natural Area
  - Wildlife Management Area

- MCBS Sites of Biodiversity Significance**
- MCBS site with outstanding biodiversity significance
  - MCBS site with high biodiversity significance
  - MCBS site with moderate biodiversity significance
  - MCBS site below minimum biodiversity significance threshold
- MCBS Native Plant Communities**
- Agassiz beach ridge complex
  - Aspen woodland
  - Calcareous seepage fen (northwest) prairie subtype
  - Dry prairie hill subtype
  - Dry prairie sand-gravel subtype
  - Dry prairie-woodland complex
  - Emergent marsh
  - Lowland hardwood forest

- Maple-basswood forest (west central)
- Mesic oak savanna (northwest)
- Mesic prairie
- Mixed emergent marsh
- Oak forest (central) dry subtype
- Prairie wetland complex
- Rich fen (transition) sedge subtype
- Saline wet prairie complex
- Seepage wetland complex
- Shrub swamp
- Wet brush prairie
- Wet meadow
- Wet prairie



**Figure 1A: Ecological Resources in the Western Planning Region**

Scale: AS SHOWN	Drawn by: CEQ	Checked by:	Project No.: 1915-145	Date: 10/14/2009	Sheet:
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701.237.5065

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Data source: MN DNR Data Del. Rare Natural Features provided by the MN DNR Natural Heritage Program.

## Exhibit A

### **Western Planning Region Goals/Objectives**

**Source: Buffalo-Red River Watershed District – Natural Resource Assessment (2009)**

1. Improve existing hydrologic conditions in watercourses.
  - Strive to create stream hydrology that is more consistent with a “natural” hydrograph. Implement activities that:
    - Reduce flood peaks
    - Reduce flashiness of flows following run-off events
    - Extend the period of time it takes to get to base flow conditions after spring runoff events (extend receding limb of hydrograph).
    - Reduce number of no flow days.
2. Re-establish the habitat corridor along the Red River and Wolverton Creek.
  - Connect and widen existing woodland habitats along the Red River. Create a contiguous corridor along the river that will cover the meander belt width of the river.
3. Reduce erosion and resulting sedimentation in watercourses.
  - Implement agricultural and drainage BMP's and promote land use changes (side inlets, buffer and grassed waterways, residue management, reduce farming into road ditches).
  - Create a contiguous corridor along the Red River and Wolverton Creek that will cover the meander belt width of these systems.
4. Grassland/wetland protection and enhancement.
  - Create additional grasslands and wetlands in the southeastern portion of the subwatershed adjacent to Manston WMA.
5. Create impoundment areas for additional migratory bird habitat in southern and eastern portions of the subwatershed.
6. Improve water quality.