2008 Wetland Assessment Documentation

Proposal

The Minnesota Pollution Control Agency (MPCA) is listing four wetlands on the 2008 TMDL list of impaired waters. In order to be considered for listing these emergent depressional wetlands meet two criteria: (1) biologically impaired as determined by plant and macroinvertebrate indices of biological integrity (IBIs), and (2) hydrologically connected to downstream impaired waters currently on the TMDL list.

The Role of Wetlands in Watershed Health

Wetlands provide a number of functions that are beneficial to watershed health and thus are beneficial to society as well. These functions include filtering pollutants and sediments from downstream surface waters, recharging aquifers, reducing erosion and the damaging effects of flooding during peak events, maintaining flow in streams during periods of drought (e.g., sites of groundwater discharge), and providing habitat for native plant and animal species (van der Valk et al. 1978, Johnston 1991, Zedler 2003). When wetlands are drained or filled these services are lost and degradation to the watershed occurs (Bedford and Preston 1988, Whigham et al. 1988, Johnston et al. 1990, Detenbeck et al. 1993, Hey 1995, Bedford 1999, Bruland et al. 2003, Zedler 2003). What is less obvious is that these benefits may also be lost or diminished when natural wetlands are modified by human activities (Kadlec and Kadlec 1978, Nichols 1983, Brinson 1988, Hemond and Benoit 1988, Richardson et al. 1996, Mitsch and Gosselink 2000). Thus, when the goal is to maintain or restore the health of a watershed, both wetland quantity and quality need to be integrated into the overall management plan.

For example, the ability of wetlands to reduce the nutrient load of downstream waters can be diminished when they become overloaded with nutrients (Kadlec and Kadlec 1978, Nichols 1983, Hemond and Benoit 1988, Richardson et al. 1996). Thus, when the assimilative capacity of the wetland is exceeded three things are likely to occur: 1) the biological integrity of the wetland is compromised, 2) nutrients are exported to downstream waters, and 3) the biological community of downstream waters is impacted. With such a scenario, restoring the nutrient budget of the wetland to be more reflective of natural conditions will not only improve the wetland itself but will also result in more natural flows upstream and improve the quality of downstream waters. In fact, impaired downstream water quality may not be able to be improved without first addressing nutrient budgets of upstream wetlands. Several noteworthy Minnesota watershed project examples of this problem include Lake Vadnais within the St Paul drinking water system, Rice Lake in the Pelican River watershed, Typo and Martin lakes in Anoka County, and riparian wetlands along the Long Prairie River.

Hydrologic modifications resulting in the partial drainage of wetlands not only affect the habitat, aesthetic, and recreational value of the wetland but also: 1) decrease the capacity for storing flood waters; 2) decrease hydraulic residence time, thereby decreasing aquifer recharge; 3) increase the export of nutrients and other pollutants (Yarbro et al. 1984, Whigham and Jordan 2003); 4) may enhance biogeochemical processes relating to mercury methylation; and 5)

increase soil erosion. Clearly, wetlands provide valuable services to the watershed, however, the efficiency of these services can be decreased when they become modified or overburdened. Another critical issue is the fact that researchers have yet to determine how much pollutants can be assimilated by wetlands without compromising their own biological integrity (Zedler 2003), a threshold that is likely to vary depending on wetland type.

An understanding of the important functions wetlands have in the watershed combined with knowledge of the factors that affect these functions is essential for successfully managing or rehabilitating water resources. The present emphasis of restoring drained wetlands to achieve water quality goals in a watershed offers the greatest benefits because of the wholesale gain in ecosystem services. However, rehabilitating modified or overburdened wetlands may offer a more efficient path for restoring certain functions (e.g., habitat, flood retention, nutrient retention). More importantly, failure to address the quality of existing wetlands in a watershed management plan may reduce the cost effectiveness of its implementation or even result in the failure to achieve its water quality objectives and goals.

The rationale behind the proposed approach for integrating wetlands into the TMDL listing and implementation process is the efficiency that can be gained when impaired waterbodies within the same watershed can be addressed simultaneously. Considering each impaired waterbody during the development of an implementation plan insures that the 'fix' for one doesn't actually result in further degradation of the others. In all likelihood, impaired wetlands, lakes, and streams within the same watershed are being degraded by the same stressors. Tackling the source of these stressors will therefore yield the greatest potential for improving the condition of all of the impaired waterbodies in the watershed as well as those further downstream.

Wetland Water Quality Standards [narrative & numeric]

Minnesota Rules Chapter 7050 narrative water quality standards protect the chemical, physical and biological characteristics of Minnesota wetlands based on the reference concept [7050.0150]. Minnesota Rules Chapter 7050 recognizes the functions that wetlands provide [7050.0210] and establishes standards to protect these important uses [7050.0185 & 7050.0186]. It also recognizes that wetlands have their own intrinsic value above and beyond their role in watershed health. Therefore, water quality standards have been established to protect wetlands' plant and animal communities as well as recreational and aesthetic values [7050.0222, 7050.0223, 7050.0224, and 7050.0225].

Wetland assessment considerations in the Guidance Manual

Discussion of wetland assessments for the purpose of listing impaired wetlands first appeared in the 2004 Guidance Manual. Included were the criteria for assessing wetlands and some limitations in scope. Both wetland macroinvertebrate and plant community assessment tools and Index of Biotic Integrity (IBI) goals were also discussed.

The 2006 Guidance Manual added some details on an estimated schedule of activities designed to meet the deadlines for listing for the 2008 cycle. Key steps in the schedule include communicating with other state agencies, and studying how EPA's Stressor Identification

Guidance Document could be utilized to relate impairments of wetland invertebrate and plant communities to the watershed stressors impacting them, including a general estimate of what restoration scenarios might look like.

Key Stakeholder Discussions

Subsequent to EPA approving the 2006 impaired waters list, including their review of the 2006 Guidance Manual, the MPCA began working through the schedule of activities. We have had a series of meetings with key state agencies, including BWSR and the state Department of Agriculture. From these meetings and discussions it has been recommended that with MPCA's limited resources to work on wetland impairments, they would prefer that our initial focus for listing impaired wetlands be limited to wetlands with hydrologic connections to downstream impaired waters where there is reasonable potential that the cause of the two impairments is interrelated. We agreed with that approach and our draft list of impaired wetlands for the 2008 list of impaired waters satisfies that concern. Addressing wetland impairments will occur in a coordinated effort simultaneously with the schedule to address the impairments of the downstream water bodies.

Proposed 2008 Wetland Impairment Listings

We are proposing to list the following four wetlands in the draft 2008 list of impaired waters:

Lake Jones (62-0076-00)	Trappers (61-0522-00)
Morraine (27-0994-00)	WoodlandWMA (86-0085-00)

Details on each wetland, including the downstream impaired lake or river, are contained in Appendix 1.

Next steps

During late 2006 and early 2007, we will be meeting with key state and local agencies and environmental groups to discuss our proposed listing of impaired wetlands and the likely implications of such listings.

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Appendix 1. Draft list of impaired wetlands within the watershed of impaired water bodies currently on the TMDL list.

The following four wetlands have been identified as not supporting their aquatic life designated use (Class 2D) based on assessments of their plant and macroinvertebrate communities. The Agency has discussed the issue of listing individual wetlands on the 303(d) impaired waters list with other key state agency partners. Each of the three identified wetlands is located in close proximity to an impaired downstream lake or stream that has been on previous 303(d) lists (e.g., 2002, 2004). Stressor identification work for these wetland impairments are currently in the initial stages of describing the site and its surroundings and compiling existing data. A complete stressor identification report will be developed at the initial stages of the TMDL study. The schedule for developing a TMDL for each wetland will be linked directly with the TMDL schedule for the nearest downstream impaired water body.

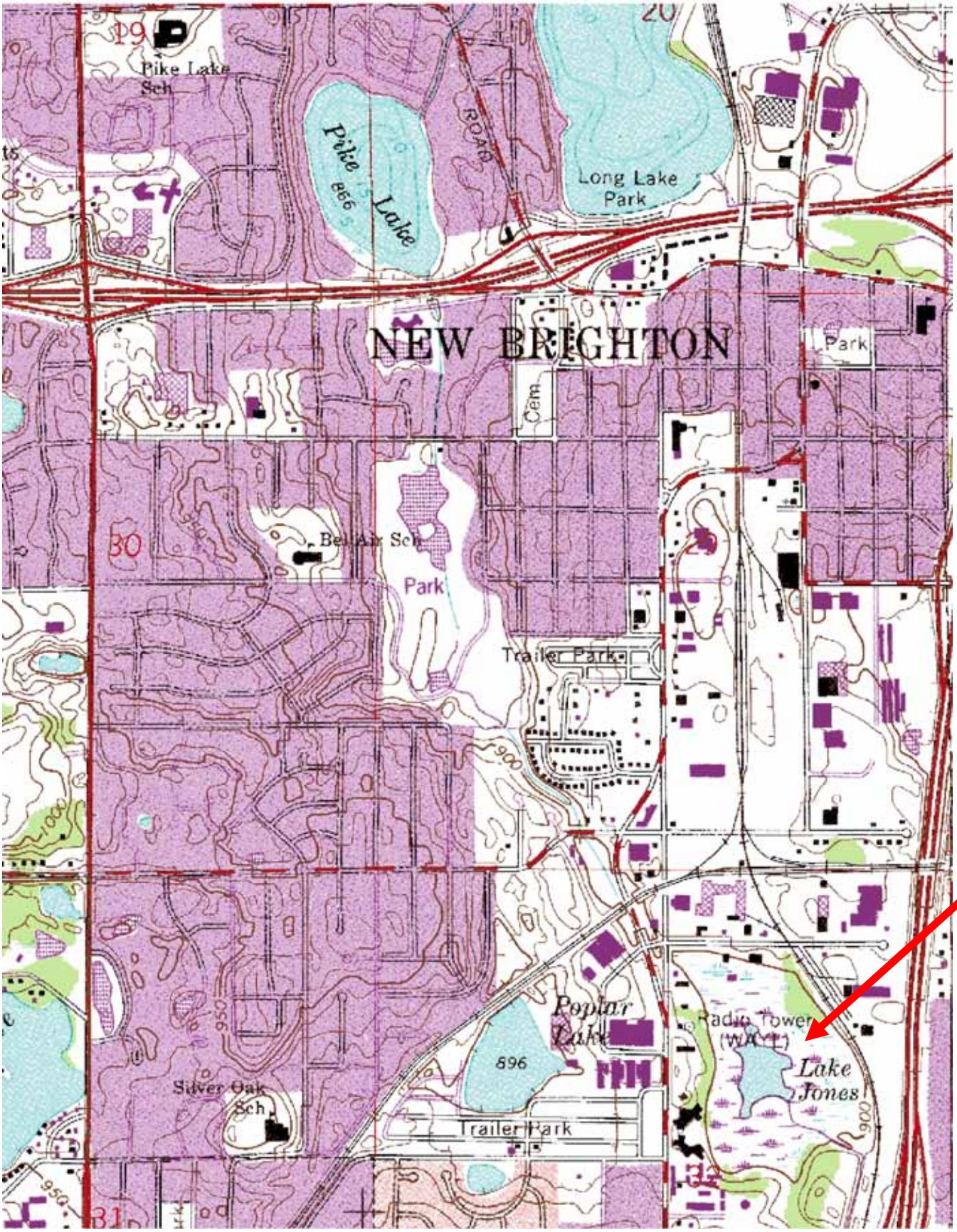
Site Name: Lake Jones **County:** Ramsey **Surrounding Property Info:** City of New Brighton
AUID: 62-0076-00 **Area:** 33.6 acres

Lake Jones is a large open water/emergent marsh located in the City of New Brighton, just west of I-35W. This wetland has an extensive emergent plant community dominated by narrowleaf and hybrid cattails. Land use surrounding this wetland is a combination of industrial, commercial, and residential. This wetland has an inlet and outlet with water flowing through the wetland from south to north. Based on a comparison of the topo map with 2003 aerial images, it appears that significant filling has occurred in the northern part of this wetland. Examination of 1950s aerial photography shows that the emergent community at this site was not as extensive as it is today.

MPCA biologists monitored this wetland in 1999 as part of the large depressional wetland study. Both the plant and macroinvertebrate IBI indicate that this wetland is not supporting its aquatic life designated use. Scores for both indices fall below the established criteria for the NCHF ecoregion (Table 1). This impaired wetland is in the watershed of other water bodies currently on the 303(d) impaired waters list. The nearest downstream impaired water is Pike Lake (1 mi) followed by Long Lake (2 mi) both listed for excess nutrients. A small stream connects Jones to these downstream impaired waters (see topo map).

Table 1. Biological monitoring results from Lake Jones.

	NCHF		**NCHF**
Invert IBI	**Criteria**	Plant IBI	**Criteria**
43	**49**	3	**42**


19
20
Pike Lake Sch
Pike Lake
ROAD
Long Lake Park
NEW BRIGHTON
Park
Cem
30
Bel Air Sch
Park
Trailer Park
900
950
Poplar Lake
Radio Tower (WCYT)
896
Lake Jones
Silver Oak Sch
Trailer Park
B1

Site Name: Trappers **County:** Pope **Surrounding Property Info:** Private, 2 landowners
AUID: 61-0522-00 **Area:** 26.8 acres

Trappers is a large open water wetland situated in an agricultural landscape about 4 mi north of Starbuck, MN off of state hwy 114. It receives inflow from the northeast via a ditch carrying agricultural drainage waters. As part of a cooperative watershed improvement project the U.S. Fish and Wildlife Service installed a small rock berm at the outflow of the wetland (southern end) resulting in an increase of about 6 inches of normal stage height. This increase in water level may have contributed to the loss of the previously established emergent vegetation that was once prevalent at this site (see aerial photos).

This site was monitored in 1999 as part of the large depressional wetland study. Only the invertebrate IBI indicates that this wetland is not supporting its aquatic life designated use (Table 2). This impaired wetland is in the watershed of other water bodies currently on the 303(d) impaired waters list. The closest downstream impaired water is Strandness Lake (1/4 mi) which is listed for excess nutrients. Malmedal Lake is also only ¼ mi away and listed for excess nutrients, however, based on the topo map it is not clear whether Trappers is upstream or downstream of this lake. Surface water connections (e.g., Trappers Run) exist between Trappers and these impaired waters (see topo).

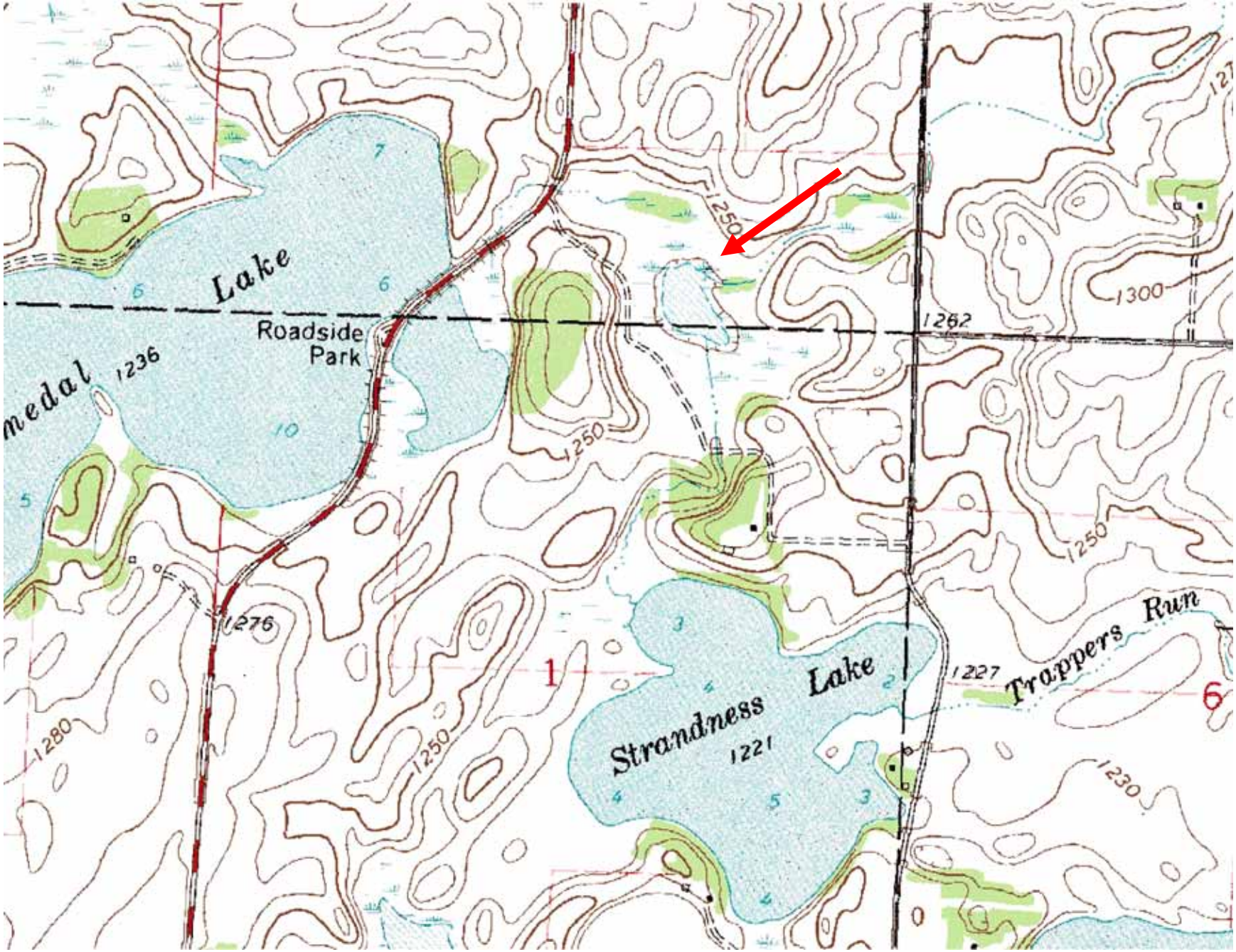
Table 2. Biological monitoring results from Trappers.

	NCHF		**NCHF**
Invert IBI	**Criteria**	Plant IBI	**Criteria**
35	**49**	56	**42**

1991 (before berm)

1999 (after berm)

Photos not to same scale.


Lake
Roadside Park
medal
1236
1250
1262
1300
1276
1280
1250
1250
1250
1230
1227
Trappers Run
Strandness Lake
1221
1
6

Site Name: Morraine **County:** Hennepin **Property Info:** City of Eden Prairie,
AUID: 27-0994-00 **Area:** 3 acres surrounded by private lots

Morraine is a small emergent marsh located in the west metro suburb of Eden Prairie. According to adjacent landowners, the water level in this wetland has decreased dramatically in recent years (see aerial photos). The estimated area of the watershed for this wetland is approximately 30 acres (Barr Engineering 2002). Modeling of a 100 yr precipitation event (24 hr rainfall = 6 inches) predicted that the water level in this wetland would increase by 1 ft following such an event.

Biological monitoring of this wetland occurred in 2002 (after water level drop) and was part of a study to compare IBI and MnRAM assessment techniques. Both invert and plant IBIs indicate that this wetland is not supporting its aquatic life designated use (Table 3). Based on the MnRAM assessment, this wetland received the following functional ratings (0-2.0 scale): Medium (0.65) for vegetative diversity; Medium (0.49) for downstream water quality; Medium (0.43) for wetland water quality; and High (0.66) for wildlife habitat.

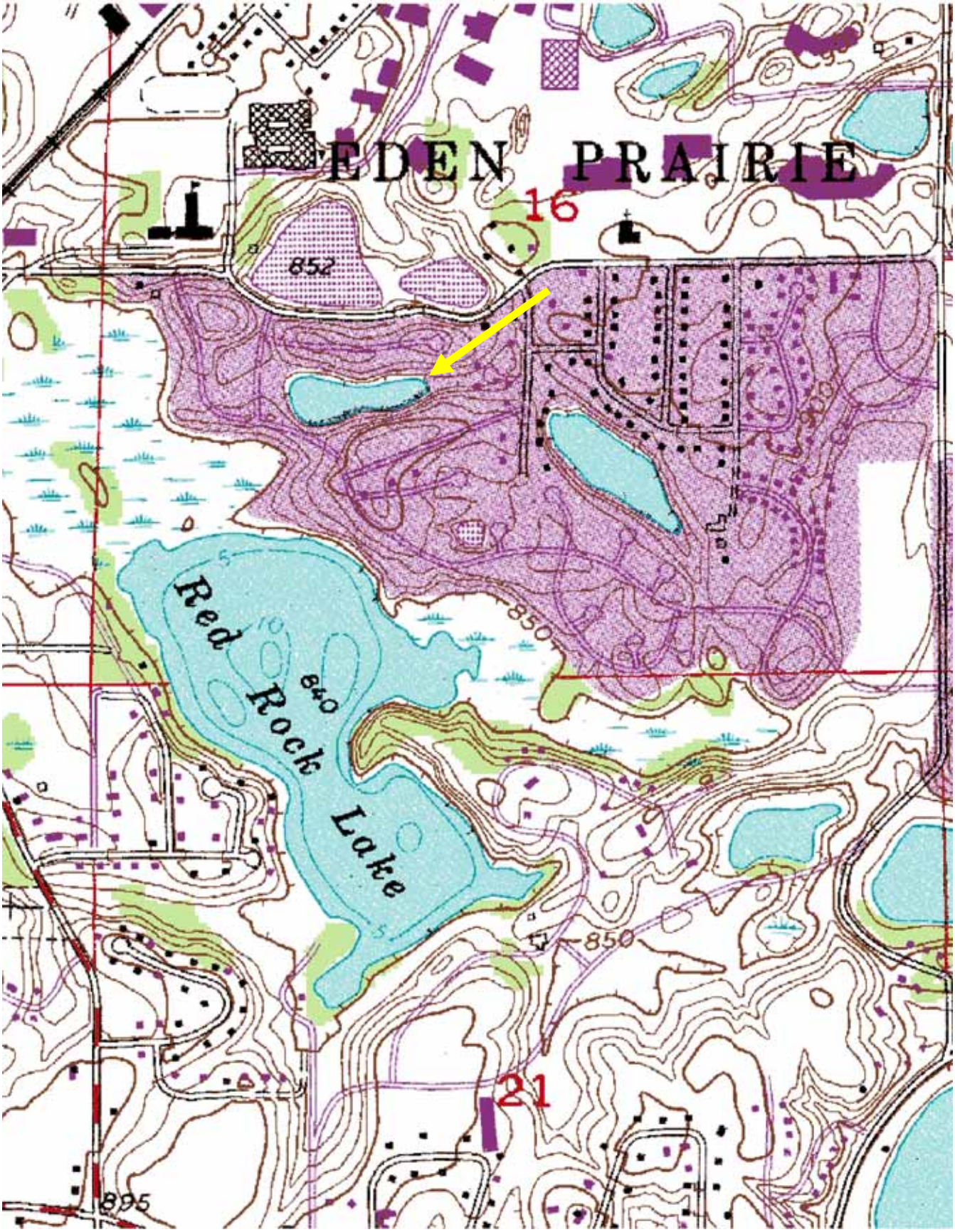
This wetland is in the watershed of other water bodies currently on the 303(d) impaired waters list. Approximately ¼ mi downstream of this wetland is Red Rock Lake which is listed for excess nutrients and mercury. It is believed that Morraine is hydrologically connected to Red Rock Lake via the City of Eden Prairie's storm sewer system. However, during the professional judgment group meeting the DNR provided elevation data for the outlet structure of this wetland indicating that a hydrologic connection between Morraine and Red Rock Lake exists only during extreme flood events. Therefore, **this wetland was not included on the draft 2008 303(d) Impaired Waters list.**

Table 3. Biological monitoring results from Morraine.

	NCHF		**NCHF**
Invert IBI	**Criteria**	Plant IBI	**Criteria**
44	**49**	22	**42**

1991 (before water level drop)

2003 (after water level drop)


EDEN PRAIRIE
16
852
Red Rock Lake
840
850
850
21
895

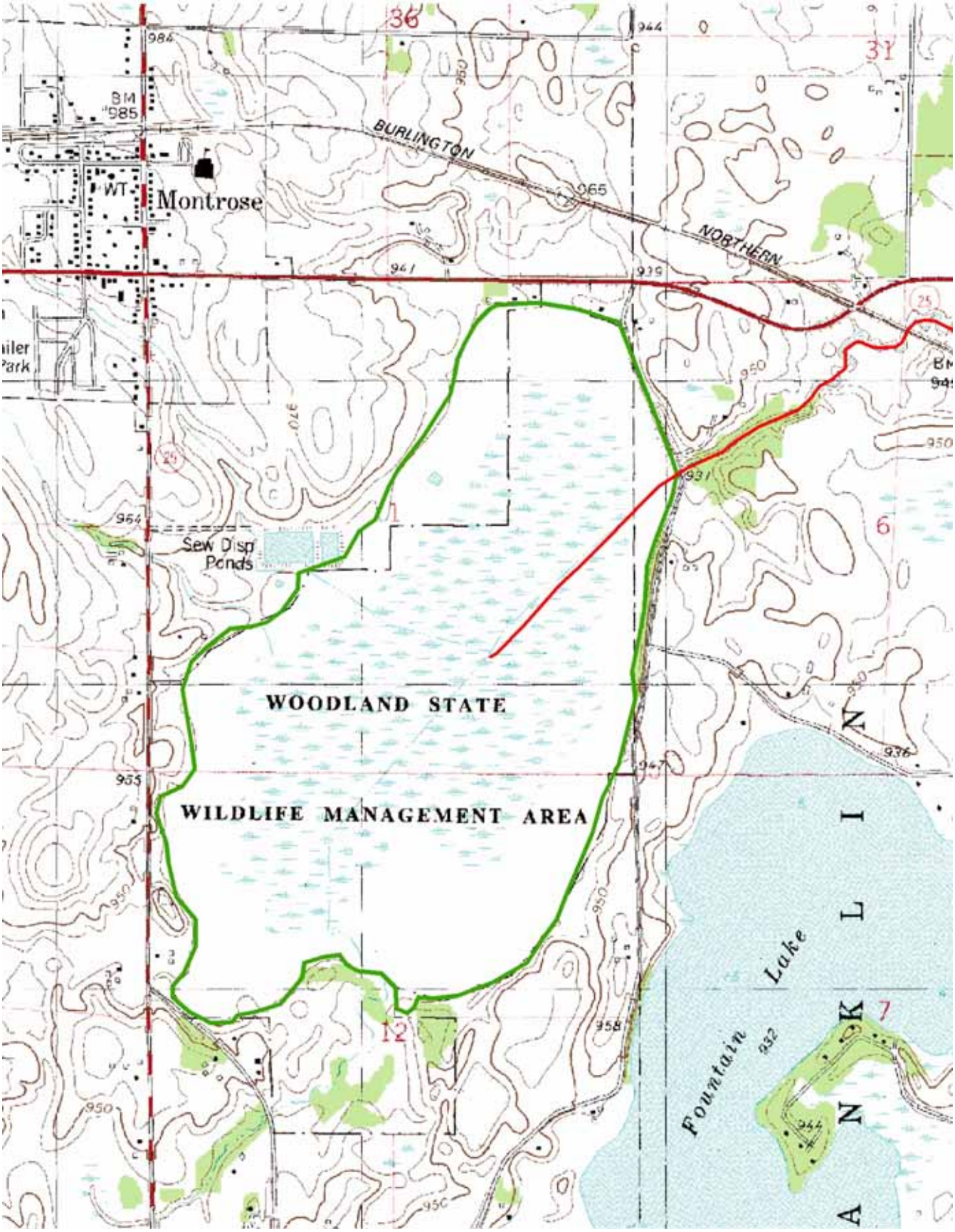
Site Name: WoodlandWMA **County:** Wright **Surrounding Property Info:** MN DNR
AUID: 86-0085-00 **Area:** 617 acres Wildlife Management Area

Woodland Wildlife Management Area (WMA) is a large open water/emergent wetland located just south of the town of Montrose and receives effluent from their municipal wastewater treatment system (see aerial photo). The wetland is situated in a mixed agricultural landscape at the growing edge of urban development in Wright County. The watershed of the WMA is relatively small, approximately 32 square miles (20,400 acres) but is extensively ditched. From 2003 data there are approximately 40 registered feedlots within the WMA watershed. Since the early 1970's the City of Montrose operated a pond treatment system that discharged to the WMA wetland. This wetland is ringed by an extensive emergent plant community dominated by narrowleaf and hybrid cattails which are able to float up and down as water levels fluctuate. The DNR manages the wetland plant community with periodic draw-downs by regulating the outlet structure.

This wetland was monitored in 2002 and 2004 as part of the 2002 permit review process for the proposed expansion of the wastewater facility. Only plant monitoring was conducted during this process. Plant IBI scores indicate that this wetland is not supporting its aquatic life designated use (Table 4). This impaired wetland is in the watershed of other water bodies currently on the 303(d) impaired waters list. In fact, the small unnamed creek (07010204-527) originating at the outlet of this wetland is currently listed for low dissolved oxygen (see topo map). This small creek is a tributary of the North Fork of the Crow River which is listed for low dissolved oxygen and temperature exceedances.

Table 4. Plant IBI assessment results from Woodland WMA.

2002		2004	**NCHF**
Rep1	Rep2	Rep1	**Criteria**
16	21	21	**42**


36
31
BM
985
WT
Montrose
BURLINGTON
NORTHERN
Sew Disp
Ponds
WOODLAND STATE
WILDLIFE MANAGEMENT AREA
Fountain
Lake
12
7
6
1