ROSEMOUNT

PUBLIC WORKS / ENGINEERING

Comprehensive Wetland Management Plan

ADOPTED 1998
AMENDED FEBRUARY 1999
AMENDED DECEMBER 2005
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I. Executive Summary

The Rosemount Comprehensive Wetland Management Plan (WMP or Plan) is an inventory/assessment of wetlands in Rosemount combined with a Plan and Ordinance designed to maximize the benefit that surface waters can provide to the community. The wetland map of the City and the wetland inventory and assessment completed for each wetland is contained in **Appendix A.** The inventory consists of detailed technical data on each wetland. Wetlands were assessed for quality and functionality based on the information gathered in the field. Functional scores are included with the wetland inventory. Each wetland has been mapped and included in the City's Geographic Information System (GIS). The functional assessment information contained within this document consists of the previously performed field evaluations and assessments conducted by City staff in the development of the 1998 plan. Wetland assessments that have been conducted since the WMP development are also included in the update.

Wetlands have been prioritized for management based on the assessed functional score. This information gives City staff the ability to make an informed decision on what water resources are important and should be protected from future urbanized growth and development. Wetlands with the highest value were assigned the most aggressive management and protection strategies.

Past and present land development has influenced the administration of the WMP since the adoption of the plan in 1998. Since then, a number of issues have been brought to the attention of City staff that affect wetland mitigation and management. These issues have been handled administratively by City staff, motions by Rosemount City Council or through Technical Evaluation Panel (TEP) discussions. The City became concerned with the ability to enforce such administration without a policy and procedure adopted as ordinance by City Council. In response, staff amended the 1998 WMP a number of times to address the outstanding and recurring issues associated with wetland impacts and management.

In 2007, 2009, 2011, and 2012, changes to the Wetland Conservation Act (WCA) were made by the State Legislature. Additionally, several wetlands have been reassessed with development proposals. The 2012 amendments to this WMP address the WCA rule changes as well as incorporate the updated wetland assessments, where applicable. New policies and provisions included in this 2012 update were discussed with the Task Force and City staff.

II. Introduction and Purpose

The City of Rosemount's Comprehensive Wetland Management Plan (WMP) was developed in 1998 to be conformance with Minnesota Rules 8420. The purpose of establishing the WMP was to develop policies related to the use and protection of wetlands within the City. Prior to 1998, wetland management and protection was primarily accomplished through site specific permitting actions of various regulatory agencies. The purpose of the WMP was to provide the City with the authority to rule on wetland impacts and implement regulations based on the needs of the community.

The WMP was also designed to provide information to land developers and the public regarding the amount, characteristics, and value of local wetlands and surface water. This WMP exists for the purpose of optimizing the City's surface water resources as provided under the Minnesota Wetland Conservation Act. The goals of this plan are to:

- Determine the quantity and quality of the wetland resources in Rosemount
- Map wetlands at a scale appropriate for local planning purposes
- Maintain data for use by residents and developers
- Focus limited resources in the most effective direction
- Solve chronic wetland management problems
- Identify key educational areas
- Achieve no net loss in the quantity, quality, functionality, and biological diversity of Rosemount's existing wetlands
- Increase the quantity, quality, functionality, and biological diversity of Rosemount's wetlands by enhancing diminished or drained wetlands
- Avoid direct or indirect impacts from activities that destroy or diminish the quantity, quality, and biological diversity of wetlands
- Replace wetland values where avoidance of activity is not feasible and prudent
- Optimize management of City surface water and wetland by integrating all surface water related management plans and ordinances
- To identify existing and potential problems or opportunities for protection, management, and development of water resources and related land resources in the county
- To develop and implement a plan of action to promote sound management of water resources in the City

- Provide performance standards for wetland replacement areas, including the associated upland buffer

According to the Metropolitan Council, the City of Rosemount is expected to be one of the top ten growth cities in the metropolitan area between 1995 – 2020. Land development has put great pressure on the quality and benefits associated with the City's surface water resources. The total wetland area in Rosemount covers about 1,832 acres, or about 8% of the City. About 1,174 of these acres are associated with the Mississippi River corridor. Most of the remaining 658 acres include about 400 other surface water bodies in Rosemount which are small to medium sized pothole wetlands lying within the City's northwest corner. Here a swath of the Wisconsin Age, St. Croix Moraine has left behind a hilly terrain with many potholes and small enclosed watersheds. Large tracts of this area are yet to be developed, but are seen as prime locations for residential housing. Just north across Rosemount's border within the City of Eagan is the Lebanon Hills Regional Park which takes advantage of this interesting terrain for education and recreation.

Wetlands within the City were assessed in 1997 and 1998 as a part of the WMP plan development (see **Appendix A**). This field assessment focused on the undeveloped Municipal Urban Service Area (MUSA) identified in the 2020 Land Use Plan. These properties have a greater density of wetlands and surface waters than other areas of the City and are expected to experience significant development and have the highest potential for wetland impacts. The 1998 WMP and ordinance were in effect before much of the development projects in Rosemount, allowing the City to protect and preserve the natural water resources to the fullest extent feasible on the property being developed. Additional functional assessments have been performed since the development of the plan and subsequent updates. This 2012 amendment incorporates all assessments since 2007.

The City has applied the WMP policies on all land development in the City of Rosemount since the adoption of the plan in 1998. The plan provides a clear outline of the City's expectations concerning wetland management and protection. Buffer monuments have contributed to the public education portion of the WMP. Buffer areas themselves have increased in overall area and vegetation density. Wetland monitoring provides the City with technical data on mitigation sites. The data are reviewed to ensure that the appropriate wetland type and functionality is attained. The City's 1998 Erosion Control policy has helped to prevent soil erosion and deposition impacts to wetlands adjacent to construction.

Based on the implementation of this Plan since 1998 and subsequent amendments, it has been determined by the City that a number of policy clarifications were needed. The purpose of this plan amendment is to address the following issues:

- Wetland buffer zones and related policies, including performance standards
- Location of storm water best management practices (BMP) within buffers including clarification of the types of storm water BMP's allowed in buffers
- Wetland replacement regulations and procedures, including siting requirements that encourage replacement within the City limits

- Address secondary impacts to wetlands that may be caused as a result of a land use change
- Changes to the WCA as per updates in 2009, 2011, 2012
- Incorporate the Minnesota Routine Assessment Method (MnRAM) as a replacement for the RoseWFA for wetland functions and values assessments
- Establish clear administrative authority for WCA decisions
- Specifically include the goal of the City to identify, evaluate, and pursue wetland replacement sites.

The WMP provides greater flexibility and control over wetland management and protection to meet the specific needs and goals of the community. The plan was developed in recognition of the City of Rosemount's 2020 Land Use Plan and the Comprehensive Stormwater Management Plan. This document is written in recognition of the Wetland Conservation Act (WCA) and shall serve as a supplement to this legislation.

This wetland management plan has been developed to be in conformance with the Wetland Conservation Act. Any future changes in the WCA would supersede the requirements outlined in this plan.

III. Definitions and References

Applicant: Person or party proposing wetland impact or related activity.

Best management practices: State-approved and practices published in the "Protecting Water Quality in Urban Areas" associated with draining, filling, or replacing wetlands that are capable of preventing and minimizing degradation of surface water and groundwater. The "Protecting Water Quality in Urban Areas" manual is written and produced by the Minnesota Pollution Control Agency.

Buffer zones: Non-wetland areas which extend a specified distance from the wetland edge. Buffer zones are undeveloped, un-manicured, and minimally maintained terrestrial areas of native or naturally occurring vegetation that experience little to no human impact. Buffer zones help to protect adverse impacts to the wetland. Restrictions apply to the activities within a wetland buffer zone once a buffer is established. The buffer starts at the delineated wetland edge.

Buffer Averaging: Practice of allowing a variable width buffer around a wetland where the average buffer width is equal to the buffer width required for the wetland management category. Buffer averaging shall incorporate landscape connectivity where possible and ecologically feasible. Some examples include, but are not limited to, the following: a) averaging the buffer to be wider around the portion of the wetland where upstream development will occur; b) incorporating landscape features that may be prone to erosion to maintain a vegetated area and prevent sedimentation into the wetland; c) incorporating a higher quality habitat to protect the area from disturbance.

City: The incorporated City of Rosemount.

Complete Application: An application, as defined in MnRule 8420 that meets the requirements as per MnRule 8420.0255, Subp. 2 Determination of a Complete Application and contains sufficient and technically accurate information required to make a decision, as determined by the City. An application may be deemed incomplete if it contains information that does not support the conclusions on which the application is based and for which a decision has been requested.

Creation: Construction of wetlands in an area that was not wetlands in the past.

Excavation: The displacement or removal of the sediment or other materials by any method.

Fill: As defined in MnRule 8420.

Growing Season: As defined in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region*.

Hydric soils: Soils that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part.

Hydrophytic vegetation: Macrophytic plant life growing in water, soil, or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content.

Impact: As defined in MnRule 8420.

Indirect impact: An impact that is a result of an activity that occurs outside of the wetland boundary (MM Rule 8420) including, but not limited to, impacts associated with altering the hydrologic inputs to a wetland basin that results in converting the wetland to nonwetland or changing the wetland type. Indirect impacts are determined on a per-project basis and shall be evaluated by the City and in consultation with the Technical Evaluation Panel, at the discretion of the City.

Landowner: A person or entity having the rights necessary to drain or fill a wetland, or to establish and maintain a replacement or banked wetland. Typically, the landowner is a fee title owner or a holder of an easement, license, lease, or rental agreement providing the necessary rights. The right must not be limited by a lien or other encumbrance that could override the obligations assumed with the replacement or banking of a wetland.

Local government unit: The City of Rosemount.

Project: A specific plan, contiguous activity, proposal, or design necessary to accomplish a goal as defined by the local government unit. As used in this chapter, a project may not be split into components or phases for the sole purpose of gaining additional exemptions.

Public value of wetlands: The public benefit and use of wetlands as determined based upon a functional assessment method.

Soil and water conservation district: A legal subdivision of state government under Minnesota Statutes, chapter 103C.

Upland Buffer Credit: For the purposes of this Plan, Upland Buffer Credit shall incorporate the requirements and standards of MnRule 8420.0526, Subp. 2.

Wetlands:

A. Lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. For purposes of this Plan wetlands must:
   (1) Have a predominance of hydric soils;
   (2) Be inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support a prevalence of hydrophytic vegetation typically adapted for life in saturated soil conditions; and
   (3) Under normal circumstances, support a prevalence of hydrophytic vegetation.

B. The wetland size is the area within its boundary. The boundary must be determined according to the United States Army Corps of Engineers Wetland Delineation Manual (January 1987). The wetland type must be determined according to United States Fish and Wildlife Service Circular No. 39 (1971 edition).

Wetland Replacement Credit: For the purposes of this Plan, Wetland Replacement Credit shall mean the Actions Eligible for Credit, as per MM Rule 8420.0526, Subp. 3-7.

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- United States Fish and Wildlife Service, Wetlands of the United States, United States Fish and Wildlife Service Circular No. 39, (1971).
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- Board of Water and Soil Resources, Minnesota Routine Assessment Methodology for Evaluating Wetland Functions, Version 3.4 beta – November (2010).
- National Wetland Inventory Maps United States Fish and Wildlife Service.

IV. Acknowledgements

The Rosemount WMP and subsequent updates were developed with input from two wetland committees and a Task Force. The members are shown below:

2012-2013 Task Force
Kimberly Shoe-Corrigan, City Council
Jeffery Weisensel, City Council
Wade Miller, Planning Commission
Ammar Husain, Planning Commission

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Kimberly Shoe-Corrigan, City Council
Jeffery Weisensel, Former Planning Commission
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Jeffery Weisensel, Planning Commission
Donald Berg, Utility Commission
Kelly Sampo, Parks Committee
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Brian Huser, Intern
Bud Osmundson, Public Works Director
Wayne Barstad, Minnesota Department of Natural Resources
Matt Moore, Minnesota Board of Water and Soil Resources
Doug Norris, Minnesota Department of Natural Resources
Brian Watson, Dakota County Soil and Water Conservation District

V. Wetland Regulations

The existing wetland regulatory framework in Minnesota involves a number of federal, state, and local agencies including the US Army Corps of Engineers, Department of Natural Resources, Pollution Control Agency, and the Local Government Units. A brief discussion of the role of each wetland regulatory agency is included in this section.

A. US Army Corps of Engineers

The US Army Corps of Engineers (COE) regulates the discharge of dredged or fill materials to wetlands and other water bodies through Section 404 of the Clean Water Act provided there is a connection to navigable waters. Any impact to navigable waters or wetlands that are connected to navigable waters, including filling, draining, or excavation, may require a permit from the COE. Wetland delineations are also subject to COE approval. Depending on the size and extent of the wetland impact, the Minnesota Pollution Control Agency may be involved in providing water quality certification for the COE permit. For more information about the COE regulations, the area COE Project Manager can be contacted at (651) 290-5367 or information can be obtained from the St. Paul District COE website at www.mvp.usace.army.mil.

B. Department of Natural Resources

The Department of Natural Resources (DNR) has jurisdiction over Public Waters and Wetlands as depicted on the DNR Public Waters and Wetland maps. The DNR has jurisdiction over Public Water and Wetlands below the Ordinary High Water (OHW) elevation or below the top-of-bank for streams. The OHW is determined by the DNR. Any impact to a Public Water or Wetland may require a permit from the DNR. The DNR Area Hydrologist can be contacted for more information at 651-259-5654 or information can be obtained from the DNR website at www.dnr.state.mn.us/waters.

C. Minnesota Pollution Control Agency

Minnesota Pollution Control Agency (MPCA) water quality standards applicable to wetland protection are contained in Minnesota Rules 7050. Water quality standards are applicable to all wetlands of the state and sequencing requirements of Minnesota Rule 7050.0186 apply to all wetland alterations that are permitted or certified by the MPCA as described below.

The National Pollutant Discharge Elimination System (NPDES)/SDS permit program is a delegated federal permit issued under the responsibilities and authorities contained in Minnesota Statutes Chapter 115. In accordance with Minnesota Rule 7050.0186, sequencing requirements to avoid, minimize, and mitigate wetland impacts are required to be satisfied in the issuance of NPDES/SDS permits, including issuance of the general Construction Storm Water NPDES permits. If a project includes a physical wetland alteration caused by draining, filling, excavation, or inundation of the wetland and that impact is not addressed in either the US Army Corps of Engineers 404 permit, the Department of Natural Resources permit, or the Wetland Conservation Act permit, then mitigation compliance with Minnesota Rule 7050.0186 must be demonstrated. For the purposes of the MPCA NPDES permit, de minimis determinations by another permitting agency that address the project impacts are recognized by the MPCA. However, a non-jurisdictional determination by another permitting agency that does not address project impacts requires the project proposer to demonstrate that they meet the NPDES permit conditions and Minnesota Rule 7050.0186.

In the past, 7050.0186 requirements were often applied during the issuance of Section 401 Water Quality Certification which is part of the issuance process of the COE 404 permit. The 401 Water Quality Certification program is an element of the Federal Clean Water Act and has been delegated to the MPCA. Under this program, the MPCA reviews all federal permits including Clean Water Act Section 404 permit applications for compliance with state water quality standards primarily contained in Minnesota Rule 7050. The MPCA can approve, deny, or waive 401 certification. If denied, the federal permit, usually the COE 404 permit, cannot be issued. As of the writing of this SWPMP, the MPCA does not implement the Section 401 program on a regular basis and nearly all certifications are being waived. This action does not eliminate, waive, or vary the applicant's responsibility to comply with all water quality standards and requirements contained in Minnesota Rules 7050. In addition, this waiver action does not waive MPCA's authority to take necessary actions, including enforcement actions, to ensure that the applicant and the project's construction, installation, and operation comply with water quality standards and all other applicable MPCA statutes and rules regarding water quality.

D. Local Government Unit (LGU)

The Wetland Conservation Act (WCA) is a state law enacted in 1991 and subsequently amended (Minnesota Laws CH 354, Minnesota Statute 103G.222-2373 and other scattered sections). The Board of Water and Soil Resources (BWSR) provides agency oversight for WCA through Minnesota Rule 8420. The WCA is administered by Local Government Units (LGU). BWSR's role is to assist LGUs in the implementation of WCA and to be a member of the Technical Evaluation Panel (TEP).

The WCA is administered by the LGUs. The City of Rosemount is the LGU for the WCA within the City's political boundary. The City can issue or deny permits depending on whether or not the project is in conformance the WCA and the requirements of this plan.

The intent of the WCA is to achieve a "No Net Loss" of wetlands in Minnesota. Therefore, the WCA prohibits filling, draining, and excavating of wetlands in some areas unless the activity is exempt or wetlands are replaced by restoration or creation of wetland of at least equal functions and values.

E. Wetland Applications

Wetland related applications shall be submitted to the City of Rosemount as per the requirements of this plan and MnRule 8420. Application forms can be found on BWSR's web-site: http://www.bwsr.state.mn.us/wetlands/index.html.

1. Wetland Boundary or Type Application

For any site development activities within the City of Rosemount, the City requires the developer to submit a wetland delineation report that identifies the location and the extent of any wetlands present on the site. Wetland delineations must be performed in accordance with the *1987 Corps of Engineers Manual for Delineating Wetlands in conjunction with the Midwest Supplement* or most recent, industry-accepted methodology. Delineations are to be performed by a wetland professional who has been trained in wetland delineations. Wetland delineations should be performed during the growing season, and will be considered incomplete if received

at a time of year not conducive for proper review. Delineations are valid for five years, or as specified in a Notice of Decision issued by the LGU.

Delineations will be subject to field verification by City staff, the Technical Evaluation Panel (TEP) and/or the US Army Corps of Engineers. It is recommended that City staff review wetland delineations prior to plan development and/or application submittal.

2. No Loss and Exemption Applications

The WCA No Loss and Exemption standards are covered in MnRule 8420.0410-0420, as amended, and are included by reference to this Plan. Applications for No Loss or Exemption determinations shall follow the procedures and requirements of MnRule 8420. Wetlands that are exempt per the WCA shall not be regulated by the policies within this Plan.

3. Sequencing Application

Sequencing must be provided as a part of an application for wetlands categorized as Preserve, Manage 1, and Manage 2. Manage 3 wetlands are applicable for sequencing flexibility when impacts are proposed. An applicant who proposes to impact a wetland must adhere to the wetland Sequencing Standards outlined in MnRule 8420.0520. The applicant may submit a sequencing evaluation with the wetland replacement plan application or apply for a preliminary sequencing decision from the City, as per MnRule 8420.0325, as amended. The determination of a complete sequencing evaluation will be made by the City and/or TEP assigned to the project.

4. Replacement Plan Application

When filling or draining any wetland, or excavating in the permanently or semi-permanently flooded areas of a type 3, 4, or 5 wetland, or excavation greater than 6 feet in any wetland is anticipated, a replacement plan application must be completed by the project proposer and submitted to the City. These applications are contained on BWSR's web site at http://www.bwsr.state.mn.us/wetlands/index.html. If wetland impacts are unavoidable, a wetland replacement plan must accompany the application as outlined within this plan. An application fee may apply.

Once sequencing has been completed in conformance with this plan and MnRule 8420 and it has been determined that wetland impacts are unavoidable, the lost functions and values of the wetland must be replaced. Replacement of lost functions and values must be in conformance with *Section X: Wetland Replacement* section of this plan. The wetland replacement standards of the WCA (MnRule 8420.0522, as amended) shall be incorporated by reference in this Plan, except where this Plan is more restrictive. Actions Eligible for Credit for wetland replacement as per MnRule 8420.0526, as amended, are included by reference in this Plan except where this Plan is more restrictive.

Although the WCA allows for upland buffer to qualify for wetland replacement, the City, at its discretion, may require that the full replacement ratio be entirely in the form of wetland creation or restoration. The preservation of existing wetlands on the

subject property is not an eligible credit for the mitigation requirements except as otherwise provided in Minnesota Rules 8420.0526

It is strongly encouraged that wetlands categorized as Manage 2 or Manage 3within this plan are utilized for wetland replacement when feasible. For example, the restoration or expansion of a Manage 2 or 3 wetland would be preferable, under this Plan, than the expansion of a Preserve or Manage 1 wetland. The goal of this recommendation is to increase the functions and values of the degraded wetlands within the City as part of projects that result in impacting wetlands.

5. Replacement for Public Transportation Projects

Through the WCA, wetland impacts that occur due to road improvement projects that address safety issues and are not undertaken solely to accommodate additional traffic capacity by the City or County as the local road authority may be eligible to be replaced by BWSR through the Local Government Wetland Replacement Program. MnRule 8420.0544 is incorporated by reference in this Plan. Applications can be found at BWSR's web-site: http://www.bwsr.state.mn.us/wetlands/index.html.

F. Wetland Application and Decision Procedures

Application review and decision procedures by the LGU shall follow the requirements as per MnRule 8420.0255, as amended, and those procedures are included by reference. Once the comment period has ended, the City will make a decision on the application within 60 days of receiving a complete application in accordance with MnRules 8420.0230 Subp. 2. If the 60 day process cannot be accommodated due to the timing of the preliminary plat process, the applicant will be informed. Generally applications will be approved or denied during the preliminary plat process. Once a decision is made, the City will mail a Notice of Decision to all who received a summary or copy of the permit application. The City's decision is then effective and the project can commence provided that replacement of the wetland impacts occurs before or concurrently with the wetland impact, all other permits from other agencies have been obtained, and that the conditions, if any, of the Notice of Decision are fully met. There is a 30 day appeal process in MnRule Chapter 8420. The applicant can begin work during this appeal window at its own risk. If the LGU's decision is appealed, work on the project would be suspended until the appeal process is resolved. See **Section H**, below, for appeal procedures.

G. Local Government Unit Decision Authority Summary

As part of the 2012 amendment, a resolution delegating WCA administrative functions to LGU staff is incorporated in the Plan. The resolution can be found in **Appendix C** and is summarized as follows:

1. The City Council of the City of Rosemount places decision authority for exemption, no loss, and wetland boundary and type determinations with City Staff.

2. Decision authority for replacement plan applications that impact 10,000 square feet or greater of wetland and wetland banking determinations is placed with the City Council of the City of Rosemount. Decision authority for replacement plan applications that impact

less than 10,000 square feet can be placed with City Staff, unless it is deemed necessary, by the City, to bring the application to the City Council for a decision.

3. City of Rosemount Staff may request that decisions for exemption, no loss, and wetland boundary and type determinations be made by the City Council.

H. Appeals of Wetland Application Decisions and Enforcement Procedures

Appeals of exemption, no-loss, wetland boundary, wetland type, sequencing, replacement plan, or banking plan decisions made by the City will follow the appeal process in accordance with MnRule 8420, as amended.

Wetland Conservation Act Enforcement procedures shall be in conformance with MnRule 8420.

VI. Technical Elements

A. Wetland/Surface Water Inventory

Wetlands were identified based on instructions in the "Minnesota Wetland Delineation Field Guide". Included in field documentation is notation on: hydrology, size, vegetation and soils, several photographs, and Dakota County topographic half-section map locations.

This field reconnaissance was carried out in 1997 and 1998 by the City's Water Resources Engineer with assistance from interns trained and supervised by the former. The database was set up using the National Wetland Inventory (NWI) compiled in 1987 using aerial photography. The database was then modified with any changes found by field inspection during the spring, summer and fall of 1997 and spring of 1998. Wetlands found by field inspection that were not listed in the NWI have been added. Wetland determinations were arrived at using the three defining factors for a wetland, **Hydrology, Vegetation, and Soils**. Each of these parameters needs to be present before an area could be determines as "wetland" according to the 1987 Corps of Engineers Manual for Delineating Wetlands.

B. Field Methods

Various resources were utilized both in the office and in the field to determine possible wetland sites. Initially, 1991 topographic maps were used in conjunction with the NWI map to locate wetlands in the City. Next, 1991 aerial photographs were viewed to locate low and possible water holding areas. The last step in the office reconnaissance was to check the local soils map for hydric (wetland) soils. After these preparatory steps were taken, the field work was undertaken. All areas were covered on foot, and low areas or areas with one of the three wetland indicators (hydrology, soils, and vegetation) were tested. Areas that tested as wetlands were documented on field data sheets as well as sketched onto topographic maps for approximate representation of size. Photographs were taken of the wetland sites as well. Precise delineations of wetlands are left to be completed by property owners, as the need arises.

C. Database Information

Using the information collected during field work, wetlands were categorized using the Fish and Wildlife Service (FWS) and NWI classification systems. This information was then entered into the wetland database. The database shows Rosemount's wetland number, size, FWS type, DNR number, and other relevant information (see **Appendix A**). This information is directly linked to the Geographic Information Systems (GIS) map which shows all of the wetlands in Rosemount that were identified in the inventory process. The inventory does not include all surface water features with the City of Rosemount. Wetland features of the GIS system are visual representations of the identified wetlands and do not represent the actual wetland delineation

D. Geographic Information Systems Map

Polygon coverage using the program Arcview was linked to the tabular data in the Microsoft Access Database with a common identifier. Polygons representing the shape of the wetlands were drawn using contour and parcel coverages as a backdrop. The overall process was used to create a digital map that can be accessed with ease to locate wetlands throughout the City of Rosemount. Maps can be generated and database information about the wetlands can be viewed. The GIS maps are updated seasonally to account for wetland impact activity and monitoring accomplished for that season. New and replacement wetlands will be incorporated in the GIS database and City map as they are established. The functionality and classification will be updated based on the monitoring information provided to the City. The GIS map will also be updated to reflect new information (i.e. wetland delineation decisions, revised management classifications, etc) on an as needed basis. For example, since the 2007 update, the City has received applications for wetland boundary decisions that have resulted, upon review and approval by the City, in several features identified in the WMP as wetland being determined to be nonwetland. These features have been removed from the Plan and as such, are not regulated by the policies herein.

VII. Functional Assessment

The functional value of each wetland was evaluated in 1997-1998 with respect to the following functional parameters:

- Floral diversity and integrity
- Water quality protection
- Fish and wildlife habitat
- Flood/storm water attenuation
- Shoreline protection
- Groundwater recharge and discharge
- Aesthetic/recreation/education and science
- Commercial uses

Wetland functionality was assessed in 1997 according to a modified version of the Minnesota Routine Assessment Method (MnRAM) referred to as the Rosemount Wetland Functional Assessment (RoseWFA) worksheet . It was developed in 1997 in consultation with the Minnesota Board of Water and Soil Resources, the Minnesota Department of Natural Resources, the Dakota County Soil and Water Conservation District, the Rosemount Wetland Committee, and City staff.

The 2012 Plan Amendment replaces RoseWFA with them most current version of MnRAM. The MnRAM has become the state standard for wetland assessments. MnRAM (**Appendix B**) is a comprehensive assessment of both a wetland's function and value and can be directly associated with WCA policies in implementing this Plan.

Upon the submittal for approval of a proposed or planned plat or any other development of a site or property, the City will require that the applicant complete a re-assessment of the wetlands using the most current version of MnRAM. This is in addition to the wetland delineation report that is required to be submitted if the site is proposed to be developed. Field work must be completed during the growing season as defined in this Plan, which is generally May 1 – October 15, but may fall outside of this date range depending on climate conditions.

VIII. Wetland Classification

Wetlands are classified for management and protection based on the "Basic Wetland Protection" management strategy in MnRAM. This classification system is included in **Appendix B** and the most recent version can be found at http://www.bwsr.state.mn.us/wetlands/index.html. The management classifications and corresponding functional scores are as follows:

> **Preserve (P):** Wetlands that were placed into the Preserve category generally provided the highest functions for vegetative diversity and wildlife habitat.
>
> **Manage 1 (M1):** Wetlands that were placed into the Manage 1 category generally provided high functions for vegetative diversity and wildlife habitat with some functions for water quality protection and flood attenuation.
>
> **Manage 2 (M2):** Wetlands that were placed into the Manage 2 category generally provided some functions for vegetative diversity and wildlife habitat with high functions for water quality protection and flood attenuation.
>
> **Manage 3 (M3):** Wetlands that were placed into the Manage 3 category generally provided the functions for water quality protection and flood attenuation.

Appeal of a Management Classification: In the event of a dispute concerning wetland management classification, the applicant or project proposer will be required to submit a *Request for Appeal* to the City's Engineer. The *Request for Appeal* must include the wetland number, current classification, and reason(s) for the appeal. A functional assessment may be conducted by City staff or a City approved wetland specialist. A decision will be made based on a review of the information within 30 days during the growing season or 30 days after the growing season begins, if the *Request for Appeal* is submitted outside of the growing season. A notice of the City's decision on the management classification appeal will be sent to the appealing party and the regulatory agencies. This notice will indicate either the revised management classification (if the City concurs with the appeal) or the existing management classification and the management and protection strategies assigned to the wetland by support of this document. Staff will make a decision within 60 days of receiving a complete request of appeal (or within the appropriate time period after the growing season begins if the application was submitted outside of the growing season) and notify the applicant of the decision. Appeals of the City Engineer's decision can be made to the City Council. Approved appeal requests and subsequent management classification changes are in **Appendix D**.

IX. Wetland Management Policies

A. General Water Quality Practices

For wetlands citywide, several tools can be applied with minimal expense. The City shall maintain its regularly scheduled program of street sweeping and storm drain sump cleaning. City streets are swept twice yearly and catch basin sumps are cleaned seasonally based on the schedule of the Stormwater Pollution Prevention Program (SWPPP). These programs can have a significant impact on wetland water quality by removing sediments and chemicals from the storm water runoff that enters surface water bodies.

The Engineering Department and Building Inspections currently maintain a general erosion control inspection and enforcement program. The goal of this program is to minimize transport of sediments eroded from construction sites to surface water bodies. This program is supported by language in the City's Surface Water Management Ordinance as well as the Uniform Building Code for the State of Minnesota. This program is continually being reviewed and improved to minimize the impact to water quality of storm water runoff.

In compliance with state requirements, the City has developed and implemented a Stormwater Pollution Prevention Program (SWPPP) which focuses on the preventative aspects of storm water pollution. The SWPPP is a combination of Best Management Practices (BMPs), ordinance, and public education tools used to prevent storm water pollution. The Minnesota Pollution Control Agency (MPCA) has required the City of Rosemount to submit a SWPPP for review and approval. The City is required to submit an annual report with results and summaries of the actions taken for the previous year.

In order to organize and implement Rosemount's Wetland and Surface Water Management Plan, an ordinance has been developed under Minnesota Statute Chapter 462. This ordinance is available on the City's webpage.

Efforts to educate residents regarding wetland ecosystems and best management practices are ongoing and will continue. Along with dissemination of surface water specific information, programs that will encourage direct action on the part of residents, such as the Citizens Assisted Monitoring Program (CAMP) will be discussed by City staff. The City will continue to promote and sponsor an "Adopt-A-Wetland" program. This will enlist volunteers to collect litter and trash that accumulates around and within City wetlands as well as addressing other needs as they develop. Other educational opportunities will be actively sought.

B. Category Specific Management Strategies

The inventory and functional assessment information was used to determine management categories for individual wetlands based on functional level. Wetlands that score highest are targeted for maximum protection and resource dedication. The wetland category management strategies were designed to optimize resource allocation. The goal of this plan is to devote resources in a manner that optimizes the overall functional value of wetlands to the community and the natural ecosystem. This plan does not "roll back" any

protection for wetlands existing under state or federal law but rather specifies proactive management strategies scaled to the current functional levels of Rosemount wetlands.

The management strategies call for increasing levels of protection for wetlands that score high in the functional assessment. In terms of actual management practices these different levels are implemented through buffer zones, storm water treatment, mitigation requirements, and public education.

1. Wetland Buffer Zones and Prioritization

Wetland Buffer Zones are upland areas that contain natural areas of vegetation designated by a LGU to protect the ecological values and functions of the aquatic system. Buffer zone functions include:

- Stabilizing soils and preventing erosion
- Filtering suspended solids and nutrients
- Supporting and protecting fish and wildlife habitat
- Encouraging the production of unique vegetation
- Stabilizing water temperature
- Deterring human encroachment
- Provide habitat connections for wildlife

Dense native vegetation is the optimal condition for an effective wetland buffer zone. Once established, activities in buffer zones that are not associated with the approved buffer management plan that disturb the roots or influence the growth of the vegetation, such as grading, mowing, landscaping and planting, fertilizing, spraying (herbicides), and seeding or sodding are prohibited. Herbicides and controlled burns or other management practices used to control noxious weeds will be allowed only with permission from the City Engineer.

The width of buffer considered appropriate to protect a wetland from degradation is related to the wetland functions being protected and the buffer functions being provided. Buffer widths for each management category are outlined below and described in **Table IX-1**. Additional buffer zone may be required above and beyond the prescribed width if determined necessary and feasible by the City Engineer.

Preserve:	75 feet
Manage1:	50 feet
Manage 2:	30 feet
Manage 3:	15 feet (non-agricultural areas)

In addition to the buffers, the City requires a 30’ structure setback from the buffer to allow for usable yard space.

Buffers will be contained within a conservation easement that includes both the wetland and the buffer. A sample of the City’s conservation easement can be obtained from the City**.** The conservation easements will be recorded with the final plat and must be indicated on subsequent land development plans. The extent of the conservation

easement will be determined based on the prescribed buffer width for the wetland in question and/or the outer limits of an approved averaged wetland buffer. These easements provide the City with a legal right to the property and the ability to enforce the wetland buffer requirements as outlined in this document.

The construction of bike paths or trails through designated wetland buffers will be determined administratively by City staff. The applicant must demonstrate that the placement of the trail does not result in a loss of total wetland buffer area for the wetland. The buffer area consumed by the placement of the bike path or trail must be compensated for by establishing additional buffer areas in equal or greater amount consumed by the bike path or trail. The buffer area on both sides of the bike path or trail must remain natural and must not be manicured or landscaped.

All projects will need to take into account a buffer prioritization review. This prioritization review involves the following and is required to be included in a wetland application:

a) Projects shall include the buffer and setback standards. However, no wetlands shall be filled or impacted in order to provide for the appropriate buffer.

b) In cases where meeting the setback standard causes impact to the wetland or the buffer, flexibility on the wetland setback will be considered.

c) In cases where meeting the buffer standard causes impact to the wetland, flexibility on the buffer will be considered. When flexibility in the buffer width is determined to be necessary by the City, the project proposer or applicant must consider the following:

- The buffer width averaging will be reviewed on a case-by-case basis.
- The buffer plan will take into account landscape connections and habitat corridors needs to be incorporated into the buffer plan. See definition of buffer averaging in **Section III.**
- The buffer plan will include the percent of the buffer that will be impacted as compared to the size of the wetland.
- A minimum 30’ buffer is encouraged on P and M1 wetlands.
- A minimum 15’ buffer is encouraged on M2.
- Averaged buffer acreage must be equal to or greater than the required buffer acreage

An exception to the minimum buffer average will be considered for linear public road projects.

Conservation easements are required over the buffer perimeter and will be recorded at the time of final plat. The City Engineer will review the proposal and either approve, approve with conditions, or deny the request to utilize buffer averaging around the wetland.

2. Buffer Establishment

For areas where seeding or buffer establishment is needed either because the buffer has been disturbed (e.g. temporarily disturbed during grading of a development site), a buffer establishment and maintenance plan must be developed. This can include the current BWSR or Mn/DOT guidelines regarding planting of native species on wetland replacement sites. Revegetation with native plants is required around wetland buffers, when disturbed. If the wetland buffer is not disturbed as a result of development, construction, or other activity, the existing natural vegetation shall be considered acceptable. This exception does not apply to wetland buffers that receive replacement credit as part of an approved replacement plan.

For projects that require buffer establishment, a Buffer Establishment and Management Plan must be submitted for review and approval by the City. Buffer monitoring will be required to be completed by the project proposer for a minimum of five years. The City can extend this monitoring requirement if the buffer is not meeting performance standards. The monitoring report shall include a summary of buffer management activities, a quantification of the plant species present, a picture of the buffer, and discussion of upcoming buffer management activities. The buffer will need to meet the City's performance standards. Information about what needs to be included in this Buffer Establishment and Management Plan and the performance standards are in included in **Appendix E.**

3. Buffers around Replacement Wetlands

Buffers will be required to be established around wetland replacement sites. If the wetland replacement is proposed to be an expansion of an existing wetland, the buffer width required for the existing wetland will be the required buffer width of the replacement area, or as required in MnRule 8420.0522, Subp. 6, whichever is greater. If the wetland replacement is a stand-alone site, the buffer width will be based on the required buffer width of the wetland being impacted, or as required in MnRule 8420.0522, Subp. 6, whichever is greater.

4. Storm Water Pre-Treatment

Storm water can have a detrimental impact on wetlands. To alleviate the sediment and nutrient loading such input places on wetlands, this plan includes various levels of storm water pretreatment as follows:

Preserve: Sediment and nutrient pretreatment required, consider diversion if possible
Manage 1: Sediment and nutrient pretreatment required
Manage 2: Sediment pretreatment required
Manage 3: Pretreatment to NPDES standards (per Minnesota Pollution Control Agency rules) is required if these standards apply to the project

The above requirements are left somewhat open as to the particular method selected for each case. This will allow some flexibility, especially to incorporate new technologies and techniques. Storm water ponds will be required to be placed in easements. Final approval of treatment methods shall in all cases be left to the City Engineer.

5. Storm Water Treatment Ponds within Wetland Buffer Zones

Storm water treatment ponds within designated wetland buffer zones are becoming a common land development practice. Although the pond compromises wetland buffer area, the construction of a pond provides storm water treatment where suspended solids and other pollutants settle out prior to overflowing into a wetland. A well designed and placed treatment pond can be beneficial to the quality and integrity of the adjacent wetland. The basin also provides additional flood control for large rain events.

The design and placement of storm water treatment ponds within wetland buffer zones must comply with the provisions of the Comprehensive Storm Water Management Plan (CSWMP) and this document concerning storm water treatment. The design guidelines are available from the City.

If the area of a wetland buffer zone includes a storm water treatment pond, the buffer zone must adhere to the following:

- Wetland buffer must be provided between the pond and the wetland and around the perimeter of the entire system. Wetland buffer must be a minimum 15 feet between the NWL of the pond and wetland edge.
- Only one treatment pond in the wetland buffer zone is allowed.
- Buffer area must be equal to the total buffer area required for the wetland based on the classification prescribed in **Table IX-1**. The storm water pond, as measured from the Normal Water Level (NWL), will not count towards the buffer area.

Infiltration basins (and similar stormwater best management practices) can be placed within the wetland buffer at the discretion and upon approval of the City Engineer. The surface area of the infiltration basin can be included, at the discretion and upon approval by the City Engineer, as part of the required buffer area since its function and structure is similar to that of the buffer. In these cases, the infiltration basin should have at least 75% cover of vegetation.

Wetlands created as part of water quality treatment systems, are eligible for replacement credit as per MnRule 8420.0526, Subp 7.C, as amended.

6. Wetland Buffer Monuments

For all new and redeveloped land subsequent to passage of this Plan, the developer shall be responsible for the installation of monuments which mark the outer edge of the wetland buffer zones. Buffer monuments must be indicated on the grading plan and shall generally be placed at the intersections of lot lines and the buffer boundary. All markers and their placement shall be per city specification or approved by the City Engineer. A monument template is available at the City**.**

7. Buffers in Previously Developed Areas

In areas developed prior to the establishment of the WMP, no buffers were required. Previously developed areas are defined as areas where final plats have been approved prior to the adoption of this Plan in 1998. In these areas, the implementation of buffers

will be encouraged rather than required. Education efforts of these residents and businesses will be used to encourage buffers in these areas for both wetlands and storm water ponds. It is believed that most Rosemount residents will respond when the benefits are understood and toward that end this plan recommends an intensive educational effort.

IX-I. Wetland Management and Protection Requirements

Management Class	Management Strategy	Wetland Buffer Standards	Storm Water Management	Minimum Mitigation Standard
Preserve	Maintain wetland and existing functions, values and wildlife habitat. Apply strict avoidance standards.	75 feet 30' minimum if buffer averaging is encouraged Monuments required	Sediment and nutrient pretreatment required; consider diversion if possible	3:1 replacement ratio with a minimum 2 acres of Wetland Replacement Credit and maximum 1 acre of Upland Buffer Credit for every acre impacted.
Manage 1	Maintain wetland without degrading existing functions, values and wildlife habitat. Sequencing is required	50 feet 30' minimum if buffer averaging is encouraged Monuments required	Sediment and nutrient pretreatment required	2:1 replacement ratio with a minimum of 1 acre of Wetland Replacement Credit and a maximum of 1 acre of Upland Buffer Credit for every acre impacted. Additional mitigation may be required by the WCA in MR 8420.
Manage 2	Maintain wetland functionality Allow limited sequencing flexibility	30 feet 15' minimum if buffer averaging is encouraged Monuments required	Sediment pretreatment required	2:1 replacement ratio with a minimum of 1 acre of Wetland Replacement Credit and maximum of 1 acre of Upland Buffer Credit for every acre impacted. Additional mitigation may be required by the WCA in MR 8420.
Manage 3	Allow maximum sequencing flexibility	15 feet for non-agricultural areas only Monuments not required	Pretreatment to NPDES standards (per Minnesota Pollution Control Agency rules) is required if these standards apply to the project	2:1 replacement ratio with a minimum of 1 acre of Wetland Replacement Credit and maximum of 1 acre of Upland Buffer Credit for every acre impacted. Additional mitigation may be required by the WCA in MR 8420.

X. Wetland Replacement

Subject to an approved sequencing evaluation, the applicant shall provide a wetland replacement plan to account for the proposed wetland impacts. Impacts due to development or other construction activity are regulated under the WCA. In terms of impact mitigation, the WCA serves as a baseline for evaluation of impacts and associated wetland replacement plans. This Plan specifies guidelines for City Staff and Commission/Council review and recommendations for individual wetlands to insure resources allocation is optimized. The guidelines are as follows:

> **Preserve**: Wetlands under this category shall receive the maximum amount of protection under this plan. Impacts will be allowed only under extreme hardship. Replacement is required at a 3:1 ratio. For project specific replacement a minimum of 2 acres of Wetland Replacement Credit and a maximum of 1 acre of Upland Buffer Credit shall replace every acre impacted.
>
> **Manage 1:** Mitigation of wetlands in this category will be at a minimum 2:1 ratio. For project specific replacement, a minimum of 1acre of Wetland Replacement Credit and a maximum of 1acre of Upland Buffer Credit shall replace every acre impacted. Additional mitigation may be required MnRule 8420.
>
> **Manage 2**: Mitigation of wetlands in this category will be at a minimum 2:1 ratio. For project specific replacement, a minimum of 1acre of Wetland Replacement Credit and a maximum of 1acre of Upland Buffer Credit shall replace every acre impacted. Additional mitigation may be required by MnRule 8420.
>
> **Manage 3**: Mitigation of wetlands in this category will be at a minimum 2:1 ratio. For project specific replacement, a minimum of 1acre of Wetland Replacement Credit and a maximum of 1acre of Upland Buffer Credit shall replace every acre impacted. WCA Sequencing flexibility is applicable for these wetlands. Additional mitigation may be required by MnRule 8420.

The City has a goal of no net loss of wetland within its political boundary, therefore replacement for wetland impacts must be sited within the City limits, unless otherwise authorized by the City. The wetland replacement application must contain a narrative that evaluates the wetland replacement siting prioritization through the siting sequence to the point of the chosen wetland replacement plan. The wetland replacement siting priority is as follows:

1. Wetland replacement within the project site;
2. Wetland replacement within the same City subwatershed drainage area as the impacted wetland;
3. Wetland replacement within the City;
4. Wetland replacement through a BWSR approved wetland bank within the major watershed. The use of wetland banking must be approved by City Council and will only be considered if Items 1-3 are deemed unfeasible.

Wetland replacement in the form of a withdrawal of available wetland credits from a State-approved wetland bank site, as per MnRule 8420.0522, as amended, shall be allowed at the discretion of the City of Rosemount.

As of the date of this amendment, there are no wetland bank sites within the City of Rosemount. A goal of the City is to identify, evaluate, and pursue wetland bank sites within the City. As wetlands are assessed using the newly incorporated MnRAM, potential wetland restoration opportunities will be identified that could be utilized as wetland bank sites.

In the event that project-specific wetland replacement fails, the applicant shall be responsible for proposing and developing an alternative plan that fulfills the requirements of the approved wetland replacement plan. The City may provide additional input or require alternative replacement strategies that ensure the requirements of the replacement plan (WCA) are met and that the alternative plans meet the intent of the WMP. These alternatives will be developed on a case-by-case basis and at the discretion of the City.

XI. Replacement Wetland Construction Certification and Wetland Monitoring

All replacement wetlands must be certified by the City of Rosemount, as per MnRule 8420.0800, prior to the start of the wetland monitoring period. Wetland monitoring is required by the applicant for replacement wetlands for a period of five years, or as required as per MnRule 8420, as amended. City staff coordinates the monitoring for all wetland replacement within the City of Rosemount. Monitoring includes actively managing the replacement site to ensure that vegetation is becoming established, erosion problem areas are stabilized, hydrology criteria are being met, and any other activities to ensure the wetland replacement goals are met. The monitoring requirements as per MnRule 8420.0810, as amended, are included by reference in this Plan.

Performance standards for replacement wetlands will be evaluated on a per-project basis by the City based on the performance standards outlined in MR 8420.0528. Replacement Plan Applications must contain a vegetation establishment and management plan for all wetland replacement sites. The establishment and management plan must include performance standards for vegetation establishment that ensure the dominance of native wetland species appropriate for the landscape conditions of the replacement site. The City, at its discretion, may require performance standards that differ from the applicant's plan if the City determines the applicant's plan does not meet the intent of the WMP, the WCA, or may not adequately replace the lost functions and values of the wetland that is proposed to be impacted.

For projects that require wetland buffer establishment, a buffer vegetation establishment and management plan must be submitted for review and approval by the City. The buffer will need to meet the City's performance standards. Information about what needs to be included in this plan and the performance standards are in included in **Appendix E.**

In accordance with MnRule 8420.0522, Subp. 9, a financial assurance, in an amount and from a source acceptable to the City of Rosemount, is required with the Subdivision or Development Agreement to ensure the proper establishment of the mitigation site(s). One fifth of the financial assurance shall be returned to the developer after City approval of each yearly monitoring report showing satisfactory vegetation establishment. The final retained amount of the assurance will be returned upon issuance of the Certificate of Compliance indicating successful replacement of wetland functions and values and fulfillment of any and all conditions of the approved wetland replacement plan. The applicant must request the final review of the replacement and demonstrate that the replacement site(s) are eligible for receipt of the Certification of Compliance.

XII. New Wetlands

"New wetlands" include wetlands deliberately created where none existed at the time this plan was adopted. This might include wetlands created as part of a wetland mitigation/creation project or as a result of blocked drainage patterns. Wet areas created by human activity ("incidental wetlands") as specified in MnRules 8420.0105 not intended to produce wetland shall not become part of this plan.

Because newly created wetlands take time to develop into functioning wetlands, the functional assessment, if done immediately, would not provide a reasonable indicator of the quality of the wetland as intended. Rather, a functional based categorization should be undertaken when the wetland has reached the fully developed functionality intended. Normally it could take 5-10 years for a created wetland to become established. A full functional assessment will be done 5 years after its creation and scores stored in the wetlands database. Upon review of the new wetland's progress and score, the City Engineer will place it in the category appropriate to the score. The City Engineer may place a created wetland in any category that is appropriate before the functionality has reached the level required by this plan.

XIII. Other Programs

A. Wetland Health Evaluation Program

The Dakota County Wetland Health Evaluation Program (WHEP) is a joint research and educational project sponsored by the Dakota County Environmental Education Program, Dakota County Soil and Water Conservation District, the Minnesota Pollution Agency, and the Cities of Dakota County. The goals of the program are to provide meaningful data on wetland health to local governments, foster public awareness of wetland value and health, and create positive partnerships between citizens and their local government in addressing natural resource issues.

Rosemount has participated in the program since 1998 and has had much success in doing so. The project provides City Staff with technical data on monitored City wetlands and it offers a great opportunity for public involvement. WHEP has attracted national and local attention for its innovative and unique approach to addressing wetland health.

When feasible and appropriate, wetland replacement sites may be chosen to be monitored by WHEP. The results of the monitoring program can be incorporated into the overall determination of whether the wetland replacement site successfully replaced the lost functions and values of an impacted wetland. The data and trends gathered from the WHEP program for a replacement site can be incorporated into the mitigation monitoring reports; however, the WHEP data cannot be used as a substitute for the mitigation monitoring reports as per MnRule 8420.

B. Department of Natural Resources – Greenway Project

The Northern Dakota County Greenway Project has identified quality natural areas, prioritized restoration efforts, and will empower landowners to create a viable suburban greenway corridor in northern Dakota County. Detailed natural resource inventories show multiple potential green corridors that can provide a natural, ecological connection between Lilydale Regional Park, Eagan's Lebanon Hills, Dodge Nature Center in Sunfish Lake and West Saint Paul, Marcott Lakes in Inver Grove Heights, and the Pine Bend Bluffs on the Mississippi River. These green corridors can provide tremendous wildlife habitat and create a green pathway across the county. A map of the greenway corridor can be found on Dakota County's website**.**

C. CAMP – Citizen Assisted Monitoring Program

The Citizen-Assisted Monitoring Program (CAMP) is a Metropolitan Council of Environmental Services (MCES) managed program where citizen volunteers monitor the water quality of local surface waters. On a biweekly basis (April-October), City volunteer groups collect a surface water sample for laboratory analysis of total phosphorus, total Kjeldahl nitrogen, and chlorophyll-a; obtains a Secchi transparency measurement; and provides some user perception information about the lake's physical and recreational condition. The main purpose of CAMP is to provide water resource personnel with water quality information that will not only help them properly manage these resources, but will also help document water quality impacts and trends. An added benefit of the program is the volunteers' increased awareness of their lakes' condition,

which has fostered local efforts to protect lakes and promote support for lake management.

At this time, the City of Rosemount does not participate in this program. In the future, the City Staff will review the costs and benefits of the program and determine if the City's involvement in this program will be beneficial.

Appendix A – Wetland Map and Assessment Results

Wetland Map and Assessment Results

Wetland ID	Management Classification	Circular 39 Type	DNR No	VEG	WQ	WILD	FLOOD	SHORE	GW	ED/ REC	COM	TOTAL
5	NFV		19-5P									
12	M2	5		25	70	65	90	0	20	95	0	365
13	M2	2		25	70	50	75	0	20	40	0	280
14	P	3		100	90	60	100	0	20	65	0	435
15	M2	3		100	70	45	70	0	20	70	0	375
16	NFV											
17	P	5	185W	100	105	95	95	30	20	145	0	590
18	M2	4		25	90	50	100	0	20	125	0	410
20	P	5	183W	100	90	90	100	30	20	140	0	570
21	P	5	184W	100	120	80	95	30	20	150	0	595
22	P	4		100	90	60	100	0	20	80	0	450
23	P	3		100	70	75	90	0	20	70	0	425
24	M2	4	311W	25	90	20	100	0	20	60	0	315
26	M2	4		100	50	50	85	0	20	50	0	355
27	M3	2		25	70	20	75	0	20	65	0	275
28	P	5	185W	100	100	95	85	30	20	130	0	560
29	P	4		100	70	75	90	0	20	70	0	425
30	M2	6		100	55	80	75	0	20	70	0	400
31	M1	4		100	55	60	90	0	20	60	0	385
32	M2	3		100	70	60	75	0	20	60	0	385
33	P	4	311W	100	85	75	85	0	20	95	0	460
34	NFV											
35	M3	3		25	70	20	75	0	20	15	0	225
36	M3	3		25	70	20	75	0	20	65	0	275
37	M2	3		100	70	60	75	0	20	65	0	390
38	NFV											
40	M3	4		25	85	25	85	0	20	35	0	275
43	M2	3		25	90	20	85	0	20	55	0	295
44	NFV											
46	P	5	185W	100	85	75	95	40	20	80	0	495
48	P	4		100	70	70	85	0	20	80	0	425
49	M3	5		25	70	50	90	0	20	20	0	275
51	NFV											
52	M2	3		25	70	65	75	0	20	70	0	325
53	M2	3		25	70	35	90	0	20	65	0	305
54	M2	2		25	100	50	85	0	20	60	0	340

NFV: Not Field Verified P: Preserve M1: Manage 1 M2:Manage 2 M3:Manage 3

Wetland ID	Management Classification	Circular 39 Type	DNR No	VEG	WQ	WILD	FLOOD	SHORE	GW	ED/ REC	COM	TOTAL
56	M2	3		25	70	60	75	0	20	30	0	280
57	M3	2		25	70	50	75	0	20	35	0	275
61	M1	3	182W	50	100	35	85	0	20	80	0	370
62	M2	1		25	85	60	70	0	20	30	0	290
63	P	4		100	50	95	80	0	60	45	0	430
65	M2	3		100	70	50	80	0	40	45	0	385
69	M1	3		100	70	75	75	0	20	65	0	405
70	P	5	187W	100	85	75	100	0	20	125	0	505
71	M2	3		25	70	50	90	0	20	85	0	340
73	M2	2		25	100	50	80	0	20	35	0	310
74	M1	3		100	70	75	75	0	20	65	0	405
75	M2	3		0	70	65	90	0	20	35	0	280
79	P	4		100	85	90	70	0	20	70	0	435
80	M2	4		100	70	30	75	0	20	70	0	365
81	M3	2		25	70	20	75	0	20	55	0	265
83	M2	3		25	70	35	75	0	20	65	0	290
85	P	5	221W	100	85	90	85	0	20	100	0	480
86	M1	4	312W	100	85	60	85	0	20	70	0	420
87	M2	1		100	85	75	70	0	20	55	0	405
88	M1	3		100	70	75	75	0	20	65	0	405
90	NFV											
92	NFV											
95	M1	1		100	70	80	75	0	20	65	0	410
96	P	5		200	70	100	90	0	20	80	0	560
97	P	4	185W	100	100	75	90	30	20	45	0	460
98	M2	3		25	100	50	90	0	20	45	0	330
100	M2	3		25	85	50	85	0	20	100	0	365
102	M3	2		25	55	35	75	0	20	65	0	275
107	NFV											
109	M2	5	186W	25	70	50	95	0	20	40	0	300
110	M2	4		25	100	65	70	0	20	75	0	355
112	M2	5		25	70	50	100	0	20	40	0	305
118	M2	5		25	100	60	95	0	20	120	0	420
119	M2	4		25	70	80	90	0	20	70	0	355
120	M2	4		100	100	60	75	0	20	40	0	395
121	M2	4		100	70	45	75	0	20	75	0	385
124	P	5	316W	200	105	105	100	30	20	100	0	660
127	M2	4		25	100	50	80	0	20	60	0	335
128	M2	4		25	85	40	75	0	20	35	0	280

Wetland ID	Management Classification	Circular 39 Type	DNR No	VEG	WQ	WILD	FLOOD	SHORE	GW	ED/ REC	COM	TOTAL
129	M2	3		25	70	65	90	0	20	70	0	340
132	P	4		100	85	80	85	0	20	70	0	440
136	M2	3		25	85	35	75	0	20	40	0	280
138	M2	4		25	70	50	90	0	20	45	0	300
139	M3	3		25	70	20	75	0	20	55	0	265
140	M2	4		100	85	50	80	0	40	45	0	400
142	P	3		100	90	60	100	0	20	75	0	445
143	M3	2		0	80	50	60	0	0	5	0	195
146	M2	4		25	70	35	75	0	20	60	0	285
148	M3	3		25	70	20	75	0	20	50	0	260
149	M3	4		25	65	50	80	0	20	35	0	275
150	P	3		100	85	75	70	0	20	75	0	425
152	P	5	008W	100	90	90	110	30	20	110	0	550
154	M2	4		25	85	50	75	0	20	80	0	335
156	M3	4		25	55	50	75	0	20	0	0	225
157	M2	3		100	85	75	70	0	20	70	0	420
159	M1	3	220W	25	90	20	100	0	20	85	0	340
165	M2	2		25	55	40	90	0	20	65	0	295
167	M3	3		0	70	50	80	0	20	25	0	245
168	M2	5		25	105	50	105	0	20	70	0	375
169	M2	4		100	70	60	75	0	20	70	0	395
173	M1	5		100	90	35	105	0	20	45	0	395
176	M1	4		25	70	80	90	0	20	65	0	350
177	M3	2		0	55	35	75	0	20	40	0	225
180	P	3		100	90	75	100	0	20	70	0	455
182	P	4		100	90	45	100	0	20	80	0	435
183	M2	4		25	90	50	100	0	20	40	0	325
185	P	4		100	70	90	75	0	20	75	0	430
187	M2	3		100	70	30	75	0	20	65	0	360
188	M2	3		100	85	45	75	0	20	65	0	390
190	M2	3		25	90	50	75	0	20	55	0	315
191	P	4		100	85	90	85	0	20	70	0	450
192	M2	4		25	90	20	100	0	20	45	0	300
193	M1	5	008W	25	90	95	80	0	20	75	0	385
194	M2	4		25	90	20	75	0	20	55	0	285
196	M2	4		25	90	20	75	0	20	65	0	295
199	M2	3		25	70	20	90	0	20	70	0	295
200	M2	3		25	70	20	100	0	20	50	0	285
202	M2	3		25	70	20	90	0	20	65	0	290

Wetland ID	Management Classification	Circular 39 Type	DNR No	VEG	WQ	WILD	FLOOD	SHORE	GW	ED/ REC	COM	TOTAL
203	M2	3		25	70	50	75	0	20	60	0	300
204	M1	3	220W	25	90	35	100	0	20	80	0	350
206	P	3		100	90	55	85	0	20	80	0	430
207	M2	3		100	70	45	75	0	20	90	0	400
209	M2	2		25	100	50	70	0	20	65	0	330
210	M3	1		0	40	25	70	0	40	30	0	205
211	M2	2		100	70	75	75	0	20	65	0	405
212	M2	2		25	70	50	75	0	20	70	0	310
214	M2	3		100	70	75	70	0	20	75	0	410
216	M2	1		25	40	70	55	0	60	30	0	280
217	M2	2		25	70	50	70	0	20	60	0	295
219	M2	2		25	70	65	75	0	20	70	0	325
220	P	2		100	105	75	85	0	20	65	0	450
224	P	5	222W	100	105	60	95	20	20	80	0	480
225	M2	3		25	70	20	75	0	20	75	0	285
226	M2	3		25	70	50	75	0	20	60	0	300
227	M2	3		25	70	50	75	0	20	45	0	285
230	M3	1		25	55	55	75	0	20	30	0	260
232	M3	5		25	55	50	75	0	20	30	0	255
233	M3	2		25	55	50	75	0	20	45	0	270
234	M2	1		25	70	70	75	0	20	60	0	320
235	M2	1		25	90	40	85	0	20	65	0	325
238	P	4	219W	100	70	90	90	0	20	90	0	460
239	M2	1		25	55	70	90	0	20	70	0	330
246	M2	1		25	70	55	75	0	20	60	0	305
247	M2	2		25	55	50	75	0	20	60	0	285
248	M2	3		100	70	80	75	0	20	70	0	415
251	M3	2		25	55	50	75	0	20	45	0	270
252	M3	2		0	55	25	55	0	60	10	0	205
253	M2	4		25	85	65	70	0	20	75	0	340
254	M2	3		25	70	35	75	0	20	65	0	290
255	M2	3		100	70	20	75	0	20	50	0	335
258	P	3		100	90	60	100	0	20	90	0	460
259	M2	4		25	70	65	75	0	20	70	0	325
260	P	3		100	105	45	85	0	20	85	0	440
262	NFV											
263	M2	3		25	105	65	70	0	20	70	0	355
265	M2	4		25	105	20	100	0	20	75	0	345
266	P	4		100	85	90	90	0	20	60	0	445

Wetland ID	Management Classification	Circular 39 Type	DNR No	VEG	WQ	WILD	FLOOD	SHORE	GW	ED/ REC	COM	TOTAL
268	M1	3		100	70	75	75	0	20	70	0	410
273	M2	2		25	70	50	75	0	20	45	0	285
275	P	3		100	70	90	90	0	20	80	0	450
276	NFV											
277	M2	4		25	70	65	75	0	20	60	0	315
278	P	3		100	90	75	100	0	20	85	0	470
279	P	4	223W	100	85	90	85	0	20	95	0	475
282	M2	4		25	70	50	75	0	20	55	0	295
283	P	3		100	70	75	90	0	20	75	0	430
284	P	5	317W	100	90	45	100	0	20	110	0	465
285	NFV											
286	M3	1		0	40	55	75	0	20	60	0	250
287	P	5	320W	100	70	105	90	0	20	75	0	460
288	M1	5	318W	25	90	35	100	0	20	95	0	365
289	M2	2		25	70	20	75	0	20	75	0	285
290	M2	5		25	105	35	100	0	20	85	0	370
293	M2	4		25	90	80	90	0	20	60	0	365
294	M2	4		100	70	75	75	0	20	65	0	405
295	M2	2		25	70	65	90	0	20	65	0	335
296	M1	3		25	90	35	100	0	20	65	0	335
298	M2	3		25	90	20	85	0	20	80	0	320
299	M2	3		100	70	60	75	0	20	70	0	395
300	M1	3	320W	100	85	75	70	0	20	60	0	410
302	P	4		100	70	90	90	0	20	75	0	445
303	NFV											
304	NFV											
305	P	4		100	120	35	105	0	20	60	0	440
306	P	4		100	70	90	75	0	20	70	0	425
307	M1	3		25	115	65	95	0	20	50	0	370
309	P	3		100	135	25	115	0	20	100	0	495
310	P	5	011P	100	105	75	110	50	20	120	0	580
313	P	3		100	115	75	80	0	20	50	0	440
314	P	3		100	150	40	125	0	20	80	0	515
315	M2	2		25	70	80	75	0	20	65	0	335
316	P	3		100	115	90	80	0	40	90	0	515
319	M2	4		25	105	35	80	0	20	45	0	310
320	P	5	322W	100	120	90	105	0	20	90	0	525
321	M2	3		25	70	80	75	0	20	80	0	350
322	P	2		100	70	90	75	0	20	80	0	435

Wetland ID	Management Classification	Circular 39 Type	DNR No	VEG	WQ	WILD	FLOOD	SHORE	GW	ED/ REC	COM	TOTAL
323	M2	2		25	70	55	70	0	20	65	0	305
324	M2	3		25	115	40	120	0	20	50	0	370
325	P	3		200	50	120	90	0	20	75	0	555
326	M2	3		25	70	65	75	0	20	50	0	305
330	P	4		100	70	75	90	0	20	80	0	435
331	M2	2		25	70	70	75	0	20	80	0	340
332	P	5		100	100	90	95	0	40	75	0	500
333	M2	2		100	70	65	65	0	20	80	0	400
335	P	4		100	70	90	90	0	20	125	0	495
337	M2	2		25	70	70	90	0	20	75	0	350
338	M2	3		25	70	75	75	0	40	50	0	335
339	M2	4		25	120	25	105	0	20	55	0	350
340	P	4	321W	100	70	80	90	0	20	90	0	450
341	P	3		200	50	120	90	0	20	75	0	555
345	P	5		100	100	90	95	0	40	90	0	515
347	M1	2		25	50	80	75	0	20	120	0	370
348	M2	2	321W	25	70	65	90	0	20	70	0	340
349	M2	5	321W	25	70	80	90	0	20	65	0	350
351	P	4		25	115	105	85	30	0	105	0	465
353	M2	2		25	70	50	75	0	20	70	0	310
355	P	3		200	50	120	90	0	20	75	0	555
356	M2	4		25	135	10	115	0	20	50	0	355
359	P	5		100	120	90	105	0	20	115	0	550
360	M2	3		100	70	90	75	0	20	60	0	415
361	P	3		100	90	45	90	0	20	85	0	430
362	P	4		100	115	90	95	0	20	90	0	510
367	M2	4		25	105	45	95	0	20	60	0	350
368	P	3		100	115	60	80	0	20	65	0	440
369	M2	2		25	70	50	75	0	20	55	0	295
371	M2	2		25	70	65	70	0	20	80	0	330
379	P	5	012W	100	90	90	100	0	20	90	0	490
380	P	5	224W	100	120	75	115	20	20	100	0	550
381	M2	3		25	100	45	70	0	20	65	0	325
382	M2	3		25	70	50	90	0	20	55	0	310
384	M2	3		100	85	45	90	0	20	75	0	415
386	M2	3		25	90	65	75	0	20	85	0	360
389	P	4		100	135	45	100	0	20	80	0	480
390	M2	4		25	90	65	80	0	20	80	0	360
395	P	4		100	120	45	100	0	20	70	0	455

Wetland ID	Management Classification	Circular 39 Type	DNR No	VEG	WQ	WILD	FLOOD	SHORE	GW	ED/ REC	COM	TOTAL
399	M2	2		25	50	60	75	0	20	65	0	295
400	P	5	012W	100	90	90	100	0	20	90	0	490
401	M2	2		25	90	20	85	0	20	75	0	315
404	M2	7		25	70	50	75	0	20	45	0	285
407	M2	2		25	100	45	70	0	20	55	0	315
408	M2	4		100	105	15	105	0	0	50	0	375
411	M3	3		25	70	15	85	0	20	55	0	270
413	M2	4		100	70	50	75	0	20	55	0	370
415	M3	1		25	50	20	100	0	40	5	0	240
417	M3	3		0	40	10	100	0	20	10	0	180
419	M3	2		0	65	50	60	0	20	50	0	245
424	M3	7		25	70	25	75	0	20	55	0	270
425	NJ	4		25	85	20	75	0	20	65	0	290
427	M2	2		25	50	75	90	0	20	65	0	325
428	M3	3		0	65	50	90	0	20	45	0	270
431	P	5	344W	100	120	80	120	0	20	150	0	590
432	M2	3		25	70	70	50	0	60	55	0	330
433	NFV											
434	M2	5		25	120	35	100	0	20	75	0	375
436	M3	3		25	70	20	75	0	20	60	0	270
437	NFV											
438	M1	3		100	90	100	80	0	60	40	0	470
439	NFV											
442	P	5		100	120	45	100	0	20	80	0	465
443	M2	4		25	105	35	105	0	20	115	0	405
445	P	2		100	70	75	70	0	60	80	0	455
448	P	4		100	75	75	100	0	20	70	0	440
450	P	5		100	105	90	95	0	20	145	0	555
452	M2	7		25	50	80	90	0	20	140	0	405
453	P	3		100	70	100	80	0	60	70	0	480
454	M2	5		25	90	45	100	0	20	70	0	350
457	M3	2		25	70	35	65	0	20	35	0	250
461	P	3		100	90	85	80	0	60	70	0	485
462	M1	5		25	90	50	90	0	20	60	0	335
463	P	4		100	105	45	95	0	20	60	0	425
464	M2	1		100	70	80	75	0	20	50	0	395
468	M2	5		0	90	35	90	0	20	65	0	300
469	M2	2		0	70	35	80	0	20	95	0	300
470	M3	1		0	60	40	75	0	60	25	0	260

Wetland ID	Management Classification	Circular 39 Type	DNR No	VEG	WQ	WILD	FLOOD	SHORE	GW	ED/ REC	COM	TOTAL
471	M2	3		100	55	65	70	0	60	55	0	405
473	M2	2		25	100	65	60	0	20	85	0	355
474	M3	2		25	40	25	55	0	60	10	0	215
487	M2	2		25	90	20	95	0	20	60	0	310
489	M2	3		100	90	30	65	0	20	75	0	380
490	M2	4		25	70	80	70	0	60	55	0	360
491	M3	2		0	70	20	80	0	20	45	0	235
492	NFV											
493	M3	4		25	70	35	80	0	20	25	0	255
495	M2	2		25	70	45	80	0	20	50	0	290
496	NFV											
497	M3	1		25	55	40	55	0	60	20	0	255
498	M1	5	345W	25	35	105	80	30	20	80	0	375
499	NFV											
501	NFV											
502	NFV											
503	NFV											
504	M3	1		25	70	40	75	0	20	45	0	275
507	M3	4		0	90	35	90	0	20	25	0	260
508	NFV											
509	M3	2		25	70	20	75	0	20	25	0	235
510	M2	1		25	70	70	80	0	20	45	0	310
511	NFV											
512	M2	1		25	70	70	80	0	20	45	0	310
520	M2	3		25	70	65	70	0	20	65	0	315
521	M2	2		25	70	70	75	0	20	80	0	340
522	M2	2		25	70	55	70	0	20	65	0	305
523	M2	3		25	70	35	75	0	20	70	0	295
524	M2	7		25	70	65	75	0	20	65	0	320
525	M2	2		25	70	50	75	0	20	65	0	305
526	M2	4		25	70	50	75	0	20	55	0	295
527	M2	2		100	70	80	75	0	20	70	0	415
528	M2	2		25	70	75	75	0	20	65	0	330
529	M2	2		0	70	65	75	0	20	65	0	295
530	M2	2		25	70	65	75	0	20	65	0	320
531	M2	2		25	70	65	75	0	20	50	0	305
532	M2	2		25	70	65	75	0	20	50	0	305
533	M2	6		100	70	65	70	0	20	65	0	390
534	M3	1		0	55	55	60	0	0	50	0	220

Wetland ID	Management Classification	Circular 39 Type	DNR No	VEG	WQ	WILD	FLOOD	SHORE	GW	ED/ REC	COM	TOTAL
535	M2	1		25	70	70	75	0	20	60	0	320
536	M2	2		25	70	65	75	0	20	65	0	320
537	M2	1		25	85	70	70	0	20	80	0	350
538	M1	1		100	70	80	70	0	20	65	0	405
539	M1	2		100	55	85	75	0	20	50	0	385
540	M1	2		100	70	75	75	0	20	50	0	390
541	M2	3		25	70	35	70	0	20	110	0	330
546	M2	1		25	65	55	70	0	20	60	0	295
548	M2	2		25	75	25	85	0	20	65	0	295
549	M3	3		25	70	20	75	0	20	65	0	275
550	M1	3		100	100	60	80	0	20	45	0	405
551	M1	3		25	100	65	80	0	20	50	0	340
552	P	7		100	115	80	80	0	20	50	0	445
555	M2	2		25	90	20	85	0	20	60	0	300
556	M2	2		25	75	20	85	0	20	80	0	305
557	M2	1		25	90	55	85	0	20	80	0	355
558	M3	7		25	70	25	70	0	20	55	0	265
559	M2	3		100	70	30	75	0	20	75	0	370
560	M3	1		0	40	25	90	0	20	60	0	235
563	M2	5		25	105	35	100	0	20	70	0	355
564	P	3		100	90	30	100	0	20	125	0	465
565	M2	6		25	90	25	100	0	20	90	0	350
567	M2	3		100	85	75	85	0	20	50	0	415
568	M2	3		25	85	75	70	0	20	50	0	325
569	M2	5		0	90	35	100	0	20	65	0	310
570	M2	3		25	50	65	90	0	20	140	0	390
571	M2	5		25	120	10	120	0	20	110	0	405
572	M2	2		25	100	65	60	0	20	85	0	355
573	M2	2		25	100	65	60	0	20	85	0	355
574	M2	2		25	100	65	60	0	20	85	0	355
575	M3	1		0	40	40	80	0	20	70	0	250
576	M1	4		100	90	30	80	0	20	85	0	405
577	M3	7		25	50	35	80	0	20	50	0	260
578	M2	4		25	90	35	85	0	20	65	0	320
579	M3	1		0	40	25	80	0	20	35	0	200
580	M2	3		25	90	45	85	0	20	80	0	345
581	M2	3		25	70	65	90	0	20	95	0	365
582	M2	1		100	55	80	75	0	20	50	0	380
583	M2	1		100	70	80	70	0	20	50	0	390

Wetland ID	Management Classification	Circular 39 Type	DNR No	VEG	WQ	WILD	FLOOD	SHORE	GW	ED/ REC	COM	TOTAL
584	M2	3		25	70	35	75	0	20	65	0	290
585	M2	2		25	70	65	75	0	20	50	0	305
586	M2	3		25	85	80	75	0	20	50	0	335
587	M2	2		25	55	65	75	0	20	65	0	305
588	M2	2		25	70	65	70	0	20	50	0	300
590	M3	1		25	70	40	60	0	20	50	0	265
591	M3	1		0	40	40	80	0	20	45	0	225
592	M2	1		25	70	70	80	0	20	60	0	325
593	M2	1		25	90	25	70	0	20	60	0	290
594	M3	1		0	40	40	65	0	20	35	0	200
595	M2	5		0	120	35	90	20	20	65	0	350
596	M3	3		0	75	10	70	0	20	50	0	225
597	M3	2		0	105	20	80	0	20	40	0	265
598	M2	1		25	105	25	70	0	20	50	0	295
599	M3	2		0	35	15	95	0	20	5	0	170
600	M2	1		25	90	40	85	0	20	90	0	350
601	M2	7		100	70	80	75	0	20	50	0	395
602	M2	2		25	90	25	80	0	60	45	0	325
603	M2	1		100	80	65	60	0	0	50	0	355
604	M2	1		100	80	65	60	0	0	50	0	355
605	M2	3		25	100	50	80	0	20	45	0	320
606	M3	2		0	70	55	75	0	20	25	0	245
607	M3	2		25	50	50	85	0	20	40	0	270
608	M2	2		25	100	50	80	0	20	15	0	290
609	M3	2		25	55	35	75	0	20	5	0	215
610	M2	3		25	135	50	85	0	20	20	0	335
611	M3	1		100	35	35	80	0	20	5	0	275
612	M2	2		0	120	50	80	0	20	30	0	300
613	M3	3		25	70	20	75	0	20	10	0	220
614	M3	3		25	70	30	75	0	20	25	0	245
615	M2	6		25	55	70	75	0	20	70	0	315
616	M2	5		25	105	35	80	0	20	60	0	325
617	M2	5		25	105	35	85	0	20	60	0	330
618	P	4		100	105	60	85	0	20	85	0	455
619	M2	1		0	105	10	85	0	20	65	0	285
620	P	4		100	90	90	100	0	20	150	0	550
621	M2	4		25	120	20	80	0	20	115	0	380
622	M3	1		0	55	55	70	0	20	30	0	230
623	NFV											

Wetland ID	Management Classification	Circular 39 Type	DNR No	VEG	WQ	WILD	FLOOD	SHORE	GW	ED/ REC	COM	TOTAL
624	M3	1		25	40	40	80	0	20	40	0	245
625	M2	1		25	70	80	60	0	60	35	0	330
626	M2	1		100	70	90	60	0	60	35	0	415
627	M2	2		25	70	75	60	0	60	35	0	325
628	M2	2		100	50	90	65	0	60	55	0	420
629	M2	1		25	55	80	65	0	60	55	0	340
630	M2	1		25	55	80	60	0	60	55	0	335
631	M2	1		25	70	65	65	0	60	35	0	320
632	M2	1		25	50	65	60	0	60	35	0	285
633	M2	2		25	70	80	65	0	60	65	0	365
634	M2	1		25	70	80	65	0	60	35	0	335
635	M2	1		25	70	80	60	0	60	35	0	330
636	M2	2		25	70	80	65	0	60	55	0	355
637	M2	2		25	70	55	60	0	60	55	0	325
638	M2	1		25	70	55	65	0	60	55	0	330
639	M2	1		25	70	55	60	0	60	50	0	320
640	M2	1		25	70	80	65	0	60	35	0	335
641	M3	1		0	70	40	65	0	60	5	0	220
642	M2	1		25	70	80	65	0	60	35	0	335
643	M2	3		25	70	50	65	0	60	35	0	305
644	M2	1		25	70	80	65	0	60	30	0	330
645	M3	2		0	40	25	60	0	60	20	0	205
646	M2	1		25	70	80	65	0	60	35	0	335
647	M3	2		25	55	40	60	0	60	20	0	260
649	M2	1		25	70	30	65	0	60	35	0	285
650	M3	2		0	75	55	65	0	60	20	0	275
651	M2	1		25	70	70	80	0	60	65	0	370
653	M3	2		25	75	25	65	0	60	20	0	270
655	M2	2		25	70	70	50	0	60	40	0	315
656	M2	2		25	70	70	50	0	60	25	0	300
657	M2	2		25	70	80	70	0	60	40	0	345
658	M2	3		25	70	65	80	0	40	30	0	305
660	M3	1		25	50	65	55	0	60	20	0	275
661	M2	2		25	70	65	55	0	60	20	0	295
662	M3	2		0	35	25	55	0	60	10	0	175
663	M2	3		100	50	90	65	0	60	55	0	420
664	M2	1		25	50	80	65	0	60	30	0	310
665	M3	1		0	40	40	50	0	60	20	0	210
666	M3	1		0	40	40	65	0	60	20	0	225

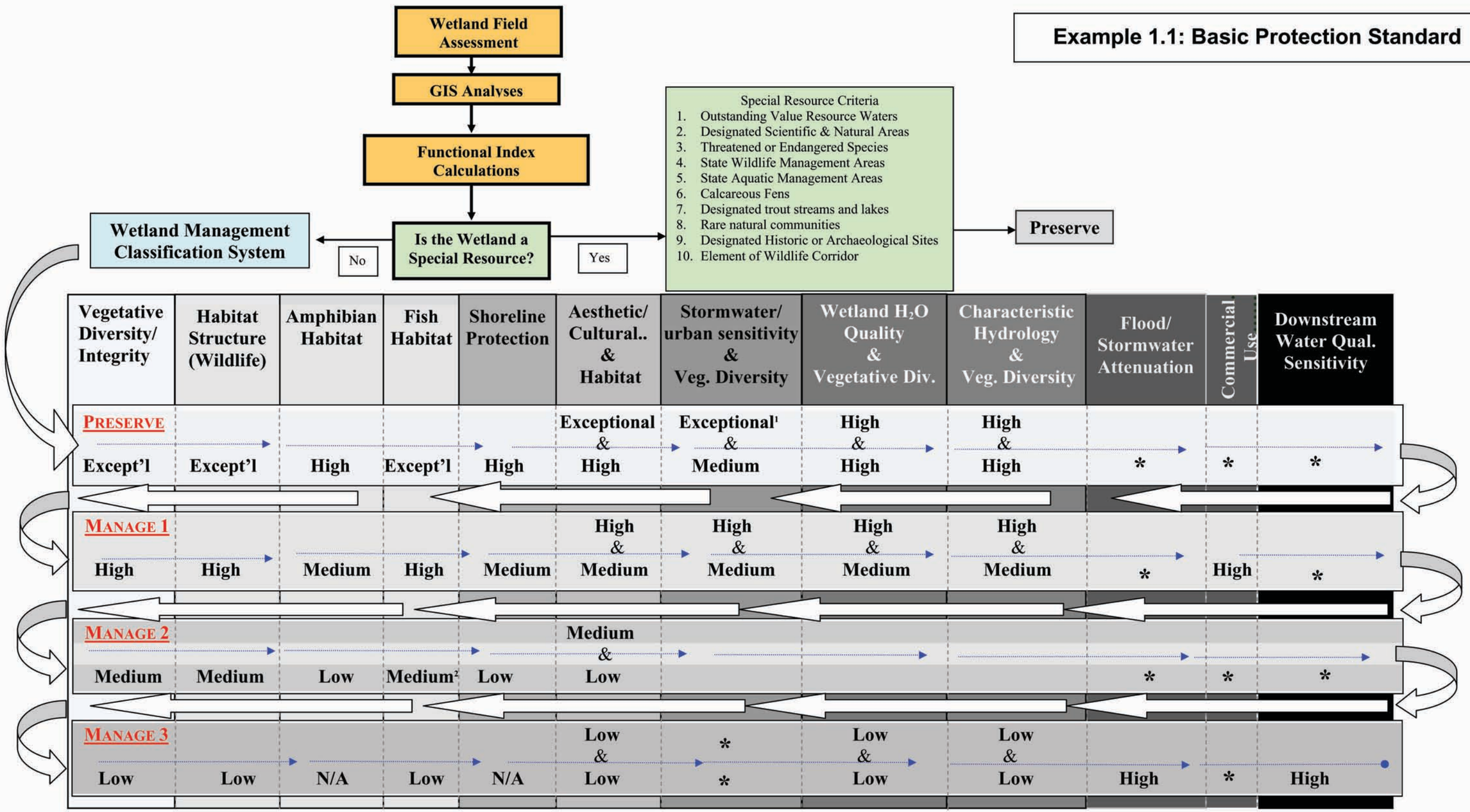
Wetland ID	Management Classification	Circular 39 Type	DNR No	VEG	WQ	WILD	FLOOD	SHORE	GW	ED/ REC	COM	TOTAL
667	M2	1		25	55	55	55	0	60	30	0	280
668	M2	3		25	70	65	55	0	60	20	0	295
669	M3	1		25	55	40	60	0	60	30	0	270
670	M3	1		25	55	40	55	0	60	20	0	255
671	M3	1		0	40	40	65	0	60	20	0	225
672	M3	1		25	55	25	60	0	60	20	0	225
674	M3	1		0	40	25	60	0	60	20	0	205
675	M2	2		25	70	70	80	0	60	55	0	360
676	M2	2		25	70	50	55	0	60	30	0	290
677	M2	3		25	90	35	65	0	60	20	0	295
678	M3	2		25	70	35	55	0	60	30	0	275
679	M2	1		25	60	40	80	0	60	70	0	335
680	M3	3		0	75	10	75	0	80	0	0	240
681	M2	4		25	70	50	75	0	60	5	0	305
682	NJ	2		25	50	40	55	0	60	25	0	255
683	M3	4		0	55	25	80	0	60	25	0	245
684	M3	2		0	40	25	60	0	60	25	0	210
685	M2	1		25	70	40	55	0	60	35	0	285
686	NFV											
687	NFV											
688	NFV											
689	NFV											
690	NFV											
691	NFV											
692	NFV											
693	NFV											
694	NFV											
695	M2	3		25	70	80	55	0	60	40	0	330

Appendix B – MnRAM

Figure 6
Wetland Management Classification Process Flowchart

Each wetland will be ranked into a Wetland Management group by the highest rated function for the wetland.
Follow the arrows to progress through the tables and classify wetlands into the first group that applies.

Example 1.1: Basic Protection Standard



[1] For types as shown in Table 1-2. * This rating does not apply here.

(Issued 9/15/10)

MnRAM 3.4

FOR EVALUATING WETLAND FUNCTIONS

MnRAM 3.4 is designed to help assess functions and values associated with Minnesota wetlands. The Comprehensive Guidance document (available at www.bwsr.state.mn.us) contains explanations, references, definitions, and a ranking formula for each function. After using this tool, the Management Classification Reference will help to organize the results for managing local wetland resources.

GENERAL INFORMATION:

Project Number or Name:		Wetland Number:	
Location: County;	Section; ,	Township	Range
Major Watershed:	Subwatershed:		City:
Evaluator(s):			Date of Site Visit:

SCOPE AND LIMITATIONS:

1. Note unusual climatic conditions experienced during this assessment due to seasonal considerations and/or unusual existing hydrologic and climatologic conditions:
2. Describe the **purpose** of this assessment: inventory/planning/monitoring/regulatory/classification_____

SUMMARY TABLE

ACTUAL CONDITIONS	FUNCTIONAL INDEX*		
FUNCTIONS (and Related Values)	N/A	Functional Index Score	Comments
Vegetative Diversity/Integrity** Plant Comm. #1			
Plant Comm. #2			
Plant Comm. #3			
Maintenance of Characteristic Hydrologic Regime			
Flood/Stormwater/Attenuation			
Downstream Water Quality			
Maintenance of Wetland Water Quality			
Shoreline Protection			
Maintenance of Characteristic Wildlife Habitat Structure			
Maintenance of Characteristic Fish Habitat			
Maintenance of Characteristic Amphibian Habitat			
Aesthetics/Recreation/Education/Cultural			
Commercial Uses			
Groundwater Interaction			
Additional Information			
Wetland Restoration Potential			
Sensitivity to Stormwater and Urban Development			
Additional Stormwater Treatment Needs			

*The functional index may be calculated manually using formulas in the Comprehensive Guidance.

**If more than 3 plant communities are present, use an additional summary table.

FUNCTIONAL ASSESSMENT - **Special Features**

Is the wetland part of, or directly adjacent to, an area of special natural resource interest?
Check those that apply:

a. ____ Designated trout streams or trout lakes (For Minnesota, see MnDNR Commissioners Order 2450 Part 6262.0400 subparts 3 and 5) (*if yes, Fish Habitat Rating is Exceptional*).

b. ____ Calcareous fen (Special Status— For Minnesota, see MN Rule Chapter 7050) *(if yes, Vegetative Diversity/Integrity functional rating is Exceptional). Consult DNR for regulatory purposes.*

c. ____ DNR designated scientific and natural area (*if yes, then Aesthetics/Recreation/Education/ Cultural functional rating is Exceptional).*

d. ____ Rare natural community. Defined as: a wetland native plant community having a state element rank of S1, S2, or S3[1] that is mapped or determined to be eligible for mapping in the Natural Heritage Information System (NHIS) maintained by the Minnesota Department of Natural Resources OR a wetland native plant community contained within an area mapped or determined to be eligible for mapping in the NHIS as a Site of Outstanding or High Biological Diversity.[2] *If present, then the ratings for Vegetative Diversity/Integrity and Wildlife Habitat are Exceptional (see MnRAM question 5). For Minnesota, refer to Minn. Rule Ch. 8420.0548, Subp. 3. This answer automatically makes the answer to #5 = "Yes."*

e. ____ High priority wetland, environmentally sensitive area or environmental corridor identified in a local water management plan.

f. ____ Public park, forest, trail or recreation area.

g. ____ State or Federal fish and wildlife refuges and fish and wildlife management areas, and water fowl protection areas *(if yes, then Wildlife and/or Fish Habitat functional rating is Exceptional).*

h. ____ Archeological or historic site as designated by the State Historic Preservation Office *(if yes, then Aesthetics/Recreation/Education/Cultural functional rating is Exceptional).*

i. Plant species: naturally occurring, persistent populations that are[3]:
   Federally listed: ____ Endangered ____ Threatened
   State listed: ____ Endangered ____ Threatened (In Minnesota, see Minn. Rule Ch. 8420.0548, Subp. 2)
   Species of special concern: _____
   List the species: _____ .

If yes, then question 35 is yes, then the Vegetative Diversity/Integrity functional rating is Exceptional. This answer automatically makes the answer to #4 = "Yes."

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[1] State element ranks are assigned to all native plant communities in the state based on their extent and status as follows: S1 = critically imperiled in the state due to extreme rarity; S2 = imperiled in the state due to rarity; S3 = rare or uncommon in the state; S4 = apparently secure in the state; S5 = demonstrably secure in the state. For information on state element ranks for specific native plant communities, contact the DNR at 651-259-5125 or 651-259-5109 or email Ecoservices@dnr.state.mn.us and put "Wetlands/NHIS" in the subject line.

[2] Information on the NHIS and how to obtain NHIS reports for a specific location is available at: http://www.dnr.state.mn.us/ecological_services/nhnrp/nhis.html .

[3] Information on known occurrences of listed plant species is available from the NHIS. See footnote 2.

j. **Wildlife species** in or using the wetland that are[4]:
Federally listed:____ Endangered ____ Threatened
State listed: ____ Endangered ____ Threatened (In Minnesota, see Minn. Rule Ch. 8420.0548, Subp. 2)
Species of special concern: _____
List the species: _____ .

If present, then the Wildlife Habitat functional rating is Exceptional.

k. ____ Local Shoreland Management Plan area.
l. ____ State Coastal Zone or Shoreland Management Plan area.
m. ____ Shoreland area identified in a zoning ordinance (generally within 1000 feet from a water basin and 300 feet from a watercourse).
n. ____ Floodplain area identified in a zoning ordinance or map.
o. ____ Wetland restored or preserved under a conservation easement.
p. ____ Wetland restored or created for mitigation purposes.
q. ____ Designated Wellhead or Sourcewater Protection Area *(if yes and Ground Water Interaction is Recharge, then Ground Water functional index is Exceptional).*
r. ____ Sensitive ground-water area *(if yes and Ground Water Interaction is Recharge, then Ground Water functional index is Exceptional).*
s. ____ State or Federal designated wild and scenic river (In Minnesota, see MN Rule Chapter 7050).
t. ____ Federally identified special area management plan, special wetland inventory study, or an advanced delineation and identification study.
u. ____ State or Federal designated wilderness area (*if yes, then Aesthetics/Recreation/Education/ Cultural functional rating is Exceptional).*

[4] Information on known occurrences of listed animal species is available from the NHIS. See footnote 2

Vegetative Diversity and Integrity

1. **Go to upper canopy to key out wetland plant community(-ities) within the evaluation area using the following key[5].** Evaluate only each contiguous type that comprises at least 10% of the vegetated wetland area; the exception is a shallow, open water community in which any fringe emergent communities must be evaluated. Be sure to sample shallow, open water areas for submergent vegetation. Enter in page one of field data form, MnRAM database second tab, or the manual-use summary table located in the Guidance.

Wetland Community Classification Key

1A. Mature trees (dbh of 6 inches or more) are present and form closed stands (more than 17 trees per acre; more than a 50 percent canopy cover) on wet, lowland soils (usually floodplains and ancient lake basins).

2A. Hardwood trees are dominant (>50% areal coverage or basal area of the tree stratum); usually alluvial, peaty/mucky, or poorly drained mineral soils.

3A. Silver maple, American elm, river birch, green ash, black willow, box elder and/or eastern cottonwood are dominant; growing on alluvial soils associated with riverine systems……..…… **FLOODPLAIN FOREST** (Type 1); (PFO; 1,6; A)

3B. Black ash, green ash, American elm, eastern cottonwood, black willow, box elder, yellow birch, silver maple, quaking aspen and/or red maple are dominant; northern white cedar may be subdominant; growing on poorly-drained mineral or peat/muck soils, often associated with ancient lake basins…….. **HARDWOOD SWAMP** (Type 7); (PFO;1, 6; A, B, C)

2B. Coniferous trees are dominant (>50% areal coverage or basal area of the tree stratum); soils usually peaty.

4A. Tamarack and/or black spruce are dominant; growing on a continuous sphagnum moss mat and acid, peat soils……...**CONIFEROUS BOG** (Type 8); (PFO; 2, 4, 6, 7; B)

4B. Northern white cedar and/or tamarack are dominant; continuous sphagnum moss mat absent; usually growing on neutral to alkaline peat/muck soils.…….**CONIFEROUS SWAMP** (Type 7); (PFO;2, 4, 6, 7; B, C)

1B. Mature trees are absent or, if present, form open, sparse stands; other woody plants, if present, are shrubs or saplings and pole-size trees (dbh less than 6 inches) less than 20 feet high and growing on wet, lowland, or poorly-drained soils, or in ground-water seepage areas.

5A. Community dominated (>50% areal coverage) by woody shrubs.

[5] Refer to Pages 19 - 22 of *"Wetland Plants and Plant Communities of MN and WI";* (USACOE - St. Paul District; Eggers and Reed).

6A. Low, woody shrubs usually less than 3 feet high; sphagnum moss mat layer may or may not be present.

7A. Shrubs are ericaceous and evergreen growing on a sphagnum moss mat layer; peat soils are acidic……..**OPEN BOG**
(Type 8); (PSS;2, 3, 4, 7; B)

7B. Shrubs are deciduous, mostly shrubby cinquefoil, often growing on sloping sites with a spring-fed supply of internally flowing, calcareous waters; other calciphiles are also dominant; sphagnum moss mat layer absent; muck/poorly-drained mineral soils are alkaline…….**CALCAREOUS FEN**
(Type 2/6), (PEM/PSS;1; B)

6B. Tall, woody deciduous shrubs usually greater than 3 feet high; sphagnum moss mat layer absent: SHRUB SWAMPS**.**

8A. Speckled alder is dominant; usually on acidic soils in and north of the vegetation tension zone (a map of the tension zone is on page 9 of Eggers and Reed [1997]). ……**ALDER THICKET**
(Type 6); (PSS;1, 6; B, C)

8B. Willows, red-osier dogwood, silky dogwood, meadowsweet and/or steeplebush are dominant on neutral to alkaline poorly drained muck/mineral soils; found north and south of the vegetation tension zone. NOTE: Non-native buckthorns (*Rhamnus cathartica* and *R. frangula*) may occur as dominant shrubs or small trees in disturbed shrub-carrs. ……**SHRUB-CARR**
(Type 6); (PSS;1, 6; B, C)

5B. Community dominated (>50% areal coverage) by herbaceous plants.

9A. Essentially closed communities, usually with more than 50 percent cover.

10A. Sphagnum moss mat on acid peat soils; leatherleaf, pitcher plants, certain sedges, and other herbaceous species tolerant of low nutrient conditions may be present. ……..**OPEN BOG**
(Type 8); (PSS; 2, 3, 4, 7; B; and PML; 1; B)

10B. Sphagnum moss mat absent; dominant vegetation consists of sedges (Cyperaceae), grasses (Gramineae), cattails, giant bur-reed, arrowheads, forbs and/or calciphiles. Soils are usually neutral to alkaline, poorly-drained mineral soils and mucks.

11A. Over 50 percent of the cover dominance contributed by the sedge family, cattails, giant bur-reed, arrowheads, wild rice, and/or giant reed grass (*Phragmites*).

12A. Herbaceous emergent plants growing on saturated soils to areas

covered by standing water up to 6 inches in depth throughout most of the growing season.

13A. Major cover dominance by the sedges (primarily genus *Carex*) typically on saturated soils with, at most, short periods of inundation. Canada blue-joint grass may be a subdominant. Lake sedges (*Carex lacustris*, *C. utriculata*) and slough sedge (*Carex atherodes*) can also be dominants in shallow marshes – see 13B. below……...……**SEDGE MEADOW**
(Type 2), (PEM; 1; B)

13B. Major cover dominance by cattails, bulrushes, water plantain, *Phragmites*, arrowheads, slough sedge and/or lake sedges typically on soils that are inundated by up to 6 inches of water depth for a significant portion of most growing seasons…….
……..…….**SHALLOW MARSH**
(Type 3); (PEM; 1, 2; C)

12B. Herbaceous submergent, floating-leaved, floating and emergent plants growing in areas covered by standing water greater than 6 inches in depth throughout most of the growing season.…….**DEEP MARSH**
(Type 4); (PEM; 1, 2; F, G, H; and PAB; 2, 4, 5; F, G; and PUB; F, G; and L2EM2; F, G; and L2AB; 2, 4, 5; F, G)

11B. Over 50 percent of the cover dominance contributed by grasses (except wild rice and *Phragmites*), forbs and/or calciphiles.

14A. Spring-fed supply of internally flowing, calcareous waters, often sloping sites; calciphiles such as sterile sedge, wild timothy, Grass-of-Parnassus and lesser fringed gentian are dominant.…**CALCAREOUS FEN**
(Type 2); (PEM; 1; B)

14B. Water source(s) variable; calciphiles not dominant.

15A. Dominated by native prairie grasses (e.g., big bluestem, prairie cordgrass, Canada blue-joint grass) usually with characteristic wet prairie forbs (e.g., Riddell's goldenrod, gayfeather, mountain mint)…
……...…….……...…….……**WET TO WET- MESIC PRAIRIE**
(Type 2); (PEM; 1; A, B)

15B. Dominated by other grass species (e.g., reed canary grass, redtop) and/or generalist forbs (e.g., giant goldenrod, giant sunflower, swamp aster, marsh aster, wild mint)……...
……..……...**FRESH (WET) MEADOW**
(Type 2); (PEM; 1; B)

9B. Essentially open communities, either flats or basins usually with less than 50

percent vegetative cover during the early portion of the growing season, or shallow open water with submergent, floating and/or floating-leaved aquatic vegetation.

16A. Areas of shallow, open water (< 6.6 feet in depth) dominated by submergent, floating and/or floating-leaved aquatic vegetation ……. ……. ……**SHALLOW, OPEN WATER COMMUNITIES** (Type 5); (PAB; 2, 4, 5; G, H; and PUB; G, H; and L2EM; 2; G, H; and L2AB; 2, 4, 5; G, H)

16B. Shallow depressions or flats including vernal pools; standing water may be present for a few weeks each year, but are dry for much of the growing season; often cultivated or dominated by annuals such as smartweeds and wild millet; when not cultivated, perennial vegetation may be present (see Table 4 on page 15)……...……**SEASONALLY FLOODED BASIN** (Type 1); (PEM; A)

2. **Utilizing the "50/20 Rule" identify the dominant species within each plant community and which ones are non-native or invasive and the cover class of each species present.** Use species list found on the MnDNR website[6] that includes non-native status and use the following six cover classes[7]: *Note: Cover Class 1 and 2 are for use with invasive species only.*

Cover Class	Class Range
1	0 – 3%
2	>3 – <10%
3	>10 –25%
4	>25 –50%
5	>50 –75%
6	>75 – 100%

Table 1: Partial List of Invasive Species[8]

Scientific Name	Common Name	Scientific Name	Common Name
Acer negundo	Box elder	*Myriophyllum spicatum*	Eurasian water milfoil
Alliaria petiolata	Garlic mustard	*Pastinaca sativa*	Wild parsnip
Berteroa incana	Hoary alyssum	*Phalaris arundinacea*	Reed canary grass
Bromus inermis	Smooth brome grass	*Phragmites australis*	Common reed grass
Butomus umbellatus	Flowering rush	*Potamogeton crispus*	Curly leaf pondweed
Cirsium arvense	Canada thistle	*Rhamnus cathartica*	Common buckthorn
Cirsium vulgare	Bull thistle	*Rhamnus frangula*	Glossy buckthorn
Euphorbia esula	Leafy spurge	*Sonchus arvensis*	Sow thistle
Glechoma hederacea	Creeping charlie, ground ivy	*Trapa natans*	Water chestnut

[6] www.dnr.state.mn.us
[7] Adapted from Kuchler, A.W.
[8] See MnRAM **3.1** database for a list of invasive/non-native plant species referenced from the MnDNR.

Hydrilla verticillata	Hydrilla	*Typha angustifolia*	Narrow leaved cattail
Hydrocharis morsus-ranae	European frog-bit	*Ulmus pumila*	Siberian elm
Iris pseudacorus	Yellow iris	*Urtica dioica*	Stinging nettle
Lonicera x *bella*	Honeysuckle	*Vicia cracca*	Cow vetch
Lotus corniculatus	Birdsfoot trefoil	*Vicia villosa*	Hairy vetch
**Typha x glauca*	Blue (hybrid) cattail	*Setaria glauca*	Yellow foxtail
Lythrum salicaria	Purple loosestrife	*Echinochloa crusgalli*	Barnyard grass
Salix fragilis	Crack willow	*Elytrigia repens*	Quack grass
Salix alba	White willow	*Sonchus arvensis*	Perennial sowthistle
Salix babylonica	Weeping willow	*Cirsium vulgare*	Bull thistle
Ambrosia artemisiifolia	Common ragweed	*Alliaria petiolata*	Garlic mustard

Cattail Key (Adapted from Smith, 1986)

Two species of cattail (*Typha* sp.) occur in Minnesota and they readily hybridize producing a highly variable hybrid known by the common name of White (or Blue or hybrid) cattail *Typha* x *glauca* (ITIS 2002) as referred to in the 'National List of Plant Species That Occur In Wetlands Region 3 – North Central, second printing 1988. Broad-leaved cattail (*Typha latifolia*) is native throughout Minnesota. Narrow-leaved cattail (*Typha angustifolia*) is believed to be native to the eastern region of the U.S. and made its way to the Upper Midwest where it began to hybridize with *T. latifolia.* Both *Typha angustifolia* and *Typha* x *glauca* are more tolerant to a wide range of human influences including hydrologic changes, nutrient inputs, loading of certain toxic compounds such as chloride and heavy metals such as cadmium, copper and zinc and are therefore more invasive. Older, more extensive stands may have both *Typha* species present; various generations of the hybrid make reliable species cover estimates difficult. The following condensed key may be used to help determine what species of cattail is encountered in the field. See the database for a more detailed key.

Table 2: Diagnostic characteristics of cattails

Characteristic	***Typha latifolia* (Broad-leaved cattail)**	***Typha angustifolia* (Narrow-leaved cattail)**	***Typha x glauca* (White/Blue or hybrid cattail)**
Mature Leaf width	14 – 23 mm	4 – 10 mm	10 – 14 mm
Leaf Cross-section shape	Flat, scarcely concave below mid.	Convex below middle	Flat to convex below middle
Spike width	25 – 34 mm	15 –22 mm	19 – 25 mm
Pistillate length	≤15 cm	≤15 cm	>15 cm
Spike separation	Frequently contiguous but not more than 2 cm apart	Separated by at least 2 cm and usually >3 cm	Occasionally contiguous, more commonly up to 4 cm
Spike color	Dark brown to black	Brown	Brown to bright brown
Colony density	Sparse, often large gaps between shoots	Frequently very dense	Density intermediate

3. Characterize the current vegetative quality of each wetland community comprising at least 10% of the wetland using the following key and enter the community proportion of the whole wetland (**3a**), and the

vegetative quality rating for each community in the table below. **Compute the index for vegetative diversity and integrity for each plant community by doing the following:** If any of questions #**4-6** are answered yes and/or if any of the Special Features **b, d, or i** have been selected, enter **Exceptional** for the functional index; if not, use the answer in the Vegetative Quality Index from the table for each community (Question 3). The overall vegetative diversity index for the wetland may be calculated one of four ways. The method should be based on the purpose of the assessment:

3b) Maintain Individual Community Scores: preserves data to the highest level by maintaining the quality ratings of each community within the wetland. While it may be cumbersome to maintain this data for a large number of wetlands, this data should always be maintained and reported when the MnRAM is utilized for inventory or regulatory purposes.

3c) Highest Quality Community: This method of presenting the Vegetative Diversity/Integrity can be utilized for determining sensitivity to impacts such as stormwater/hydrologic alterations. Typically, communities with the highest quality are also those that are most sensitive to alteration. *(This method would be preferable in regulatory situations in which a wetland basin may be impacted).*

3d) Non-Weighted Average Quality of all Communities: This method of data presentation results in the greatest dilution of the individual community data. However, it may be the only reasonable method for comparing large numbers of wetlands such as for an inventory and/or planning project. In some instances, it may not be possible, given budget and scope constraints, to collect community dominance data. In that case, one way to get a single measure of overall wetland vegetative diversity/integrity quality is to utilize the non-weighted average. It is important to maintain and report the individual community quality data, even if it cannot be readily used to develop management classifications. *(This method is not recommended for regulatory purposes)***.**

3e) Weighted Average Quality Based on Percentage of Each Community: This data presentation method provides the best average Vegetative Diversity/Integrity measure for the entire wetland. Here the quality rating is computed by summing the product of each community rating and the proportion of the wetland that community comprises. Whenever possible, the community proportion data should be collected to preserve the highest possible value for a single Vegetative Diversity/Integrity rating. Again, the individual community ratings should be preserved and reported to provide a complete data set. *(This method is not recommended for regulatory purposes).*

Guidance: The plant community rating incorporates two principal components: integrity and diversity. **Diversity** refers to species richness, e.g., number of plant species. Generally, the more floristically diverse a community is, the higher the rating. **Integrity** refers to the condition of the plant community in comparison to the reference standard for that community. The highest rating is given to those communities that represent the characteristic condition of that particular community. The degree (e.g., minor versus substantial) and type of disturbance typically play an important role in the diversity/integrity of plant communities. Some native plant communities are maintained by periodic, natural disturbances (e.g., fire, annual floods). For purposes of this functional assessment, disturbances are more in reference to man-induced alterations (e.g., filling, dredging, drainage) that are typically detrimental to vegetative diversity/integrity.

It is important to note that some native wetland plants naturally form large colonies or clones creating communities that are low in diversity, but high in integrity. Examples are stands of wild rice, arrowhead, lake sedges, river bulrush, hardstem bulrush, American lotus, wild celery, pickerelweed, wire-grass sedge and tussock sedge. Plant communities with low diversity but high integrity can have a high vegetative diversity/integrity ranking if they represent the characteristic condition of that plant community (i.e., compared

to the reference standard community).

Size of the area sampled for the rating can also be a factor. If the area sampled is small, the evaluator must be aware that it may not naturally support the diversity of species a larger area of the same plant community supports.

User Notes: Each community is outlined below with descriptions for high, medium, and low quality. Many sites have more than one community; consult the descriptions individually to decide the appropriate rating for each community, *except* the following description of "exceptional" quality is applicable to all communities:

Exceptional Quality: Plant community is undisturbed, or sufficiently recovered from past disturbances, such that it represents pre-European settlement conditions. Non-native plant species are absent or, if present, constitute a minor percent cover of the community. Unique features (e.g., old growth forest, never-plowed wet prairie, T/E species) may also be present.

NOTE: For purposes here, "dominant" or "dominated by" refers to the dominant species determined by the "50/20 Rule" or other appropriate method for determining which species are dominants. "Subdominant" refers to species that may not meet the "50/20 Rule" for dominance, but have at least 10 percent areal cover (or other dominance measure)[9].

16A. SHALLOW, OPEN WATER COMMUNITIES[10]

High Quality: Aquatic bed communities with greater than 10 percent coverage of the open water area and dominated by 3 or more species of native aquatic plants such as pondweeds, water lilies, bladderworts, wild celery, duckweed, water crowfoots, native milfoils, etc.; or communities with low diversity but high integrity as given in additional guidance (e.g., beds of wild celery). Eurasian water milfoil and/or curly leaf pondweed, if present, cumulatively comprise less than 20 percent cover of the aquatic bed community.

Medium Quality: Aquatic bed communities with greater than 10 percent coverage of the open water area and dominated by 1 or 2 species of native aquatic plants; and/or Eurasian water milfoil and/or curly leaf pondweed cumulatively comprise 20 to 50 percent cover of the aquatic bed community.

Low Quality: Aquatic vegetation absent or coverage is less than 10 percent of the open water area; or, Eurasian water milfoil and/or curly leaf pondweed cumulatively comprise greater than 50 percent cover of the aquatic bed community.

13B. SHALLOW MARSHES[11]

High Quality: Three or more native aquatic plants (e.g., bur-reeds, bulrushes, arrowheads, duckweeds, cattails, sweet flag, pondweeds) are dominants; or, communities with low diversity but high integrity as described in guidance (e.g., stands of arrowhead, lake sedges). Cattails, if present, comprise less than 40 percent cover. Purple loosestrife absent or comprises less than 20 percent cover.

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[9] The "50/20 Rule" is explained in the *Corps of Engineers Wetlands Delineation Manual* (1987).
[10] I., page 28, Eggers and Reed.
[11] II.B., pages 51-53, Eggers and Reed.

Medium Quality: At least 2 species of native aquatic plants are dominants; and/or purple loosestrife comprises 20 to 50 percent cover; and/or cattails comprise 40 to 85 percent cover.

Low Quality: Dominated by 1 native aquatic species; and/or purple loosestrife comprise more than 50 percent cover; and/or cattail comprises more than 85 percent cover.

12B. DEEP MARSHES[12]

High Quality: Three or more species of native aquatic plants (e.g., bur-reeds, bulrushes, arrowheads, duckweeds, cattails, sweet flag, pondweeds) are dominants; or communities with low diversity but high integrity as described in guidance (e.g., stands of bulrushes, wild rice, lotus, arrowheads). Cattails, if present, comprise less than 40 percent cover. Purple loosestrife and/or Eurasian water milfoil absent or cumulatively comprise less than 20 percent cover.

Medium Quality: Dominated by 2 species of native aquatic plants; and/or purple loosestrife and/or Eurasian water milfoil, cumulatively comprise 20 to 50 percent cover; and/or cattail comprises 40 to 85 percent cover.

Low Quality: Dominated by 1 native aquatic species; and/or purple loosestrife and/or Eurasian water milfoil cumulatively comprise more than 50 percent cover; and/or cattail comprises more than 85 percent cover.

13A. SEDGE MEADOWS[13]

High Quality: Stands dominated solely by sedges (e.g., wiregrass sedge, hummock sedge, lake sedge, woolgrass [*Carex lasiocarpa*, *C. stricta*, *C. lacustris*, *Scirpus cyperinus*, respectively]) including nearly monotypic stands; or stands with a mixture of sedge dominants and dominant or subdominant native forbs/ferns/grasses/rushes (e.g., Canada blue-joint grass, joe-pye weed, giant sunflower). Reed canary grass, purple loosestrife, stinging nettle and/or other invasive species (Table 1) are absent or cumulatively comprise less than 20 percent cover in the herbaceous stratum. Non-native buckthorns, if present, comprise less than 10 percent cover within the sedge meadow community.

Medium Quality: Stands of sedges where the invasive species listed above cumulatively comprise 20 to 40 percent cover in the herbaceous stratum; and/or non-native buckthorns comprise 10 to 30 percent cover within the sedge meadow community.

Low Quality: Invasive herbaceous species listed above cumulatively comprise 40 to 50 percent cover; and/or non-native buckthorns comprise 30 to 50 percent cover within the sedge meadow community.

[Note: Stands with less than 50 percent cover by sedges key out to wet meadows, 15B. Stands with greater than 50 percent cover by buckthorn shrubs key out to shrub-carrs, 8B.]

15B. WET MEADOWS[14]

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[12] II.A., pages 51-53, Eggers and Reed.
[13] III.A., page 86, Eggers and Reed.
[14] III.B., page 105, Eggers and Reed.

High Quality: Composed of 10 or more species of native/non-invasive grasses, sedges, ferns, rushes and/or forbs. Reed canary grass, purple loosestrife, stinging nettle and/or other invasive species (Table 1), if present, cumulatively comprise less than 20 percent cover. Non-native buckthorns absent or comprise less than 10 percent cover within the wet meadow community.

Medium Quality: Community composed of 5 to 9 species of native grasses, sedges, rushes, ferns and/or forbs; and/or invasive herbaceous species listed above cumulatively comprise 20 to 50 percent cover; and/or non-native buckthorns, comprise 10 to 30 percent cover within the wet meadow community.

Low Quality: Composed of 4 or fewer species of native grasses, sedges, rushes, ferns and/or forbs; and/or invasive herbaceous species listed above cumulatively comprise more than 50 percent cover; and/or non-native buckthorns comprise 30 to 50 percent cover within the wet meadow community. For example, this rating includes the nearly monotypic stands of reed canary grass that are commonly encountered.

[Note: Greater than 50 percent cover by buckthorn shrubs key out to shrub-carrs, 8B.]

15A. WET to WET-MESIC PRAIRIES[15]

High Quality: Community composed of native grasses (e.g., prairie cord-grass, switchgrass, Canada blue-joint grass), sedges, and forbs characteristic of wet to wet-mesic prairies. Reed canary grass, purple loosestrife, quack grass, Canada thistle and/or other invasive species (Table 1) are absent or cumulatively comprise less than 20 percent cover. Non-native buckthorns absent or comprise less than 10 percent cover within in the prairie community.

Medium Quality: Invasive species listed above cumulatively comprise 20 to 50 percent cover in the herbaceous stratum; and/or non-native buckthorns comprise 10 to 30 percent cover within the prairie community.

Low Quality: Invasive species listed above cumulatively comprise more than 50 percent cover in the herbaceous stratum; and/or non-native buckthorns comprise 30 to 50 percent cover within the prairie community.

7B. & 14A. CALCAREOUS FENS[16]

Due to their uniqueness, rarity, and disproportionate number of threatened and special concern plant species, calcareous fen communities are rated as “exceptional” for vegetative diversity/integrity (see Special Features, item b.).

7A. & 10A. OPEN BOGS[17]

High Quality: Composed of the characteristic assemblage of sphagnum mosses, sedges and heath family

[15] III.C., page 125, Eggers and Reed.
[16] III.D., page 141, Eggers and Reed.
[17] IV.A., page 161, Eggers and Reed.

shrubs, often with carnivorous plants and various orchid species. Cattails, quaking aspen, non-native buckthorns, reed canary grass, stinging nettle and/or other invasive species (Table 1) are absent or comprise less than 20 percent cover in each stratum (e.g., bryophyte, herbaceous, shrub).

Medium Quality: Invasive species listed above comprise 20 to 50 percent cover in one or more strata.

Low Quality: Invasive species listed above comprise greater than 50 percent cover in one or more strata. Dieback of sphagnum mosses due to flooding, nutrient loading, salt spray, sediment input, etc., can be an indicator.

4A. CONIFEROUS BOGS[18]

High Quality: Stands of tamarack and/or black spruce with the characteristic assemblage of sphagnum mosses, sedges and heath family shrubs. Cattails, quaking aspen, non-native buckthorns, stinging nettle, reed canary grass, and/or other invasive species (Table1) comprise less than 20 percent cover in any stratum (e.g., bryophyte, herbaceous, shrub, tree).

Medium Quality: Stands of tamarack and/or black spruce invaded by cattail, quaking aspen, non-native buckthorns, stinging nettle and other invasive species (Table 1) that comprise 20 to 50 percent cover in one or more strata.

Low Quality: Non-native buckthorns, quaking aspen, stinging nettle, cattail and/or other invasive species (Table 1) cumulatively comprise more than 50 percent cover in one or more strata. Also includes stands where greater than 50 percent of the black spruce and tamarack are dead (due to impoundment, drainage, salt spray, etc.).

8B. SHRUB-CARRS[19]

High Quality: Dominated by native shrubs (e.g., dogwoods, willows) with a herbaceous stratum composed of five or more species of native grasses, sedges, rushes, ferns and/or forbs. Non-native buckthorns, non-native honeysuckles, box elder and/or other invasive woody species (Table 1), cumulatively comprise less than 20 percent cover of the shrub stratum. Reed canary grass and other invasive herbaceous species comprise less than 20 percent cover of the herbaceous stratum.

Medium Quality: Invasive species listed above comprise 20 to 50 percent cover in any one stratum (shrub or herbaceous or both); and/or the herbaceous stratum has 4 or fewer species of native grasses, sedges, rushes, ferns or forbs.

Low Quality: Invasive species listed above comprise more than 50 percent cover in any one stratum (shrub or herbaceous or both).

8A. ALDER THICKETS[20]

[18] IV.B., page 175, Eggers and Reed.
[19] V.A., page 180, Eggers and Reed.
[20] V.B., page 192, Eggers and Reed.

High Quality: Stands of speckled alder with less than 20 percent cumulative cover by non-native buckthorns, non-native honeysuckles, box elder and/or other invasive woody species (Table 1). Herbaceous stratum composed of 5 or more species of native grasses, sedges, rushes, ferns and forbs. Reed canary grass, if present, comprises less than 20 percent cover.

Medium Quality: Invasive species listed above cumulatively comprise 20 to 40 percent cover of the shrub stratum; and/or the herbaceous stratum has 4 or fewer native herbaceous species; and/or herbaceous stratum has 20 to 50 percent cover of reed canary grass or other invasive species.

Low Quality: Forty to 50 percent cover of the shrub stratum consists of invasive woody species listed above (Table 1); and/or reed canary grass comprises more than 50 percent cover of the herbaceous stratum.

[Note: Stands with more than 50 percent cover by buckthorns, key out to shrub-carrs, 8B.]

3B. HARDWOOD SWAMPS and 4B. CONIFEROUS SWAMPS[21]

High Quality: Tree/sapling/shrub strata each have less than 20 percent cover of box elder, non-native buckthorns, non-native honeysuckles, eastern cottonwood, quaking aspen (see note below regarding aspen) and/or other invasive species (Table1). Herbaceous stratum composed of 5 or more species of native grasses, sedges, rushes, ferns and/or forbs, and reed canary grass comprises less than 20 percent cover. Another factor is the common presence of seedlings/saplings of the characteristic tree species, which indicates regeneration of the stand, as opposed to observing abundant seedlings/saplings of invasive woody species. NOTE: aspen parkland in northern Minnesota is a special case. Stands of quaking aspen with a ground layer of native prairie species should be rated by a separate method specific to aspen parklands.

Medium Quality: Invasive species listed above comprise 20 to 50 percent cover in one or more strata, and/or the herbaceous stratum has 4 or fewer species of native grasses, sedges, rushes, ferns and forbs. This rating also includes early successional forests of quaking aspen with an under story of characteristic tree species of swamps (e.g., green ash, black ash, red maple, balsam poplar, northern white cedar.).

Low Quality: Invasive species listed above comprise more than 50 percent cover in one or more strata (e.g., tree, sapling, shrub, herbaceous). Typically, few to no indications of regeneration of the characteristic tree species are present.

3A. FLOODPLAIN FORESTS[22]

High Quality: Tree stratum with less than 20 percent cumulative cover by box elder, crack willow, weeping willow or white willow. Herbaceous stratum, if present, composed of native forbs, ferns, sedges and grasses characteristic of floodplain forests (e.g., wood nettle, jewelweed, Virginia rye, cut-leaf coneflower) with less than 20 percent cover by reed canary grass.

Medium Quality: Invasive species listed above comprise 20 to 50 percent cover in one or more strata.

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[21] VI.A and VI.B., pages 197 to 213, Eggers and Reed.
[22] VII., page 214, Eggers and Reed

Low Quality: Invasive species listed above comprise greater than 50 percent cover in one or more strata. Also include stands where greater than 50 percent of the trees are dead.

16B. SEASONALLY FLOODED BASINS[23]

High Quality: Dominated by native/non-invasive species (examples in Table 4) with less than 20 percent cover in any one stratum by non-native and/or invasive species (e.g., common buckthorn, reed canary grass, Canada thistle, yellow foxtail, barnyard grass, common ragweed, stinging nettle, quack grass – see Table 1). Typically located within an area of permanent vegetative cover (e.g., forest, prairie, non-agricultural settings) undisturbed or minimally disturbed by artificial drainage, haying, grazing, plowing, stormwater input, or other disturbances.

Medium Quality: Invasive species listed above comprise 20-50 percent cover in one or more strata. Typically located in areas that are partially drained, infrequently cropped, lightly grazed, subject to some stormwater input, etc.

Low Quality: Invasive species listed above comprise greater than 50 percent cover in one or more strata. Typically located in frequently cropped agricultural fields, heavily grazed, or subjected to substantial inputs of stormwater, or other adverse disturbances.

Table 4: Examples of Native/Non-Invasive Species of Seasonally Flooded Basins Including Vernal Pools

Scientific Name	Common Name	Scientific Name	Common Name
Onoclea sensibilis	Sensitive fern	*Geum canadense*	White avens
Athyrium filix-femina	Lady fern	*Impatiens capensis*	Jewelweed
Ribes americanum	Wild black currant	*Juncus canadensis*	Canada rush
Sambucus canadensis	Common elderberry	*Juncus tenuis*	Slender rush
Vitis riparia	Riverbank grape	*Juncus torreyi*	Torrey's rush
Boehmeria cylindrica	False nettle	*Leersia virginica*	Whitegrass
Carex grayi	Gray's sedge	*Leersia oryzoides*	Rice cut-grass
Carex lupulina	Hop sedge	*Rudbeckia laciniata*	Cut-leaf coneflower
Carex muskingumensis	Muskingum sedge	*Sium suave*	Water parsnip
Carex stipata	Stalk-grain sedge	*Polygonum pensylvanicum*	Penn. smartweed
Carex typhina	Cattail sedge	*Polygonum lapathifolium*	Nodding smartweed
Cyperus strigosus	Straw-color flatsedge	*Ranunculus septentrionalis*	Buttercup
Eleocharis obtusa	Blunt spikerush	*Elymus virginicus*	Virginia wild-rye
Aster lateriflorus	Calico aster	*Bidens cernua*	Nodding beggartick

[23] VIII., page 227, Eggers and Reed.

4. Y N Are state or federally listed plant species, rare, threatened or of special concern, found or known to be found in the wetland recently? If Special Features questions d or i [rare natural community, rare plant species] are answered yes, then this question is yes and Vegetative Diversity function is Exceptional.

5. Y N Is the wetland or a portion of the wetland a rare natural community or habitat based on the Minnesota Natural Heritage Database or the County Biological Survey[24]? If yes, wildlife habitat functional level rating = exceptional. (If Special Features question d is answered yes, this question will also be affirmative.)

Guidance: Rare Natural Communities. The Minnesota Department of Natural Resources Natural Heritage and Nongame Research Program and the County Biological Survey collects, manages, and interprets information about nongame animals, native plants, and plant communities to promote the wise stewardship of these resources. A ranking system is intended to reflect the extent and condition of natural communities and species in Minnesota. These 'state ranks' have no legal ramifications; they are used by the Natural Heritage Program to set priorities for research and for conservation planning. They are grouped as follows:

State Element Rank:

S1: Critically imperiled in the state because of extreme rarity.
S2: Imperiled in state because of rarity.
S3: Rare or uncommon in state.
S4: Apparently secure in state.
S5: Demonstrably secure in state.

For this question, a rare natural community is defined as a wetland native plant community having a state element rank of S1, S2, or S3 that is mapped or *determined to be eligible for mapping* in the Natural Heritage Information System OR a wetland native plant community contained within an area mapped or determined to be eligible for mapping in the NHIS as a Site of Outstanding or High Biological Diversity.

If a special case is suspected, consider using a specific assessment tool in addition to MnRAM.

6. Y N Does the wetland represent pre-European-settlement conditions? (e.g., MnDNR Native Plant Communities publication) If yes, then Vegetation function is Exceptional (continue to answer subsequent questions). Created wetlands would not qualify, regardless of quality.

[24] These references are available at local Soil & Water Conservation District offices; some counties are online at the Minnesota Department of Natural Resources/Ecological Services website.

General information about the wetland site:

7. Describe the hydrogeomorphology of the wetland and associated topography (check those that apply):

___ Depressional/Isolated (no discernable inlets or outlets)
___ Depressional/Flow-through (apparent inlet and outlet)
___ Depressional/Tributary (outlet but no perennial inlet or drainage entering from upstream subwatershed)
___ Riverine (within the river/stream banks)
___ Lacustrine Fringe (edge of deepwater areas)/Shoreland
___ Extensive Peatland/Organic Flat
___ Slope
___ Floodplain (outside waterbody banks)
___ Other _____

8. Approximate maximum depth of standing water in the wetland (inches): _____

Percent of wetland area inundated: _____%

~ **9. What is the estimated area of the wetland's immediate drainage area in acres?_____**

~ **10. Estimated size of existing wetland in acres:_____**

10. Guidance: Determining wetland size. The estimated size of existing wetlands can be calculated off aerial photos, preferably infrared, and/or in some cases calculating the size of the depressional hydric soil polygon. If available on a GIS system, these polygon areas can automatically be calculated.

~ **11. General description of soil(s)** from Soil Survey and on site:

	Adjacent UPLAND Area (within 500 feet)	**WETLAND Area**
Soil Survey Classification(s):		

12. For depressional wetlands, describe the wetland surface and subsurface outlet characteristics as it relates to the wetland's ability to detain runoff and/or store floodwater.

A = No surface or subsurface outlet, or a restricted outlet at or greater than 2 feet higher than the wetland boundary

B = Swale, channel, weir, or other large, surface outlet (>18 inch pipe) with outflow elevation 0-2 feet above the wetland boundary, subsurface tile with no surface inlet.

C = Wetland outflow elevation below the wetland boundary with either a high capacity surface outlet (swale, channel, weir, pipe >18 inch diameter, etc…) or a subsurface outlet (drain tile) with a surface inlet.

N/A = Not applicable for floodplain, slope, lacustrine, riverine, and extensive peatland/flat wetlands.

13. Describe the wetland surface and subsurface outlet characteristics as it relates to the wetland hydrologic regime[25]:

A = No outlet, natural outlet condition, or a constructed outlet at the historic outflow elevation; no evidence of subsurface drainage (drain tile).

B = Constructed, reduced capacity outlet below the top of the temporary wet meadow zone; moderate indications of subsurface drainage; outlet raised but managed to mimic natural conditions; watercourse has been recently ditched/channelized.

C = Excavated or enlarged outlet constructed below the bottom of the wet meadow zone; strong indications of subsurface drainage; outlet removes most/all long-term and temporary storage; or outlet changes hydrologic regime drastically.

12/13. Guidance: Outlet Characteristics. The ability of a wetland to maintain a hydrologic regime characteristic of the wetland type is somewhat dependent upon whether a natural outlet is present, or whether an outlet has been constructed or modified by humans. Constructed outlets can significantly diminish the ability of a wetland to provide temporary and long-term water retention, and thus its ability to maintain its characteristic hydrologic regime. Wetlands with natural outlets are functioning at the highest level possible for the type within the wetland comparison domain, and should be rated A [high]. Constructed outlets above the temporary wetland (wet meadow) zone are rated B [medium] if managed to mimic natural conditions. Constructed outlets, either surface or subsurface, below the top of the temporary wet meadow zone reduce the ability of the wetland to provide temporary and long-term water retention; if a constructed outlet is present below the top of the temporary wetland zone, but is such that the wetland is able to provide some temporary and long-term water retention (i.e. the wetland is only partially drained), the rating should be B [medium]. Constructed outlets, either surface or subsurface, which remove most or all temporary and long-term retention capabilities, significantly reduce the ability of the wetland to maintain its characteristic hydrologic regime; the rating should be C [low]. Constructed outlets that keep open water wetlands open water or keep saturated wetlands saturated are rated B [medium]. If the constructed outlet changes the wetland to non-wetland or to deepwater habitat or from saturated conditions to open water or from open water to saturated then it is rated C [low].

[25] Lee et al., 1997.

~ **14. Describe the dominant land use and condition of the immediate upland drainage area of wetland.[26] If the immediate upland drainage is not evident, then within 500 feet.**

A = Watershed conditions essentially unaltered; < 10% impervious (i.e. low density residential, >1 acre lots); land use development minimal, idle lands, lands in hay or forests or low intensity grazing.

B = Watershed conditions somewhat modified; e.g., 10–30 % impervious (i.e. medium density residential, 1/3 to 1 acre lots); moderate intensity grazing or haying with some bare ground; conventional till with residue management on moderate slopes, no-till on steep slopes.

C = Watershed conditions highly modified; e.g., >30 % impervious surfaces (i.e. high density residential, lots smaller than 1/3 acre, industrial, commercial, high impervious institutional) maximizing overland flow to the wetland; intensive agriculture or grazing with a high amount of bare ground, no residue management on moderate or steep slopes, intensive mining activities.

14. Guidance: Dominant upland land use[27]. Overland flow affects wetland flood storage capabilities and overland flow is affected by changes in upstream vegetative communities. Upland land use within the watershed contributing to the wetland (as defined in Question #9) and the watershed size have a significant influence on the flow of runoff and sediments to the wetland, and thus the ability of the wetland to desynchronize flood flows and maintain its characteristic hydrologic regime. The more developed and intensively the watershed is used, the greater the delivery of runoff and sediments to the wetland is likely to be and the more likely the wetland will have the opportunity to minimize flooding downstream. With increased runoff and sediment delivery, the wetland will be less likely to maintain its characteristic hydrologic regime. As the proportion of the impervious watershed area increases, runoff volume and rate increases along with sediment concentrations.

15. Describe the conditions of the wetland soils:

A = There are no signs or only minor evidence of recent disturbance or alteration to the wetland soils; temporary wetland wet meadow zone intact; idle land, hayed or lightly to moderately grazed or logged. Minimal compaction, rutting, trampling, or excavation damage to wetland.

B = Moderate evidence of disturbance or alteration to the wetland soils. Temporary wet meadow zone tilled or heavily grazed most years. Zones wetter than temporary receive tillage occasionally. Some compaction, rutting, trampling, or excavation in wetland is evident.

C = Evidence of significant disturbance or alteration to the wetland soils. Wetland receives conventional tillage most (>75%) years; or otherwise significantly impacted (e.g., fill, sediment deposits, cleared, excavated). Severe compaction, rutting, trampling, or excavation damage to wetland.

15. Guidance: Condition of Wetland Soils. The condition of the soils in the wetland affects the vegetation within the wetland, and thus the relationships affecting ground-water discharge, recharge, and evapotranspiration. The more developed and intensively the wetland is used (i.e. tillage, excavation, vehicle traffic, pedestrian or livestock usage), the more likely these relationships are to be impacted, and the more likely the ability of the wetland to maintain its characteristic hydrologic regime will be reduced.

16. Enter the percentage of the wetland that is vegetated with woody, emergent, submergent, or

[26] Lee et al., 1997.

[27] The range of impervious proportions for various land uses is borrowed from Chow, Maidment, and Mays (1988)

floating-leaved vegetation.

_____%

16. Guidance: Wetland Vegetation is assessed here for two related properties:

1) Water/Vegetation Proportions and Interspersion. Rooted vegetation in flow-through wetlands slows floodwaters by creating frictional drag in proportion to stem density, more or less according to vegetation cover type and interspersion. Flow-through wetlands with relatively low proportions of open water to rooted vegetation and low interspersion of water and rooted vegetation are more capable of altering flood flows. Dense stands of rooted vegetation, including trees, shrubs, and herbaceous emergent are more capable of slowing floodwater than open water alone. Ratings follow these categories: High (dense vegetative cover) >75%; Medium (combination some unvegetated open water and vegetative cover) = 25 - 75%; Low (primarily unvegetated open water) = <25%. Isolated wetlands, which are perfect containers of floodwaters, should be rated 100%.

2) Nutrient Uptake/Cycling. A wetland's ability to uptake, metabolize, sequester and/or remove nutrients and imported elements from the water is primarily dependent on wetland vegetative conditions. Microbial processing and bioaccumulation are associated with plant cover including floating, emergent or submergent vegetation.[28] Vegetative density can serve as an index of primary production, which is an indicator of nutrient assimilation. Forested wetlands retain ammonia during seasonal flooding and wetland environments are effective at denitrification. Wetlands take up metals both by adsorption in the soils and by plant uptake via the roots. They allow metabolism of oxygen-demanding materials and can reduce fecal coliform populations. These pollutants are often buried by deposition of newer plant material, isolating them in the sediments.

17. Describe the roughness coefficient of the potential surface floodwater flowpath in relation to wetland vegetation biomass, numeric density and plant morphology[29]:

A = Dense bushy willow, heavy stand of timber with or without downed trees, or mature field crops with flow at half or less of crop height.

B = Dense grass with rigid stems, weeds, tree seedlings, or brushy vegetation where flows can be two to three times the height of the vegetation.

C = Primarily flexible turf grass or other supple vegetative cover or unvegetated.

N/A = Not applicable if wetland is isolated.

17. Guidance: Floodwater resistance. Forest cover and other woody stems increase surface roughness resulting in an increased detention of high flows. The cumulative effect is reduced peak flows downstream. A forest (i.e. ash, boxelder, red maple, conifers) with a dense understory is best for detaining high flows. Without a forest present, woody shrubs (i.e. alder, willow, red osier dogwood) can be extremely effective but lose effectiveness once high flows approach and exceed the woody shrub height. Dense, non-woody vegetation (i.e. cattails, reed canarygrass) are effective at detaining minor flood flows but lay down to higher flows and the surface roughness greatly diminishes. Turf grass and other supple vegetation has minimal effects on flood flows. Open water wetlands with submergent and scattered emergent vegetation are part of the channel characteristics and have minimal effect on detaining flood flows. The Manning's roughness coefficient decreases as water depth increases above the macrophytes and other surface roughness characteristics**.** Dense, robust, tall vegetation is best for

[28] Magee and Hollands, 1998; Lee et al., 1997.
[29] Adamus et al., 1991.

floodplains.

18. Describe the extent of observable/historical sediment delivery to the wetland from anthropogenic sources including agriculture:

A = No evidence of sediment delivery to wetland.

B = Minor evidence of accelerated sediment delivery in the form of stabilized deltas, sediment fans.

C = Major sediment delivery evidenced by buried detritus and/or vegetation along outer edge of temporary wetland (wet meadow) zone. Recent deltas, sediment plumes, etc. in areas of concentrated flow or sedimentation raising bottom elevation of wetland.

18. Guidance: Sediment Delivery. Wetlands filled by sediment from anthropogenic sources will have reduced capacity to store stormwater. Land use, ground slope, and erodibility characteristics of the soils affect the potential for sediment delivery to the wetland.

~ **19. Describe the predominant upland soils within the wetland's immediate drainage area that affect the overland flow characteristics to the wetland[30]:**

A = Sands (Hydrologic soil group A)

B = Silts or loams (Hydrologic soil group B)

C = Clays or shallow to bedrock (Hydrologic soil groups C, D, A/D, B/D, C/D)

19. Guidance: Watershed Soils. Use hydrologic grouping if available, otherwise, use soil texture from the soil survey [see chart in Guidance for Question #60]. Greater runoff and higher flood peaks occur in watersheds having primarily impermeable soils. These types of soils impede water infiltration and so produce increased runoff. Wetlands located downslope of more impermeable soils are more likely to provide flood attenuation.

20. Describe the characteristics of stormwater, wastewater, or concentrated agricultural runoff detention/water quality treatment prior to discharging into the wetland:

A = Receives significant volumes of untreated/undetained stormwater runoff, wastewater, or concentrated agricultural runoff directly, in relation to the wetland size.

B = Receives moderate volumes of directed stormwater runoff, wastewater, or concentrated agricultural runoff in relation to wetland size, which has received some treatment (sediment removal) and runoff detention.

C = Does not receive directed stormwater runoff, wastewater, or concentrated agricultural runoff; receives small volumes of one or more of these sources in relation to wetland size; or stormwater is treated to approximately the standards of the National Urban Runoff Program (NURP); and runoff rates controlled to nearly predevelopment conditions.

20. Guidance: Stormwater Runoff Pretreatment and Detention. These ratings apply to both Flood/Stormwater Storage and Attenuation *and* Downstream and Wetland Water Quality Protection. When used for determining water quality characteristics, the ratings are reversed (i.e. A=High shown

[30] See the Soil Data Mart on the NRCS/USDA website for help with soil characterization.

above will be counted as C=Low). Wetlands receiving undetained, directed stormwater from developed areas generally provide a higher functional level for flood/stormwater storage than do similar wetlands receiving stormwater at rates of, and with water quality equivalent to, that prior to development.

A NURP pond is most easily identified by having a 10-foot wide, nearly flat shelf just below the normal water level and will be 4 to 10 feet deep. Typically, these ponds will have a wet surface area (at the normal level) approximately equal to 1% of the watershed area (when the impervious percentage is less than 50), or 2% of the watershed impervious area (when the impervious percentage is >50). For example, a 0.5 acre pond will serve 50 acres of drainage area with 15% impervious surfaces or a 35 acre watershed containing 25 acres of impervious surfaces). Ponds that remove sediment only are typically smaller with a depth of 4 feet or less. The high rating equates with direct pipe discharge into the wetland and runoff rates, which will likely increase the water level in the wetland significantly (i.e. a pipe discharge from a short length of road or from several residential back yards to a 100 acre wetland complex does not constitute a significant impact).

~ **21. Describe the proportion of wetlands within the DNR minor watershed** (5,600 DNR minor watersheds are defined in Minnesota by Minnesota Rules 8420.0110, Subp. 31—the definition of "minor watershed" may vary by state) **and the opportunity for contributing to floodwater detention[31]:**

A = Wetlands make up less than 10% of the minor watershed area.
B = Wetlands make up 10-20% of the minor watershed.
C = Wetlands make up more than 20% of the minor watershed.

21. Guidance: Subwatershed Wetland Density. The density of wetlands in the minor watershed will determine the benefit each provides downstream. Wetlands reduce flood peaks up to 75 percent compared to rolling topography when they occupy only 20 percent of the total basin.[23] When wetland densities in the minor watershed exceed 20% total cover, the flood storage benefits of additional wetlands rapidly decrease.

22. Describe the functional level of the wetland in retarding or altering flows based on the surface flow characteristics through the wetland:

A = No channels present.
B = Channels present, but not connected, or meandering channels.
C = Channels connecting inlet to outlet.

22. Guidance: Channels/Sheet Flow. Channels are formed in the underlying substrate, not just as paths through emergent vegetation. Sheet flow, rather than channel flow, offers greater frictional resistance. The potential for floodflow desynchronization is greater when water flows through the wetland as sheet flow. Connecting channels will carry water directly from the inlet to the outlet preferentially in the channel. Channels not connected indicate that some channelized flow may occur within the wetland but not all the way through the wetland via a single channel; some sheet flow will occur. No channels present represents wetlands in which water from the inlet will spread out over the wetland to the outlet (e.g., unchannelized meadows, shallow marshes, deep marshes, ponds, typical floodplains without meander channels, etc.).

[31] Verry, 1988; Wells et al., 1988; Flores et al., 1981; and Ogawa and Male 1983/MA:P.

23. Adjacent Buffer width: Average width of the naturalized buffer:_____feet [Within 500']

23. Guidance: Upland Buffer. Vegetated buffers around wetlands provide multiple benefits including wildlife habitat, erosion protection, and a reduction in surface water runoff. A buffer is an unmanicured area immediately adjacent to the wetland boundary. For this question, do not include lawn areas. If the buffer varies from one side to another, take the average width over the entire perimeter.

Widths for Water Quality	**Widths for Wildlife Habitat**
High = >50 feet	High = >300 feet
Medium = 25 – 50 feet	Medium = 50 – 300 feet
Low = <25 feet	Low = <50 feet

TO SCORE THE NEXT THREE QUESTIONS, consider a 50-foot ring around the wetland or assessment area. Describe the condition (minimum 10%) of each category. Total must equal 100%.

24. Adjacent Area Management: average condition of vegetative cover for water quality.

____% Full vegetative cover

____% Manicured, primarily vegetated (i.e. short-grass lawn, clippings left in place)

____% Lacking vegetation: bare soil or cropped, unfenced pasture, rip-rap, impervious/pavement.

24. Guidance: Adjacent Area Management. This question refers to the 50 feet surrounding the wetland assessment area (unlike the shoreland wetland vegetation question, which refers to the vegetation within the wetland itself). Maintenance may include mowing, haying, spraying or burning.

25. Adjacent Area Diversity & Structure (composition of characteristics for habitat)

____% Full coverage of native non-invasive vegetation

____% Mixed native/non-native vegetation, moderate density coverage, OR dense non-native cover.

____% Sparse vegetation and/or impervious surfaces.

25. Guidance: Adjacent Area Diversity and Structure. Many wetland-associated wildlife utilize upland areas for breeding, nesting, and foraging activities. Quality of the upland will affect the diversity and stability of the wetland wildlife community. This question combines estimates of both diversity and density—most wetlands will fall in the middle.

26. Adjacent Upland Slope

____% gentle slopes, 0-6%

____% moderate slopes, >6-12%

____% steep slopes, >12%

26. Guidance: Adjacent Upland Slope. Gentle slopes are associated with greater use by wildlife and also are less likely to erode. This measurement is best estimated on site.

~ **27. Describe the proximity of the first recreational lake, recreational watercourse, spawning area or significant fishery, or water supply source down-gradient of the wetland[32]:**

A = Isolated wetlands *or* wetland with one or more resource within 0.5 mile downstream via any form of channel, pipe.
B = One or more resource within 0.5 to 2 miles downstream.
C = No significant resources are located within 2 miles downstream.

27. Guidance: Downstream Sensitivity. The water quality function wetlands provide help disperse the physical, chemical, and biological impacts of pollution in downstream waters. Sensitive water resources located within 0.5 miles downstream of the wetland will realize the greatest benefit to water quality from the wetland. As discharges from the wetland move farther downstream, the benefits to water quality provided by the wetland will continue to diminish.

28. Does the wetland water quality and/or plant community exhibit signs of excess nutrient loading:

A = No evidence of excess nutrient loading or nutrient sources (e.g. evidence of diverse, native vegetative community, no pipes, etc.).

B = Some evidence of excess nutrient loading source and evidence in the plant communities such as dense stands of reed canary grass or narrowleaf, and/or blue (hybrid) cattail.

C = Strong evidence of excess nutrient loading by evident nutrient sources or evidence in the plant community such as algal mats present or evidence of excessive emergent, submergent and/or floating macrophyte growth.

28. Guidance: Nutrient Loading. Excessive nutrient loading to a wetland can cause nuisance algal blooms and the production of monotypic stands of invasive or weed species. Observed point source or nonpoint source of nutrients may include but is not limited to: fertilized lawns, agricultural runoff, manure storage or spreading, concentrated stormwater runoff, or pet waste inputs.

29. Y N Is the wetland fringing deepwater habitat, a lake, or within a watercourse? If NO, enter "not applicable" for this function in the Summary Table and skip to Question 35 [remove from computation of Shoreline Protection function.] If YES, answer the following questions.

29. Guidance: Shoreline Wetlands. The Shoreline Protection function only applies to wetlands that lie at the fringe of lakes, deepwater habitats, and within creeks, streams, rivers, and other watercourses. Typically, these include lacustrine wetlands i.e. fringing lakes which are defined as being situated in a topographic depression; lacking trees, shrubs, persistent emergents, emergent mosses or lichens with greater than 30 percent areal coverage; and greater than 20 acres in size or fringing deepwater habitats which are defined as less than 20 acres in size, but either greater than 6.6 feet deep at the deepest, or has a wave-formed shoreline[33]. The wetland portion is typically the area that is less than 6.6 feet deep. Also included as shoreline wetlands are floodplain/riverine systems (i.e. wetlands present between the active river channel and river banks that may experience frequent water level fluctuations and/or erosive forces).

[32] Wells et al., 1988.
[33] Cowardin, 1979

30. Enter the percent cover of rooted shoreline wetland vegetation[34].
_____%

30. Guidance: Rooted Shoreline Vegetation. The erosive strength of waves and currents can be greatly dissipated by a dense vegetation cover including submerged macrophytes. The greater the vegetation density, the greater the shoreline protection. (High = Macrophyte cover in the wetland >50%; Medium = Macrophyte cover in the wetland is 10% - 50%; Low = Macrophyte cover in the wetland <10%.)

31. Enter the average wetland width in feet between the shoreline/streambank and deep water/stream[35]:
_____ feet

31. Guidance: Wetland Width. Wetlands with wide stands of vegetation are more likely to stabilize sediments than those with narrow stands. Knutson et al. (1981) found that wetlands wider than 30 feet reduced wave energy by 88% while emergent wetlands less than 6 feet wide were relatively ineffective in wave buffering. Measure width starting from the deepwater edge up to the normal water's edge, not to include the shore area up out of the water itself (the shore-area wetland is considered in Question #34). (High = Wetland width >30 feet; Medium = Wetland width 10-30 feet; Low = Wetland width <10 feet).

32. Describe the emergent vegetation type and resistance within the shoreline wetland[36]:

A = Dominance of emergent species with strong stems present all year and/or dense root mats in the wash zone (e.g., cattails, shrubs) that are resistant to erosive forces.

B = Presence of some emergent species with strong stems or dominance of weak-stemmed emergent species persisting most of the year and/or moderately dense root mats in the wash zone (e.g., bulrushes, grasses) that are resistant to erosive forces.

C = Presence of some weak-stemmed emergent species and/or no dense root mats in the wash zone (e.g., rushes).

32. Guidance: Emergent Vegetation. The erosive strength of waves and currents can be greatly dissipated by a dense, emergent vegetation cover. In addition, species with stronger stems will provide greater protection than weak-stemmed species. The greater the vegetation density, the greater the shoreline protection. Some of the more common species with potentially high value for shoreline anchoring include: sweetflag (*Acorus calamus*), speckled alder (*Alnus incana* ssp. *rugosa*), blue joint grass (*Calamagrostis canadensis*), sedges (*Carex* spp.), red-osier dogwood (*Cornus stolonifera*), spike rush (*Eleocharis palustris*), scouring rush (*Equisetum fluviatile*), rice cutgrass (*Leersia oryzoides*), switchgrass (*Panicum virgatum*), reed canary grass (*Phalaris arundinacea*), common reed (*Phragmites australis*), smartweeds (*Polygonum* spp.), pickerelweed (*Pontederia cordata*), cottonwood (*Populus deltoides*), arrowhead (*Sagittaria* spp.), willows (*Salix* spp.), bulrushes (*Scirpus* spp.), cordgrass (*Spartina pectinata*), and cattails (*Typha* spp.).

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[34] Wells et al., 1988.
[35] Adamus et al., 1991.
[36] Wells, et al., 1988.

33. Describe the shoreline erosion potential at the site[37]:

A = Strong wave action or water current (greatest wind fetch on a lake or outside river bend); frequent boat traffic and restrictions that funnel boats into narrow passages; sandy soils or evidence of erosion or slope failure.

B = Moderate wave action or water current (small lakes or large ponds); moderate boat traffic with some evidence or potential for erosion or slope failure.

C = Negligible erosive forces (little open water or wave action or slow-moving, straight river); minimal to no boat traffic or no-wake zone; no evidence of past erosion or slope failure.

33. Guidance: Shoreline Erosion Potential. Wetlands located in areas with strong currents and wave action have the greatest potential for protecting shoreline. Shorelines composed of sandy or erodible soils will benefit the most from shoreline wetland protection.

34. Describe the shoreline/streambank vegetation conditions up slope from the water level in relation to the ability to protect the bank from erosion or slope failure:

A = Lack of vegetation; regularly manicured, short-grass lawn.

B = Full vegetative cover composed of shrubs receiving only moderate maintenance or grasses/understory vegetation that is not manicured.

C = Deep-rooted vegetation not actively manicured (e.g., trees, shrubs and grasses), or rip-rap.

34. Guidance: Bank Protection Ability. The potential for erosion and/or slope failure of shoreline or streambank areas is also dependent on the land use and condition on the slope above the water level and on top of the bank. Bare soils or those with shallow rooted grasses that are manicured on a regular basis provide less protection than deep-rooted grasses allowed to grow naturally. For this question, consider that part of the wetland starting at the water's edge up to the upland edge, to encompass the shore area up out of the water itself (the water-level wetland is considered in Question #31).

~ **35. Y N Is the wetland known to be used recently by rare wildlife species or wildlife species that are state or federally listed?** If yes, wildlife habitat functional level rating = exceptional. (If Special Features, question J is answered, the functional level will also be exceptional)

35. Guidance: Rare Wildlife. Rare wildlife species include any of those listed in the or are federally listed. This question is meant to address local conditions rather than statewide priorities. Although consulting the Minnesota Natural Heritage Database or County Biological Survey (see Question #5) will be helpful to guide the assessment, local considerations of scarcity or abundance must be applied.

~ **36. Y N Is the wetland plant community scarce or rare within the watershed?** If the wetland community has a High quality rating from Question #2 and this question is yes, then Vegetation function is Exceptional.

36. Guidance: Rare Community. This question is meant to address local conditions rather than statewide priorities. Although consulting the Natural Heritage Database and County Biological Survey

[37] Wells et al., 1988.

(see Question #5) will be helpful to guide the assessment, local considerations of scarcity or abundance must be applied here.

37. For deep and shallow marshes or shallow open water wetland types (types 3, 4, and 5) select the cover category that best illustrates the interspersion of open water and emergent, submergent, or floating-leaved vegetation within the wetland (See Interspersion Diagram Figure 1[38], Appendix Fig. 1 or the database *image*).

Enter the cover category based on the diagram: _____

N/A = Not applicable for wetland types 1, 2, 6, 7, 8.

37. Guidance: Vegetation Interspersion[39]. Wetlands that contain vegetation interspersed with open water are more likely to support notably greater on site diversity and/or abundance of fish and wildlife species. Those with very dense vegetation and no channels or open water areas are less likely to support this function. Vegetation interspersion is a measure of the amount of edge between vegetation and open water, which is valuable to wildlife. Cover categories 5 and 7 rate High; 3, 4, and 6 rate Medium; 1, 2, and 8 rate Low.

38. For wetlands having more than one vegetative community (see Question 1), indicate the interspersion category that best fits the wetland (see Appendix Fig. 2 or database version *Image*).

Category =____. (Category 3=High, 2=Medium, 1=Low)

N/A = Only one vegetative community is present.

38. Guidance: Vegetative Interspersion. For wetlands that are characterized by multiple vegetative communities, the increased structural diversity and amount of edge associated with greater interspersion is generally positively correlated with wildlife habitat quality. Interspersion is a modification based on the Wells et al., 1988, Page 67, Interspersion Diagram, Golet et al., 1976. The figures shown in the appendix are examples of complexity, not meant to be exact representations of any individual site. Choose the one that most closely approximates the degree of interspersion at your site, regardless of structural differences. "Site," in some instances, may mean a portion of a larger basin, if that is how the assessment area has been defined from the start.

39. A healthy wetland will have detritus (vegetative litter) in several stages of decomposition. Describe the wetland condition[40]:

A = The presence of litter layer in various stages of decomposition.

B = Some litter with apparent bare spots, or dense litter mat (e.g., reed canary grass mat).

C = No litter layer.

N/A = Deep marshes, shallow open water and bog communities.

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[38] Wells et al., 1988; Adamus et al., 1991.

[39] Interspersion is based on Wells et al., 1988, Page 180 Interspersion Diagram

[40] Lee et al., 1997

39. Guidance: Wetland Detritus. Detritus or vegetative litter in various stages of decomposition is a sign of a healthy wetland. Detrital biomass impacts nutrient cycling processes and disturbance regime and thereby influences plant assemblages. Detritus maintains thermal regulation of rhizomes and propagules, and is essential to nutrient cycling. The integrity of the system's vegetation components supplies the bulk of the faunal habitat requirements. When assessing a site, consider that the amount of detritus will vary with the time of year; floodplain forests may show no litter after spring flood events, for example.

~ **40. Describe the relative interspersion of various wetlands in the vicinity of the assessment wetland[41]:**

A = The wetland occurs in a complex of wetlands of various types (general guideline: at least 3 wetlands within 0.5 miles of assessment wetland, at least one of which has a different dominant plant community than the assessment wetland); or the assessment wetland is the only wetland within a 2 mile radius.

B = Other wetlands of the same plant community as the assessment wetland are present within 0.5 miles.

C = No other wetlands are present within 0.5 miles of the assessment wetland but are present within 2 miles.

40. Guidance: Wetland Interspersion. This question is best determined using GIS (except in forested areas where wetlands smaller than one to three acres may not appear). This question uses a 0.5-mile radius and rates wetlands higher for having more wetland neighbors. However, research indicates that the critical radius varies by species[42]. Wetlands that are isolated in the landscape may provide the last refuge for wetland dependent plant and animal species in an otherwise upland or developed area.

41. Habitat value diminishes when fragmented by barriers, which restrict wildlife migration and movement. Describe barriers present between the wetland and other habitats[43]:

A = No barriers or minimal barriers present; i.e. low traffic; uncurbed roads, low density housing (> 1 acre lots), golf courses, utility easements, or railroads.

B = Moderate barriers present; i.e. moderately traveled; curbed roads, moderate density housing (1/3 to 1 acre lots), residential golf courses, low dikes, row crops.

C = Large barriers present; i.e. 4-lane or wider, paved roads, parking lots, high-density residential (<1/3 acres), industrial and commercial development.

41. Guidance: Wildlife Barriers. This variable is defined as a measure of habitat fragmentation of the wetland relative to other wetlands and native plant communities to indicate the ecosystem connectivity. It identifies barriers to wildlife migration ranging from very small barriers such as unpaved roads and low-density housing to large hydrologic barriers such as regional canals and levied roads. Reference area will affect this rating: "other habitats" includes upland areas usable as wildlife resting or reproductive habitat. Because agricultural use can vary in intensity, use Best Professional Judgment to determine if cropland could be considered "habitat."

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[41] Wells et al., 1988; Adamus et al., 1991
[42] Whited et al., 2000
[43] Rheinhardt et al., 1997

42. Amphibian breeding potential – hydroperiod (check one)

___ Adequate—the wetland is inundated long enough in most years to allow amphibians to successfully breed (Cowardin et al. water regimes A, C, F, H, G) (Score = 1.0)

___ Inadequate—the wetland is not inundated long enough in most years to allow amphibians to successfully breed (Cowardin et al. water regimes B, D, E, J) (Score = 0)

42. Guidance: Amphibian Breeding/Hydroperiod. Frogs, toads and salamanders reproduce at different times from late March to June, depending on the species[44]. Early breeders (such as spring peepers, wood frogs, chorus frogs, salamanders) typically reproduce in shallow, seasonal wetlands. Green frogs and mink frogs reproduce in larger more permanent wetlands. For breeding to be successful, the wetland must remain inundated long enough for the larval stages to metamorphose into adults. This period varies depending on the species, but a rough guide is that the wetland should remain inundated at least through June 1 for the portion of the state south of I-94 and at least through June 15 north of I-94. This period of inundation will not accommodate all species, but is reasonably likely to ensure that the wetland is suitable for breeding by some amphibians.

The Cowardin et al. water regimes listed above are approximate indicators—more direct evidence of hydroperiod should be used when possible. Direct evidence of amphibian breeding **may** be an indication of a sufficient hydroperiod. Such evidence would include observations of frogs calling, egg masses in the water, presence of tadpoles or presence of young, newly metamorphosed frogs, toads or salamanders at the wetland. Note however, that some species are opportunistic and will lay eggs in temporary pools that will not remain inundated long enough for successful reproduction. Exercise caution when using this indicator.

43. Amphibian breeding potential – fish presence

A = The wetland is isolated so that predatory fish (e.g., bass, northern pike, walleye, bluegill, perch, etc…) are never present.

B = The wetland may occasionally be connected to other waters so that predatory fish may be present in some years.

C = The wetland is connected with a lake or river so that predatory fish are always present or the wetland is used for rearing of game fish.

43. Guidance: Amphibian Breeding/Predators. Optimal amphibian breeding habitat is characterized by a lack of predatory fish[45]. These habitats are wetlands that winterkill, dry periodically, are periodically anoxic, and are not connected to waters bearing predatory fish. The wetland should not be used to rear bait or game fish. This question utilizes observable characteristics of the wetland to infer about the status of fish. Direct observation or knowledge about fish presence should be substituted where possible.

44. Amphibian and reptile overwintering habitat

A = The wetland is normally more than 1.5 meters deep (never or rarely winterkills).

B = The wetland is normally around 1 meter deep (may occasionally winterkill).

C = The wetland is normally less than 1 meter deep and often freezes to the bottom.

N/A = The wetland never or rarely contains standing water or is nearly always dry in winter.

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[44] Oldfield and Moriarty, 1994

[45] Lannoo, 1998

44. Guidance: Amphibian Habitat. Wetlands that are deep and well oxygenated provide over-wintering habitat for leopard, green and mink frogs, as well as turtles[46]. Evidence of over-wintering would be observations of migrations of frogs to the wetland in fall and away from the wetland in spring and basking turtles in the spring. Recent evidence of Blandings turtles overwintering in Type 6 wetlands may alter this assessment.

45. List any noteworthy wildlife species observed or in evidence (e.g., tracks, scat, nest/burrow, calls, viewer reports), including birds, mammals, reptiles, and amphibians. *(Note: This list is for documentation only and is not necessarily an indication of habitat quality.)*

46. Is the wetland contiguous or intermittently contiguous with a permanent waterbody or watercourse such that it may provide spawning/nursery habitat for native fish species? Choose the condition from the following list that best describes the wetland in relation to fish habitat:

Exceptional = The wetland is a known spawning habitat for native fish of high importance/interest or the wetland is part of or adjacent to a trout fishery as identified by the DNR.

A = The wetland is lacustrine/riverine or is contiguous with a permanent water body or watercourse and may provide spawning/nursery habitat, refuge for native fish species in adjacent lakes, rivers or streams, or provides shade to maintain water temperature in adjacent lakes, rivers or streams.

B = The wetland is intermittently connected to a permanent water body or watercourse that may support native fish populations as a result of colonization during flood events, or the wetland is isolated and supports native, non-game fish species.

C = The wetland is isolated from a permanent water body or watercourse or has exclusive, high carp populations, which cause degradation to the wetland.

N/A = None of the above. The wetland does not have standing water during most of the growing season. The site is not capable of supporting fish.

46. Guidance: Fish Habitat Quality. Generally, the value of a wetland for fish habitat is related to its connection with deepwater habitats. In the north central region, spawning habitat for warm water species can be an important function of a wetland, and northern pike are among the most valuable warm water species spawning in wetlands[47]. Cold-water species are relatively rare and wetlands (according to traditional definition) do not provide habitat for spawning trout, but have an indirect effect through improving water quality[48].

Northern pike wetland spawning habitat will have several characteristics including: 1) A semi-permanent or permanent connection to a lake or stream that has a population of northern pike; 2) The wetland is vegetated primarily with reeds, grasses, or sedges; or secondarily with cattails, rushes, arrowhead, water lilies, submerged plants, and shrubs or lowland hardwoods with grass and low emergents; 3) The wetland is flooded during the early spring at least once every 3 years for at least 20 days and remains connected to the lake or stream during that time; 4) Lacustrine areas should have 4 to 8 acres of actual spawning area for each 100 littoral acres of lake[49]; and 5) Shallow or deep marsh wetland spawning areas are typically located on the upstream side of the lake or stream[50].

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[46] Oldfield and Moriarty, 1994
[47] Adamus et al., 1991.
[48] Adamus et al., 1991.
[49] MIDNR, 1981; Adamus et al., 1991.
[50] Personal communication, D. Ellison, MnDNR.

A wetland should be rated as having high value for fish if it provides spawning/nursery habitat, or refuge for *native* fish species in adjacent lakes, rivers or streams. Some isolated deep marshes may intermittently support populations of sunfish and northern pike as a result of colonization during flood events. Permanently flooded isolated wetlands that support native populations of minnows provide moderate value. Wetlands with exclusive, high carp populations provide low value for fish habitat because carp cause extreme degradation of the wetland. Isolated wetlands that are not permanently flooded do not generally support fish populations.

47. List any fish species observed or evidenced. *Note: This list is for documentation only and is not necessarily an indication of habitat quality* (database drop-down list: northern pike, perch, sunfish, bass, minnows, carp).

48. Y N Does the wetland provide a unique or rare educational, cultural, or recreational opportunity (e.g., located in an outdoor learning park focused on wetland study)? (If yes this function rates exceptional)

48. Guidance: Unique Opportunity.
The wetland must provide a rare or unique opportunity within the ecoregion, wetland comparison domain, or study area, such as a wetland associated with a school environmental program or public education institution (University of Minnesota's Cedar Creek, Landscape Arboretum's Spring Peeper Wetland), cultural experience (wild rice areas), or a pristine-reference site for another assessment tool[51].

49. Is the wetland visible from vantage points such as: roads, waterways, trails, houses, and/or businesses?

A = The wetland is highly visible and can be seen from several public vantage points.
B = The wetland is somewhat visible and can be seen from a few vantage points.
C = Very limited visibility.

49. Guidance: Visibility. While dependent on accessibility, a wetland's functional level could be evaluated by the view it provides observers. Distinct contrast between the wetland and surrounding upland may increase its perceived importance. Multiple vantage points increase the likelihood and number of people that may view the wetland.

50. Y N Is the wetland in/near a city, town, or village so as to generate aesthetic/recreation/ educational/cultural use?

50. Guidance: Population Centers. Accessibility of the wetland is key to its aesthetic or educational appreciation. Thus, proximity to population centers may increase its perceived importance. However, proximity to population centers and locations in public areas may have associated noise and/or pollution factors that could degrade the aesthetic and educational functional level.

~ 51. Is any part of the wetland in public or conservation ownership?

A = Completely contained within publicly owned land or entirely within a conservation easement.

B = Partially within publicly owned land or partially within a conservation easement.

C = Privately owned or not within a conservation easement.

[51] Minnesota's Index of Biologic Integrity uses several wetlands as reference-standard sites for both high- and low-functioning sites.

51. Guidance: Public Ownership. Wetlands located on lands in public ownership inherently will provide open accessibility. Wetlands being on lands within a conservation easement provides some certainty that the wetlands will not be subject to impact pressures.

52. Does the public have access to the wetland from public roads or waterways?

A = Direct access through a public facility with an established parking area or boat access.

B = Cumbersome access from a public facility (i.e. no established trails to or near wetland) or no public parking or boat access available.

C = No public access available.

52. Guidance: Public Access. Accessibility of the wetland is key to its aesthetic or educational appreciation. Wetlands located on private lands are not likely to provide aesthetic or educational opportunities to the general public.

53. What are the obvious human influences on the wetland itself, such as:

A = No structures, pollution, trash, or other alteration present in the wetland.

B = Wetland only moderately disturbed by structures, pollution, trash, or alteration.

C = Wetland has signs of extensive pollution/trash, severe vegetative alteration, or multiple structures.

53. Guidance: Human Disturbances in Wetland. Wetlands subject to direct human disturbances/impacts are not likely to provide aesthetically pleasing natural environments.

54. What are the obvious human influences on the viewshed of the wetland, such as:

A = No or minimal buildings, roads, or altered land uses surrounding the wetland.

B = Surrounding area composed of mostly open space with a few buildings or roads, low intensity agriculture.

C = Wetland surrounded by residential, other intensively developed land uses, or intensive agriculture.

54. Guidance: Wetland Viewshed. This question requires a judgment as to the dominant land use visible at the primary viewing locations within the wetland. This method assumes that the most appealing views of wetlands are from other areas of natural beauty such as an upland forest[52]. Wetlands occurring in densely developed urban areas equate with lower ratings. Excessive noise from nearby highway or factories could be considered an intrusive human influence.

55. Does the wetland and buffer area provide a spatial buffer between developed areas?

A = Spatial buffer more than 500 feet wide.
B = Spatial buffer between developed areas less than 500 feet wide.
C = Does not provide a spatial buffer—no developed land near the wetland.

55. Guidance: Spatial Buffer. Views of open water and open space in general are considered to be

[52] Ammann and Stone, 1991.

aesthetically appealing[53]. Distinct contrast between the wetland and surrounding upland may increase its perceived importance. Expansive wetlands and associated buffer areas provide open space and a feeling of a natural environment while reducing the visibility of adjacent human development. If the wetland is surrounded by undeveloped land within its immediate viewshed, the wetland has little value as a spatial buffer. Developed lands across any portion of the wetland will benefit from the spatial buffering of the wetland. Spatial buffer is measured from the edge of the developed area, across the wetland, to the edge of the next developed area. The edge may be considered the end of manicured lawn or golf course, sidewalk or paved area, or up to a wall or fence.

56. Is the wetland and immediately adjacent area assumed to be currently used for (or does it have the potential to be used for) recreational activities such as the following: education, cultural, scientific study, hiking, biking, skiing, hunting, fishing, trapping, boating, canoeing, wildlife observation, exploration, play, photography, or food harvest.

A = Evidence or a high probability for multiple recreational uses.
B = Evidence of or a high probability for a few recreational uses.
C = Low probability or potential for recreational use

56. Guidance: Activities. Wetlands can provide recreational and educational opportunities that enhance their value. Use Best Professional Judgment to decide the likelihood and value of multiple uses from the list above, or of others not noted.

57. Is the vegetation or hydrology currently controlled or modified to sustain a commercial product?

A = Highly Sustainable Use: commercial use of the wetland does not permanently alter the wetland characteristics.

B = Somewhat Sustainable Use: wetland characteristics have been altered but vegetation is still hydrophytic.

C = Hydrology dramatically altered to produce a commercial product such as row crops or peat.

N/A = This wetland is not used for commercial products.

57. Guidance: Commercial Quality. Is the wetland being used for a commercial product that does not sustain the wetland? If so, consider the nature of the use. Sustainable uses of the wetland would not require modifying a natural wetland. Products in this category would include collection of botanical products, wet native grass seed, floral decorations, wild rice, black spruce, white cedar, and tamarack. Other sustainable uses may require modification of the natural hydrology, such as for wetland-dependent crops that rely on the wetland hydrology for part of their life cycle (rice, cranberries). Haying and grazing are less intrusive agricultural activities utilized more or less casually when hydrologic conditions permit; light pasture and occasional haying might be considered highly sustainable [A], whereas heavier use would result in a rating of [B]. Row crops such as corn and soybeans can be planted in some wetlands after spring flooding has ceased and still have adequate time to grow to maturity. Like peat-mining, cropping is an unsustainable use of the wetland as it is results in severe alterations of wetland characteristics (soil, vegetation, hydrology).

[53] Ammann and Stone, 1991.

The following questions (#58-63) relate to the movement of groundwater into and out of the wetland. Base your answers on the best available information. Classification of a given site as a primarily recharge or discharge wetland will be based on how a majority of the questions are answered and does not offer a definitive result as to the actual movement of groundwater in the assessment area. When the primary hydrology comes from ground-water, wetlands are labeled discharge, whereas recharge wetlands are those whose hydrology is primarily supported by surface-water that then seeps into a ground-water system.

~ 58. Describe the soils within the wetland[54]:

Recharge = Mineral soils with a high organic content (all soils not included in discharge system).

Discharge = Organic/peat soils, formed due to more continuous wetness associated with a ground water discharge system

58. Guidance: Wetland Soils. Wetlands with mineral hydric soils typically represent drier hydrologic regimes where groundwater recharge is more likely (i.e. saturated, seasonally flooded, and temporarily flooded) where the wetness does not significantly limit oxidation of organic materials. Groundwater discharge wetlands represent more stable and permanent hydrologic regimes where excessive wetness limits the oxidation of organic matter resulting in the accumulation of peat and/or muck. In addition, coarser-grained mineral hydric soils may have higher permeabilities allowing groundwater recharge, while histosols generally have low permeabilities, reducing groundwater discharge. Disturbed soils in excavated wetlands or stormwater ponds are subject to best professional judgement for this question.

~ 59. Describe the land use/runoff characteristics in the local subwatershed upstream of the wetland[55]:

Recharge = Land is primarily developed to high-density residential, commercial, industrial and road land uses (equivalent to lots 1/4 acre or smaller) indicating impervious surfaces (>38%), which result in more runoff to wetlands and lowered water tables creating a gradient for recharge under wetlands.

Discharge = Upland watershed primarily undeveloped or with low to moderate density residential development (i.e. lots larger than ¼ acre) with low percentage of impervious surfaces (<38%) so upland recharge (to groundwater) and higher water table will be more likely to contribute discharge to wetlands.

59. Guidance: Land Use/Runoff. The local subwatershed boundary, smaller still than the DNR minor watershed, is available from the local Soil and Water Conservation District office. Watersheds with extensive paved surfaces, topographic disruptions, and the presence of wells are associated with human development that lowers the potentiometric contours. Lowered or diversified potentiometric contours enhance the likelihood of recharge, not discharge[56]. Wetlands with unpaved watersheds are more likely to allow groundwater discharge to occur.

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[54] R.P. Novitzki, 1998 personal communication in MnRAM 2.0; Magee and Garrett, 1998.
[55] Adamus et al., 1991.
[56] Fetter, 1980.

60. Indicate conditions that best fit the wetland based on wetland size and the hydrologic properties of the upland soils within 500 feet of the wetland[57].

Recharge = Wetland is <200 acres and surrounding soils (within 500 feet) are primarily in the C or D hydrologic groups.

Discharge =Wetland is >200 acres in size or wetland is <200 acres and the surrounding soils (within 500 feet) are primarily in the A or B hydrologic groups.

60. Guidance: Wetland Size and Surrounding Soils. The size or area of the wetland and the soil texture in the surrounding upland are two factors controlling the wetland's water budget. A large wetland with a proportionately small watershed may indicate subsidization of its water budget by groundwater discharge. The probability of groundwater discharge occurring may thus increase as the wetland/watershed ratio increases. The wetland size also controls the amount of recharge potential. The more fine-grained the soil texture in the surrounding uplands, the more water will flow to the wetland via overland flow and less likely water is to flow to the wetland via groundwater discharge. Williams (1968) observed that a small wetland situated in a large watershed favored groundwater recharge, because surface water inflow from a large watershed was sufficient to create a water mound conducive to recharge. Sandy and loamy upland soils allow more infiltration of precipitation than clayey soils. The infiltrated water will percolate downward vertically and/or flow laterally becoming groundwater discharge where wetlands intersect the water table.

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms. The four hydrologic soil groups are as follows[58]:

← higher) **Runoff Potential** (lower→	Soil Group	Infiltration rate	Depth and drainage characteristics	Water Transmission Rate
	A	High	Deep, very well drained to excessively drained sands or gravelly sands.	high
	B	Moderate	Moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture.	moderate
	C	Slow	Soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture.	slow
	D	Very slow	Clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material.	very slow
	A/D B/D C/D	The first letter (for drained areas) should be used for the determination of recharge/discharge; if unsure, the second letter (D) would be used for undrained areas and therefore put it into the recharge category.		

61. Indicate the hydroperiod of the wetland[59]:

[57] Adamus et al., 1991; Magee and Garrett, 1998.
[58] USDA Natural Resources Conservation Service Hennepin County Soil Survey – Issued 2004.
[59] Adamus et al., 1991; Lee et al., 1997.

Recharge = Cowardin et al. water regimes: A, C, D, E, and J (i.e. temporarily flooded, seasonally flooded, seasonally flooded/well drained, seasonally saturated, and intermittently flooded as well as wetlands with the B regime (saturated) that: (1) are on flats; and/or (2) are acid bogs (indicates precipitation-driven systems).

Discharge = Cowardin et al. water regimes: F, G, H, (i.e. semi-permanently flooded, intermittently exposed, and permanently flooded), as well as wetlands with the B water regime (saturated) that: (1) consist of sloping organic soils; (2) are on a river valley terrace or at the toe of a bluff or beach ridge, etc.; or (3) have any observed springs or seepages.

61. Guidance: Hydroperiod. Permanently flooded, semi-permanently flooded, and saturated water regimes, especially in regions having high evaporation rates, often indicate groundwater discharge to a wetland. Exceptions are saturated wetlands on flats and/or bogs that are precipitation-driven systems. Wetlands that are seasonally- or temporarily-flooded are more likely to recharge groundwater.

62. Describe the inlet/outlet configuration that best fits the wetland[60]:

Recharge = No outlet or restricted outlet in natural wetlands and lacustrine wetlands.

Discharge = Perennial outlet but no perennial or intermittent stream inlet; perennial stream riverine or floodplain wetland.

62. Guidance: Inlet/Outlet for Groundwater. A wetland with a permanent stream inlet but no permanent outlet is more likely to recharge groundwater than one with an outlet. Several factors support this ranking. First, a higher hydraulic gradient will likely be present in an area with no outlet, especially if an inlet is present. Second, the longer water is retained in an area, the greater the opportunity for it to percolate through the substrate. Third, wetlands without outlets generally experience more water-level fluctuations, resulting in inundation of unsaturated soils. Finally, lack of an outlet suggests that water is being lost either through recharge or evapotranspiration, especially if an inlet is present. A wetland with a permanent outlet and no inlet is more likely to discharge groundwater than one with other combinations of inlets and outlets. Continuous discharge of water (i.e. permanent outlet) without surface water feeding the wetland through an inlet suggests an internal source of groundwater (e.g., springs or seeps). Flow-through wetlands would be considered discharge wetlands for the purposes of this question.

~ **63. Characterize the topographic relief surrounding the wetland[61]:**

Recharge = Land slopes away from (below) the wetland (wetland is elevated in the subwatershed).

Discharge = Topography characterized by a downslope toward the wetland around the majority of the wetland (wetland is found lower in the subwatershed).

63. Guidance: Topographic Relief. This question refers to landscape-level topography at a large, subwatershed scale. Groundwater discharge is more likely to occur in areas where the topographic relief is characterized by a sharp downslope toward the wetland (i.e. wetland is located at the toe of a slope). Groundwater recharge is more likely in wetlands where the topographic relief is characterized by a sharp downslope away from most of the wetland. The slope of the water table with respect to the wetland influences the hydraulic gradient for groundwater movement. The water table usually slopes roughly parallel to the land surface topography. Thus, when local topography slopes sharply toward the

[60] Adamus et al., 1991; Lee et al., 1997.

[61] Adamus et al., 1991.

wetland, the result is typically a hydraulic gradient favorable for groundwater discharge.

END OF PRIMARY QUESTION SET FOR MNRAM 3.1

Optional Evaluation Information

64. Y N Does the wetland have the potential for hydrologic restoration without flooding: roads, houses, septic systems, golf courses or other permanent infrastructure (active agricultural fields are acceptable uses within potential restoration areas) within the restoration area? If yes, answer the following questions. If no, skip to question 71.

64. Guidance: Hydrologic Restoration Potential. The purpose of this question is to identify opportunities for restoration of drained or partially drained wetlands. Generally, this question applies to wetlands that have been ditched or tiled for agricultural or other purposes. Some drained or partially drained wetlands will not have the potential for restoration because of altered land uses that rely on continued drainage of surface and/or subsurface water. It is important to look at land uses upstream of the drained wetland to determine if any of the features mentioned could be flooded by plugging a ditch, breaking drain tiles or creating an impoundment.

65. Indicate the number of landowners that would be affected by the wetland restoration project:

- ❑ Completely within public ownership
- ❑ 1
- ❑ 2
- ❑ 3 or more

65. Guidance: Landowners. The number of landowners of the drained or partially drained wetland and any obvious upstream areas that would be flooded by hydrologic restoration of the wetland directly affects the feasibility of a restoration project. Typically, as the number of private owners of a potential restoration site goes up the project becomes more complex and the probability of success is reduced due to conflicting desires among the landowners. All public=Exceptional, 1=High, 2=Medium, 3 or more=Low.

~ **66. Enter the existing wetland area and estimated size of the total wetland if effectively drained or filled areas were restored (not including any buffer area).** Two characteristics will be computed from the following information: 1) total restored wetland size, and 2) percentage of historic wetland effectively drained.

Programming the overall restoration potential will assign the rank based on size.

A. Size of existing wetland (acres) _____ (should be the same as Question #10)

B. Total wetland including restorable and existing wetland (acres) _____

C. Calculated potential new wetland area (acres) _____

In the database, enter this at the General Information tab (first screen).

66. Guidance: Wetland Restoration Area. The size of the potential wetland restoration will be determined partially by the extent of historic hydric soils mapped on the site, but must also take into consideration upstream land uses, current land uses on the site, methods of hydrologic alteration that have occurred, and the current topography of the site. Restoring the natural hydrology to partially drained wetlands will restore the historic wetland type. Restoration of existing wetlands that had some ditching or tiling that did not effectively drain the entire wetland may result in some new wetland and some hydrologically restored wetland. Some wetland laws may allow for wetland replacement credit for hydrologically restored wetlands as well as restoration of drained wetlands. Two ratings will be determined for this question;

1) **Total restored wetland size (acres)**: (High >10 acres, Medium = 2 to 10 ac, or Low = less than 2 ac.)

2) **Percent of historic wetland effectively drained:** (High = >60%, Medium = 20 - 60%, or Low = < 20%)

67. Enter the average width of naturalized upland buffer that could potentially be established around the restored wetland:

_____ feet (High = more than >50' around the potential wetland restoration area;
Medium = between 25' and 50' around the potential wetland restoration area;
Low = less than <25' around the potential wetland restoration area)

67. Guidance: Restorable Buffer Width. Upland buffer protects wetland function.

68. Rate the potential ease of wetland restoration:

A = Break tile line and/or plug ditch, discontinue pumping.
B = Break multiple tile lines and/or ditch plugs.
C = Diking, berming, excavation or grading.

68. Guidance: Restoration Ease. The easiest wetlands to restore are those that were drained by a single ditch or drain tile. Restoration of those wetlands will typically involve simply plugging the ditch or breaking the tile line. The most difficult situation for creating wetlands is by impoundment or excavation in uplands. This involves much more uncertainty and greater cost.

69. Indicate the type of hydrologic alteration:

____Ditching
____Drain Tiles
____Ground Water Pumping
____Lowered Outlet Elevation
____Watershed Diversion
____ Filling

69. Guidance: Hydrologic Alteration. Alterations may include ditching or tiling which is typical in agricultural settings. Also important are ground water pumping activities that can lower local ground water levels and drain wetlands (i.e. dewatering for quarries, underground construction, or utility construction; ground water pumping for residential, commercial or municipal water use). In metro areas, the natural wetland outlet elevation may be lowered by the construction of an outlet structure (i.e. weir, culvert, lowered overland outflow elevation). Development activities occasionally result in the diversion of drainage away from a wetland, which can change the natural hydrology. This information is not used in calculations.

70. Indicate the potential restoration wetland classification according to Circular 39 (USFWS, 1956): Type 1, 2, 3, 4, 5, 6, 7, or 8. (Informational purposes only.)

71. The susceptibility of the wetland to degradation from stormwater input: wetland type classification (Question #1, Community Type and Question #3, Vegetative Diversity/Integrity) will be utilized to determine the best fit to the following categories based on the most sensitive, dominant wetland community:

Exceptional = Sedge meadows, open and coniferous bogs, calcareous fens, low prairies, wet to wet mesic prairies, coniferous swamps, lowland hardwood swamps, or seasonally flooded basins.

A = Shrub-carrs, alder thickets, diverse fresh wet meadows dominated by native species, diverse shallow and deep marshes and diverse shallow, open water communities.

B = Floodplain forests, fresh wet meadows dominated by reed canary grass, shallow and deep marshes dominated by cattail, reed canary grass, giant reed or purple loosestrife, and shallow, open water communities with moderate to low diversity.

C = Gravel pits, cultivated hydric soils, or dredge/fill disposal sites.

71. Guidance: Stormwater Sensitivity. Guidelines are taken from State of Minnesota, 1997, Section IV, Wetland Susceptibility.

72. The sustainability of the wetland with regard to stormwater treatment prior to discharge into the wetland. (This rating uses the calculated outcome from the Wetland Water Quality Protection Function (H, M, or L) and applies it as follows):

A = No additional stormwater treatment needed.

B = Additional stormwater nutrient removal needed.

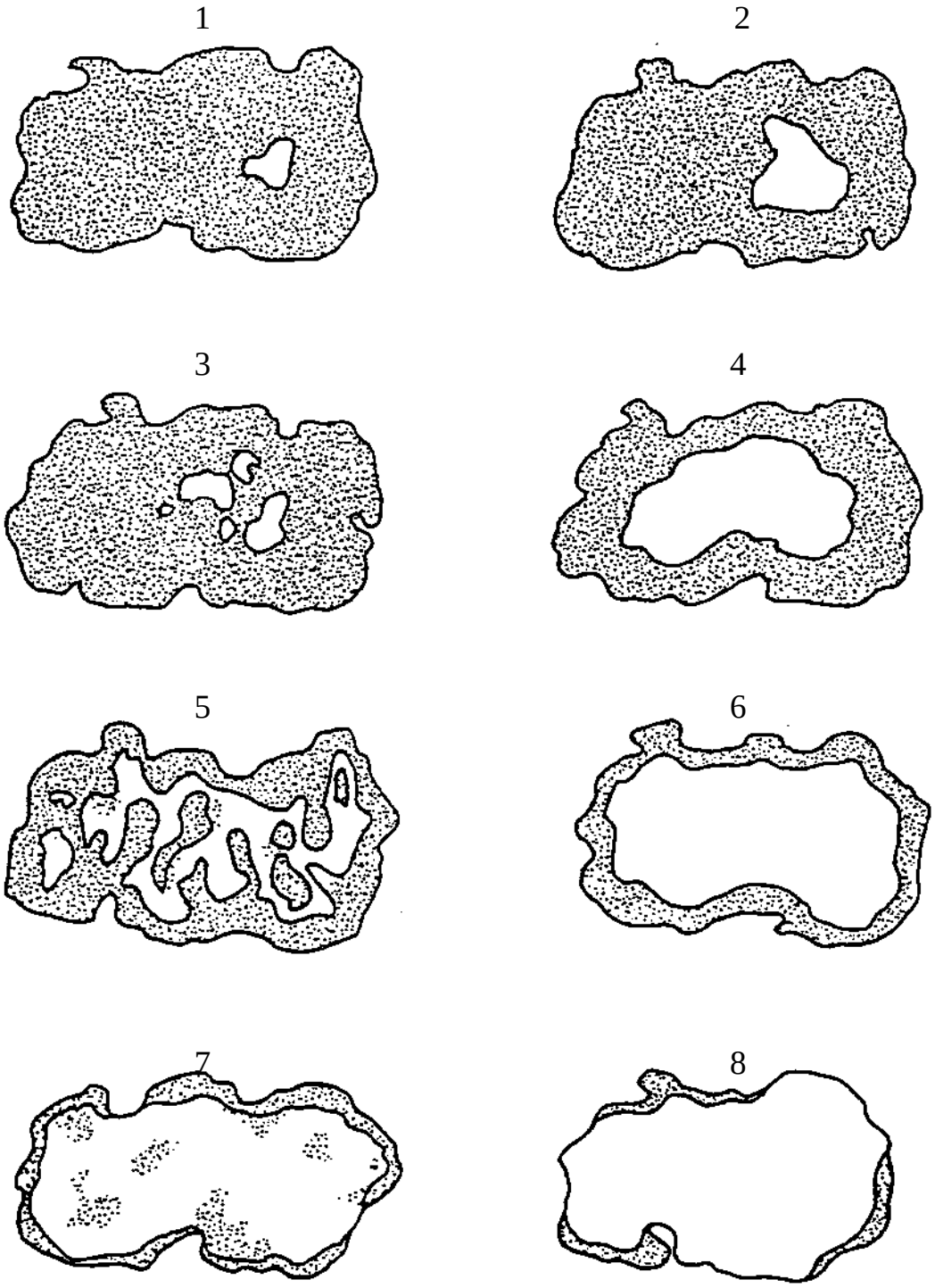
C = Additional sedimentation and nutrient removal needed.

72. Guidance: Nutrient Loading. Wetlands that receive untreated, directed stormwater containing sediment and nutrients will not be as sustainable as in a native landscape. Typically, wetlands receiving stormwater treated to approximately NURP standards will have a higher likelihood of sustainability. Wetlands receiving stormwater with just sediment removal will be subject to nutrient loading and excessive plant growth.

Appendix 1 – Figure 1

Open Water Types

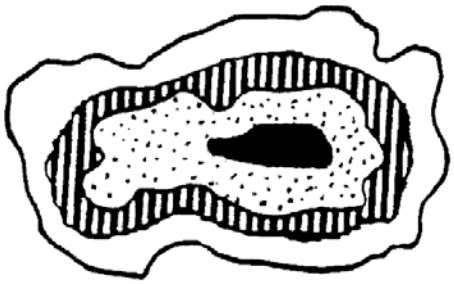
White areas indicate open water (including floating and submerged plants). Stippled areas indicate emergents, shrubs, and trees.



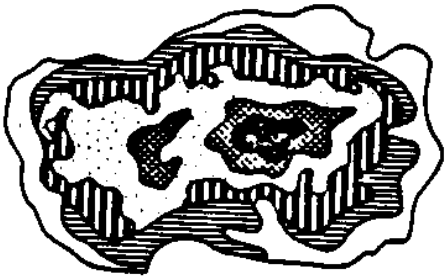
Source: Adapted from Golet, 1976

Appendix 2 – Figure 2

INTERSPERSION CATEGORY 1



INTERSPERSION CATEGORY 2



INTERSPERSION CATEGORY 3

INTERSPERSION CATEGORIES OF VEGETATIVE TYPES ADAPTED FROM GOLET, 1976

The figures shown here are examples of complexity, not meant to be exact representations of any individual site. Choose one that most closely approximates the degree of interspersion at your site, regardless of structural differences.

Appendix C – City Council Resolution

CITY OF ROSEMOUNT
DAKOTA COUNTY, MINNESOTA

RESOLUTION 2013-15

A RESOLUTION DEFINING THE ADMINISTRATIVE PROCEDURES OF THE WETLAND CONSERVATION ACT

WHEREAS, the State Legislature revised the Wetland Conservation Act (WCA) in 2012;

WHEREAS, the City of Rosemount has prepared amendments to the Comprehensive Wetland Management Plan as result of the State WCA revisions;

WHEREAS, on February 5, 2013, the City of Rosemount City Council reviewed and approved the Comprehensive Wetland Management Plan Amended February 2013; and

WHEREAS, the City of Rosemount is authorized by Minnesota Administrative Rules Part 8420.0200, Subpart 2, to delegate certain local government unit functions with regard to implementation of the Wetland Conservation Act to its staff, and

WHEREAS, City of Rosemount staff is defined as the City Engineer, or its designee, such as its Environmental Consultant.

NOW, THEREFORE, BE IT RESOLVED, by the City Council of the City of Rosemount, Minnesota, that decision authority for exemption, no loss, wetland boundary and type, and replacement plan determinations with less than 10,000 square feet of proposed wetland impact, are placed with City of Rosemount staff.

AND, that decision authority for wetland banking determinations and replacement plan determinations with greater than or equal to 10,000 square feet of proposed wetland impact are placed with the City Council of the City of Rosemount.

AND, City of Rosemount staff may request City Council decision authority for exemption, no loss, wetland boundary and type, and replacement plan determinations with less than 10,000 square feet of proposed wetland impact.

ADOPTED this 5th day of February, 2013, by the City Council of the City of Rosemount.

William H. Droste, Mayor

ATTEST:

Amy Domeier, City Clerk

Appendix D – Appealed Wetland Management Classifications

WSB & Associates, Inc.
Engineering ■ Planning ■ Environmental ■ Construction

701 Xenia Avenue South
Suite 300
Minneapolis, MN 55416
Tel: 763-541-4800
Fax: 763-541-1700

Memorandum

To: *Jeremy Duehr, Arcadis*
Ian Peterson, Pulte Homes of Minnesota
Andy Brotzler, City of Rosemount

cc: *Ken Powell, BWSR*
Brian Watson, Dakota County SWCD
Melissa Doperalski, DNR
Travis Thiel, Vermillion River Watershed JPO

From: *Jed Chesnut, WSB & Associates*

Date: *July 20, 2011*

Re: *Marshes of Bloomfield – Wetland Assessment Report*
Wetland Management Classification Appeal – Notice of Decision
WSB Project No. 1916-17

As part of the Marshes of Bloomfield Development proposal, Jeremy Duehr of Arcadis ("Applicant") completed a wetland functional assessment of the wetlands on the property, as per the City of Rosemount's Wetland Management Plan ("WMP"). The assessment was done in accordance with the Rosemount Wetland Functional Assessment ("RoseWFA"), as required by the WMP.

The Applicant has appealed the management classification of two wetlands that were identified and assessed on the property (see attached figure from applicant's submittal). The Applicant has proposed the following management classification change:

Wetland ID	WMP Classification	Proposed Classification by Arkadis
Wetland I (WMP # 340)	Preserve	Manage 2
Wetland J (WMP # 340)	Preserve	Manage 2

Wetlands I and J were identified and assessed in the WMP as one wetland, number 340. The Applicant delineated the basin as two separate wetlands. The City of Rosemount, Local Government Unit for the Wetland Conservation Act approved the delineated wetland boundaries (Notice of Decision dated 12/16/10) of the two separate wetlands, I and J.

The City of Rosemount has reviewed the "Wetland Assessment Report" dated May 31, 2011 and the results of the RoseWFA completed by the Applicant. The City of Rosemount's Wetland Specialist visited Wetlands I and J in the field and evaluated the wetlands' overall condition for

comparison to the Applicant's RoseWFA. According to the Wetland Assessment Report, the primary reason for the change from Preserve to Manage 2 is the lack of diverse wetland vegetation within the wetlands. During the Applicant's assessment the wetlands were dominated by reed canary grass with very few native species. This observation was confirmed by the Wetland Specialist during the City's site visit. It is entirely possible that when the original assessment was completed in 1997/1998, the wetlands contained a more diverse assemblage of native wetland plant species. However, the wetlands are now nearly completely comprised of reed canary grass with a very minimal presence of native plant species, most likely because the surrounding landscape has been altered through various land use practices.

Based on the Wetland Assessment Report, the RoseWFA completed by the Applicant, and the site visit and evaluation completed by the City's Wetland Specialist, the City of Rosemount has made the following decision as it pertains to the Applicant's appeal of the wetland management classification of Wetlands I and J:

APPROVED: ***The management classification of Wetlands I and J (Wetland # 340 in WMP) is changed from Preserve to Manage 2.***

Summary Table of Changes

Wetland ID	Revised WMP Management Classification
Wetland I (WMP # 340)	Manage 2
Wetland J (WMP # 340)	Manage 2

The management and protection strategies as per the WMP are attached. Appeals of this Decision can be made to the Rosemount City Council.

MALCOLM PIRNIE	ROSEMOUNT, MINNESOTA MARSHES OF BLOOMFIELD	WETLAND BOUNDARIES	NOVEMBER 2010 FIGURE 6

IX-I. Wetland Management and Protection Requirements

Management Class	Score	Management Strategy	Wetland Buffer Requirements	Storm Water Management	Mitigation Standard
Preserve	660 - 425	Maintain wetland and existing functions, values and wildlife habitat. Apply strict avoidance standards.	75 feet 30' minimum if buffer averaging is allowed Monuments required	Sediment and nutrient pretreatment required; consider diversion if possible	3:1 replacement ratio with a minimum 1.5 acres of New Wetland Credit and maximum 1.5 acres of Public Value Credit for every acre impacted.
Manage I	420 - 280	Maintain wetland without degrading existing functions, values and wildlife habitat. Sequencing is applicable	50 feet 30' minimum if buffer averaging is allowed Monuments required	Sediment and nutrient pretreatment required	2:1 replacement ratio with a minimum of 1 acre of New Wetland Credit and a maximum of 1 acre of Public Value Credit. Additional mitigation may be required by the WCA in MR 8420.
Manage II	420 - 280	Maintain wetland functionality Apply some sequencing flexibility	30 feet 15' minimum if buffer averaging is allowed Monuments required	Sediment pretreatment required	2:1 replacement ratio with a minimum of 1 acre of New Wetland Credit and maximum of 1 acre of Public Value Credit. Additional mitigation may be required by the WCA in MR 8420.
Manage III	275 - 0	Allow maximum sequencing flexibility	15 feet for non-agricultural areas only 15' is the minimum buffer standard Monuments not required	Pretreatment to NPDES standards (per Minnesota Pollution Control Agency rules) is required if these standards apply to the project	2:1 replacement ratio with a minimum of 1 acre of New Wetland Credit and maximum of 1 acre of Public Value Credit. Additional mitigation may be required by the WCA in MR 8420.

Appendix E – Buffer Performance Standards and Management Plan

Buffer Establishment and Management Plan

As part of the application, a Buffer Establishment and Management plan must be submitted for review and approval. The buffer management plan needs to include:

1. A seeding plan with a native seed mix appropriate for site conditions for buffers that are to be created or reestablished.
2. Five-year maintenance plan
3. Buffer maintenance strategies designed to meet buffer performance standards. These strategies could include, but are not limited to:
    - Annual mowing
    - Spot spraying herbicide
    - Reseeding or over seeding
    - Planting plugs
    - Burning

Buffer Performance Standards

The buffer must meet the following performance standards by the end of the third growing season post-seed installation (establishment period):

1. 90% of the buffer area needs to be covered with vegetation.
2. To encourage native vegetation, this vegetation coverage needs to contain a minimum of 80% native plant species.
3. To encourage plant species diversity, a minimum of 50% of the seed mix plant species, or a minimum of ten species (whichever is less), must be present within the buffer.
4. Vegetation must be comprised of grasses and forbs but may also include trees and shrubs.
5. The buffer cannot contain any "State Prohibited Noxious Weeds," as listed by the Minnesota Department of Agriculture.

If at any time during the establishment period of the buffer the City determines the buffer is not meeting the performance standards the City can require corrective action to ensure compliance. If compliance is not met by the project proposer, the City will draw on the developer's financial security to complete the work.