



RAPID FLORISTIC QUALITY ASSESSMENT PROJECT SITE REPORT

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PURPOSE OF RESEARCH

The Minnesota Pollution Control Agency (MPCA) has worked for over a decade to develop wetland quality assessment techniques to support the state and federal no net loss wetland policy and Clean Water Act goals (<http://www.pca.state.mn.us/water/biomonitoring/bio-wetlands-plants.html>). The purpose of this project is to develop standardized 'rapid' sampling methods and scientifically based assessment criteria for the Floristic Quality Assessment (FQA). It is anticipated that this will allow natural resource professionals with moderate botanical expertise to make accurate and scientifically based wetland quality assessments within a short time frame that can be applied to a number of wetland management issues. While the primary purpose of the sampling at your site was to test sampling scenarios to determine the rapid methods, a secondary purpose was to provide you with a wetland quality site assessment.

BACKGROUND

FQA is an ecological assessment technique based on plants and their individual affinity with unaltered habitats. This affinity is captured by a measure called the Coefficient of Conservatism (C). C is a numerical rating from 0-10 of how conservative each plant species is to unaltered habitats based on best professional judgment from local botanical experts. To perform an FQA, plants are identified in the area of interest and metrics such as Mean C and the Floristic Quality Index (FQI; which is the product of the Mean C and the square root of the number of native species) are calculated from the C-values assigned to the observed species. These metrics have repeatedly been found to be responsive wetland quality



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indicators. The MPCA completed a project to assign C-values to all of MN's wetland plant species in 2007. To learn more about FQA please see: <http://www.pca.state.mn.us/publications/wetlandassessment-guide.html>

SITE LOCATION

The site is located approximately 200 m southeast of the main parking lot in Quarry Park and Nature Preserve. It is situated in a long narrow depression that runs from southwest to northeast and extends beyond the park boundaries. The target community for this site was Sedge/Fresh Meadow according to the Eggers and Reed Wetland Plant Communities of Minnesota and Wisconsin¹. The majority of the basin is the Sedge/Fresh Meadow wetland plant community but it also includes patches of Alder Thicket and several patches of Shallow Marsh towards the center of the basin where standing water tends to pool for prolonged periods of time. Only the Sedge/Fresh Meadow portions of the basin were sampled as part of this project. A site map is included at the end of this report that provides the specific site boundary; MPCA plot location point; and DNR MN County Biological Survey (MCBS) sample point.

SAMPLING METHODS

Two primary sampling methods were employed at each sample site: plot sampling where standard sized plots were established in representative locations of the site and meander sampling where the observer walks through the site recording plant species as they are encountered. With both methods the level of effort was recorded along with the plant data to determine the minimum effort needed to acquire a representative sample for FQA. In the case of plot sampling this was done by recording all species in a series of nested plots that doubled in size at each iteration and ranged from 1m²-100m². At the maximum plot size a complete Relevé plant community sample was collected according to DNR MCBS protocols². For meander sampling, the time that the plant was observed was recorded. Sampling was limited to the Sedge/Fresh Meadow plant community and was completed on August 21, 2008.

This site was also sampled by the DNR MCBS on August 24, 1998. MCBS data and results are included in the site data and assessment sections below.

SITE DATA SUMMARIES & METRIC SCORES

All plant species observed from all of the MPCA sampling at the site and FQA metric scores are provided in Table 1. A DNR MCBS data summary and FQA metric scores are provided in Table 2. All of the raw data are archived with the MPCA and with the DNR MCBS and can be provided upon request.

¹Eggers, S.D and D.M. Reed. 1997. Wetland Plants and Plant Communities of Minnesota & Wisconsin (2nd ed.). US Army corps of Engineers, St. Paul District. St. Paul, MN.

²MN DNR. 2007. A Handbook for Collecting Vegetation Data in Minnesota: the Relevé Method. http://files.dnr.state.mn.us/eco/mcbs/releve/flat_page.pdf



Table 1. Species list and FQA metrics derived from 2008 MPCA sampling.

Scientific Name	Common Name	C-value	MN Native Status
<i>Acer negundo</i>	Box elder	1	Native
<i>Alnus incana</i> ssp. <i>rugosa</i>	Speckled alder	3	Native
<i>Asclepias incarnata</i> ssp. <i>incarnata</i>	Swamp milkweed	4	Native
<i>Athyrium filix-femina</i> ssp. <i>angustum</i>	Lady fern	4	Native
<i>Betula papyrifera</i> var. <i>papyrifera</i>	Paper birch	3	Native
<i>Bromus ciliatus</i> var. <i>ciliatus</i>	Fringed brome	6	Native
<i>Calamagrostis canadensis</i>	Bluejoint	4	Native
<i>Caltha palustris</i> var. <i>palustris</i>	Common marsh marigold	6	Native
<i>Campanula aparinoides</i>	Marsh bellflower	5	Native
<i>Carex lacustris</i>	Lake sedge	5	Native
<i>Carex stipata</i> var. <i>stipata</i>	Awl-fruited sedge	3	Native
<i>Carex stricta</i>	Tussock sedge	5	Native
<i>Carex utriculata</i>	Beaked sedge	7	Native
<i>Cicuta bulbifera</i>	Bulb-bearing water hemlock	7	Native
<i>Cicuta maculata</i>	Spotted water hemlock	5	Native
<i>Cirsium arvense</i>	Canada thistle	0	Introduced
<i>Comarum palustre</i>	Marsh cinquefoil	7	Native
<i>Cornus sericea</i> ssp. <i>sericea</i>	Red-osier dogwood	3	Native
<i>Doellingeria umbellata</i>	Flat-topped aster	5	Native
<i>Dryopteris cristata</i>	Crested fern	7	Native
<i>Epilobium coloratum</i>	Purple-leaved willow herb	3	Native
<i>Epilobium leptophyllum</i>	Linear-leaved willow herb	7	Native
<i>Eupatorium maculatum</i>	Spotted Joe pye weed	4	Native
<i>Eupatorium perfoliatum</i> var. <i>perfoliatum</i>	Common boneset	4	Native
<i>Frangula alnus</i>	Glossy buckthorn	0	Introduced
<i>Fraxinus nigra</i>	Black ash	6	Native
<i>Galium trifidum</i> ssp. <i>trifidum</i>	Three-cleft bedstraw	6	Native
<i>Impatiens capensis</i>	Spotted touch-me-not	2	Native
<i>Lathyrus palustris</i>	Marsh vetchling	6	Native
<i>Lycopus americanus</i>	Cut-leaved bugleweed	4	Native
<i>Lycopus uniflorus</i>	Northern bugleweed	5	Native
<i>Lysimachia thyrsoiflora</i>	Tufted loosestrife	6	Native
<i>Mimulus ringens</i> var. <i>ringens</i>	Blue monkey flower	5	Native
<i>Onoclea sensibilis</i>	Sensitive fern	4	Native
<i>Parthenocissus vitacea</i>	Virginia creeper	2	Native
<i>Phalaris arundinacea</i>	Reed canary grass	0	Introduced
<i>Poa palustris</i>	Fowl bluegrass	5	Native
<i>Polygonum amphibium</i>	Water smartweed	4	Native
<i>Polygonum sagittatum</i>	Arrow-leaved tearthumb	4	Native
<i>Rubus idaeus</i> ssp. <i>strigosus</i>	Red raspberry	3	Native
<i>Rubus pubescens</i> var. <i>pubescens</i>	Dwarf raspberry	6	Native
<i>Rumex orbiculatus</i>	Great water dock	6	Native
<i>Salix bebbiana</i>	Bebb's willow	6	Native
<i>Salix discolor</i>	Pussy willow	3	Native
<i>Salix petiolaris</i>	Slender willow	5	Native
<i>Scirpus cyperinus</i>	Woolgrass	3	Native



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Scutellaria galericulata	Marsh skullcap	5	Native
Solidago gigantea	Giant goldenrod	3	Native
Spartina pectinata	Prairie cordgrass	5	Native
Spiraea alba	White meadowsweet	5	Native
Stachys palustris	Woundwort	4	Native
Symphyotrichum lanceolatum	Eastern panicled aster	5	Native
Symphyotrichum puniceum	Red-stemmed aster	6	Native
Thalictrum dasycarpum	Tall meadow-rue	4	Native
Thelypteris palustris var. pubescens	Northern marsh fern	7	Native
Toxicodendron rydbergii	Western poison ivy	1	Native
Triadenum fraseri	Marsh St. John's wort	6	Native
Ulmus americana	American elm	3	Native
Verbena hastata	Blue vervain	6	Native

FQA Metrics

Native Species Richness	56
Mean C	4.389831
FQI	32.85048



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Table 2. Species list and FQA metrics derived from 1998 DNR MCBS sampling.

Scientific Name	Common Name	C-value	MN Native Status
<i>Asclepias incarnata</i> ssp. <i>incarnata</i>	Swamp milkweed	4	Native
<i>Bromus ciliatus</i> var. <i>ciliatus</i>	Fringed brome	6	Native
<i>Calamagrostis canadensis</i>	Bluejoint	4	Native
<i>Caltha palustris</i> var. <i>palustris</i>	Common marsh marigold	6	Native
<i>Campanula aparinoides</i>	Marsh bellflower	5	Native
<i>Carex lacustris</i>	Lake sedge	5	Native
<i>Carex prairea</i>	Prairie sedge	8	Native
<i>Carex stipata</i> var. <i>stipata</i>	Awl-fruited sedge	3	Native
<i>Carex stricta</i>	Tussock sedge	5	Native
<i>Chelone glabra</i>	White turtlehead	7	Native
<i>Cicuta maculata</i>	Spotted water hemlock	5	Native
<i>Doellingeria umbellata</i>	Flat-topped aster	5	Native
<i>Epilobium ciliatum</i> ssp. <i>ciliatum</i>	American willow herb	3	Native
<i>Equisetum arvense</i>	Field horsetail	1	Native
<i>Eupatorium maculatum</i>	Spotted Joe pye weed	4	Native
<i>Eupatorium perfoliatum</i> var. <i>perfoliatum</i>	Common boneset	4	Native
<i>Impatiens capensis</i>	Spotted touch-me-not	2	Native
<i>Lathyrus palustris</i>	Marsh vetchling	6	Native
<i>Lycopus americanus</i>	Cut-leaved bugleweed	4	Native
<i>Lycopus uniflorus</i>	Northern bugleweed	5	Native
<i>Lysimachia thysiflora</i>	Tufted loosestrife	6	Native
<i>Onoclea sensibilis</i>	Sensitive fern	4	Native
<i>Platanthera psychodes</i>	Small purple fringed orchid	7	Native
<i>Rumex orbiculatus</i>	Great water dock	6	Native
<i>Salix discolor</i>	Pussy willow	3	Native
<i>Solidago gigantea</i>	Giant goldenrod	3	Native
<i>Symphotrichum puniceum</i>	Red-stemmed aster	6	Native
<i>Thelypteris palustris</i> var. <i>pubescens</i>	Northern marsh fern	7	Native

FQA Metrics

Native Species Richness	28
Mean C	4.785714
FQI	25.32362



SITE ASSESSMENT

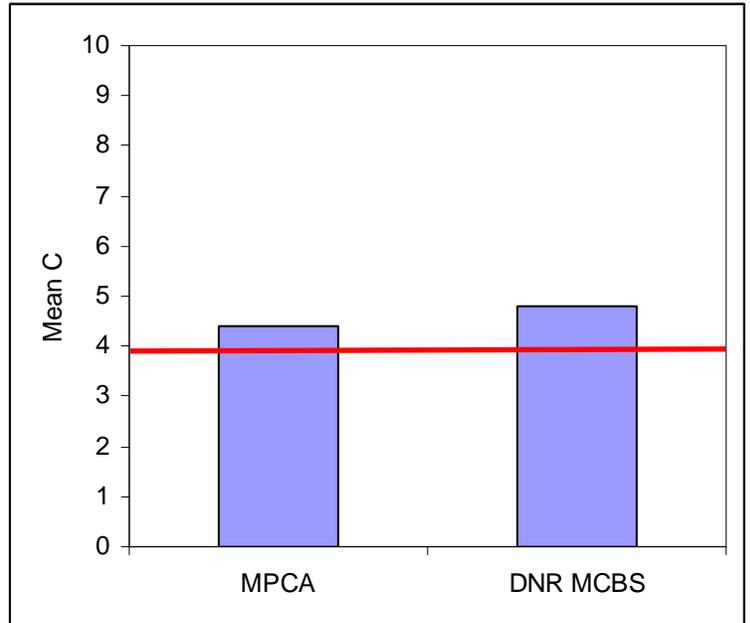
This site is an example of a largely intact Sedge/Fresh Meadow community in MN. Expected dominant species *Carex stricta* (Tussock sedge) and *Calamagrostis canadensis* (Bluejoint grass) occur over the majority community at expected abundances. In addition, the majority of the subordinate species occurring at the site are natives that you would expect to find at an intact Sedge/Fresh Meadow. A somewhat common orchid species *Platanthera psycodes* (Small purple fringed orchid) was also observed at the site by DNR MCBS in 1998. While the site appears to be largely intact, several exotic invasive species have become established and may threaten the current condition of the plant community. Chief among these is *Phalaris arundinacea* (Reed canary grass) which is a major invasive species that has largely replaced native Sedge/Fresh Meadow vegetation in much the state (excluding the northeast). *Phalaris arundinacea* currently is scattered throughout the site in low abundance and is dominant on relict fills (such as old roads or trails) that occur along the margins of the site. In addition, *Frangula alnus* (Glossy buckthorn) also occurs scattered throughout the site but not to same degree as *P. arundinacea*. *Frangula alnus* is an invasive shrub that can change Sedge/Fresh Meadow type wetlands into a shrub dominated type called a Shrub-Carr in the absence of natural disturbance regimes (e.g., occasional fire or series of higher water years that 'drown out' shrubs).

These current conditions are reflected in the FQA metrics, particularly Mean C. The Mean C scores generated from both MPCA and DNR MCBS data are above the 5th percentile Mean C score for all of the Sedge/Fresh Meadow samples in the DNR MCBS database (Figure 1). As the MCBS collects data at intact natural communities, this 5th percentile Mean C score represents the lowest expected score for un-impacted reference sites in the state. However, while the site Mean C scores are above the 5th percentile they are also near the bottom of the statewide range for un-impacted sites. This is consistent with the above observations where invasives have become established, representing a slight degradation from pre-European settlement conditions, but the invasives have not gotten to a point where they are negatively affecting the native community. There is also a slight decrease in Mean C from the DNR MCBS sample taken in 1998 and the current 2008 MPCA data. This difference, however, is likely due to sampling variability and probably does not indicate a downward trend in vegetative condition of site over the last 10 years.

As previously discussed, the invasives do represent a threat to the current vegetative condition at the site. They have the potential to degrade the site if left unchecked by displacing native species. Invasive species management such as prescribed burns and/or spot treatments may be warranted.



Figure 1. Mean C scores derived from MPCA and DNR MCBS data. The red line indicates the 5th percentile Mean C score of all MCBS samples for Sedge/Fresh Meadows in MN (Mean C 5th percentile = 3.89, N = 313).



SITE #: 08ISAN003

Legend

- RelevePoints
- DNRRelevePoints
- FQASites



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