

Wetland Health Evaluation Report (WHEP)



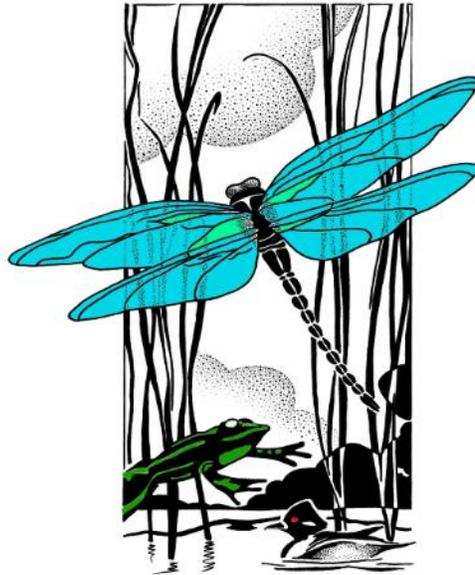
2020

Dakota County, MN



2020 Wetland Health Evaluation Program Report

Dakota County, MN



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February 2021

Report
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F⁺ORTIN
CONSULTING, INC.
serving the environment

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City of Apple Valley
City of Egan
City of Farmington
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City of Lakeville
City of Mendota Heights
City of Rosemount
City of South St. Paul
City of West St. Paul
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For more information on the Dakota County Wetland Health Evaluation Program or for a copy of this report, please contact the Dakota County Environmental Resources Department or visit www.mnwhep.org.

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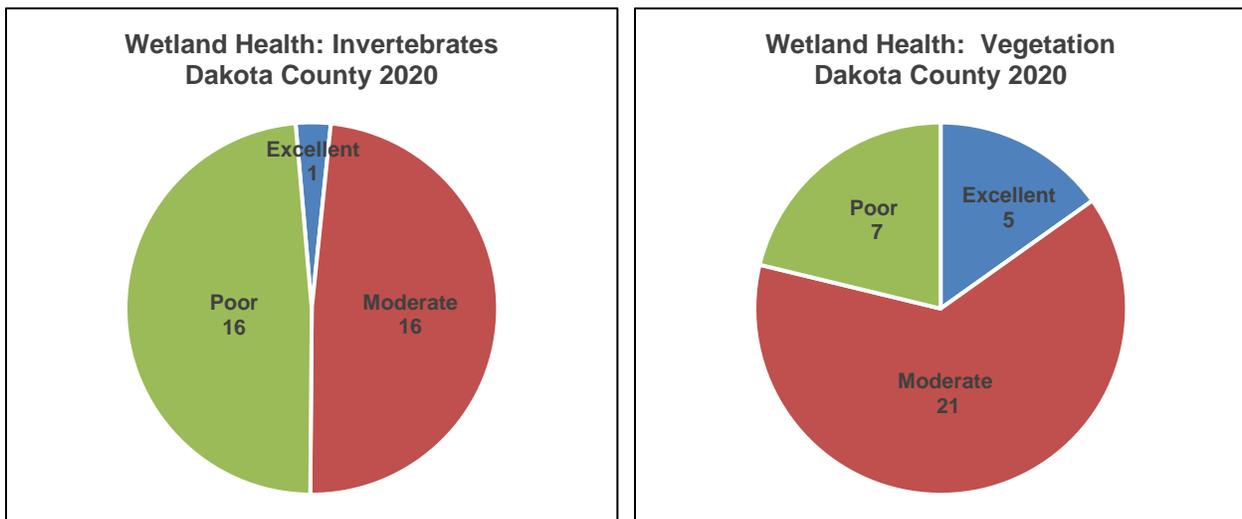
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Executive Summary

Dakota County Wetland Health Evaluation Program 2020

Dakota County began sponsoring the Wetland Health Evaluation Program (WHEP) in 1997. Since then, 198 wetlands have been monitored by many volunteers across the County. Due to the COVID-19 pandemic in 2020, alterations to the program were made based on health and safety measures. These changes included reduction of the number of wetlands surveyed (including the dismissal of team cross-checks) to decrease in-person contact, shifting invertebrate identification to third party (Fortin Consulting) to limit indoor activity, and the absence of sponsor(s) choosing to abstain for the year for health and safety reasons. In 2020, nine cities, one watershed management organization, and Dakota County Parks sponsored WHEP teams, monitoring 33 different wetlands. One of these wetlands (NC-3) was monitored for the first time in 2020. Trained volunteers collect macroinvertebrate (insects and other small animals without backbones) that live in the wetland, and survey for vegetation (plants) present in the wetland. The invertebrates and vegetation are identified and documented. The data is used to calculate an Index of Biotic Integrity (IBI) that is used to estimate the health of each wetland.

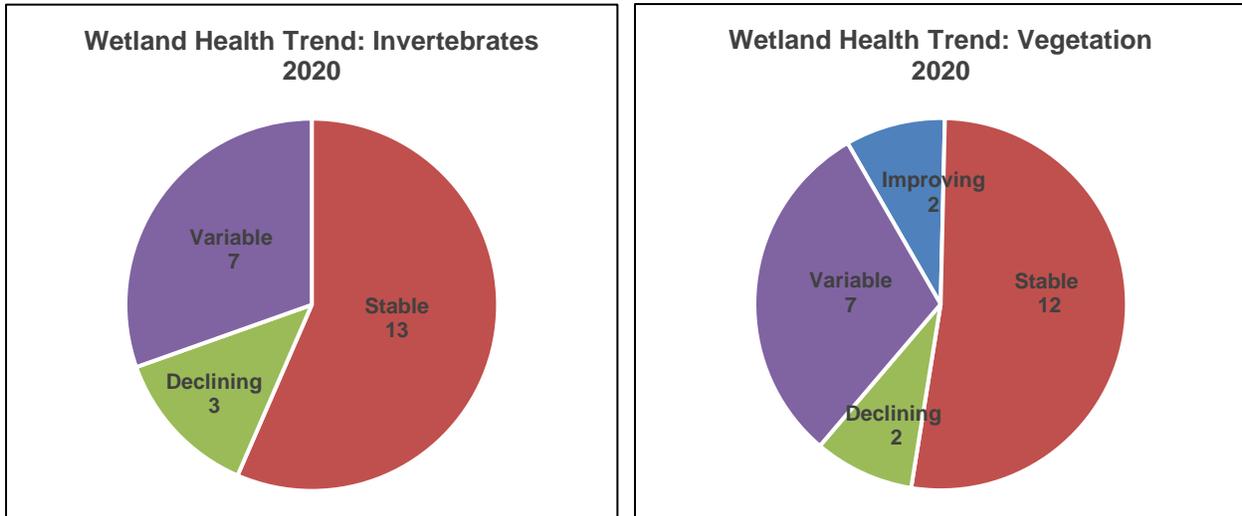


The results of the monitoring for 2020 showed a variety of wetland conditions. The Index of Biotic Integrity was used to determine wetland health ranging from poor to excellent. The majority of wetlands were in the moderate category for vegetation (51%). The wetlands divided evenly between poor and moderate ratings for invertebrate scores (39% each). One wetland site rated excellent for macroinvertebrates: Loretto Wetland (NCR-1). It had a score of 24. Five wetland sites rated excellent for vegetation: Tamarack Swamp (DC-3), Lilypad Pond (DC-7), DNR #387 (L-7), Copperfield (MH-2), and CR-38 Mitigation Site 2 (R-23). The Dakota County Parks' Lilypad Pond had the highest vegetation score (31).

A trend analysis was conducted for each of the wetlands monitored in 2020 that had enough data to analyze trends. The overall trends are indicated as follows; however, the health of each wetland is unique and observed changes in health score trends are discussed with each wetland later in the report. For invertebrates, no wetlands appear to be improving; however, 13 are stable and only 3 are declining. For vegetation, two of the wetlands appear to be improving, 12 are stable, and 2 are declining. Seven wetlands for each category had variable data over the years of their monitoring. Ten wetlands did not have enough years of data to demonstrate a health trend.

Several analyses were done to try to identify some of the causes of wetland health conditions found. No significant relationships were found between IBI scores and wetland alterations.

2020 Dakota County Wetland Health Trends*



*excludes wetlands that did not have adequate data for trend analysis

In 2020, despite health and safety limitations due to COVID-19 pandemic, 94 Dakota County WHEP volunteers donated more than 737 hours in training, invertebrate sample collections, and vegetation surveys in completion of this valuable monitoring. The dedicated volunteers look forward to the science, environmental stewardship, and community gathering that WHEP demonstrates. It gives citizens an opportunity to study the wetlands in their communities and see the impacts of human disturbance on our wetlands, and it provides valuable data to the cities and County. The data collected by the WHEP volunteers can be used for many purposes such as, to help track changes in wetlands over time and relate to changes in the watershed, help identify high quality wetlands that may need protection, track changes in wetland health with restoration projects, evaluate the success of wetland creation or impacts of new stormwater input, and to help find invasive species that threaten the wetlands. WHEP is a great example of a successful cooperative program between citizens, cities, counties and state government.

1.0 Background

The Wetland Health Evaluation Program (WHEP)

The Wetland Health Evaluation Program (WHEP) is a volunteer monitoring program for wetlands. WHEP uses sampling methods and evaluation metrics developed by the Minnesota Pollution Control Agency (MPCA) to evaluate wetland health. The metrics are based on species diversity and richness for both vegetation and macroinvertebrates. Citizen teams, led by a trained team leader with education and/or work experience in natural resources, conduct the sampling.

WHEP got its start at the MPCA in the 1990s, when Mark Gernes and Judy Helgen were separately developing biological indexes to measure wetland health using grants from the US Environmental Protection Agency (US EPA). Mark's biological index was based on wetland plants, Judy's on invertebrates. Developing chemical standards for measuring pollution in wetlands seemed impossible then, so they pushed for the biological approach, as did US EPA.

Wetlands are generally not viewed as having the same status as streams and lakes. The Wetland Conservation Act helps maintain the number and acreage of wetlands in Minnesota, but often the quality of the wetlands is not protected. MPCA staff recognized that they could teach citizens how to evaluate wetlands and they could convince their local governments to protect the water quality as reflected by the diversity of organisms and plants that thrive in healthy wetlands.



JUDY HELGEN,
PROGRAM CO-FOUNDER



MARK GERNES,
PROGRAM CO-FOUNDER
(DEMONSTRATING HIS "SEDGE
THREE-RANKED" POSE)

In 1996, the MPCA partnered with Minnesota Audubon, forming a large contract with them (with EPA funds) to help start WHEP. Audubon handled the logistics for the various training sessions and organization of the original teams of volunteers linked to six communities in Scott County. Mark and Judy provided the training and developed the guides for sampling protocols and identifications based on MPCA's more technical biological indexes.

Wetland sampling efforts began in 1997 in Dakota County. During 1998-2000, the program was managed by the Dakota Environmental Education Program. During these years, the project was funded by various sources, including the US EPA grant, Minnesota Legislature (LCCMR grant), and participating cities. Gradually, the number of cities participating in WHEP increased under the leadership of Charlotte Shover and Dan Huff, and now Paula Liepold at Dakota County. Up to thirteen cities/citizen teams have participated in the project in Dakota County. MPCA continues to provide the training, but the organization of teams and other logistics are handled by the County and communities.

Hennepin County joined the project in 2001, and began co-managing with Dakota County in 2002. Dakota County, the Vermillion River Watershed Joint Powers Organization, participating cities, and North Cannon River Watershed Management Organization provide funding for Dakota County WHEP. Today, the program is strong and thriving in both Dakota and Hennepin counties, setting an example for the nation in volunteer wetland monitoring.

Why Monitor Wetlands?

Why are we sampling the plants and critters that live in wetlands? Many aquatic invertebrates (animals without a backbone that live in water) spend much or most of their life living in wetlands. Because these animals are exposed to the conditions within the wetland for a period of time, they serve as indicators of the health of the wetland. Some are more sensitive to pollution and habitat conditions than are others. Aquatic plants also respond to wetland conditions. Different plants are found in different water quality and bottom conditions. If we evaluate what is living in a wetland, we can assess its general condition. When the same wetlands are monitored over time, the data can also be used to track changes in wetland health.

The information collected by the WHEP volunteers can be used by decision makers to help identify the highest quality wetland resources and identify those that have been negatively impacted. More information is available to help with decisions regarding development, transportation corridors, and other areas that may affect our water resources. For example, wetlands ranked as excellent may receive more protection. Cities can use this information to evaluate the overall success of construction or restoration projects or to evaluate the impact of new stormwater inputs.

Citizen volunteers are an essential component to WHEP's success. Each season, volunteers are relied upon to provide important data on the health of wetlands in their communities. The data collected is used by the cities, counties, and the State of Minnesota to better plan and protect these environments.

Although ten million acres of wetlands remain, Minnesota has lost approximately 50 percent of its wetlands since it became a state. Throughout the country, wetlands are being lost due to agriculture, development, and road expansion. Wetlands play a vital role in ecosystems by filtering runoff for groundwater, absorbing rain and snowmelt before flooding, providing habitat for mammals, birds, amphibians, reptiles, and many other organisms, and creating beautiful views for our own recreation. Since the adoption of the Minnesota Wetland Conservation Act, Minnesota has worked to maintain no-net-loss of wetlands.

Everyone involved in Minnesota WHEP past, present, and future can be pleased with their contribution, and rewarded with increasingly healthier wetland ecosystems to enjoy for years to come.

Wetland Types

Wetlands make up about 6.5 percent (24,501 acres) of the total area in Dakota County. Using the Circular 39 classification system, eight different wetland types are recognized in Minnesota. A description of each type and estimates of acreage are listed below. Two additional wetland categories are included in the total, riverine (between banks) and industrial/municipal (dike-related impoundments). WHEP focuses on the open water wetlands, types 3, 4 and 5.

Type 1 – Seasonally Flooded Basin or Flat: 5,995 acres

Seasonally Flooded Basins or Flats are fully saturated or periodically covered with water, usually with well-drained soils during much of the growing season. The vegetation varies from bottomland hardwoods to herbaceous plants depending on the season and length of flooding.

Type 2 – Wet Meadow: 551 acres

Wet Meadow wetlands usually do not have standing water, but have saturated soils within a few inches of the surface during the growing season. Grasses, sedges, rushes, and various broad-leaved plants dominate Wet Meadows. Common sites include low prairies, sedge meadows, and calcareous fens.

Type 3 – Shallow Marsh: 12,491 acres

Shallow Marsh wetlands often have saturated soils and six inches or more standing water during the growing season. Grasses, bulrush, spike rush, cattail, arrowhead, pickerelweed, and smartweed often grow in these wetlands.

Type 4 – Deep Marsh: 778 acres

Deep Marsh wetlands often have inundated soils and six inches to three feet or more standing water during the growing season. Cattail, reed, bulrush, spike rush, and wild rice grow in these wetlands. Pondweed, naiad, coontail, watermilfoil, waterweed, duckweed, water lily, and spatterdock can often be found in the open water areas.

Type 5 – Shallow Open Water: 1,213 acres

Shallow Open Water wetlands have standing water less than 10 feet deep. These wetland types include shallow ponds and reservoirs. Emergent plants are often found in these areas.

Type 6 – Shrub Swamp: 1,188 acres

Shrub Swamp wetlands are often covered with up to six inches of water, and the soils are usually completely saturated. The water table is usually at or near the surface of these areas. Alder, willow, buttonbush, dogwood, and swamp privet inhabit these areas.

Type 7 – Wood Swamp: 1,859 acres

Wood Swamp wetlands often have one foot of standing water, and the soils are completely saturated during the growing season. The water table is usually at or near the surface of these areas. Hardwood and coniferous swamps contain tamarack, northern white cedar, black spruce, balsam fir, balsam poplar, red maple, and black ash.

Type 8 – Bogs: 0 acres

Bogs are often supplied by the water table being at or near the surface of these areas. The acidic peat soils are usually saturated. Heath shrubs, sphagnum mosses, sedges, leatherleaf, Labrador tea, cranberry, and cottongrass dominate bogs.

Riverine: 52 acres

Wetlands associated with rivers and found between the river banks.

Municipal/Industrial: 374 acres

Municipal/Industrial wetlands include diked areas.

Total wetland area in Dakota County: 24,501 acres

Many federal and state agencies are involved in wetland regulation, protection, and restoration. In Minnesota, the state wetland regulations are overseen by the Board of Water and Soil Resources and

Department of Natural Resources. To learn more about regulations and programs that affect or protect wetlands, visit www.bwsr.state.mn.us and click on wetlands. Many cities, watershed organizations and counties have adopted local administration of the state Wetland Conservation Act.

Dakota County Wetland Monitoring

Everyone agrees: COVID-19 presented many challenges in 2020. As our WHEP season was getting started, we faced many unknowns when deciding if we could implement a volunteer program in a pandemic. If we could, we knew the 2020 WHEP season would require changes to ensure it would be as safe as possible for team leaders and volunteers to participate.

We retooled the program to increase safety for volunteers while maintaining protocols that ensure reliable data. Some of the measures to decrease in-person contact included:

- Reduced the number of wetlands surveyed
- Eliminated team cross-checks
- Macroinvertebrate identification by Fortin Consulting, instead of teams
- Provided hand sanitizer
- Suggested protocols for using equipment to limit contact
- Suggested mask use when appropriate physical distancing could not be achieved
- Adjusted two training sessions to virtual rather than in-person
- Eliminated macroinvertebrate identification training

At the end of the season, team leaders remarked that team members were thankful for Dakota County continuing the program because it gave them an opportunity to get outside and do something meaningful. They also stated that the County's efforts to retool WHEP indicated its commitment to the environment.

Thank you to volunteers and team leaders, partners and sponsors, MPCA and Fortin Consulting for making the 2020 a safe and successful season.

Jeff Korpik is the Field Monitoring Coordinator for Dakota County WHEP. He has been involved in WHEP since 2007 as a volunteer, team leader, and field monitoring coordinator. Jeff stated, "2020 was an interesting year for all of us. WHEP was no different. The field procedures still worked pretty well under some altered conditions and the team leaders were all great. It was still great visiting all of the teams and seeing some of the best, and yes, some of the worst wetlands around the County. I look forward to the upcoming season."



PAULA LIEPOLD



EMILY GABLE



JEFF KORPIK

2.0 Methods

2.1 Training

Training for citizen monitors is arranged by Dakota and Hennepin counties and taught by technical experts from the MPCA and Fortin Consulting. Both classroom and field sessions are held. Training is provided on vegetation plot selection/sampling and invertebrate sampling (dip netting and setting/retrieving bottle traps). Volunteers learn to identify the vegetation and macroinvertebrates during laboratory identification sessions which cover sampling protocol, key characteristics for invertebrate and plant identification, as well as hands-on identification of live and preserved specimens. For a more detailed explanation of the methods used in WHEP, visit www.mnwhep.org.



Minnesota Pollution Control Agency Experts

Part of the success of WHEP is due to the great assistance provided by the knowledgeable team of experts from the MPCA. Mark Gernes and Michael Bourdaghs provide WHEP vegetation training and technical assistance. Joel Chirhart and John Genet provide WHEP macroinvertebrate training and technical assistance.

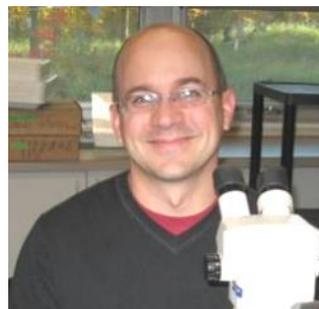


MARK GERNES



MICHAEL BOURDAGHS

Mark Gernes commented, "WHEP is an opportunity for citizens to learn about wetland plants and bugs, build lasting friendships all while helping our local communities protect and manage water resources. As a watershed professional I value the contribution citizen scientists are able to make. Each year I look forward to recounts of citizen experiences in their local wetlands."



JOEL CHIRHART



JOHN GENET

The MPCA staff support WHEP and have been very helpful in making WHEP a success.

2.2 Data Collection

In order to use the data to interpret the health or condition of the wetlands, a scoring process called the Index of Biological Integrity (IBI) is used. Separate IBIs are calculated for plants and macroinvertebrates. Several measures, referred to as metrics, are used to calculate an IBI. The IBI scores are categorized into poor, moderate or excellent. Biological integrity is commonly defined as "the ability to support and maintain a balanced, integrated, and adaptive community of organisms having a species composition,

diversity and functional organization comparable to those of natural habitats within a region" (Karr, J. R. and D. R. Dudley. 1981. Ecological perspectives on water quality goals. Environmental Management 5: 55-68). Biological integrity is equated with pristine conditions, or those conditions with no or minimal disturbance (MPCA, <https://www.pca.state.mn.us/water/tmdl-glossary>). Each city participating in WHEP has identified "reference" wetlands, those that are believed to be minimally disturbed and represent the most pristine conditions within the city.

Vegetation Index of Biological Integrity (IBI)

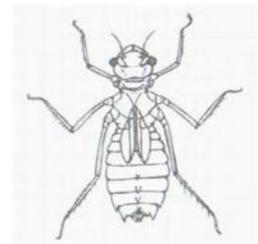
Vegetation is analyzed using a 100 square meter releve plot. All species within the sampling plot are identified to the genus level, and documented on the field data sheet. Vegetation is divided into categories based on their ecological function or relationship. The categories include nonvascular, woody, grass-like and forbs. The forbs are further subdivided into various submergent and emergent categories. The number and coverage of genera identified are then evaluated using the metrics developed by MPCA.



The methodology and evaluation for the vegetation IBI has remained relatively consistent throughout the project. However, the persistent litter metric calculation was revised in 2004 to reflect average cover values as compared to maximum cover values. In 2005 and again in 2015, minor changes to the data sheets were implemented to reduce the number of transcription errors. The scoring criteria were adjusted slightly to better represent vegetation diversity. Since 2018, Dakota County Parks has altered the vegetation survey protocol (see Dakota County Parks section 4.2). Previous changes in methodology have been documented in earlier summary reports.

Macroinvertebrate IBI

Macroinvertebrates (small aquatic animals with no backbone) are analyzed by collecting samples using six bottle traps and two dip netting efforts combined to represent one sample. The invertebrates are then identified to the genera or "kind" level. Generally, the invertebrates evaluated are macroinvertebrates and include leeches, bugs and beetles, dragonflies and damselflies, caddisflies, mayflies, fingernail clams, snails, crustaceans and phantom midges. The number of genera identified is then evaluated using the metrics developed by MPCA.



**DRAGONFLY
GRAPHIC: MPCA**

Several changes have been made to the data collection and metrics for the invertebrate IBI over the duration of the program. There were no modifications to the methods after 2004. Previous changes in methodology have been documented in earlier summary reports.

Blank data sheets and equipment lists can be found at www.mnwhep.org.

2.3 Cross-Checks and Quality Control

There are several safeguards included in WHEP to validate the data, including training, assistance in the wetland, team cross-checks, and third-party cross-checks. In typical years, each city is responsible for evaluating one wetland in another city as a means of providing a cross-check, providing a second sample for the selected wetland to determine if two different samples provide similar results for the vegetation and

invertebrate IBI; the Citizen Monitoring Coordinator (Jeff Korpik) assists teams and provides advice regarding proper sampling methods and sampling placement; and a third party technical expert (Fortin Consulting) provides Quality Control (QC) review of the completed data sheets, and invertebrate and vegetation identification. Due to COVID-19 health and safety restrictions in 2020, citizen cross-checks were not conducted, and Fortin Consulting identified all invertebrates rather than reviewing team identified specimen.

In 2020, Fortin Consulting (FCI) assisted MPCA in training sessions, provided quality assurance of data, and prepared the annual report. FCI has been working with Dakota County on the WHEP program since 2007.

Over the duration of the program, team cross-checks and third-party cross-checks have been conducted on a rotational basis. In 2020, Fortin Consulting cross-checked the vegetation plots of two wetlands: Dakota County Parks’ Tamarack Swamp (DC-3) and Hastings’ Lake Rebecca (H-6). The purpose of the checks is to determine if the data being collected by the citizen team is accurate and complete, to verify and correct the samples, and to help the teams better interpret their data and strengthen their vegetation and invertebrate identification. The tables and graphs in Section 4.0 include the corrected data from the technical quality control checks. The official data scores are derived from the City team’s data incorporating any corrections made during the technical quality control checks (vegetation cross-check, and datasheet review) conducted by FCI.



CONNIE FORTIN, CAROLYN DINDORF, KATIE FARBER, DOUG KLIMBAL, JESSICA JACOBSON, AVERY ROWAN, NICK MCREAVY, ROMAN ROWAN

2.4 Wetland Scores and Quality Ratings

Each metric, or measure, is evaluated based on the specimens identified and given a score of one, three or five points. The scores for each metric are then combined to get a total score for the IBI. Table 2-1 illustrates the scoring range for each IBI, the corresponding quality rating, and the scores in percent form.

Table 2.1 Interpretation of site IBI scores.

INVERTEBRATE IBI SCORE INTERPRETATION			VEGETATION IBI SCORE INTERPRETATION		
Point Scores	Quality Rating	Percent Score	Point Scores	Quality Rating	Percent Score
6 – 14	Poor	<50%	7 – 15	Poor	<46%
15 – 22	Moderate	50 – 76 %	16 – 25	Moderate	46 – 74%
23 – 30	Excellent	>76%	26 – 35	Excellent	>74%

The ratings (poor, moderate, and excellent) are useful to give the wetland a qualitative description, which can make it easier to describe the overall quality of the wetland. A wetland described as having poor quality would have low species richness (number of species) and diversity and a large number of the species would likely be pollution tolerant. A wetland of excellent quality would have high diversity and species richness

and would include species that are sensitive to pollution or human disturbance. It should be noted that the invertebrate and vegetation IBIs have slightly different ratings based on the scoring range. This is due, in part, to the number of metrics evaluated in each IBI: six for the invertebrate IBI and seven for the vegetation IBI.

Converting IBI scores to percentages allows for the ability to compare the site scores over several years. Thus, the trend in the vegetation or invertebrate IBI can be evaluated. Additionally, the percent scores allow comparison of the IBI results for a given year. This may be helpful to determine if the scores are consistent, and to determine if additional data collection or more intensive evaluation is necessary to characterize the wetland.

IBI point scores can be used to directly compare sites for a given year; however, they cannot be used to compare sites from year to year because:

- The 1998 invertebrate IBI was scored using seven metrics as compared to the six that have been used in 1999 until present.
- The ranges used to determine the quality rating have been modified since 1998 and numerous scoring sheet and metric modifications have been occurring as well.
- The total possible score is not the same for the two IBIs (vegetation IBI has seven metrics with a possible 35 point score while the invertebrate IBI has six metrics with a possible 30 point score).

2.5 Using the Data

Biological data can be difficult to interpret and use. Converting the data collected to metrics and indexes is helpful in interpreting and presenting the data. The methods used in WHEP allow one to identify wetland health conditions. However, they do not determine the cause of poor wetland health. Once a condition of poor wetland health is identified and confirmed, additional testing and analysis of the wetland may be necessary to further define the problem. For example, monitoring of nutrient and/or chloride may be appropriate. To identify the cause of poor wetland health, analysis of surrounding land use, stormwater inputs and other potential stressors is the next step.

For those wetlands identified as having excellent wetland health, local governmental organizations may choose to adopt requirements to provide protection to these wetlands in order to maintain wetland health. Where poor wetland health or declining trends are indicated, steps may need to be taken to help reverse the trend. Best management practices (BMPs), actions taken to reduce pollutant loading or stressors to the wetland, may need to be implemented within the wetland or in the surrounding watershed.

When BMPs are implemented, biological monitoring can be used to help track the impacts of the BMPs on the wetland. Continued monitoring can identify a change in trend or improvement in a wetland.

3.0 General Results and Recommendations

3.1 2020 Sampling Season Results

During the 2020 sampling season, twelve citizen teams (Apple Valley, Dakota County Parks Team 1, Dakota County Parks Team 2, Eagan, Farmington, Hastings, Lakeville, Mendota Heights, North Cannon River Watershed Management Organization, Rosemount, South St. Paul, and West St. Paul) monitored 33 wetlands in nine cities in Dakota County, one watershed management organization, and Dakota County Parks. Two wetland vegetation samples were checked for accuracy through the quality control check performed by Fortin Consulting.

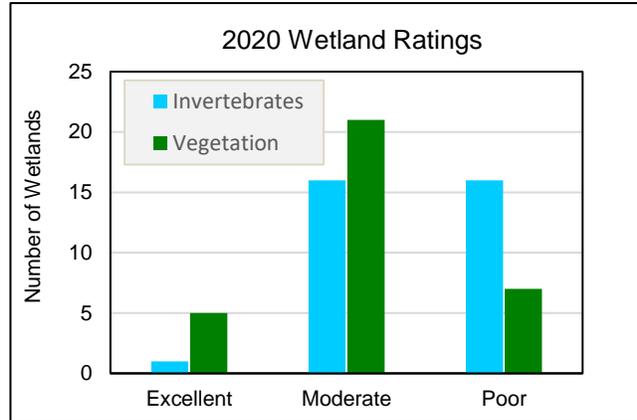


FIGURE 3.1.1 DAKOTA COUNTY WETLAND RATINGS

Figure 3.1.1 and Table 3.1.1 show the invertebrate and vegetation ratings for all of the wetlands assessed during the 2020 sampling season. Based on invertebrate scores, one of the wetlands rated excellent, 16 of the wetlands rated moderate, and 16 rated poor. Invertebrate scores ranged from 10 to 24 out of a maximum of 30 points. Based on vegetation scores, five wetlands rated excellent, 21 rated moderate, and 7 rated poor. Vegetation scores ranged from 13 to 31 out of a maximum of 35 points.

Several of the sites showed different ratings for vegetation versus invertebrates. Sixteen of the wetlands showed agreeing ratings for vegetation versus invertebrates. Differing ratings per wetland may be the result of varying factors influencing the plant and invertebrate communities in each wetland. Possible factors affecting wetland quality are described in the next section. Appendix A lists the wetland scores separated per metric per wetland. Each metric can achieve a score of 1, 3, or 5.

Table 3.1.1 Wetland Ratings by City Based on IBI Scores

Values are listed as number of wetlands rated in each category for Invertebrates/Vegetation

City	Poor	Moderate	Excellent
Apple Valley (AV)	0/1	4/3	0/0
Dakota County (DC)	6/0	0/4	0/2
Eagan (E)	0/0	3/3	0/0
Farmington (F)	1/2	2/1	0/0
Hastings (H)	2/1	1/2	0/0
Lakeville (L)	2/0	0/1	0/1
Mendota Heights (MH)	1/0	1/1	0/1
North Cannon River (NCR)	0/1	1/1	1/0
Rosemount (R)	0/0	3/2	0/1
South Saint Paul (SSP)	2/2	0/0	0/0
West Saint Paul (WSP)	2/0	1/3	0/0
Totals	16/ 7	16/ 21	1/ 5

Note: For an interpretation of scores, please see page 7.

Figure 3.1.2 2020 Invertebrate Scores. Shows the distribution of wetland health ratings for each site monitored in 2020.

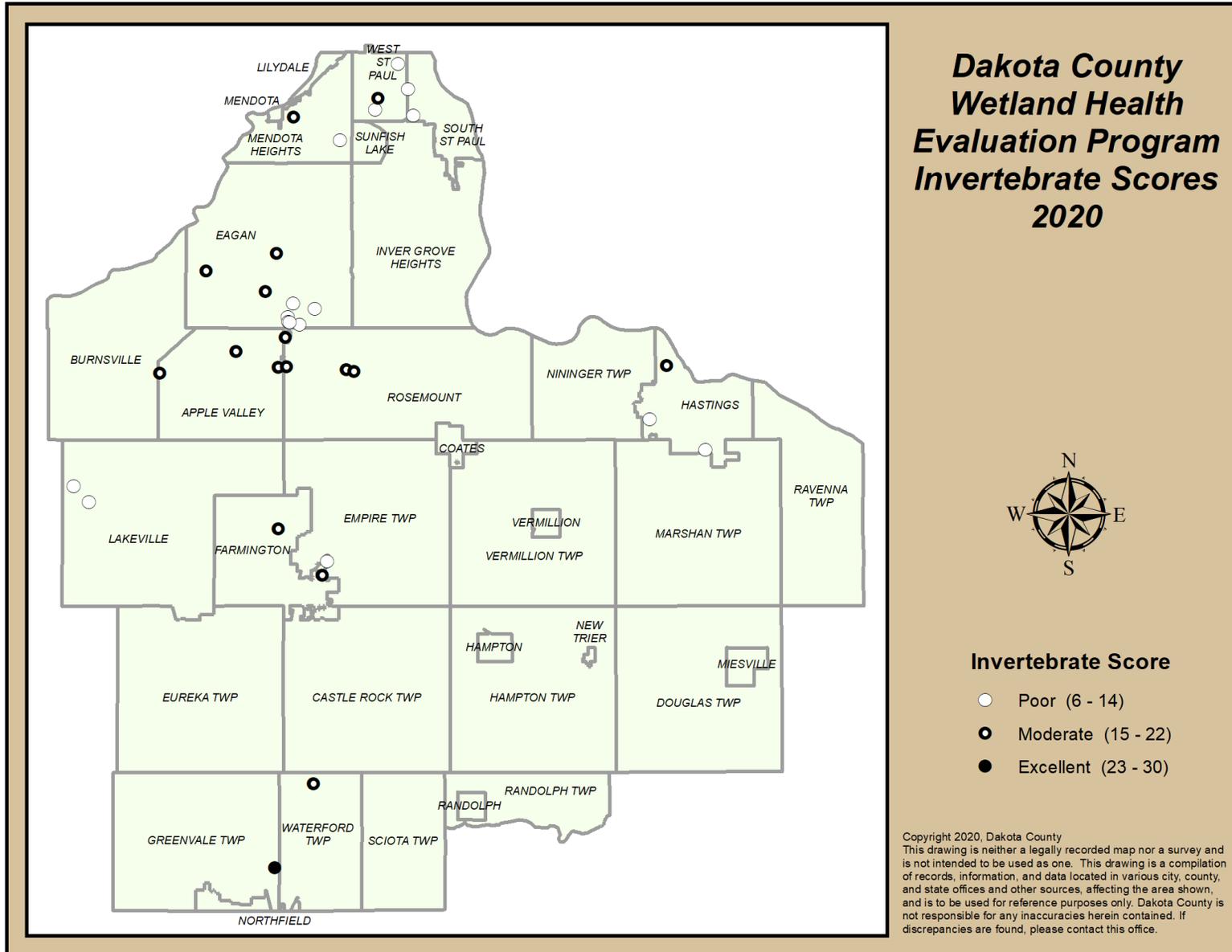
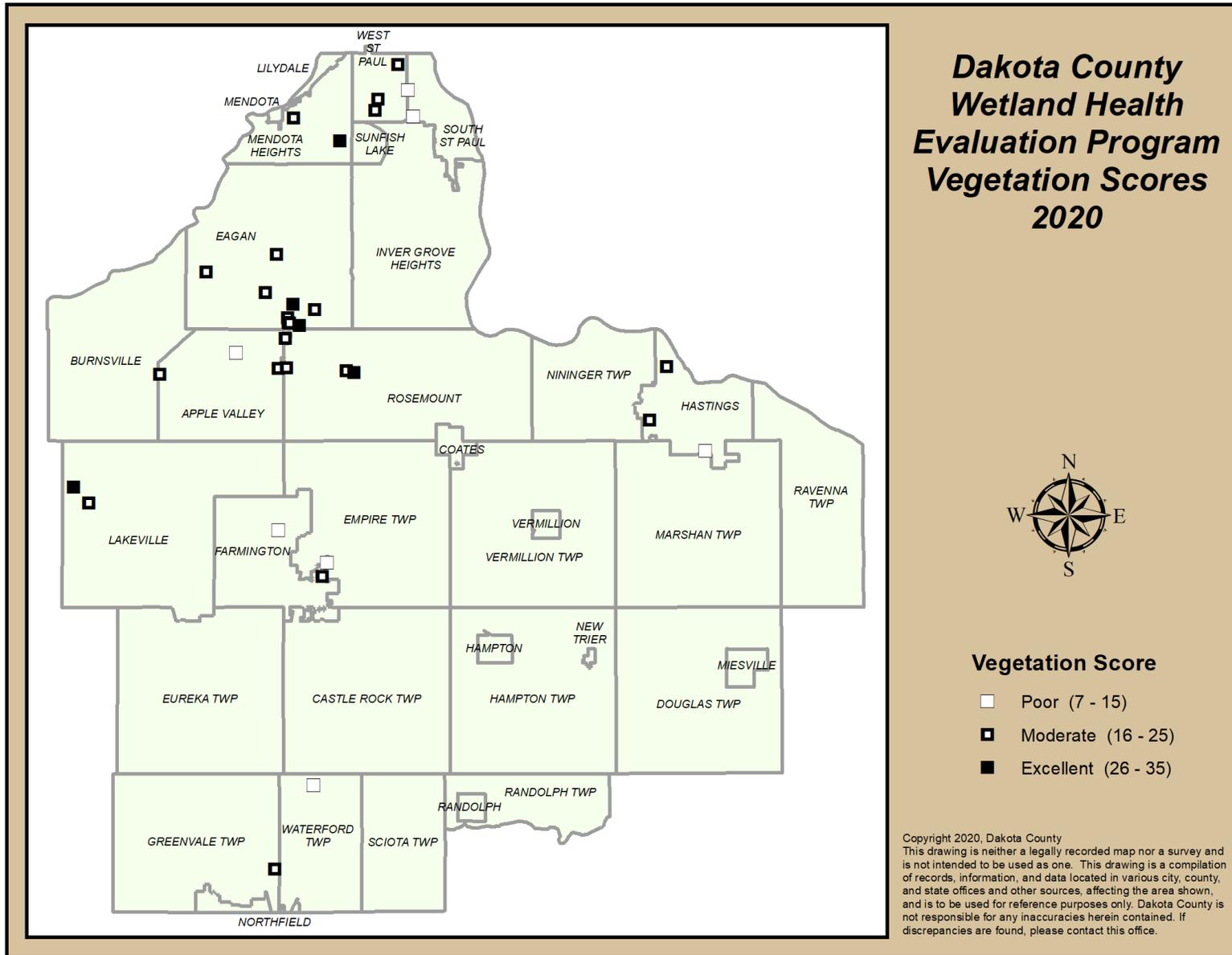


Figure 3.1.3 2020 Vegetation Scores. Shows the distribution of wetland health ratings for each site monitored in 2020.



In an attempt to help identify why there are differences in wetland quality, different factors that impact the wetlands were evaluated.

3.1.1 Aquatic Invasive Species and Wetland Health

Invasive species are non-native organisms that spread to ecosystems beyond their natural historic range, causing harm to economic, environmental, or human health. Aquatic invasive species (AIS) are invasive species more generally found in or near water. Invasive species are often aggressive, spread quickly, and take over areas. They impact native habitat and species diversity. They may be introduced to new areas by wind, water, animals, humans, and other means of transport.

Early detection of invasive species can greatly reduce their success and spread. New infestations or smaller populations of invasive species require less resources to control, and chances of eradication are improved. Once established, invasive species are very difficult and expensive to control, and eradication is unlikely. Detecting and reporting the presence of invasive species early in their introduction to a new area is key. WHEP provides an opportunity for aquatic invasive species to be detected and reported early so that control can be implemented before they take over a wetland.

Aquatic invasive species education and early detection tools have been incorporated into WHEP, preparing WHEP volunteers as early detectors. WHEP volunteers receive AIS training including a presentation highlighting AIS to watch for, identification tips and techniques, and how to record and report AIS to authorities. Hands-on identification practice of native and non-native species is also offered at the invertebrate and vegetation trainings to heighten species recognition, demonstrate comparisons of species, and improve identification skills. WHEP volunteers also receive AIS identification materials, including the [AIS Identification Guide](#) by the University of Minnesota CFANS, and the [Aquatic Invasive Species Early Detectors: A How to Guide](#) by Minnehaha Creek Watershed District. Each team receives AIS early detection field data sheets to record findings during each wetland visit.

Invasive species that have not yet been introduced to Minnesota or exist in limited distribution, but are known to thrive in neighboring states with similar climates and ecosystems are being targeted for early detection. Highlighted species in WHEP training include starry stonewort (*Nitellopsis obtuse*), Hydrilla (*Hydrilla verticillata*), Brazilian elodea (*Egeria densa*), brittle naiad (*Najas minor*), Carolina fanwort (*Cabomba caroliniana*), water chestnut (*Trapa natans*), flowering rush (*Butomus umbellatus*), yellow iris (*Iris pseudacorus*), non-native phragmites (*Phragmites australis*), water hyacinth (*Eichhornia crassipes*), water lettuce (*Pistia stratiotes*), and other invasive species already found in the wetlands.

WHEP teams are expected to report the presence of invasive species in the wetlands that they monitor. Findings in 2020 were as predicted. Many of the WHEP wetlands have been found to contain invasive species. In 2020, a species of common reed grass (*Phragmites* sp.) was found at Mendota Heights' Orchard Heights (MH-20); however, it was not verified as the invasive variety. Reed canary grass (*Phalaris arundinacea*) and purple loosestrife (*Lythrum salicaria*) are two common wetland invaders. Curly-leaf pondweed (*Potamogeton crispus*), Eurasian water-milfoil (*Myriophyllum spicatum*), and Chinese mystery snails (*Cipangopaludina chinensis*) were also observed in wetlands monitored in 2020. Reed canary grass was found in 24 of the wetlands, purple loosestrife was found in 6 of the wetlands, Eurasian water-milfoil was found in 4 of the wetland, curly-leaf pondweed was found in 2 of the wetlands, and Chinese mystery snails were found in 6 of the wetlands. It is possible that other invasive species exist in wetlands, but were not observed near monitoring sites at each wetland. In addition, pondweeds and milfoils were found in

several additional wetlands, but not specifically identified as the invasive species. Appendix B shows the history of invasive species presence in WHEP monitored wetlands.

An analysis of variance (ANOVA) was completed to determine if the differences in wetland health scores were affected by the presence of invasive species, and statistically significant. Differences in IBI scores for wetlands with invasive species present vs. not present were not statistically significant.

3.1.2 Natural versus Altered Wetlands

Wetlands were classified as natural, altered by stormwater input, or created based on information provided in the site identification form from city staff. The average score of each site was used. In the past, WHEP team leaders have commented that the created wetlands seem to exhibit poorer insect diversity. The site averages indicate that created, stormwater, and natural wetlands are scoring similarly (Appendix B). An analysis of variance (ANOVA) was completed to determine if the differences were statistically significant. Differences in IBI scores comparing natural, created, and stormwater wetlands were not statistically significant. In addition, an ANOVA comparing IBI scores for natural, created and stormwater, showed no statistically significant difference between the three scores.

The score range between the created, stormwater, and natural wetlands is similar. The most recent invertebrate scores for each wetland show the lowest invertebrate scores for created, stormwater, and natural wetland, respectively, are 6, 8, 8. The highest invertebrate scores, respectively, are 30, 28, 26. The lowest vegetation scores for created, stormwater, and natural wetlands, respectively, are 11, 9, 11. The highest vegetation scores, respectively, are 27, 31, 31.

Wetland health scores vary from year to year. In 2020, the wetland health was not affected by the type of wetland (created, stormwater, or natural). One would expect that natural wetlands would support the richest and most diverse invertebrate and plant communities. Stormwater altered wetlands tend to have a greater short-term bounce (increase or decrease in water level) and more frequent fluctuations than natural wetlands. They are also inundated with pollutants found in stormwater. Created wetlands likely receive stormwater and thus would have some of the same impacts as stormwater wetlands and would take time to colonize. These factors are also likely to affect the type and diversity of plants found in the wetlands. These results infer that the created wetlands are functioning similarly to the natural wetlands as far as the biological community. See Appendix C for detailed data.

3.1.3 Impervious Area in the Watershed

Data on percent impervious area (hard cover such as streets, parking lots and rooftops) in the watershed was compiled for each wetland based on the site identification forms submitted by each team sponsor. Wetlands with higher impervious areas in the watershed, likely receive more runoff and pollutants. Impervious areas ranged from 0 to 80% (Table 3.1.3). Studies have shown that stream degradation occurs at low levels of imperviousness (about 10%)¹. A similar relationship may exist for wetlands too. Linear regressions have not shown any relationship between imperviousness and IBI scores. Watershed impervious area is likely a factor affecting wetland vegetation and invertebrate life, but there are other factors that are impacting these communities. Appendix D contains wetland and watershed data.

¹Schueler, T. 2000. The Importance of Imperviousness, Article 1 in The Practice of Watershed Protection. Center for Watershed Protection. Ellicott City, MD.

3.1.4 Effect of Wetland Water Levels on Wetland Health

Wetland water levels fluctuate from year to year. They may fluctuate daily in response to rainfall and drought, as well. Water levels may affect site sampling placement. High water levels may push plots farther upland than normally placed. Water levels may also affect the species dominance and diversity. Wetter conditions may encourage more submergent and emergent species of vegetation. Drought, of course, may reduce the population of invertebrates. Water levels were measured by volunteer WHEP teams in 2020 within the vegetation plot sites. The lowest water level measured within the plots in 2020 was zero feet, the highest water level was 4.9 feet (1.5 m), and the average water level was 1.6 feet. A linear regression was completed to compare IBI scores to average plot depth. No significant relationship between IBI score and average plot depth was found for either invertebrates or vegetation. Results assume that vegetation and invertebrates sampling occurred in the same general vicinity of the wetland.

3.2 Is Volunteer Data Usable?

WHEP was designed with several layers of quality assurance and quality control to be able to identify and correct potential errors. This was put into place to make sure the data collected is scientifically justifiable and will be used. The WHEP protocol includes standard annual trainings; citizen monitoring leaders and team leaders that check on the team's collection methods, data entry, and metric calculations; cross-checks by other teams; and quality control checks by a professional consultant. With all of these checks in place, data users can be assured that the data and information presented is acceptable. Despite health safety restrictions due to COVID-19, most quality assurance measures were intact for 2020 season.



TAMARACK SWAMP (DC-3)



LAKE REBECCA (H-6)

3.2.1 2020 Cross-checks

In a typical year, each team is responsible for evaluating one wetland in another city; however, due to health and safety restrictions for COVID-19, team cross-checks were not conducted in 2020.

3.2.2 2020 Quality Control Checks

Quality control checks were conducted at two sites for vegetation in 2020 by Fortin Consulting (FCI). The vegetation check was conducted by re-sampling the area marked off by the citizen team using the WHEP procedures and comparing results. In a typical year, teams would identify the collected invertebrate samples and turn in their results for review; however, due to health and safety restrictions for COVID-19, Fortin Consulting identified all invertebrate samples. Wetlands DC-3 and H-6 were checked as a measure of quality control for vegetation identification and accuracy plot placement by FCI. The teams and Fortin Consulting identified similar vegetation at each site, and matching vegetation scores were calculated by the teams and Fortin Consulting (Figure 3.2.2).

WHEP also provides review of the data sheets for scoring and data transfer errors. This review is conducted by Fortin Consulting. Table 3.2.2 shows the data sheet review results. There were 5 math errors, 5 metric calculation errors, and 1 transfer error. The metric calculation errors pertained the *Utricularia* Metric and Persistent Litter Metric. Corrections affected the scores by zero to four points. Many of these errors could be prevented by double-checking the transfer and math work on the data sheets. The quality control checks are working well. Errors are identified and corrections are made as needed.

Table 3.2.2 Data Sheet Review

Vegetation IBI Scores				Vegetation IBI Scores			
Site	Team Score	Review Score	# Errors	Site	Team Score	Review Score	# Errors
Apple Valley Team				Lakeville			
AV-1	13	13	0	L-7	29	29	0
AV-11	17	17	0	L-8	23	23	0
AV-18	15	17	1				
AV-20	19	19	0				
Dakota County Parks Team 1				Mendota Heights			
DC-4	22	22	1	MH-2	27	27	0
DC-5	19	19	0	MH-20	25	25	0
Dakota County Parks Team 2				North Cannon River			
DC-2	NA	NA	NA	NC-1	19	23	1
DC-3	NA	NA	NA	NC-3	15	15	0
DC-6	NA	NA	NA				
DC-7	NA	NA	NA				
Eagan				Rosemount			
E-1	17	23	4	R-1	19	19	0
E-10	19	19	0	R-21	19	19	0
E-32	21	21	0	R-23	27	27	0
Farmington				South St. Paul			
F-3	19	19	0	SSP-1	17	15	1
F-7	8	13	1	SSP-3	15	13	1
F-9	15	15	0				
Hastings				West St. Paul			
H-4	23	23	0	WSP-3	17	17	0
H-6	21	21	0	WSP-5	23	21	1
H-57	15	15	0	WSP-6	17	17	0

3.3 WHEP Historical Data

Since WHEP began in 1997, 198 wetlands have been sampled, but not all are sampled every year. Figures 3.3.1 and 3.3.2 provide an overall picture of wetland health in Dakota County based on the most recent sample collected for each wetland. The historical data can be found for each site since the start of the program at www.mnwhep.org. Section 4.0 includes the sites sampled in 2020 with an analysis of historical data, identifying sampling history and trends based on a trend analysis for those with adequate data. There is a spread in the distribution of poor, moderate and excellent ratings.

Figure 3.3.1 Most Recent Invertebrate Scores

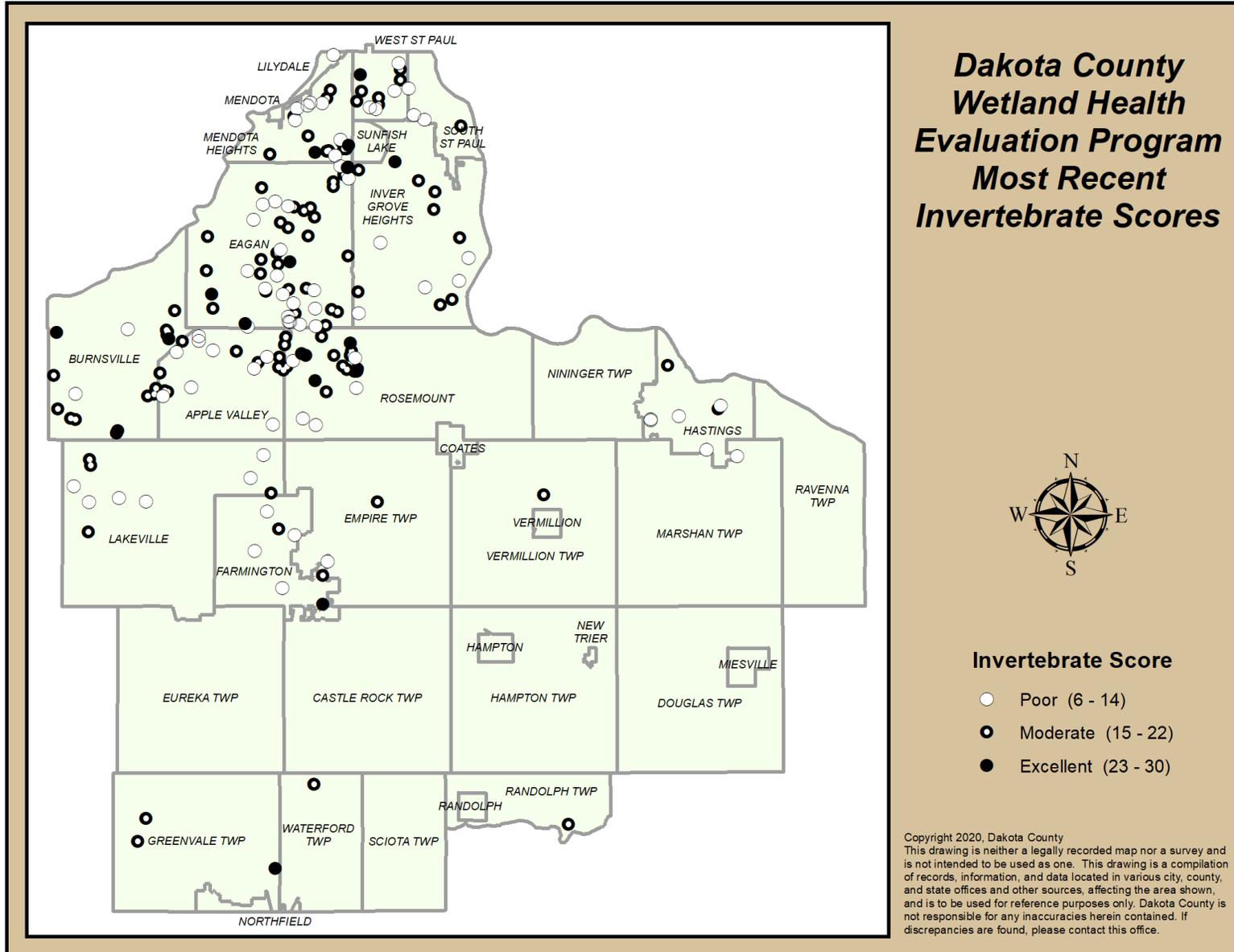
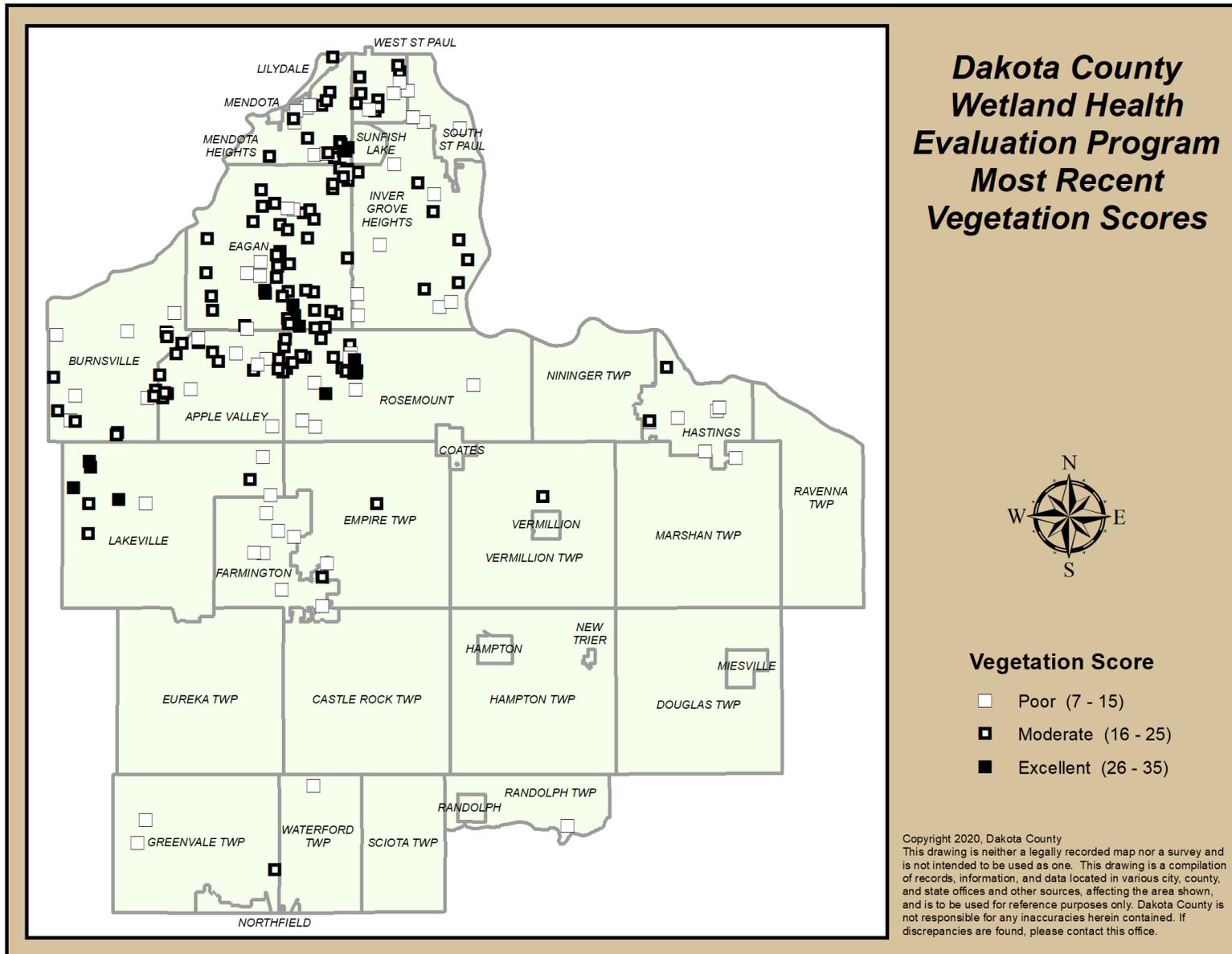


Figure 3.3.2 Most Recent Vegetation Scores



4.0 Wetland Evaluations

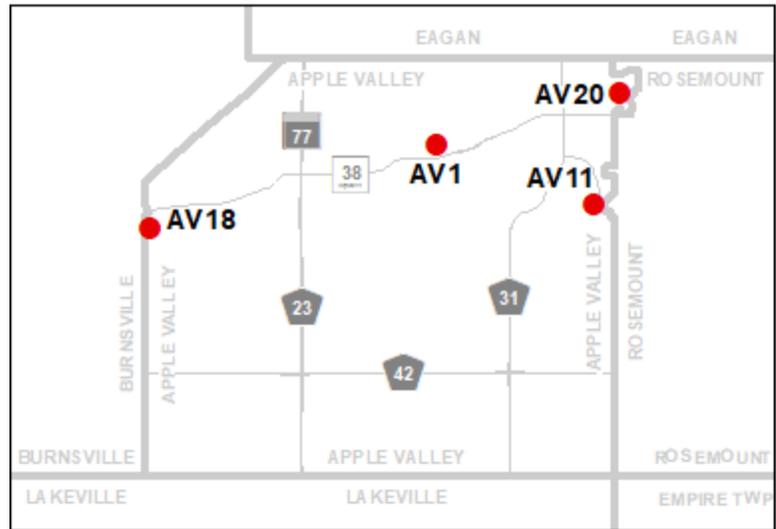
4.1 Apple Valley Wetlands

Four wetlands were monitored within the City of Apple Valley in 2020. This is the 23rd year the City has participated in WHEP! Twenty wetlands have been monitored in Apple Valley since the initiation of WHEP in 1997.

Team Leader: Tom Taintor

Team Members: Brad Blackett, Sheethal Marpaka, Maya Ricard, Noah Ricard, Rachel Ricard, Sophia Ricard, and Cindy Taintor.

Apple Valley WHEP Sites Monitored in 2020



TOM AND CINDY TAINTOR

This is Tom Taintor’s first year as team leader of the Apple Valley WHEP team; however, he had knowledgeable support from his wife and former team leader (2017-2019), Cindy Taintor.

They agree, “It’s always a treat to get out into the ponds, and more than ever in this extraordinary year. The plants and wildlife were thriving and beautiful as ever. This year we saw wild iris blooming for the first time; a muskrat pushing a clump of vegetation across a pond that left a trail through all the duckweed; nobody fell in; and the mosquitoes didn’t find us.”

The Apple Valley WHEP team collected invertebrate samples and plant surveys at four ponds. They said, “we were on our own to set bottle traps and collect inverts in June. Jeff Korpik assisted us on a visit and made sure things were going well. We appreciated his help especially at the golf course because it’s a bit of a hike to get to the pond. One of our volunteers from the previous year stopped by to see us in action at another pond, and to say hi from a safe distance. It was encouraging to know she is still engaged and planning to participate again next year. In July, veteran volunteers Brad Blackett, Sheethal Marpaka, and Rachel Ricard and her three children masked up and showed up. They were a great help with setting the plots and identifying the vegetation. We were grateful that we had a solid team working on the vegetation surveys. And we’re hoping to see them again next year.”



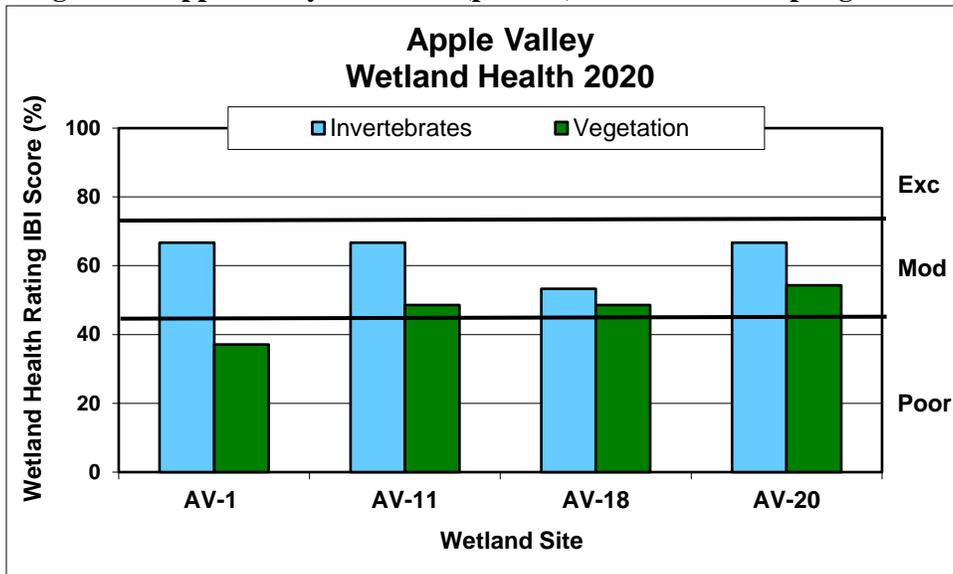
SAMANTHA BERGER

Samantha Berger is entering her 2nd year coordinating the WHEP program. She was impressed by the volunteer’s dedication even during the pandemic and is hopeful 2021 allows for more public interaction so she can get her feet wet with the volunteers. The City utilizes the WHEP program to help track how wetlands are being impacted, specifically when the wetland may be near road construction projects. By evaluating the wetland before and after projects, we get an idea of how our projects may impact nearby wetlands. This information will be useful as the City continues to reconstruct roadways and install new stormwater management practices to treat stormwater runoff, which may have previously discharged into areas, such as wetlands, untreated. The City looks forward to learning more about these wetlands and how they change and react over time and whether the wetland health will increase as new stormwater projects are installed.

Apple Valley General Wetland Health

Figure 4.1 presents an overall view of wetland health for all of the 2020 monitoring sites in Apple Valley based on the IBI scores for invertebrates and vegetation presented as a percent. Figure 4.1 also illustrates the consistency between the IBI scores (in percent form) for each wetland sampled. Invertebrate and vegetation scores that differ by ten percent or less are considered consistent. Based on the IBI scores, a wetland health rating is assigned as excellent, moderate, or poor. The Apple Valley wetlands exhibited moderate wetland health based on invertebrate and vegetation data, with the exception of AV-1 scoring poor for vegetation. The invertebrates and vegetation scores were inconsistent for AV-1, AV-11, and AV-20, with scores differing by 30, 18, and 13 percent, respectively. Invertebrate data scored higher than vegetation data for all four wetlands.

Figure 4.1 Apple Valley site scores (percent) for the 2020 sampling season



4.1.1 Hidden Valley (AV-1)

Hidden Valley (AV-1), also known as EVR-P53, is a 2.0-acre, type 4 wetland within the Vermillion River Watershed. It drains locally to a wetland known as EVR-53, and then through a series of wetlands and lakes. The wetland watershed is 21 acres with 15 acres of direct drainage, and is 35 percent impervious. It has two inlets along the southern border, one equalizer pipe along the eastern border, and one outlet along the western border. This wetland is part of the



CINDY TAINTOR

City’s stormwater management plan, and is designated as a Manage 2 wetland with a goal to continue monitoring over time. Wetlands assigned to this category are characterized by high or exceptional restoration potential but are not located in public or open space.

The wetland is located within a privately-owned residential development and is surrounded by homes and dense lines of deciduous trees such as oak, box elder, and ash. A steep slope extends down to the wetland. Dense stands of cattails, reed canary grass, and willows line much of the wetland edge. Historic aerial photos taken from the Dakota County website show an increase in open water/ponding depth. An adjacent County trail (North Creek Greenway) was constructed in 2016. Infiltration BMPs were included during the trail construction and native seed was used to establish any areas that were disturbed adjacent to the wetland.

Wetland Health

Site Observations: The wetland slope is steep from the road to the wetland, but gentle at the water’s edge. The wetland substrate is mucky with a solid bottom. There is a large vegetative buffer between the homes and the wetland. Duckweed (*Lemna* sp. and *Spirodela* sp.), water-meal (*Wolfia* sp.) covered the surface of the water. Reed canary grass (*Phalaris arundinacea*) and cattail (*Typha* sp.) also dominated the vegetation plot. Other vegetation present included coontail (*Ceratophyllum* sp.), water-milfoil (*Myriophyllum* sp.), pondweed (*Potamogeton* sp.), and smartweed (*Polygonum* sp.). Several species of leeches, dragonflies, damselflies, caddisflies, snails, trueflies, crustaceans, and beetles and bugs were collected.



BRAD BLACKETT

Table 4.1.1 Hidden Valley (AV-1) Wetland Health based on Index of Biotic Integrity (IBI)

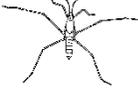
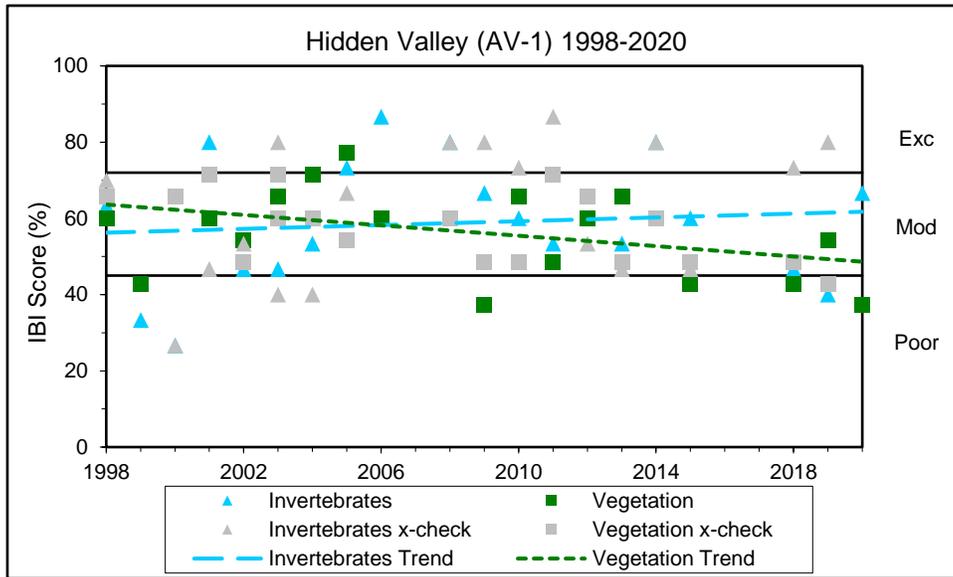
	Invertebrates 	Vegetation 
2020 Data (AV-1)		
Wetland Health Rating (IBI score)	Moderate (20)	Poor (13)
Trend 1998-2020	Variable, but stable	Variable, but declining

Figure 4.1.1 Invertebrate and vegetation trends for Hidden Valley (AV-1)



Site Summary: Hidden Valley has been surveyed 20 times since 1998. The invertebrate and vegetation health scores were inconsistent in 2020. The invertebrate data calculated moderate wetland health while the vegetation showed poor wetland health, which is opposite to the health scores in 2019. Both the invertebrate and vegetation scores have been variable over the years fluctuating between moderate and poor. The extreme fluctuations may be due to factors such as changes in water level and plot placement. Overall, the invertebrates trend appears to be stable, if not improving slightly, while the vegetation trend appears to be declining.



TOM TAINTOR



THE RICARD FAMILY

4.1.2 Farquar Lift Station pond (AV-11)

Farquar Lift Station pond (AV-11), also known as EVR-P352, is a 2.2-acre, type 4 wetland within the Vermillion River watershed. The wetland watershed includes approximately 373 acres, of which 7 acres drains directly. The watershed has 25 percent impervious surface. There is one inlet at the northwest corner of the wetland, one inlet at the southern point of the wetland, and one outlet at the lift station on the north end of the wetland. This wetland is part of the City’s stormwater management plan, and is designated as a Manage 2 wetland with a goal to continue monitoring periodically over time. A future project is anticipated at this pond. The wetland is located within the Farquar and Long Lakes TMDL area.



The surrounding area is residential. A narrow buffer of natural shoreline exists. There is rumor that goldfish are present in this wetland; however, they were not observed during the 2020 monitoring season.

Wetland Health



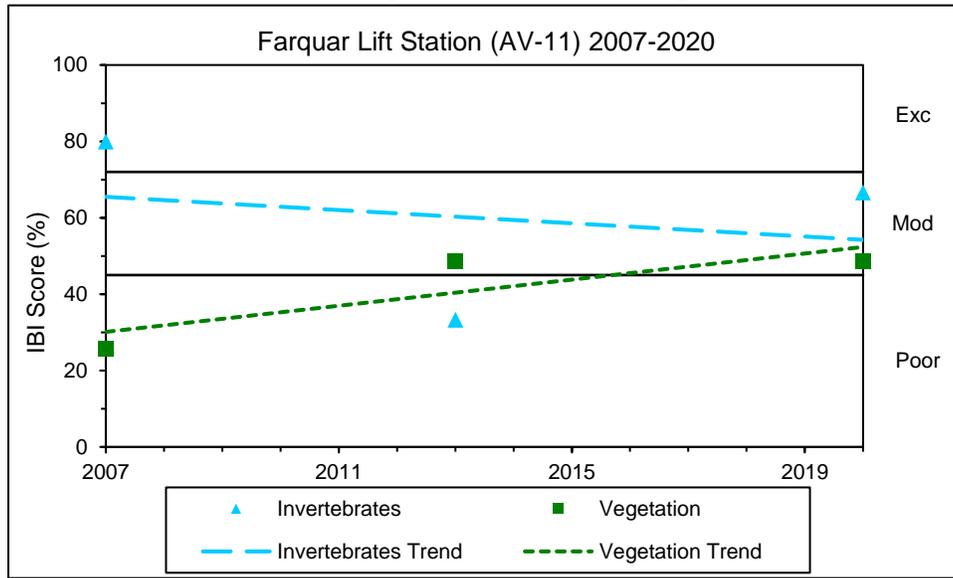
SHEETHAL MARPAKA AND BRAD BLACKETT
SET A VEGETATION PLOT

Site Observations: The wetland slope is gentle and the substrate is very mucky. There are many submerged trees, logs, and branches hiding beneath the surface of the water. It was difficult to collect a dipnet sample without also collecting a lot of mud. The surface of the water covered with duckweed (*Lemna* sp. and *Spirodela* sp.) and water-meal (*Wolffia* sp.). A dense population of coontail (*Ceratophyllum* sp.) was the only submergent vegetation observed. Spike-rush (*Eleocharis* sp.), bulrush (*Scirpus* sp.), and giant reedgrass (*Phragmites australis*), along with overhanging woody vegetation were also present. Several species of leeches, as well as dragonflies, damselflies, caddisflies, snails, fingernail clams, crustaceans trueflies, and beetles and bugs were collected. Chinese mystery snails (*Cipangopaludina chinensis*) were present.

Table 4.1.2 Farquar Lift Station pond (AV-11) Wetland Health based on IBI

	Invertebrates 	Vegetation 
2020 Data (AV-11)		
Wetland Health Rating (IBI score)	Moderate (20)	Moderate (17)
Trend 2007-2020	Not enough data	Not enough data

Figure 4.1.2 Invertebrate and vegetation trends for Farquar Lift Station (AV-11)



Site summary: This is the third time that this wetland has been monitored since the initial survey in 2007. The invertebrate and vegetation scores were inconsistent, but both scored health ratings of moderate. The data is variable, and more data would help assess a more reliable health trend.

4.1.3 Sunset Park Pond (AV-18)

Sunset Park Pond (AV-18), also known as AL-P8, is a 1.0-acre, type 4 wetland within the Vermillion River watershed. The wetland watershed includes approximately 252 acres, of which 43 acres drains directly. The watershed has 30 percent impervious surface. There are four inlets along the northeast side of the wetland. There are also two outlets; one large pipe at the west corner of the wetland and one drain tile pipe in the southwestern area of the wetland, as part of the City’s new iron-enhanced sand filters (IESF) project. This wetland is part of the City’s stormwater management plan, and is designated as a Manage 2 wetland with a goal to determine if there were any impacts from the 2019 installation of IESF.



The area surrounding the wetland is residential and parkland. In 2019, a new iron-enhanced sand filter was installed. The project was identified in a subwatershed assessment for Alimagnet Lake. The goal is to reduce the pollutants, such as phosphorous, from entering into Alimagnet Lake. When water levels rise in the wetland, the water seeps through the gabion wall into the sand filter areas. The iron-enhanced sand combines with dissolved phosphorous to remove it from the water column, then discharges via a drain tile into the lake, cleaner than before. The buffer around the pond was impacted by the IESF project.

Wetland Health



SHEETHAL MARPAKA

Site Observations: The wetland slope is somewhat steep with a solid sand/gravel substrate covered with a layer of muck. Coontail (*Ceratophyllum* sp.), waterweed (*Elodea* sp.), and horned pondweed (*Zannichellia palustris*) dominated the vegetation plot. Pondweed (*Potamogeton* sp.), duckweed (*Lemna* sp.), smartweed (*Polygonum* sp.), and spike-rush (*Eleocharis* sp.) were also present. Species of leeches, dragonflies, damselflies, snails, trueflies, crustaceans, and bugs and beetles were collected.

Table 4.1.3 Sunset Park Pond (AV-18) Wetland Health based on IBI

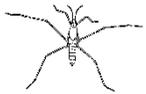
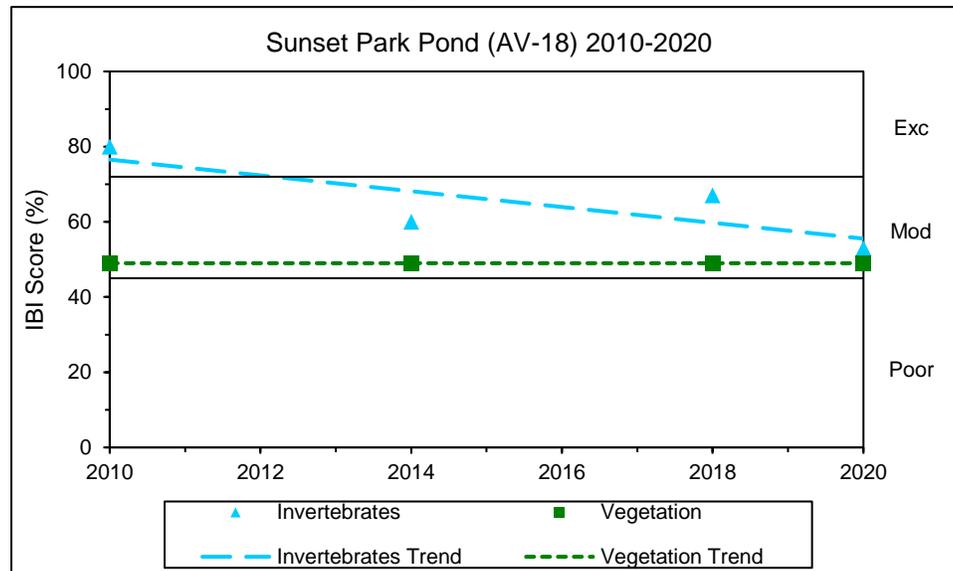
	Invertebrates 	Vegetation 
2020 Data (AV-18)		
Wetland Health Rating (IBI score)	Moderate (16)	Moderate (17)
Trend 2010-2020	Not enough data	Not enough data

Figure 4.1.2 Invertebrate and vegetation trends for Sunset Park Pond (AV-18)



Site summary: This is the fourth time that AV-18 has been monitored since the initial survey in 2010. The invertebrate and vegetation scores are consistent, and both showed moderate wetland health. The vegetation health trend is already displaying stable health scores; however more data would help assess a more reliable health trend.

4.1.4 Valleywood Golf Course (AV-20)

Valleywood Golf Course (AV-20), also known as Hole 16 Pond, is a 1.5-acre type 5 wetland located within the Vermillion River Watershed. The wetland watershed directly drains approximately 12 acres. There is no impervious surface that directly affects the watershed. There are no inlets or outlets in the wetland; however, there is overland flow into and out of the wetland. This wetland is not part of the City’s stormwater management plan, and is designated as a Manage 2 wetland. Wetlands assigned to this category are characterized by high or exceptional restoration potential.



Valleywood Golf Course wetland is located within the boundaries of the City’s golf course. Management of the wetland is consistent with the golf course’s practices. The golf course is interested in pursuing Audobon Certification, and to maintain cooperation in programs like WHEP that can add to their educational components.

Wetland Health

Site Observations: The wetland slope is gentle, and the substrate is mucky. Oak trees surround the wetland. Duckweed (*Lemna* sp. and *Spirodela* sp.) and water-meal (*Wolffia* sp.) cover the surface of the wetland. Dense populations of coontail (*Ceratophyllum* sp.), waterweed (*Elodea* sp.), and pondweed (*Potamogeton* sp.) made up the submergent vegetation. Emergent vegetation including smartweed (*Polygonum* sp.), beggar-ticks (*Bidens* sp.), and reed canary grass (*Phalaris arundinacea*) were also present. Leeches, damselflies, caddisflies, snails, trueflies, crustaceans, and bugs and beetles were collected.

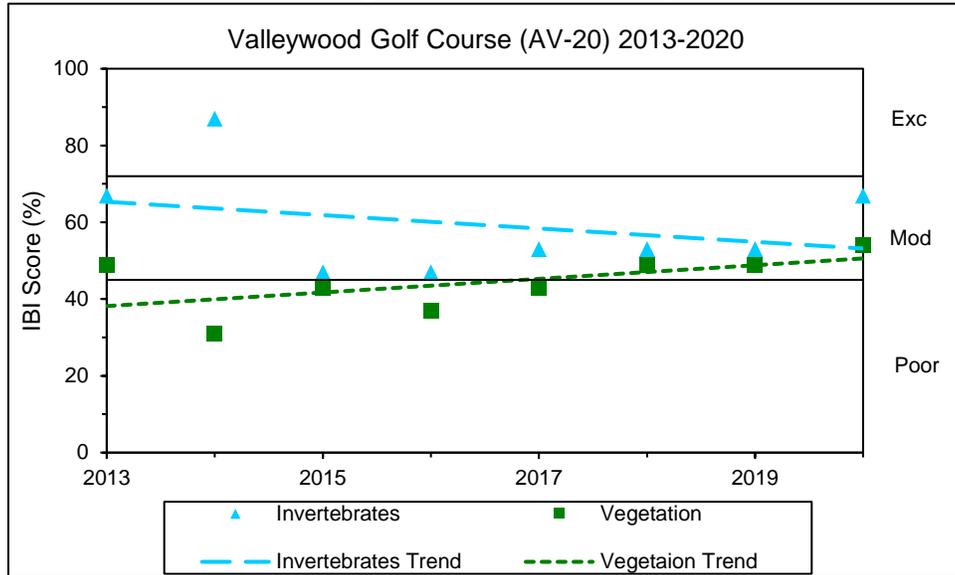


RICARD FAMILY IDENTIFYING VEGETATION

Table 4.1.4 Valleywood Golf Course (AV-20) Wetland Health based on Index of Biotic Integrity

2020 Data (AV-20)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (20)	Moderate (19)
Trend 2013-2020	Declining	Stable

Figure 4.1.4 Invertebrate and vegetation trends for Valleywood Golf Course (AV-20)



Site summary: This is the eighth consecutive year that AV-20 has been monitored through WHEP. The wetland health scores improved in 2020, compared to recent scores. Both wetlands scored moderate; however, the scores were inconsistent, differing by 13 percent. Invertebrate and vegetation health scores have been stable since 2015.

4.2 Dakota County Parks Wetlands

Two teams monitored six wetlands for Dakota County Parks in 2020. This is the sixth year that Dakota County has monitored wetlands with WHEP. Ten wetlands have been monitored for the Parks Department since 2015.

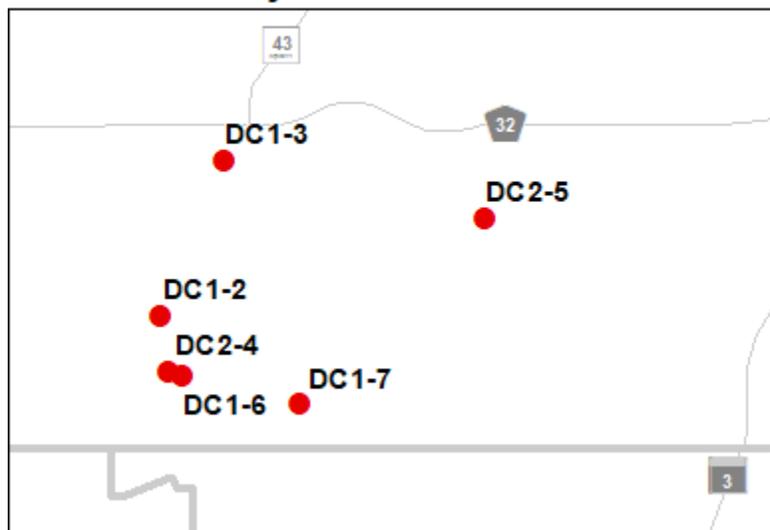
Team Leaders:

David Leard (Team 1) and Rachel Crownhart (Team 2)

Team 1 Members:

Jacob Angstman, Pat Graham, Kaitlyn Hop, Roberta Hop, Caitlin Hughes-Parry, and Doris Ikier

Dakota County WHEP Sites Monitored in 2020



Team 2 Members: Mike Lynn, Lauren Meckle, Betsy Pribyl, Ethan Rossow, and Josh Wielenga.

Dave Leard is the team leader for the Dakota County Parks Team 1. This was his second year as a WHEP team leader. He worked with the Lakeville WHEP Team since 2011 prior to that. Dave is also a Master Water Steward volunteering with the Vermillion River Watershed Joint Powers Organization. He has a degree in Environmental Engineering from Penn State and is a retired Army Reserve Engineer Officer. He was glad the WHEP program was able to work through the COVID-19 pandemic even if in a reduced capacity.”



DAVID LEARD



RACHEL CROWNHART

Rachel Crownhart is the team leader for the Dakota County Parks Team 2. It is her fourth year as a WHEP leader. She wrote, “I love being outside and doing science so it really is a perfect fit for me. My team's wetlands were all in Lebanon Hills County Park, two of which I have sampled in the past and are two excellent restoration success stories. Buck Pond was a reed canary infested depressional wetland before Dakota County had it restored. Twice now our team has had a Common Mudpuppy in our bottle traps here; they are such neat animals! The second restoration is a tamarack swamp that had buckthorn removed in hopes of having the Tamarack trees start to regenerate. Both of these restorations are proof that humans can make a difference in helping our mother Earth.

“Our WHEP season went without fault. The best memory I have is finishing two macro collections in 90+ heat and coming back to our cars and drinking ice-cold lemonade...probably the best I have ever had! Thanks to my volunteers for all their help! When I'm not in waders, you can find me in my garden or on my porch watching the birds. This was the best year I have ever had with my tomato crop.”



CHRIS KLATT

Chris Klatt is Dakota County Parks’ WHEP contact. He said, “Dakota County Parks’ mission is to enrich lives by providing high quality recreation and education opportunities in harmony with natural resource preservation and stewardship. We’re currently maintaining over 1000 restored acres and actively restoring an additional 900 acres within the County Park system. To ensure we’re having a positive impact on wetland plant communities, thereby enhancing their habitat value, we’re committed to ongoing monitoring of our restorations. This was the fifth year Dakota County Parks has participated in the WHEP program. We are grateful for the opportunity to engage volunteers to study the health of the wetlands in Lebanon Hills Regional Park, both to inform the success of past restoration efforts, and inform future needs to improve water and habitat quality in our Parks.”

Vegetation Protocol Modified

In 2019, the Dakota County Parks Department modified the WHEP vegetation protocol in order to better understand species richness, abundance, and distribution. The traditional WHEP protocol is to identify vegetation to the genus level. The modified protocol requires that the vegetation be identified to the species.

Team members set up a 100 m² vegetation plot and surveyed the vegetation within the plot, as outlined in the traditional WHEP protocol. The key difference is specifying the plants to the species level of identification. The shared genus of species could then be easily transferred into the WHEP metrics to calculate a vegetation health score.

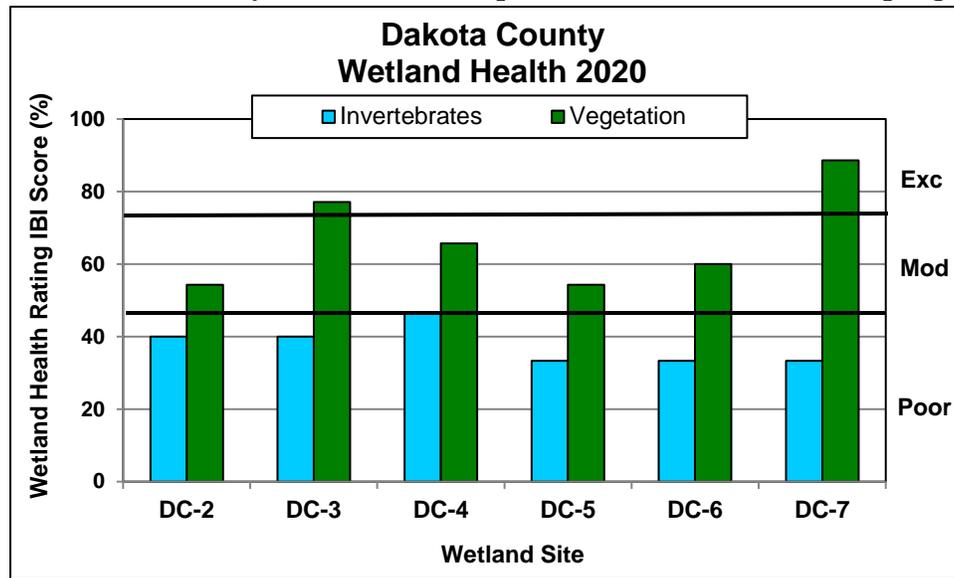
In addition, to surveying the vegetation plot, Dakota County WHEP volunteers may have conducted an optional 20-minute meander survey. This was to be completed after the 100 m² plot sampling. Meander surveys involve walking “randomly” through a wetland site and noting each species found. Meander surveys are useful in difficult terrain or irregularly-shaped sites, and are particularly useful for locating small habitat features that fall outside of the plot site. The meander should be conducted on the edges of the plot sample area. The meander should be completed only if there is enough time after the normal plot sampling has been completed.

These modifications came after a trial of the Rapid Floristic Quality Assessment (rFQA) was completed in the Dakota County Parks wetlands in 2018. Modifications of the WHEP protocol in 2019 were made in hopes that moderately trained and/or experienced naturalists are able to complete the surveys.

Dakota County Parks General Wetland Health

Figure 4.2 presents an overall view of wetland health for all of the 2020 monitoring sites in Dakota County Parks based on the IBI scores for invertebrates and vegetation presented as a percent. Figure 4.2 also illustrates the consistency between the IBI scores (in percent form) for each wetland sampled. Invertebrate and vegetation scores that differ by ten percent or less are considered consistent. Based on the IBI scores, a wetland health rating is assigned as excellent, moderate or poor. Each of the Dakota County wetlands exhibited poor wetland health based on invertebrate data. DC-3 and DC-7 exhibited excellent wetland health based on vegetation data. Invertebrate and vegetation scores for all wetlands were inconsistent. Most of the wetland health scores are moderate with vegetation scoring higher than invertebrates at all sites.

Figure 4.2 Dakota County Parks site scores (percent form) for the 2020 sampling season



4.2.1 Buck Pond (DC-2)

Buck Pond (DC-2) is a 1.6-acre, type 3 wetland located in the Lower Minnesota River watershed. The pond’s watershed is approximately 12 acres with zero impervious surface. It is a small, round pond/wetland located near the center of Lebanon Hills Regional Park. It’s an isolate terrene basin, within 700-1200 feet of larger lakes to the east and south. It is classified as “shallow marsh” and a “freshwater emergent wetland”. It is surrounded by smooth brome-dominated uplands and overgrown savanna/woodland. It was likely grazed historically. The wetland was previously dominated by reed canary grass (*Phalaris arundinacea*), and deposition from the surrounding land had caused build-up in the wetland covering the native emergent vegetation with fine sands.



MIKE LYNN AND ETHAN ROSSOW

Dakota County began implementing major ecological restoration of this wetland in December 2015 and continued through June 2018. In December of 2015, the wetland was scraped 1.5 feet deep from the wetland edge in hopes that it would remove the rhizomatous root system of reed canary grass, and expose and reestablish the native wetland seed bank. Prior to the scrape, there was very low plant diversity within the basin and very little native emergent vegetation; however, following the scrape in June 2016, the native seedbank began emerging during the growing season. Data collected before, during, and after the restoration monitored the effects of the project on the wetland.

Wetland Health

Site Observations: The wetland slope is gentle. The wetland substrate is very mucky. Pondweed (*Potamogeton* sp.), coontail (*Ceratophyllum* sp.), and arrowhead (*Sagittaria latifolia*) dominated the wetland vegetation. Duckweed (*Lemna* sp.), water-meal (*Wolffia* sp.), smartweed (*Polygonum* sp.), spike-rush (*Eleocharis* sp.), sedges (*Carex* sp.), and beggar-ticks (*Bidens* sp.) were also represented in small populations. Reed canary grass (*Phalaris arundinacea*) is present along the edges of the wetland. Leeches, snails, fingernail clams, trueflies, crustaceans, and bugs and beetles were collected. Mud puppies and tadpoles were found in the bottle traps.

Table 4.2.1 Buck Pond (DC-2) Health based on Index of Biotic Integrity

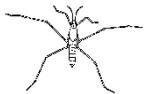
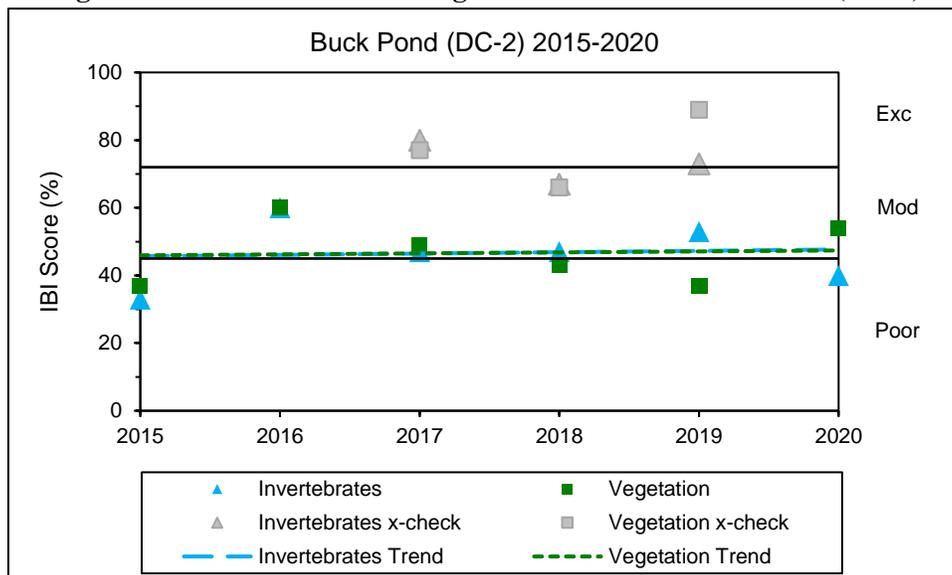
	Invertebrates 	Vegetation 
2020 Data (DC-2)		
Wetland Health Rating (IBI score)	Poor (12)	Moderate (19)
Trend 2015-2020	Improving	Stable

Figure 4.2.1 Invertebrate and vegetation trends for Buck Pond (DC-2)



Site summary: This is the sixth consecutive year that Buck Pond has been monitored by WHEP. The invertebrate and vegetation scores were inconsistent, differing by 14 percent. The invertebrates score indicates poor wetland health, and the vegetation score indicates moderate wetland health. The invertebrates and vegetation scores fluctuate, but remain stable. Vegetation score improved in 2020.

4.2.2 Tamarack Swamp (DC-3)

Tamarack Swamp (DC-3) is a 7.7-acre, type 3 wetland located in the Lower Minnesota River watershed. The wetland’s watershed is approximately 40 acres with zero impervious surface. No large scale alterations to the historic hydrology of the swamp have been detected, and efforts have been made throughout the history of the park to protect this unique feature from human impact.



Tamarack Swamp is a 24-acre basin that contains a remnant Tamarack Swamp in Lebanon Hills Regional Park. It is the southernmost example of tamarack swamp remaining in Minnesota. Surrounding the swamp are oak woodland and oak forest plant communities. The natural area is comprised of a matrix of glacial moraine hills, plains and kettle hole lakes and ponds. The dominant land cover types pre-settlement would have been primarily oak forest, shallow lakes and wetlands, and prairie/savanna.

Dakota County Natural Resource Department’s primary goal is to create conditions in this wetland that favor tamarack regeneration through the removal of shrubs and invasive herbaceous species within the swamp, and to buffer the swamp by removing invasive species from the adjacent plant communities with the swamp watershed. Monitoring will give the County baseline data and on-going data collection in the following years. Minnesota County Biological Survey surveyed the park, including the Tamarack Swamp, and found the swamp to be of moderate biological diversity significance. This wetland has also been monitored by MPCA for the past decade.

Wetland Health

Site Observations: The wetland slope is gentle, and the wetland substrate is mucky. Duckweed (*Lemna* sp.) and water-meal (*Wolffia* sp.) cover the wetland surface. Moderate populations of arrowhead (*Sagittaria* sp.), water plantain (*Alisma* sp.), spikerush (*Eleocharis* sp.), and bladderwort (*Utricularia* sp.) were present. Pondweed (*Potamogeton* sp.), Naiad (*Najas* sp.), sedges (*Carex* sp.), and cut grass (*Leersia* sp.), and several other emergent plants were found in the vegetation plot. Reed canary grass (*Phalaris arundinacea*) was also observed. Leeches, true flies, crustaceans, and bugs and beetles were collected.

Table 4.2.2 Tamarack Swamp (DC-3) Health based on Index of Biotic Integrity

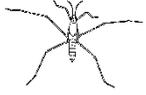
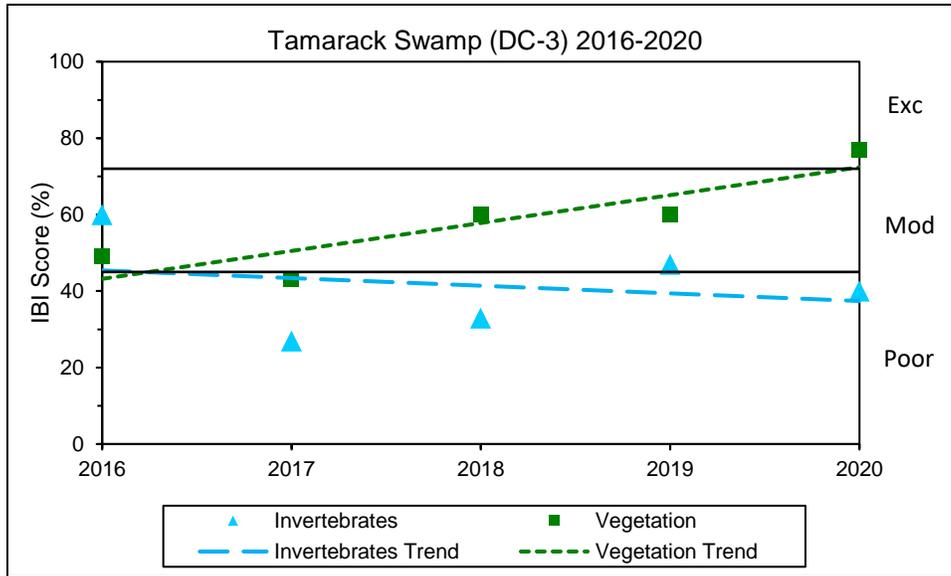
	Invertebrates 	Vegetation 
2020 Data (DC-3)		
Wetland Health Rating (IBI score)	Poor (12)	Excellent (27)
Trend 2016-2020	Not enough data	Not enough data

Figure 4.2.2 Invertebrate and vegetation trends for Tamarack Swamp (DC-3)



Site summary: This is the fifth consecutive year that Tamarack Swamp has been monitored by WHEP. The invertebrate and vegetation scores were not consistent with each other, differing by 37 percent. The invertebrate data is variable, but stable. The vegetation data is showing an improving health trend. FCI cross-checked the vegetation plot at Tamarack Swamp. Identification results were very similar. More years of monitoring are needed to determine reliable wetland health trends.

4.2.3 Jensen Lake East (DC-4)

Jensen Lake (DC-4) is a 50-acre, type 5 wetland located in the Lower Minnesota River watershed. The pond’s watershed is approximately 330 acres with seven percent impervious surface. The watershed in this area of the south metro has been greatly changed/alterd with the building of roads, commercial industry, and residential areas. The general water flow is still in the same direction; however, altered with the addition of Pilot Knob Road culverts and overall landscape altering. There is a culvert running under Pilot Knob Road that connects two small ponds on either side of the road. The pond adjacent to Jensen Lake was created to collect sediment, salt, and fertilizers from entering into Jensen Lake. When this pond reaches a certain depth, the excess water flows into Jensen without these contaminants. Jensen Lake drains into Sedge Pond in the northeast corner.



Historically, the land north of Jensen Lake was agriculture and pastured land. The woodland surrounding Jensen Lake was most likely grazed with cattle. The Natural Resource Department is in the process of restoring 175 acres in the surrounding adjacent acres in Lebanon Hills. The north woodland slope of Jensen Lake was identified by the MN DNR as a high quality Southern Mesic Oak-Basswood Forest. The north

and east woodlands are more degraded with invasive species like buckthorn and honeysuckle which will be removed and treated with the completion of the restoration of this area. Baseline data is wanted to monitor the change over time in this natural area as the land is restored and maintained to the proper native plant community. Along with vegetation surveys, turtle visual and trapping surveys, and insect surveys, Dakota County would like the invertebrate and plant survey information that WHEP supplies to monitor this restoration area. The goal is to minimize invasive species and maximize the cover of native species.

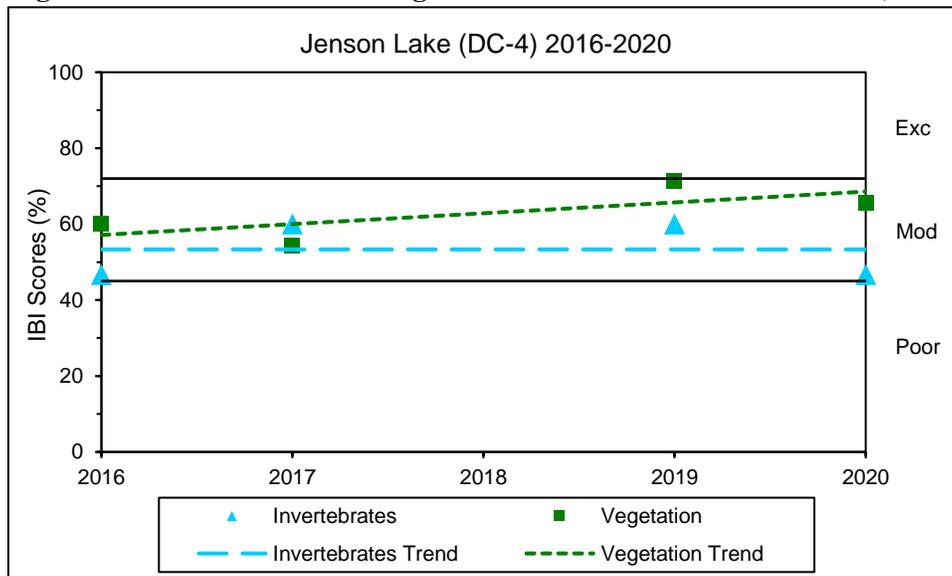
Wetland Health

Site Observations: The wetland slope is gentle, and the wetland substrate is mucky. The surrounding area is forested up to the wetland perimeter. The wetland is covered with white and yellow water-lilies (*Nymphaea* sp. and *Nuphar* sp.). A canoe path is the only means of openwater. Coontail (*Ceratophyllum* sp.) and pondweed (*Potamogeton* sp.) grows densely below the water’s surface. Flatsedge (*Cyperus* sp.), iris (*Iris* sp.), swamp milkweed (*Asclepias incarnata*), smartweed (*Polygonum* sp.), and a few other emergent plants were observed. Several species of leeches, dragonflies, damselflies, snails, fingernail clams, trueflies, crustaceans, and bugs and beetles were collected.

Table 4.2.3 Jensen Lake East (DC-4) Health based on Index of Biotic Integrity

	Invertebrates 	Vegetation 
2020 Data (DC-4)		
Wetland Health Rating (IBI score)	Poor (14)	Moderate (23)
Trend 2016-2020	Not enough data	Not enough data

Figure 4.2.3 Invertebrate and vegetation trends for Jensen Lake East (DC-4)



Site summary: This is the fourth year that Jensen Lake East has been monitored by WHEP since 2016. The invertebrate and vegetation scores were inconsistent with each other, differing by 19 percent. More years of monitoring are needed to determine reliable wetland health trends.

4.2.4 Wood Pond (DC-5)

Wood Pond (DC-5) is a 0.8-acre, type 3 wetland located in the Lower Minnesota River watershed. The pond’s watershed is approximately 22 acres with no impervious surface. Water flows into Wood Pond from Cattail Pond and seeps from the surrounding area. The water eventually drains into Schultz Lake.



Wood Pond is near a restored and maintained prairie. Historically, the area was used for grazing.



KAITLYN HOP, ROBERTA HOP,
JACOB ANNGSTMAN, DORIS IKIER

Wetland Health

Site Observations: The wetland slope is gentle, and the wetland substrate is mucky. A hiking trail runs along the northern portion of the wetland. Coontail (*Ceratophyllum* sp.) and white water lily (*Nymphaea* sp.) dominated the wetland vegetation. Duckweed (*Lemna* sp.), waterweed (*Elodea canadensis*), and pondweed (*Potamogeton* sp.) were also present. Leeches, dragonflies, snails, crustaceans and trueflies were collected. Tadpoles, frogs, sunfish, and catfish were caught in the bottle traps.

Table 4.2.4 Wood Pond (DC-5) Health based on Index of Biotic Integrity

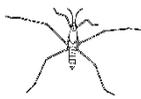
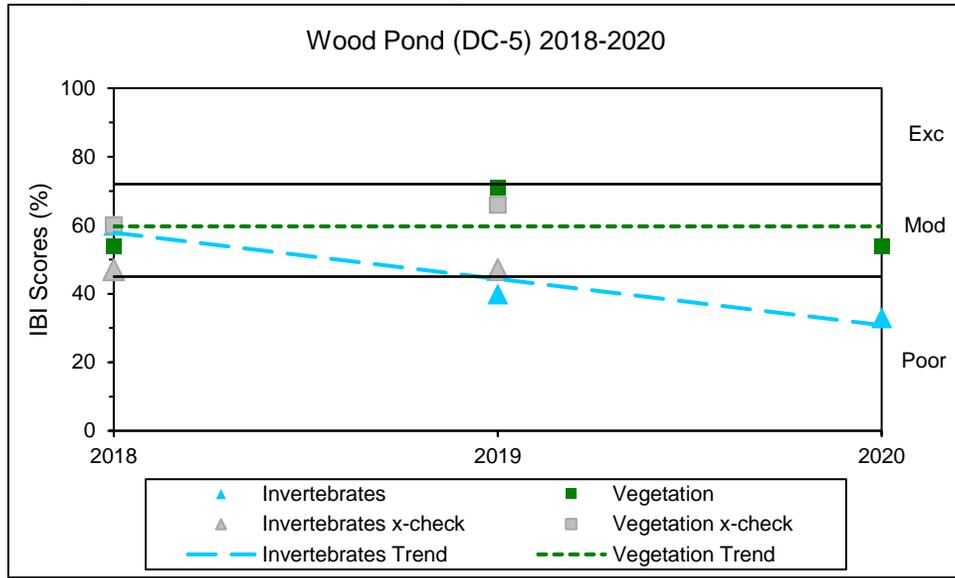
	Invertebrates 	Vegetation 
2020 Data (DC-5)		
Wetland Health Rating (IBI score)	Poor (10)	Moderate (19)
Trend 2018-2020	Not enough data	Not enough data

Figure 4.2.4 Invertebrate and vegetation trends for Wood Pond (DC-5)



Site summary: This is the third consecutive year that Wood Pond has been monitored by WHEP. The invertebrate and vegetation scores were very inconsistent with each other, differing by 19 percent. The invertebrates health score was poor while the vegetation health score was moderate. The vegetation diversity was smaller than 2019 data. More years of monitoring is needed to determine reliable wetland health trends.

4.2.5 BB’s Wetland (DC-6)

BB’s Wetland (DC-6) is a 1.2-acre, type 5 wetland located in the Lower Minnesota River watershed. There is a natural inlet on the west end of the wetland, as well as a natural overflow/outlet on the west end.



This wetland is within Lebanon Hills Regional Park. There is very little disturbance, with natural oak forest surrounding the wetland. This wetland is significant due to the presence of Blanding’s turtles that live in the area throughout most of the year. The County Parks have been tracking a female Blanding’s turtle in the vicinity of the wetland. The wetland management goal is to maintain high quality vegetative cover conducive to turtle habitat. The overall strategy is to continue monitoring for the presence of invasive species and determine stability of native plant cover.

Wetland Health

Site Observations: The wetland slope is gentle, and the wetland substrate is very mucky. A hiking trail runs along the northern portion of the wetland. White water lily (*Nymphaea* sp.) and duckweed (*Lemna* sp. and *Spirodela* sp.) cover most of the water surface. Submergent vegetation included waterweed (*Elodea* sp.), bladderwort (*Utricularia* sp.), and Eurasian watermilfoil (*Myriophyllum spicatum*). Bur-reed (*Sparganium* sp.), sedges (*Carex* sp.), spike-rush (*Eleocharis* sp.), beggar-ticks (*Bidens* sp.), and reed canary grass (*Phalaris arundinacea*) were also present. Leeches, dragonflies, damselflies, snails, fingernail clams, trueflies, crustaceans, and bugs and beetles were collected.

Table 4.2.5 BB's Wetland (DC-6) Health based on Index of Biotic Integrity

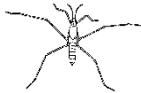
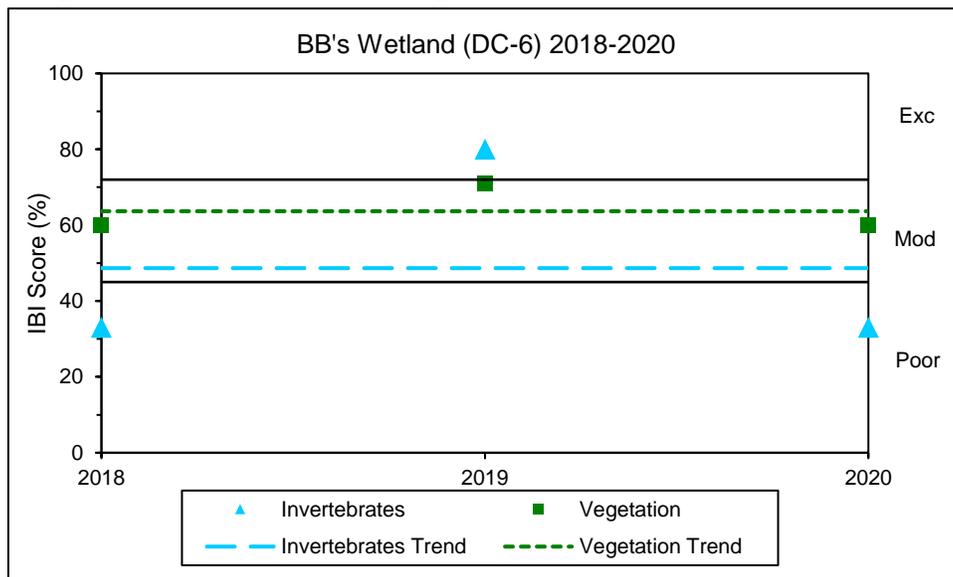
	Invertebrates 	Vegetation 
2020 Data (DC-6)		
Wetland Health Rating (IBI score)	Poor (10)	Moderate (21)
Trend 2018-2020	Not enough data	Not enough data

Figure 4.2.5 Invertebrate and vegetation trends for BB's Wetland (DC-6)



Site summary: This is the third consecutive year that BB's Wetland has been monitored by WHEP. The invertebrate and vegetation scores were not consistent with each other, differing by 27 percent. The invertebrate score indicates poor wetland health, and the vegetation score indicates moderate wetland health. The invertebrate score decreased dramatically since 2019, but scores are the same as 2018 data for both categories. More years of monitoring are needed to determine reliable wetland health trends.

4.2.6 Lilypad Pond (DC-7)

Lilypad Pond (DC-7), formerly known as E-29, is a 2.35-acre wetland located in the Lower Minnesota River watershed. It is delineated as a type 3 (shallow marsh) and type 5 (shallow open water) wetland. Water flows into Lilypad Pond from Dakota Lake. A natural outflow/outlet exists on the west end of the wetland.



This wetland is within Lebanon Hills Regional Park. There is very little disturbance, with natural oak forest surrounding the wetland.

The portion of the wetland defined as shallow marsh includes excellent vegetative diversity. It is considered high quality with a management goal to protect and maintain health. The portion of the wetland defined as shallow open water (i.e. shallow lake) is considered moderate quality with a management goal to protect the area from reed canary grass and cattail invasion.

Wetland Health



ELIZABETH PRIBYL, LAUREN MECKLE
AND ETHAN ROSSOW

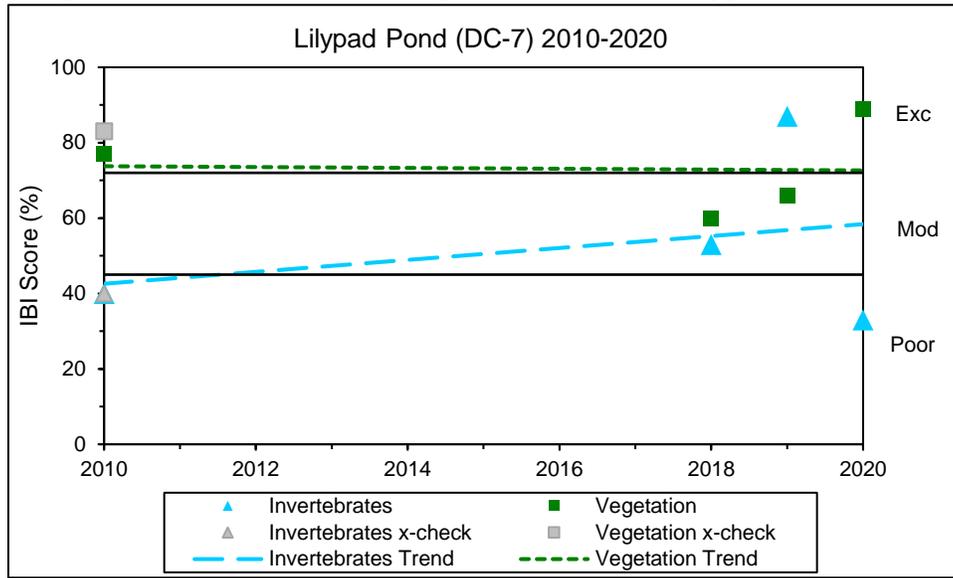
Site Observations: The wetland slope is gentle, and the wetland substrate is mucky. A prescribed burn in the upland vegetation surrounding the wetland occurred in the spring. Emergent vegetation buffers the entire perimeter of the wetland. A dense population of coontail (*Ceratophyllum* sp.) dominates. Waterweed (*Elodea* sp.), pondweed (*Potamogeton* sp.), duckweed (*Lemna* sp. and *Spirodela* sp.), and water lilies (*Nymphaea odorata*) were also present. Several emergent plants were also represented in the vegetation plot, including sedges (*Carex* sp.), Iris (*Iris* sp.), bur-reed (*Sparganium* sp.), marsh fern (*Thelypteris palustris*), and reed canary grass (*Phalaris arundinacea*). Slender Riccia (*Riccia fluitans*) was also observed.

Damselflies, mayflies, caddisflies, snails, fingernail clams, true bugs, crustaceans, and bugs and beetles were collected.

Table 4.2.6 Lilypad Pond (DC-7) Health based on Index of Biotic Integrity

	Invertebrates 	Vegetation 
2020 Data (DC-7)		
Wetland Health Rating (IBI score)	Poor (10)	Excellent (31)
Trend 2010-2020	Not enough data	Not enough data

Figure 4.2.6 Invertebrate and vegetation trends for Lilypad Pond (DC-7)



Site summary: This is the fourth year that Lilypad Pond has been monitored by WHEP. It was first monitored in 2010 by the Eagan Team. The invertebrate and vegetation scores were very inconsistent with each other, differing by 56 percent. Invertebrate data indicates a poor wetland health in 2020, which is completely opposite to 2019 data, but more similar to 2010 data. The vegetation data indicates excellent wetland health in 2020. The water was deep enough to require a 5 x 20 square meter plot. Tadpoles and bullheads were caught in the bottle traps which may have impacted invertebrates score. More years of monitoring are needed to determine reliable wetland health trends.

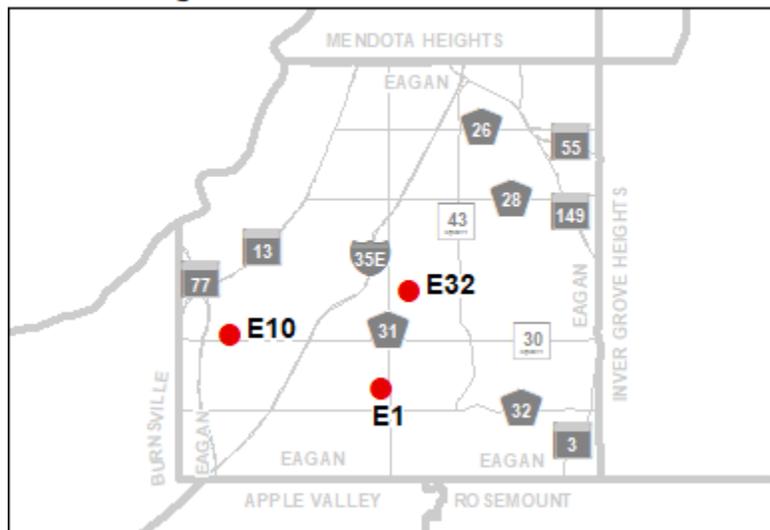
4.3 Eagan Wetlands

Three wetlands were monitored within the City of Eagan in 2020. The City has 23 years of data! Forty-four wetlands have been monitored in Eagan since the initiation of WHEP in 1997.

Team Leader: Hannah Figura

Team Members: Benjamin Adolphson, Nicole Deziel, Chris Figura, Craig Harnagel, Evan Lafont, Bill Larson, Randi Martin, and Mark Niznik.

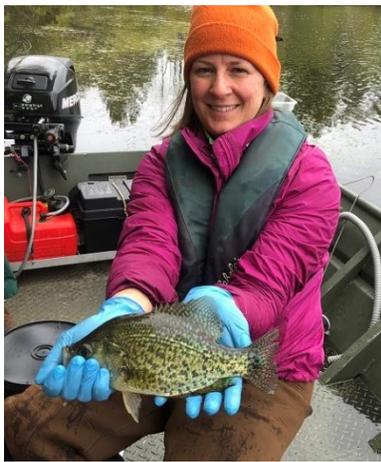
Eagan WHEP Sites Monitored in 2020



Hannah Figura is a first year team leader for the Eagan WHEP team. She is a graduate of the School of Environmental Studies in Apple Valley and is currently in her Freshman year in the Water Resource Management program at University of Wisconsin Steven Point. Having volunteered for WHEP and similar wetland programs in prior years, she stepped up to lead the WHEP team in her hometown. She related, “I most appreciated the wide range of ages and experience of the volunteers on the Eagan team, and how we all worked and collaborated so seamlessly. The first timers learned alongside the more seasoned volunteers. While the safety protocols were restrictive on sharing tools and maintaining proper distance, we managed to keep everyone active and involved yet never felt understaffed.”



HANNAH FIGURA



JESSIE KOEHLE

Jessie Koehle is the Water Resources Specialist for the City of Eagan, and has a background in aquatic biology and fisheries management. She explained, “I have been involved with selection of Eagan’s WHEP sites since I joined the City of Eagan in 2007. I communicate as needed with our WHEP leader to help plan and strategize the WHEP sampling season. The 2020 WHEP season was different for all of us, from new safety protocols to a brand new team leader, but I am still so proud of our community and volunteers for finding creative ways to make this happen. I hope to connect more often with volunteers in the field in the coming years! Whenever I am able to meet volunteers in the field, I enjoy getting to know them and practicing my plant and invertebrate identification. We are building a group of wetland ambassadors that are an invaluable resource to our program and the Eagan community.”

“At the City of Eagan, WHEP data are used as a source of qualitative and interesting information about wetland health, areas of special concern or protection, and historical recordkeeping for future changes. We have a unique challenge of tracking the health of our 820-some natural waterbodies! It can be difficult to choose just a few to sample, but it is a good problem to have. Thanks to all the WHEP staff and volunteers for your dedication and time spent on this excellent program.”

Since 1999, Eric Macbeth has managed Eagan’s water resources programs that focus on protecting and improving lakes, conserving wetlands, and preventing stormwater pollution. “The City of Eagan has supported WHEP from the beginning, when we helped develop the program with Dakota County in 1997,” he says. “WHEP gives residents a wonderful opportunity to be involved and learn about wetlands. Volunteers literally get their hands wet,” he says. “With over 700 lakes and wetlands and over 400 storm basins in Eagan, most residents live very near surface water or regularly visit parks with wetlands. WHEP helps strengthen our community’s appreciation of these resources and enhances public support of our programs.”

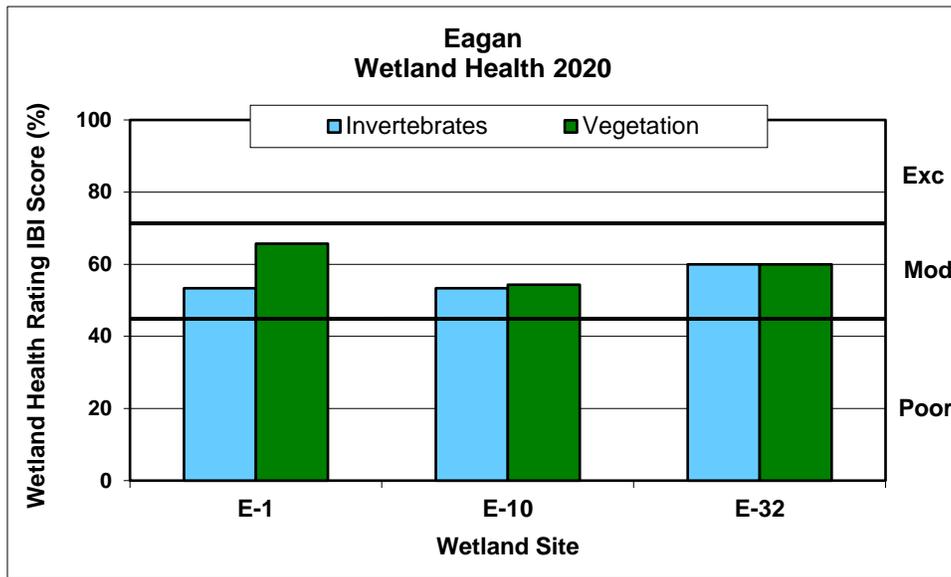


ERIC MACBETH

Eagan General Wetland Health

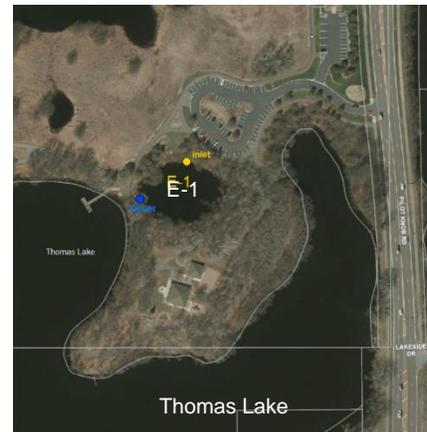
Figure 4.3 presents an overall view of wetland health for all of the 2020 monitoring sites in Eagan based on the IBI scores for invertebrates and vegetation presented as a percent. Figure 4.3 also illustrates the consistency between the IBI scores (in percent form) for each wetland sampled. Invertebrate and vegetation scores that differ by ten percent or less are considered consistent. Based on the IBI scores, a wetland health rating is assigned as excellent, moderate or poor. Three wetlands were monitored in the City of Eagan in 2020. The wetland health scores for all three sites rated moderate. The invertebrates and vegetation scores for E-10 and E-32 were very consistent; but the scores for E-1 were inconsistent and differed by 13 percent.

Figure 4.3 Eagan site scores (percent form) for the 2020 sampling season



4.3.1 Thomas Lake Park Pond (E-1)

Thomas Lake Park Pond is a 0.64-acre, type 5 wetland within the Eagan-Inver Grove Heights Watershed. The wetland watershed receives 4 acres of direct drainage which includes approximately 25 percent impervious surface. There is one inlet on the north side of the wetland and one outlet on the west side of the wetland which drains directly to Thomas Lake. The wetland is part of the City’s stormwater management plan, and is Unclassified by the City. The management goal is to protect the wetland from stormwater impacts, manage the wetland in compliance with all regulations and according to community values and priorities, and enhance the function, value, and ecological diversity, as opportunities arise.



The surrounding area is mostly wooded, with exception to local paved areas that include the parking lot and a pavilion area. The wetland receives runoff from these structures. An Eagle scout group installed a native shoreline planting along the north and northwest sides of the wetland circa 2000.

Wetland Health

Site Observations: The wetland slope is gentle, and the substrate is very mucky. The 5x20 meter plot was set along the southern shore of the wetland. A dense cover of floating-leaved forbs, including duckweeds (*Lemna* sp. and *Spirodela* sp.) and water-meal (*Wolffia* sp.) covered the water's surface. A dense population of coontail (*Ceratophyllum* sp.) dominated the submergent story of the vegetation which also included pondweed (*Potamogeton* sp.), waterweed (*Elodea* sp.), and bladderwort (*Utricularia* sp.). Arrowhead (*Sagittaria* sp.), spike-rush (*Eleocharis* sp.), and reed canary grass (*Phalaris arundinacea*) were also present. Several species of leeches, caddisflies, snails, fingernail clams, true flies, crustaceans, and beetles and bugs were collected. Chinese mystery snails (*Cipangopaludina chinensis*) were present. Tadpoles, fish, and crayfish were found in the bottle traps. Mallards were observed.

Table 4.3.1 Thomas Lake Park Pond (E-1) Wetland Health based on Index of Biotic Integrity

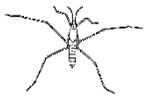
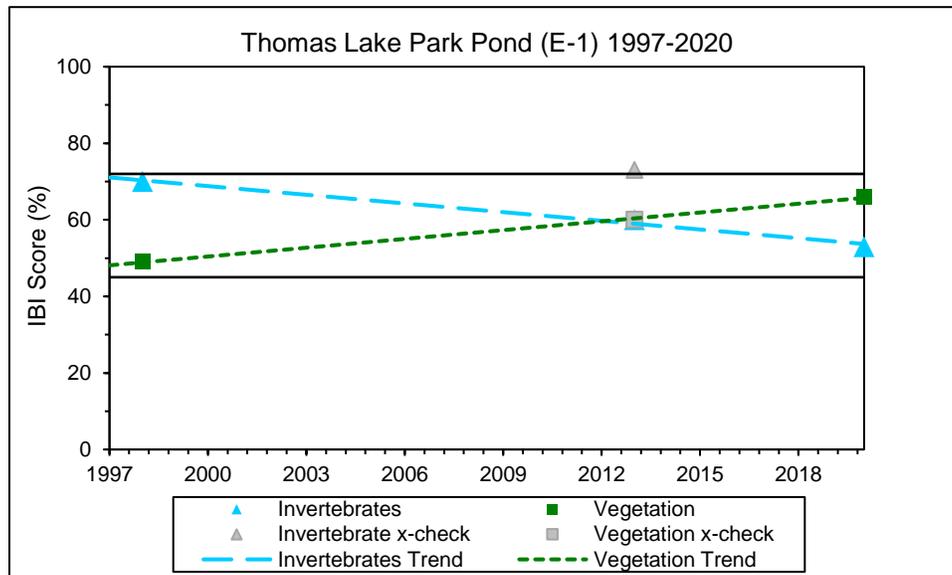
	Invertebrates 	Vegetation 
2020 Data (E-1)		
Wetland Health Rating (IBI score)	Moderate (16)	Moderate (23)
Trend 1997-2020	Not enough data	Not enough data

Figure 4.3.1 Invertebrate and vegetation trends for Thomas Lake Park Pond (E-1)



Site summary: This is the fourth time that E-1 has been surveyed since 1997. The invertebrates and vegetation scores were inconsistent, differing by 13 percent, even though both scores indicate moderate wetland health. Health scores have varied, and more years of data will help determine more reliable health trends.

4.3.2 Cedar Pond (E-10)

Cedar Pond (E-10), also known as AP-3, is a 3.1-acre, type 5 wetland within the Eagan-Inver Grove Heights Watershed. The wetland’s watershed is 212 acres with 30 percent impervious surface. There is one inlet in the northeast corner of the wetland, one inlet in the southeast corner of the wetland, and one outlet on the western side of the wetland. It is part of the City’s stormwater management plan, and is designated as a Class III Scenic Recreation wetland. The management goal is to protect the wetland from stormwater impacts, manage in compliance with all regulations and according to community values and priorities, and enhance the function, value, and ecological diversity.



Cedar Pond Park is surrounded by single family homes and neighborhoods. Approximately 90 percent of the shoreline has native planting which provides a buffer, but also requires yearly maintenance. There are raingardens established in the northeast corner of the park, as well as streetside within the local watershed. The City removed the sand delta from the southeast corner of the wetland in 2013. The pond still receives a large volume of stormwater runoff; however, the City plans to continue to educate the public about the importance of keeping stormwater clean, and to keep up maintenance of the wetland buffer and raingarden sediment traps.

Wetland Health

Site Observations: The wetland slope is steep, and the substrate is solid with pebbles and sand. The 5x20 meter plot was set along the northern shoreline of the wetland. Dense populations of waterweed (*Elodea* sp.) and pondweed (*Potamogeton* sp.), including curly-leaf pondweed (*Potamogeton crispus*), dominated the vegetation within the plot. Coontail (*Ceratophyllum* sp.), duckweed (*Lemna* sp. and *Spirodela* sp.), water-meal (*Wolffia* sp.), smartweed (*Polygonum* sp.), and burreed (*Sparganium* sp.) were also present. Bulrush (*Scirpus* sp.) and reed canary grass (*Phalaris arundinacea*) were the only emergent plants observed in the vegetation plot. Leeches, dragonflies, snails, fingernail clams, trueflies, crustaceans, and few bugs and beetles were collected. Mallards were also observed.

Table 4.3.2 Cedar Pond (E-10) Wetland Health based on Index of Biotic Integrity

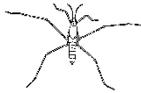
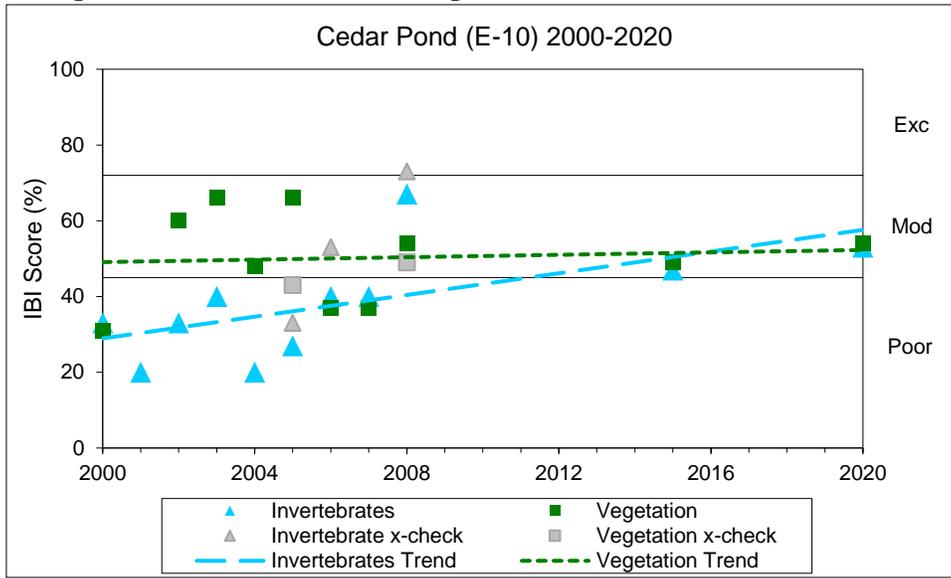
	Invertebrates 	Vegetation 
2020 Data (E-10)		
Wetland Health Rating (IBI score)	Moderate (16)	Moderate (19)
Trend 2019	Not enough data	Not enough data

Figure 4.3.2 Invertebrate and vegetation trends for Cedar Pond (E-10)



Site summary: This is the seventeenth time that E-10 has been surveyed for WHEP since 2000; however, it has only been surveyed twice in more than a decade. Health scores have varied over the years, but the scores were very consistent in 2020.

4.3.3 City Hall Pond (E-32)

City Hall Pond (E-32), also known locally as JP-6, is a 6.6-acre, type 5 wetland, within the Eagan-Inver Grove Heights Watershed. The wetland’s watershed is 83 acres including 15 percent impervious surface. There are two inlets in the northwest corner of the wetland, two inlets along the southern shore, and one outlet on the northern shore near the northeast corner. Eagan designates JP-6 a Class L3 lake, with management goals to support wildlife habitat, educational opportunities, and aesthetics.



The area surrounding City Hall Pond outside of the park is mostly residential; however, the Eagan Sanitary Sewer lift station is along the northern shore. Wooded and natural areas buffer the wetland. City Hall Pond gets street runoff and indirect runoff from parking lots at City Hall, Civic Center, and Cascade Bay. A storm pond upstream of this pond intercepts water from the parking lots before it flows into this wetland. Redevelopment of City Hall campus in 2019 created new stormwater infiltration opportunities.

Wetland Health

Site Observations: The wetland slope is gentle, and the substrate is very solid but with many snail shells. Duckweeds (*Lemna* sp. and *Spirodela* sp.) and water-meal (*Wolffia* sp.) covers the water’s surface. A dense population of coontail (*Ceratophyllum* sp.) dominates the submergent vegetation. Waterweed (*Elodea* sp.),

pondweed (*Potamogeton* sp.), smartweed (*Polygonum* sp.), sedges (*Carex* sp.), and bulrush (*Scirpus* sp.) were also represented in the vegetation plot. Leeches, dragonflies, damselflies, snails, trueflies, crustaceans, and bugs and beetles were collected. Curly-leaf pondweed (*Potamogeton crispus*), reed canary grass (*Phalaris arundinacea*), and Chinese mystery snails (*Cipangopaludina chinensis*) are present in the wetland.

Table 4.3.3 City Hall Pond (E-32) Wetland Health based on Index of Biotic Integrity

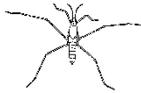
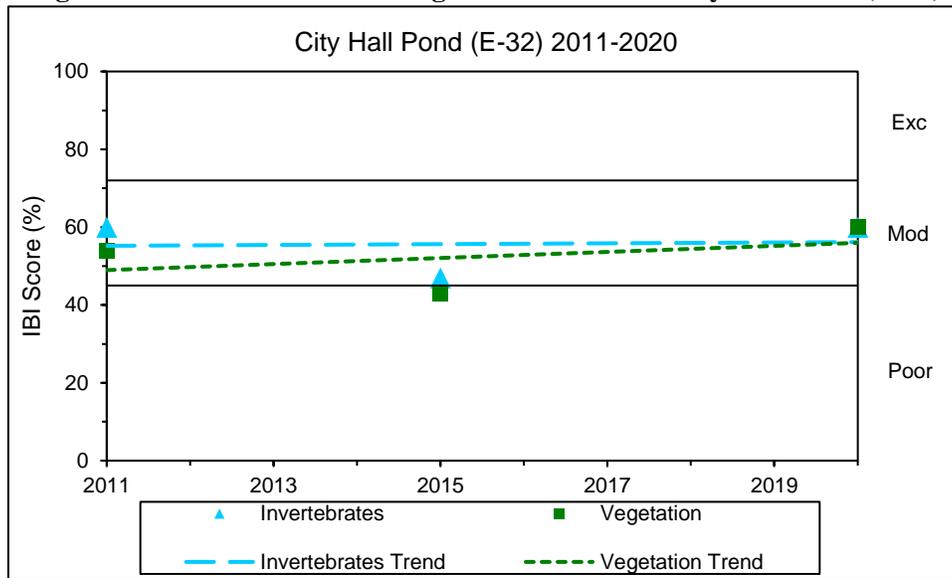
	Invertebrates 	Vegetation 
2020 Data (E-32)		
Wetland Health Rating (IBI score)	Moderate (18)	Moderate (21)
Trend 2011-2020	Not enough data	Not enough data

Figure 4.3.3 Invertebrate and vegetation trends for City Hall Pond (E-32)



Site summary: This is the third time that E-32 has been surveyed since 2011. The invertebrate and vegetation scores were very consistent, rating moderate in 2020. The few data sets show steady health trends; however, more years of data will help determine more reliable health trends.

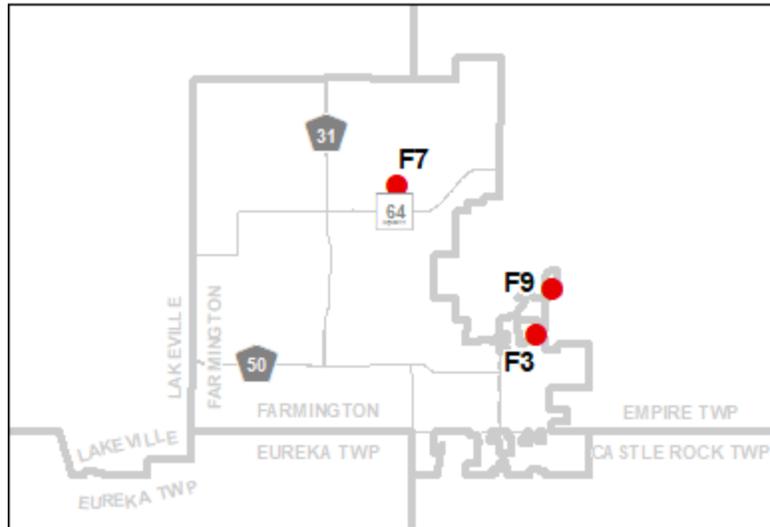
4.4 Farmington Wetlands

Three wetlands were monitored within the City of Farmington in 2019. The City has 22 years of data! Nine wetlands have been monitored in Farmington since the initiation of WHEP in 1997.

Team Leader: Rick Schuldt

Team Members: Rollie Greeno, Josiah Hakala, Denise Hennigar, Katie Koch-Laveen, Marcia Richter, Eric Speckan, and Zachary Speckan.

Farmington WHEP Sites Monitored in 2020



ROLLIE GREENO, RICK SCHULD, MARSHA RICHTER, DENISE HENNIGAR, KATIE KOCH LAVEEN, ERIC SPECKAN AND ZACHARY SPECKAN

Rick Schuldt has been involved with the Farmington WHEP team since 2010 and has been its team leader since 2016. He retired from the US Fish and Wildlife Service in 2009 after a career that included both field and management positions. As a field biologist, stationed in Marquette, Michigan, he spent 15 years with the Sea Lamprey Control Program working on Great Lakes tributaries in the US and Canada. The goal of the program was to evaluate and eradicate larval and adult populations of this invasive species. He completed his career with 14 years in the Regional Office at Fort Snelling, MN. Participation in WHEP has allowed for an opportunity to work with wetlands as opposed to his background with flowing river systems.

He said, “The Farmington Team has been blessed over the years with a cadre of retired teachers and others with a strong scientific background. The teaching of high school students by several members lends itself to establishing a great rapport with the occasional youth who join the team. The Covid virus this season resulted in a change in the sampling protocol. Masks, social distancing, limited participation, and a reduced workload all seemed quite foreign to the team. We sampled the three Farmington sites and did not do a cross check or macroinvertebrate identification. We all hope to return to normal for the coming season.”



RICK SCHULD

Farmington is a growing community and expects to continue to grow in the future, the WHEP program is used to monitor wetland areas where there will be future development. We can then look back and compare

the pre-construction conditions to post construction development. This helps us understand the impacts of development on our natural resources and if there are any additional best management practices (BMPs) we need to implement in order to better protect them. By utilizing dedicated volunteers, the City is able to gather additional detailed information for key wetlands. WHEP is a great partnership that helps get citizens involved along with providing detailed information on the state of the City’s wetlands.

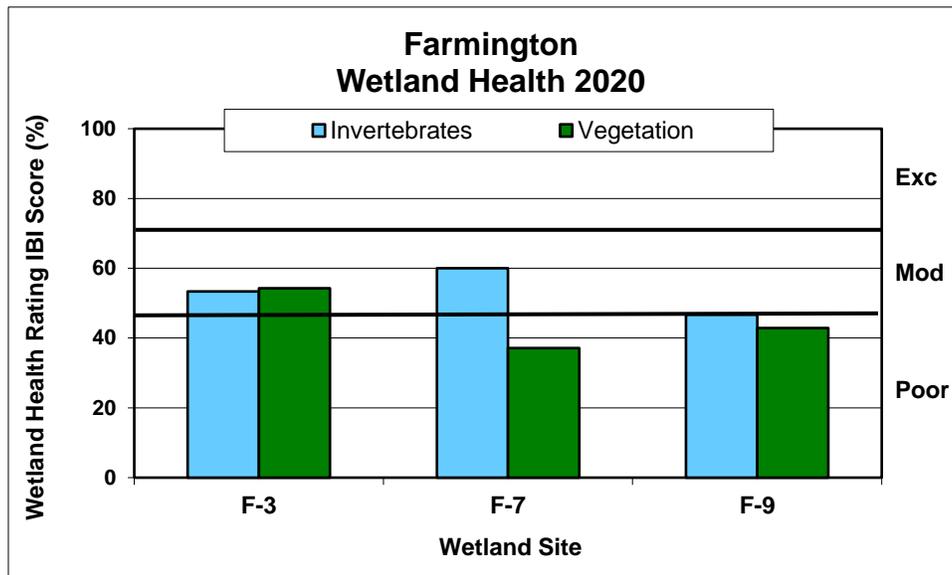


ERIC AND ZACHARY SPECKAN

Farmington General Wetland Health

Figure 4.4 presents an overall view of wetland health for all of the 2020 monitoring sites in Farmington based on the IBI scores for invertebrates and vegetation presented as a percent. Figure 4.4 also illustrates the consistency between the IBI scores (in percent form) for each wetland sampled. Invertebrate and vegetation scores that differ by ten percent or less are considered consistent. Based on the IBI scores, a wetland health rating is assigned as excellent, moderate or poor. Scores for the three wetlands indicate poor to moderate wetland health. Invertebrate and vegetation health scores were inconsistent for F-7, differing by 23 percent.

Figure 4.4 Farmington site scores (percent) for the 2020 sampling season



4.4.1 Kral Pond (F-3)

F-3, also known as Kral Pond, is a 10-acre, type 4 wetland located within the Vermillion River Watershed. The wetland watershed is 41.8 acres and 6.6 percent impervious. There is one inlet in the southwest corner, one inlet in the northeast corner, and one outlet on the north end of the wetland. It is obvious, based on its shape, that this wetland has been altered in the past, likely to accommodate farming practices. Kral Pond is included in the City’s wetland management plan and is designated as a Manage 2 wetland. Manage 2 wetlands have usually been altered by human activities. These wetlands have low to medium floral diversity and wildlife habitat components, and are slightly susceptible to impacts from stormwater. There is development to the north, south, and west, and agriculture to the east. Wetland buffers are in place. The wetland management goal is to document how land uses impact the man-made wetlands.



Wetland Health

Site Observations: The wetland slope is gentle. The wetland substrate is fairly solid. This is a large wetland with an extensive stand of cattail. The team finds a rich variety of aquatic plants at the site each year. Duckweed (*Lemna* sp. and *Spirodela* sp.) and water-meal (*Wolffia* sp.) cover the surface of the water. Several species of submergent forbs are present, including coontail (*Ceratophyllum*, sp.), milfoil (*Myriophyllum* sp.), pondweed (*Potamogeton* sp.), water-crowfoot (*Ranunculus* sp.), and bladderwort (*Utricularia* sp.). Bulrush (*Scirpus* sp.), arrowhead (*Sagittaria* sp.), cattail (*Typha* sp.), and reed canary grass (*Phalaris arundinacea*) are present. Dragonflies, damselflies, snails, fingernail clams, trueflies, and crustacean were collected.

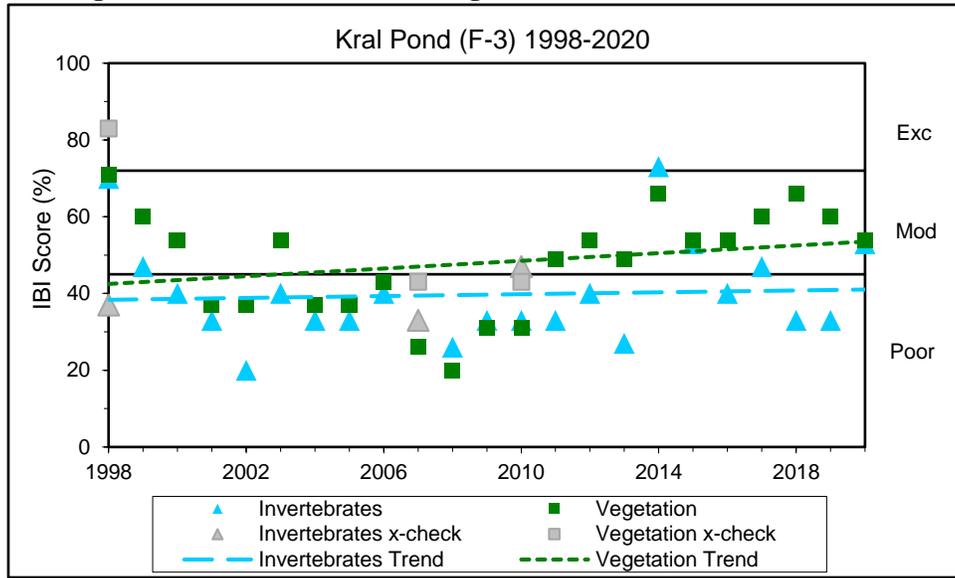


MARSHA RICHTER SETTING VEGETATION PLOT

Table 4.4.1 Kral Pond (F-3) Wetland Health based on Index of Biotic Integrity

	Invertebrates	Vegetation
2020 Data (F-3)		
Wetland Health Rating (IBI score)	Moderate (16)	Moderate (19)
Trend 1998-2020	Stable, but variable	Stable, but variable

Figure 4.4.1 Invertebrate and vegetation trends for Kral Pond (F-3)



Site summary: Kral Pond has been monitored for 23 consecutive years. The invertebrate and vegetation scores were very consistent in 2020, both indicating moderate wetland health. The vegetation diversity is similar to 2019, and the invertebrate diversity increased in 2020. The data throughout the years has been variable. The vegetation scores were gradually decreasing from 1998 to 2008 and then rebounding. The invertebrate scores are consistently poor with exception to a few years of data. Vegetation scores are more often higher than invertebrate scores. The long-term health trends are stable. The area was historically agricultural. Development surrounding the wetland may have impacted the wetland. In some cases, conversion from agriculture to residential development can improve water quality since stormwater treatment is added. The fluctuation in the health trend may be in response to development in the area.

4.4.2 Autumn Glen (F-7)

Autumn Glen (F-7) is a 2.9-acre wetland within the Vermillion River Watershed. The wetland watershed is ten acres including four percent impervious surface. There is one inlet in the northwest corner of the wetland along Dunbury Avenue and one outlet in the northeast corner. The wetland is included in the City’s stormwater management plan; however, it does not have a designated classification. The wetland management goal is to understand the health of a wetland surrounded by forest, agriculture, and residential homes in an area with potential development. There is development to the north and west, and forest and agriculture to the east. Man-made ponds lie to the north and south. The water ultimately flows to North Creek.



Autumn Glen is located within a trail system, but is not easily spotted from the trail. Tall grasses (including reed canary grass) and tree lines obstruct views. The wetland is approximately 50 meters from the trail.

Wetland Health

Site Observations: The wetland slope is gentle and the substrate is solid. A bicycle path runs along the south side of the wetland separated by a wide stand of reed canary grass. Reed canary grass (*Phalaris arundinacea*) surrounds the wetland, and dominated the vegetation plot. A 10 x 10 square meter plot was set on the south side of the wetland with water levels approximately 0.75 meters deep. Coontail (*Ceratophyllum* sp.), smartweed (*Polygonum* sp.), and reed canary grass dominated the vegetation plot. Duckweeds (*Lemna* sp. and *Spirodela* sp.), water-meal (*Wolffia* sp.), and water crowfoot (*Ranunculus* sp.) were also represented. There were very few plants in deeper portions of the wetland. Leeches, dragonflies, damselflies, caddisflies, snails, trueflies, crustaceans, and bugs and beetles were collected.



TEAM HEADING INTO AUTUMN GLEN WETLAND

Table 4.4.2 Autumn Glen (F-7) Wetland Health based on Index of Biotic Integrity

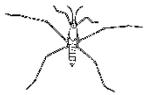
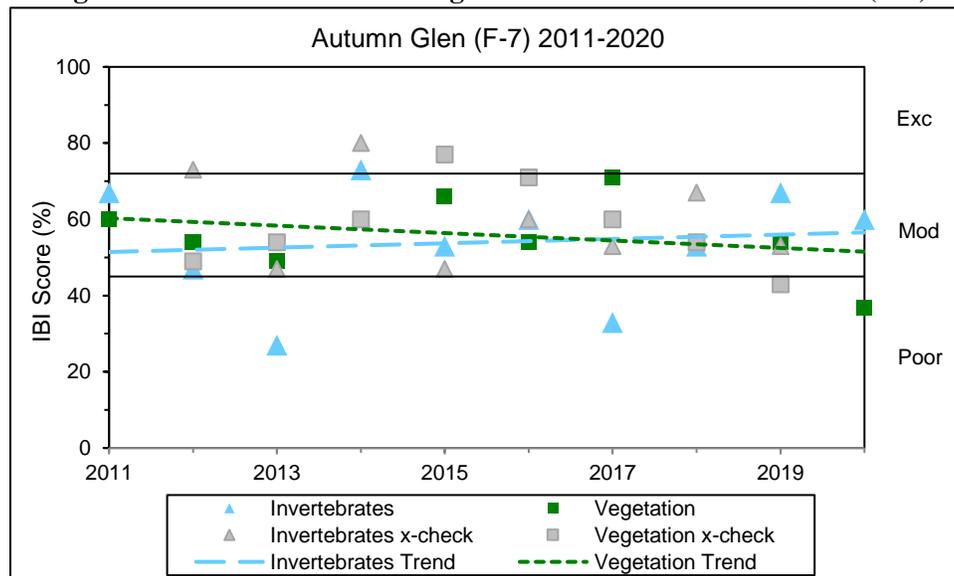
	Invertebrates 	Vegetation 
2020 Data (F-7)		
Wetland Health Rating (IBI score)	Moderate (18)	Poor (13)
Trend 2011-2020	Variable, but stable	Variable, but stable

Figure 4.4.2 Invertebrate and vegetation trends for Autumn Glen (F-7)



Site Summary: This is the tenth consecutive year that Autumn Glen has been monitored. The invertebrate and vegetation scores are inconsistent with each other, differing by 23 percent. The invertebrate score

indicates moderate wetland health, and the vegetation score indicates poor wetland health. Vegetation diversity was decreased in 2019 and 2020. Reed canary grass is heavily prominent in the area, and it is possible that it encroaches on the wetland more each year. Though the data is somewhat variable, the health trends appear stable.

4.4.3 Cambodia Avenue (F-9)

Cambodia Aveune (F-9) is a 5-acre, type 5 wetland within the Vermillion River Watershed. The wetland drainage area is 24 acres with 9 percent impervious surface. There is one inlet on the southwest corner of the wetland and one outlet in the northeast end of the wetland. It is included in the City’s Stormwater Management Plan, and is designated as a Manage 2 wetland. The management goals are to monitor and document how different land uses impact man-made wetlands over time.



A wide buffer zone with native vegetation surrounds the wetland. Much of the surrounding area is agricultural land; however, development of residential homes exist to the north and west of the wetland.

Wetland Health

Site Observations: The wetland slope is gentle, and the substrate is fairly firm but uneven. It is a small, though fairly deep wetland, with open water surrounded by concentric rings of white water lilies (*Nymphaea* sp.) and cattails (*Typha* sp.). The wetland is bordered by farmland to the south and east and housing tracts to the north and west. There is an excellent assortment of prairie plants along the shoreline. The 10 x 10 square meter plot was set in the northwest corner of the wetland in water up to one meter deep. A dense population of coontail (*Ceratophyllum* sp.) was the only submergent vegetation present in the vegetation plot. Duckweeds (*Lemna* sp. and *Spirodela* sp.) and white water lilies cover the surface of the water. Bulrush (*Scirpus* sp.), reed canary grass (*Phalaris arundinacea*), and cattails dominate the emergent vegetation. Sedges (*Carex* sp.) and blue grass (*Poa* sp.) were also present. Dragonflies, damselflies, caddisflies, snails, trueflies, crustaceans, and bugs and beetles were collected.

Table 4.4.3 Cambodia Avenue (F-9) Wetland Health based on Index of Biotic Integrity

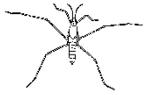
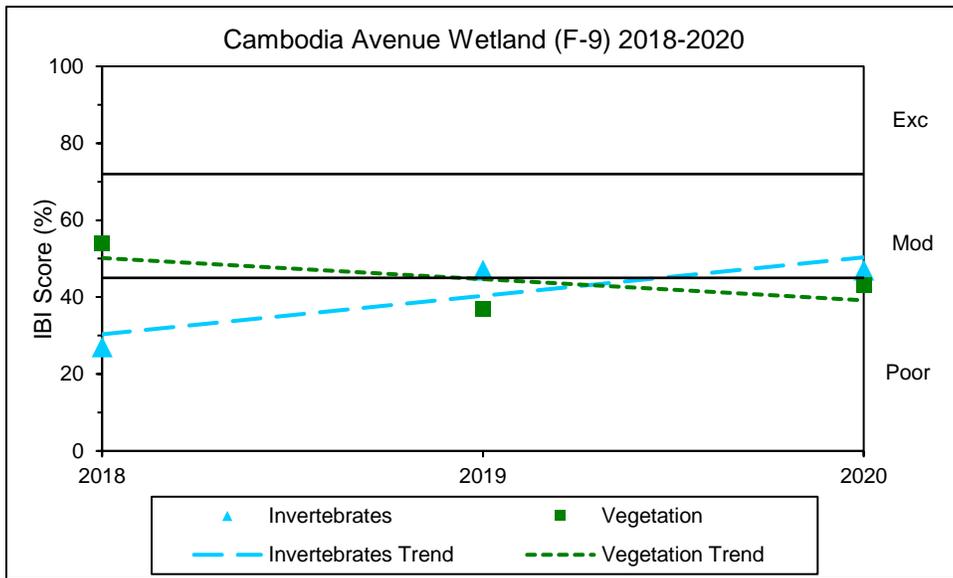
	Invertebrates 	Vegetation 
2020 Data (F-9)		
Wetland Health Rating (IBI score)	Poor (14)	Poor (15)
Trend 2018-2020	Not enough data	Not enough data

Figure 4.4.3 Invertebrate and vegetation trends for Cambodia Avenue (F-9)



Site Summary: This is the third time that Cambodia Avenue wetland has been surveyed for WHEP. Invertebrate and vegetation scores were very consistent with each other, both indicating poor wetland health. The scores from 2019 and 2020 are similar. Leeches were not present in 2020. Though the wetland is crowded with vegetation, the diversity is low. More years of data are needed to help determine a more reliable health trend.

4.5 Hastings Wetlands

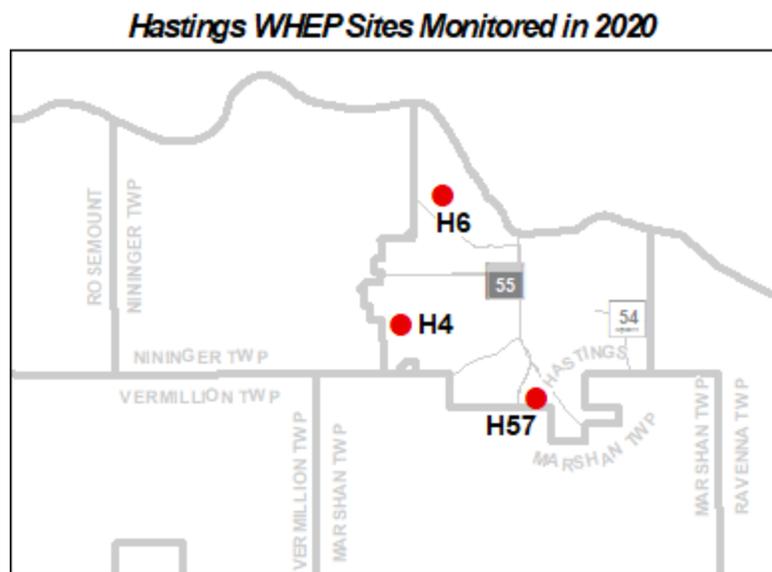
Three wetlands were monitored within the City of Hastings in 2020. The City has 22 years of data! Nine wetlands have been sampled in the City of Hastings through the WHEP program since 1999.

Team Leader: Jessie Eckroad

Team Members: Mike Nelson, Dwight Smith, Kevin Smith, and Alexander Theisen.

Jessie Eckroad is an environmental educator at Carpenter St. Croix Valley

Nature Center and has been the WHEP Hastings Team leader for six years. “I love WHEP because it provides me the opportunity to spend time outdoors and connect with other people who are passionate about the environment,” she says. Even though this season was a challenge due to the COVID-19 pandemic, the





JESSIE ECKROAD

Hastings team adjusted and had a fun summer. Working outside, wearing masks, and keeping space between team members when possible kept everyone safe and healthy. Although the field work portion of WHEP is always fun and energizing, the Hastings team was very disheartened to not be taking part in analyzing macroinvertebrates in the lab. Bonding over the shared excitement of seeing the tiny invertebrates magnified, is an experience that was sorely missed this year.”

John Caven is the Assistant City Engineer for the City of Hastings. He has been the WHEP City contact and administrator since 2010. His role includes selecting the wetlands to be monitored as well as being a communication

link for the City. He said, “The volunteers overcame some unique challenges this year to provide yet another year of success for the program. Thank you!”

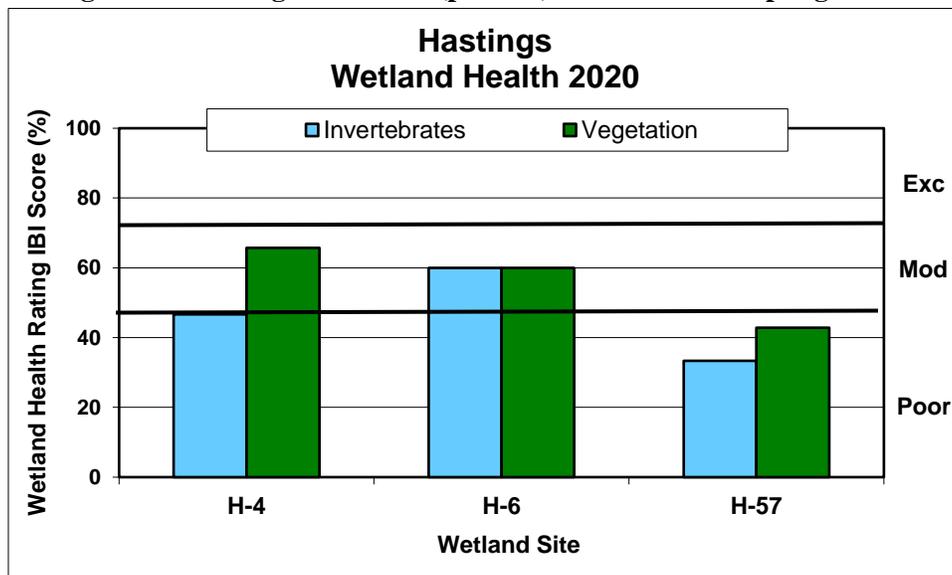


JOHN CAVEN

Hastings General Wetland Health

Figure 4.5 presents an overall view of wetland health for all of the 2020 monitoring sites in Hastings based on the IBI scores for invertebrates and vegetation presented as a percent. Figure 4.5 also illustrates the consistency between the IBI scores (in percent form) for each wetland sampled. Invertebrate and vegetation scores that differ by ten percent or less are considered consistent. Based on the IBI scores, a wetland health rating is assigned as excellent, moderate or poor. The wetlands showed poor to moderate wetland health in 2020. Invertebrate and vegetation scores for H-4 were inconsistent, differing by 19 percent.

Figure 4.5 Hastings site scores (percent) for the 2020 sampling season



4.5.1 Stonegate Treated Wetland (H-4)

H-4, also known as Stonegate Treated, is the second cell of a two-celled stormwater management system created to treat runoff from surrounding residential development. It is a 1.2-acre, open water wetland located within the Vermillion River Watershed. The watershed is nine to ten acres, and is 30 to 40 percent impervious. The wetland has one inlet in the southeast corner and one outlet on the north end. It is part of the stormwater management plan, and is designated as a Stormwater Detention Pond. It serves as a stormwater detention pond within a developed neighborhood. The goal for the wetland is to improve water quality of the stormwater runoff before it adversely affects the Vermillion River.



The watershed is primarily residential with private property on three sides and a public trail along the south side of the wetland. Private landowners within the Wyndham Hills Neighborhood Association manage their own frontages of the pond with rip-rap, mowing, and chemical use. Several property owners demonstrate good management practices by maintaining shoreland buffers to protect water quality and provide wildlife habitat. In 2004, the Wyndham Hills Neighborhood Association partnered with the City of Hastings and the DNR to provide native plantings around the pond. A private trail access divides Stonegate pond from another pond just south of the site. Some concerns compromising the health of the pond include invasive species, mowing too close to the water’s edge, and the use of chemicals on adjacent shoreline turf.

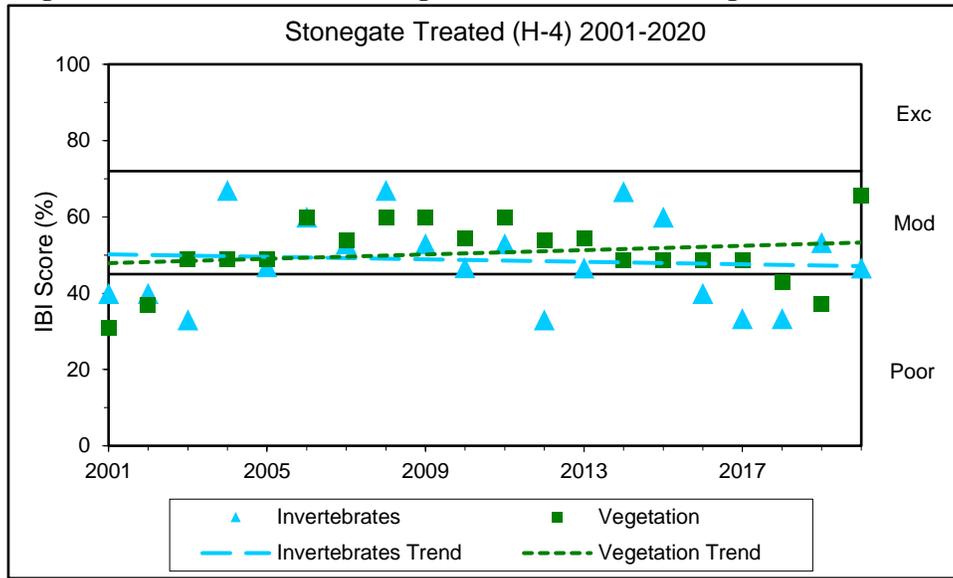
Wetland Health

Site Observations: The wetland slope is moderate. The substrate is moderately mucky, but not so viscous that one gets stuck. The upland prairie is flourishing in comparison to the past two summers. The 5x20 meter plot was set along the southern edge of the wetland in water up to 1.2 meters deep. Willow (*Salix* sp.), maple (*Acer* sp.), dogwood (*Cornus* sp.), and cattail (*Typha* sp.) dominate the shoreline, with the exception of shoreline areas where homeowners mow to the wetland edge. Pondweeds (*Potamogeton* sp.) dominate the submergent zone which also included waterweed (*Elodea* sp.). Duckweed (*Lemna* sp.) and water-meal (*Wolffia* sp.) dusted the surface of the water. Several emergent plants including sedges (*Carex* sp.), bulrush (*Scirpus* sp.), cut grass (*Leersia* sp.), swamp milkweed (*Asclepias incarnata*), bugle weed (*Lycopus* sp.), smartweed (*Polygonum* sp.), and purple loosestrife (*Lythrum salicaria*) were represented in the vegetation plot. Leeches, caddisflies, snails, true flies, and crustaceans were collected. Bottle traps were completely full of tadpoles and bullheads. Tiny toads were emerging in the wetland.

Table 4.5.1 Stonegate Treated (H-4) Health based on Index of Biotic Integrity

	Invertebrates 	Vegetation 
2020 Data (H-4)		
Wetland Health Rating (IBI score)	Poor (14)	Moderate (23)
Trend 2001-2020	Variable, but stable	Variable, but stable

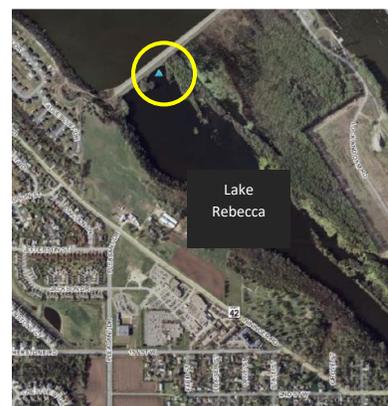
Figure 4.5.1 Invertebrate and vegetation trends for Stonegate Treated (H-4)



Site summary: This is the twentieth consecutive year that Stonegate Treated has been surveyed. The invertebrates and vegetation scores were inconsistent in 2020, differing by 19 percent. The invertebrate score indicates poor health, while the vegetation score indicates moderate health. The scores are variable over the years; however, the invertebrates and vegetation scores appear to fluctuate together. In general, the invertebrate scores have been lower than the vegetation scores. The long term trends appear stable. The invertebrate scores declined from 2019. This may be due to a large population of frogs and tadpoles in 2020. The vegetation score is the highest on record. The team commented that the upland vegetation is healthy in 2020. The emergent vegetation present including sedges, as well as the lack of persistent litter aided the vegetation scoring in comparison to 2019.

4.5.2 Lake Rebecca Wetland (H-6)

Lake Rebecca, H-6, also known as Rebecca EM 1&2, is a public water wetland in the City of Hastings. It is a 19-acre, open water wetland located in the Vermillion River Watershed. The wetland drainage area is 56 acres, and is 1 percent impervious. The wetland has two stormwater inlets along the southwest shoreline and one controlled outlet on the southeast end. The wetland is part of the City’s stormwater management plan, and is designated as a High Quality Wetland. It is being managed as a wildlife habitat area and for recreational use. A natural shoreline buffer zone exists along much of the lake’s perimeter. The Mississippi River Flats Natural Resource Management and Restoration Plan was adopted in December 2002. One of the inflow areas to the lake is fitted with a series of sediment control structures. These are maintained by the City Public Works Department. The City Parks Department operates an aeration system during the winter season to benefit the game fish.



The wetland is an emergent marsh and shoreline/floodplain forest. Spring fed water from the bluffs helps maintain water levels. Jaycee Park provides access for recreation on the lake, including a boat launch. Diversion of stormwater into the lake and an impervious parking lot/boat launch adjacent to the eastern edge of the lake are of concern. Purple loosestrife and zebra mussels compromise the health of the lake.

Wetland Health

Site Observations: The wetland slope is moderate, but many submerged logs create tripping hazards. The substrate is very mucky in the shallow areas, but more solid in deeper water. The team commented that the northwest end of the lake is drastically different than past years. Long term high water has caused death of floodplain trees. The water level was lower in 2020; however, the thick mucky substrate made it too dangerous to sample in past locations and challenging to find a suitable area for sampling for invertebrates. The 5x20 meter vegetation plot and macroinvertebrate surveys were placed along the western edge of the wetland. Access to the monitoring site is via the bikepath on the levee that divides the Mississippi River and Lake Rebecca. The slope from the bike path to the water is very steep and is covered with tall grasses and forbs. Cottonwood trees (*Populus* sp.), maple trees (*Acer* sp.), and dogwoods (*Cornus* sp.) grow along the perimeter of the water. A healthy population of coontail (*Ceratophyllum* sp.), waterweed (*Elodea* sp.), and curly-leaf pondweed (*Potamogeton crispus*) dominated the vegetation. Duckweeds (*Lemna* sp. and *Spirodela* sp.), and water-meal (*Wolffia* sp.) floated on the surface of the water. Sedges (*Carex* sp.), cut grass (*Leersia* sp.), reed canary grass (*Phalaris arundinacea*), bugle weed (*Lycopus* sp.), clearweed (*Pilea* sp.), and smartweed (*Polygonum* sp.) were also present. Leeches, dragonflies, caddisflies, snails, trueflies, crustaceans, and bugs and beetles were collected.

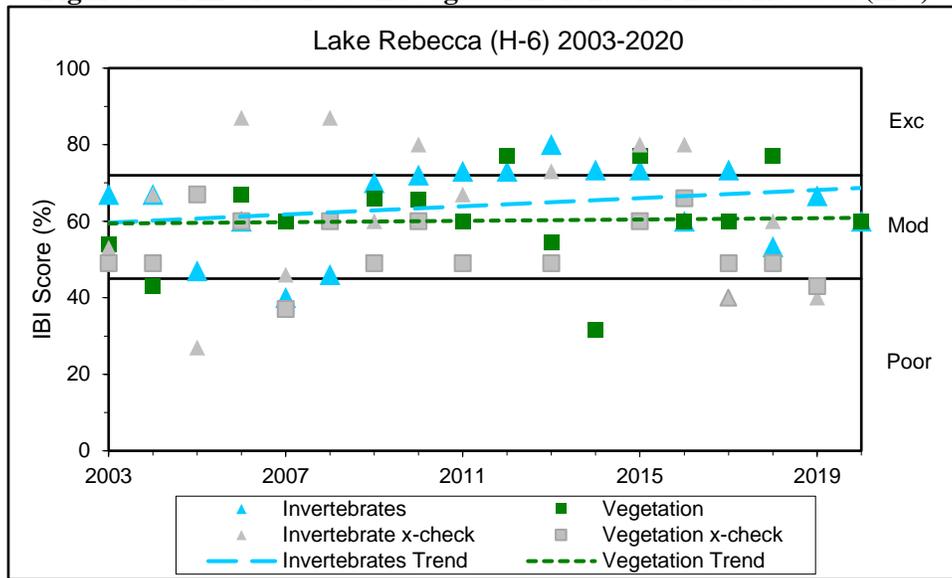


DWIGHT SMITH AND MIKE NELSON

Table 4.5.2 Lake Rebecca (H-6) Wetland Health based on Index of Biotic Integrity

	Invertebrates 	Vegetation 
2020 Data (H-6)		
Wetland Health Rating (IBI score)	Moderate (18)	Moderate (21)
Trend 2003-2020	Stable	Variable, stable

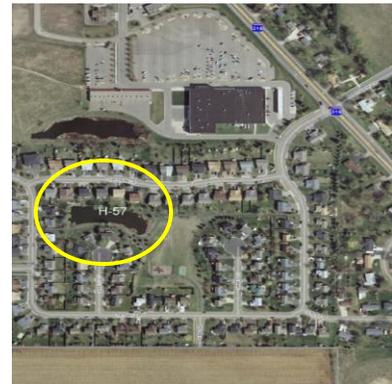
Figure 4.5.2 Invertebrate and vegetation trends for Lake Rebecca (H-6)



Site summary: This is the eighteenth consecutive year of monitoring for Lake Rebecca. Invertebrate and vegetation scores are very consistent. There has been a lot of variability in the invertebrate data; however, data from 2009 until 2020 has maintained moderate to excellent health. The vegetation data is variable, but the long term trend appears stable. Lower water levels exposed very mucky substrate which made sampling safely a challenge. A new location for sampling was set in 2020. This vegetation plot at this site was cross-checked by Fortin Consulting in 2020. Each team found similar diversity and make-up for vegetation.

4.5.3 Cari Park Pond (H-57)

Cari Park Pond (H-57) is a 0.78-acre stormwater detention pond located in the Vermillion River Watershed. The wetland drainage area is 29 acres, and 14 percent impervious. The wetland has four inlets of which three are located on the east side of the pond and one on the west side. It also has one outlet on the west side. This wetland is part of the City’s stormwater management plan. It is a man-made sedimentation pond that was constructed in 1989. It is designated as a Medium Quality Wetland. It serves as a stormwater detention pond within a developed neighborhood. The goal for the wetland is to improve water quality of the stormwater runoff before it adversely affects the Vermillion River. The City has erosion control regulations in place to minimize the impacts of development within the watershed.



Private landowners within the Cari Park neighborhood manage their own frontages of the pond with rip-rap, mowing, and chemical use. On the south and east sides of the pond, a City bituminous path connects the neighborhoods through Cari Park. Cari Park offers recreational opportunities on the south side of the pond. A bike trail runs along the south and east sides of the pond.

Wetland Health

Site Observations: The wetland slope is gentle, and the substrate is very mucky. The wetland is surrounded by homes and a nearby park. Trees overhang portions of the wetland shoreline. Cattails (*Typha* sp.) dominated the shoreline. Duckweed (*Lemna* sp.) and water-meal (*Wolffia* sp.) covered much of the wetland surface. Pondweed (*Potamogeton* sp.) was the only submergent vegetation found in the vegetation plot. Cattail (*Typha* sp.), bulrush (*Scirpus* sp.), and reed canary grass (*Phalaris arundinacea*) dominated the shoreline. Leeches, damselflies, mayflies, snails, trueflies, crustaceans, and bugs and beetles were collected. Vegetation and invertebrate species identical to 2019 observations. Chinese mystery snails were found.

Table 4.5.3 Cari Park Pond (H-57) Wetland Health based on Index of Biotic Integrity

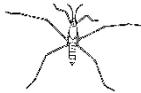
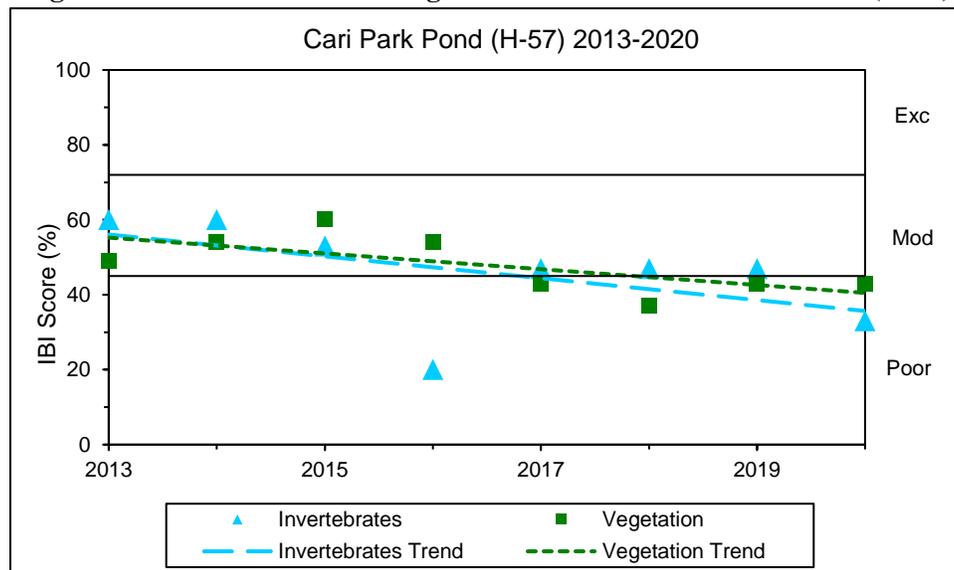
	Invertebrates 	Vegetation 
2020 Data (H-57)		
Wetland Health Rating (IBI score)	Poor (10)	Poor (15)
Trend 2013-2020	Slight decline	Slight decline

Figure 4.5.3 Invertebrate and vegetation trends for Cari Park Pond (H-57)



Site summary: This is the eighth consecutive year that Cari Park Pond has been monitored. The vegetation and invertebrate scores were consistent with each other in 2020, both indicating poor wetland health. Both invertebrates and vegetation scores appear to be stabilizing since 2017. Data was very similar to 2019.

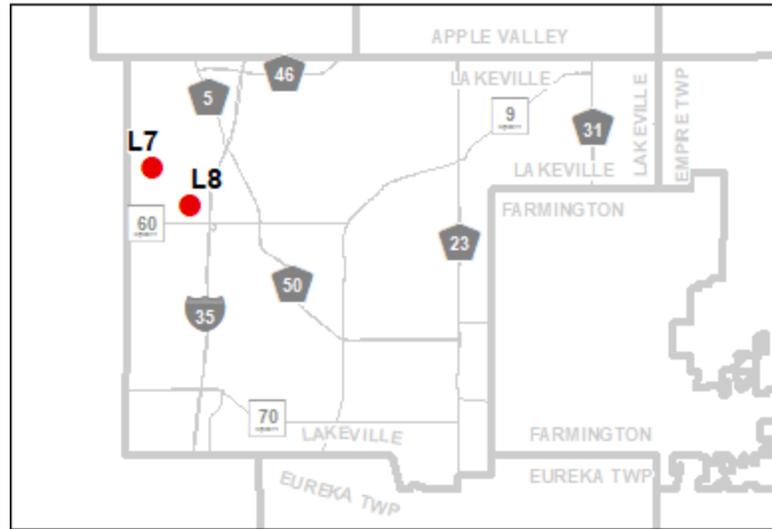
4.6 Lakeville Wetlands

Two wetlands were monitored within the City of Lakeville in 2020. The City has 23 years of data! Ten wetlands have been sampled in the City of Lakeville through the WHEP program since 1998.

Team Leader: Steve Weston

Team Members: Nate Barnes, William Barnes, Tom Goodwin, Emma Hinson, Dominique Menard, Kim Menard, Ella Renner, Nora Renner, Thomas Renner, and Laura Wolf.

Lakeville WHEP Sites Monitored in 2020



STEVE WESTON

Steve Weston has participated in WHEP for over 17 years. He describes himself as a naturalist who is best known for bird observations and is really interested in all components of the environment. He said, “WHEP is far more than evaluating wetlands. It is about getting people out to experience wetlands. In Lakeville the kids that join us in the wetlands usually go on in college to study the natural sciences.”

Ella Renner, a youth WHEP volunteer said, “I’ve participated in WHEP multiple times now and I love doing it every summer I come back. It’s really amazing to go tromping around out in the wetlands and really get your hands dirty learning about the earth in my own community. The specimens we find are always super interesting and I’ve gotten to use this knowledge multiple times outside of WHEP, for example, during Honors Biology and hopefully next year in AP Biology. I’ve gotten to use it to teach other kids and help others understand the possibly misunderstood micro-organisms that others may think are “gross” or “weird”. It’s always fun meeting people from around the community of Lakeville who are interested in biology like myself. I can’t wait for next year!”



ELLA RENNER

Nora Renner added, “I learned during WHEP that the health of our wetlands are very important. I learned how to take samples of the wetland but also how to identify the different macroinvertebrates and plants of the wetland. I have also learned that there are tiny little macroinvertebrates that live in the wetland, some that you can’t see but are very important.”



ANN MESSERSCHMIDT

Ann Messerschmidt is the WHEP contact at the City of Lakeville. Her role is to determine which wetlands should be monitored by WHEP volunteers as well as review the collected data. She uses the data to compare to past years data and see what changes are occurring with the wetlands. She says, "Over time, we hope to be able to see trends in the data." Ann believes, "The WHEP program is a great opportunity for residents interested in the natural environment to learn about wetland plants and invertebrates. This is a valuable asset to the volunteers. Because of the work by the volunteers, the community as a whole can now find in-depth information about the connections of the environment to its inhabitants and how that reflects the overall health of the system. This helps residents of our community learn how their actions can directly affect water quality." She admits, "I like how WHEP connects residents to wetlands, and the long-term data at these sites are something worth tracking."

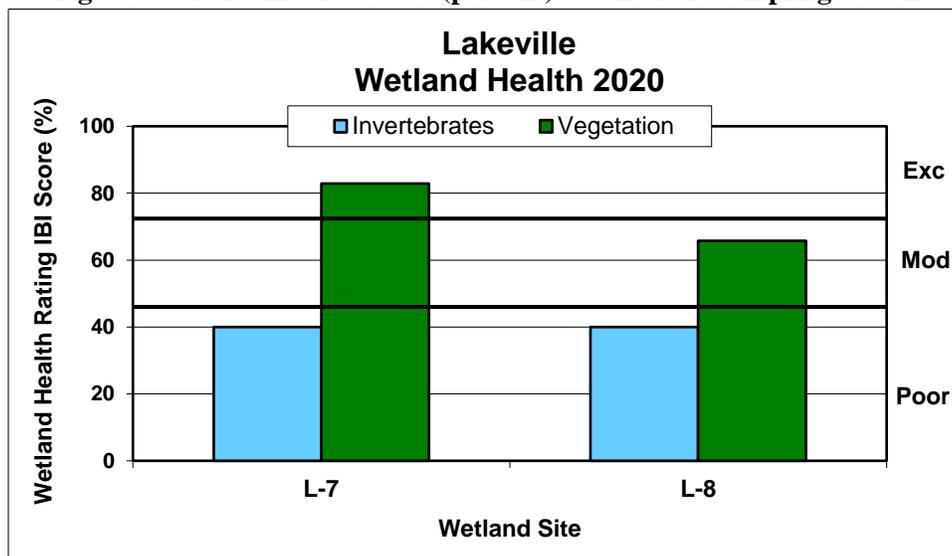
Lakeville General Wetland Health

Figure 4.6 presents an overall view of wetland health for all the 2020 monitoring sites in Lakeville based on the IBI scores for invertebrates and vegetation presented as a percent. Figure 4.6 also illustrates the consistency between the IBI scores (in percent form) for each wetland sampled. Invertebrate and vegetation scores that differ by ten percent or less are considered consistent. Based on the IBI scores, a wetland health rating is assigned as excellent, moderate or poor. The invertebrate and vegetation scores for sites L-7 and L-8 were inconsistent, differing by 43 and 26 percent, respectively.



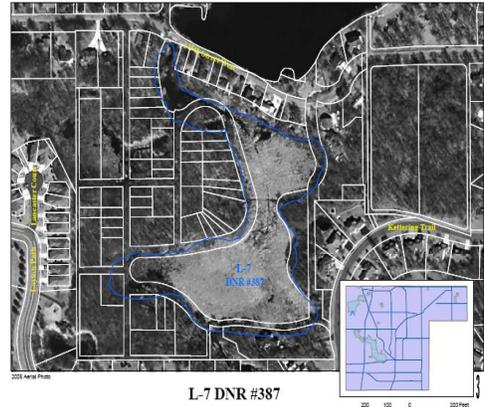
KIM MENARD, DOMINIQUE MENARD, LAURA WOLF, STEVE WESTON, EMMA HINSON, TOM RENNER, ELLA RENNER, NORA RENNER

Figure 4.6 Lakeville site scores (percent) for the 2020 sampling season



4.6.1 DNR Wetland #387 (L-7)

DNR #387 (L-7) is a ten-acre, type 4 wetland located in the Orchard Lake subwatershed within the Black Dog Watershed. The Orchard Lake subwatershed is 506.6 acres with 105.5 acres of direct drainage. It is 29 percent impervious, and both publicly and privately owned. It has one inlet in the southeast corner of the wetland off of Kettering Trail and two outlets along the north side near Orchard Lake. The wetland is part of the City's stormwater management plan. The wetland designation is to preserve. The management goal is to actively protect and preserve the functions and values of the wetland. A woodland buffer surrounds most of the west side of the wetland, with woodland buffers between the few properties along the north and southeast wetland boundary. In an effort to improve water quality of Orchard Lake, an aeration system was installed in L-7 in 2010. There are four diffuser heads installed near the north outlet into Orchard Lake. The goal is to precipitate phosphorous out of the water column and drop it out into the sediments in L-7 so that less phosphorous will enter into Orchard Lake. The aeration system is scheduled to run from April to October annually. In 2020, it was noted that there were periodic aerator issues where none or only a few aerator heads were in operation. In addition, road reconstruction is active right near the wetland.



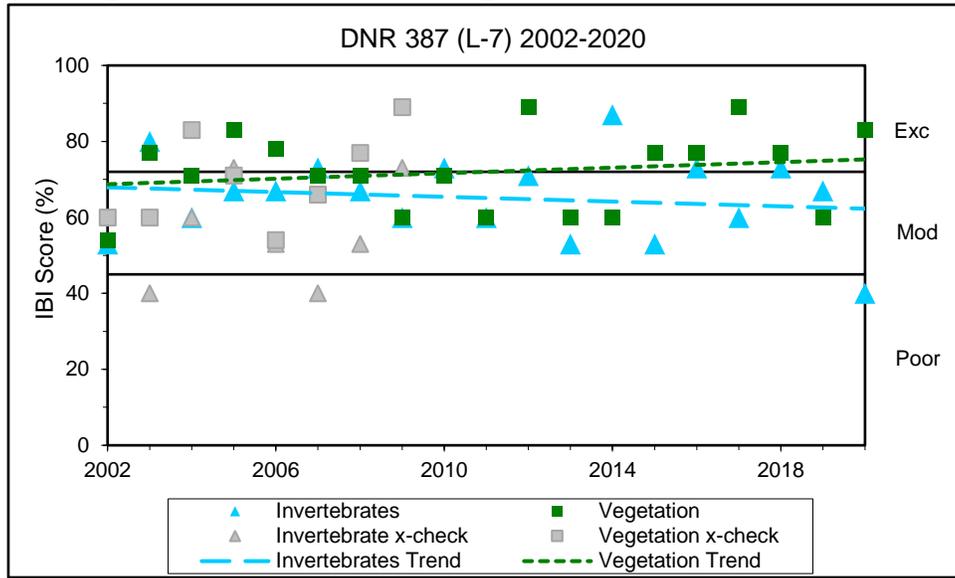
Wetland Health

Site Observations: The wetland slope is mostly steep, and the substrate is comprised of “boot-sucking muck”. The team commented that the water levels were higher than average in 2020. The site is very rich in diversity which is not typical of the wetland as a whole. The wetland is characterized by hummocks that were invaded by purple loosestrife which once dominated the wetland but has since been well-controlled by introduced beetles as a biological control. Purple loosestrife is only occasionally found blooming. The wetland is dominated by cattails (*Typha* sp.), reed canary grass (*Phalaris arundinacea*), purple loosestrife (*Lythrum salicaria*), smartweed (*Polygonum* sp.), and duckweed (*Lemna* sp.). The wetland displays a large diversity of other vegetation, including: sedges (*Carex* sp.), rushes (*Juncus* sp.), bulrush (*Scirpus* sp.), arrowhead (*Sagittaria* sp.), burreed (*Sparganium* sp.), and other emergent species. Leeches, dragonflies, damselflies, snails, fingernail clams, trueflies, crustaceans, and bugs and beetles were collected.

Table 4.6.1 DNR 387 (L-7) Health based on Index of Biotic Integrity

	Invertebrates 	Vegetation 
2020 Data (L-7)		
Wetland Health Rating (IBI score)	Poor (12)	Excellent (29)
Trend 2002-2020	Variable, but stable	Variable, but stable

Figure 4.6.1 Invertebrate and vegetation trend for DNR 387 (L-7)

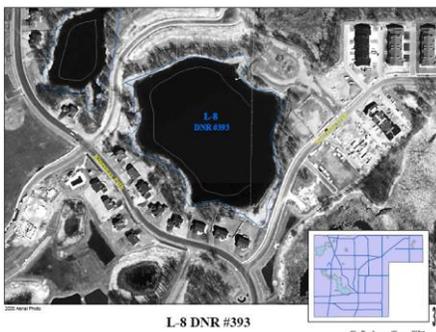


Site summary: This is the nineteenth consecutive year that DNR 387 has been monitored. The invertebrate and vegetation scores were inconsistent in 2020. The invertebrates score indicates poor wetland health while the vegetation score indicates excellent wetland health. The invertebrate and vegetation data is variable from year to year, but the health trends appear stable. Heavy rains prior to invertebrate collection dates, as well as, the presence of tadpoles and fish (including pike and mudminnows) may have impacted the invertebrate data in 2020.



NORA RENNER, ELLA RENNER,
DOMINIQUE MENARD

4.6.2 DNR #393 (L-8)



DNR #393 (L-8) is a 9.6-acre, type 5 wetland located in the Lake Marion subwatershed of the Vermillion River Watershed. The wetland drainage area is 74.7 acres, and 17 percent impervious. It is a publicly owned wetland. It has one non-stormwater inlet on the west side, and one outlet on the south side. There is a structure on the west side of the wetland that is connected to another wetland; however, it does not receive stormwater. The wetland is included in the City’s stormwater management plan and is designated to preserve. The wetland management plan is to actively protect and preserve the function and values of the wetland to the maximum extent feasible. The wetland is within a residential neighborhood where development began in 2003 and ended in 2008. A conservation easement of varying widths exists along all sides of this wetland, with vegetative buffer.

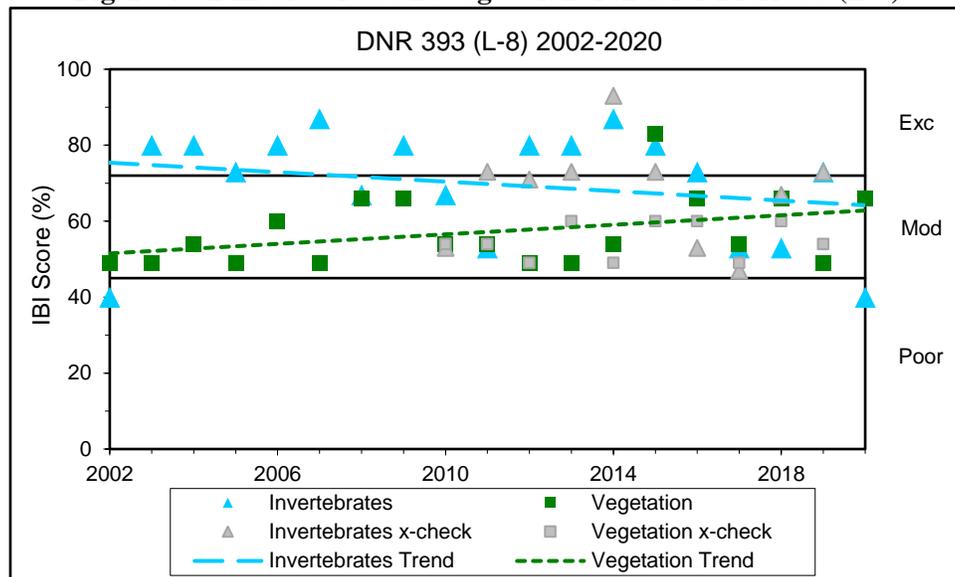
Wetland Health

Site Observations: The wetland slope is steep near the shoreline, but gentle in the water. The substrate is a firm, sandy bottom. Water levels in 2019 and 2020 are highest observed. Vegetation observed include dense populations of coontail (*Ceratophyllum* sp.), water milfoil (*Myriophyllum* sp.), curly-leaf pondweed (*Potamogeton crispus*.), arrowhead (*Sagittaria* sp.), smartweed (*Polygonum* sp.), water-shield (*Brassenia schreberi*). Duckweeds (*Lemna* sp. and *Spirodela* sp.), rushes (*Juncus* sp.), bulrush (*Scirpus* sp.), reed canary grass (*Phalaris arundinacea*), and a few other emergent forbs were observed. Leeches, dragonflies, damselflies, mayflies, snails, trueflies, and crustaceans were collected.

Table 4.6.2 DNR Wetland 393 (L-8) Health based on Index of Biotic Integrity

	Invertebrates 	Vegetation 
2020 Data (L-8)		
Wetland Health Rating (IBI score)	Poor (12)	Moderate (23)
Trend 2002-2020	Variable, but stable	Stable

Figure 4.6.2 Invertebrate and vegetation trends for DNR 393 (L-8)



Site summary: DNR 393 has been monitored nineteen consecutive years. The invertebrate and vegetation scores were inconsistent, differing by 26 percent. Excluding a high score in 2015, the vegetation scores regularly indicate moderate wetland health and the trend is stable. With the exception of a few years of data including 2020, the invertebrate scores indicate excellent wetland health and the health trend remains stable. The absence of beetles and bugs and fingernail clams affected the invertebrate health score in 2020. Heavy rains prior to invertebrate collection dates may have impacted the invertebrate diversity.

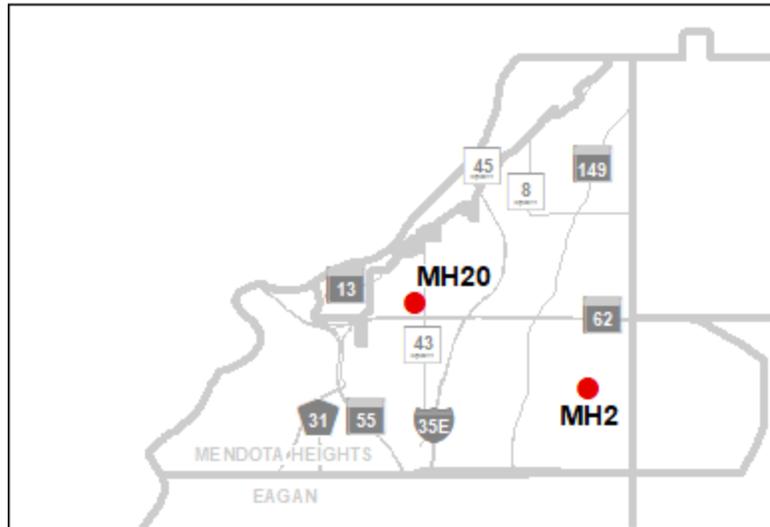
4.7 Mendota Heights Wetlands

Two wetlands were monitored within the City of Mendota Heights, in 2020. The City has 23 years of WHEP data! Nineteen wetlands have been monitored in Mendota Heights since the start of the WHEP program.

Team Leader: Darcy Tatham

Team Members: James Chastek, William Chastek, Gayl Gustafson, Niko Hess, Joan O'Donnell, Marjorie Savage, Mary Stade, Camille Wang, and Noelle Wang.

Mendota Heights WHEP Sites Monitored in 2020



DARCY TATHAM

Mendota Heights' team leader, Darcy Tatham, has been part of WHEP for more than 20 years. She commented, "There's rarely a dull moment and this year was no exception due to COVID-19. We monitored two ponds, as usual, this year, but no lab work identifying our samples.

"We have a pretty consistent team which I am very grateful for, and this year we added a couple more high school students which was great. I was so impressed by my team members wanting to come out and be together monitoring the wetlands, but at the same time being very careful because of COVID-19. The usual socializing was kept to a minimum and we didn't have our end-of-season picnic.

"One notable event was when we were monitoring Copperfield for macroinvertebrates on the second day. The first day we were there we completed the dip netting and set out bottle traps. On the second day when we were scheduled to meet to collect the bottle traps, a huge storm was brewing for that evening about the same time we were to meet. We kept in touch throughout the day and I decided to leave my day job a little bit early and told the others. Enough people showed up to gather the bottle traps. Just as we were finishing processing the sample, the sky let loose & the rain came. We were able to get it all done in about 15 minutes. Teamwork! I was soaked and ended up driving home in my waders, peering through the windshield to see the road.

"Even though we monitored only two ponds and these ponds have been done in the past, they are different ponds and no two ponds are alike. We are dealing with dynamic systems and that's why it's always fun to come and see the changes from year to year. It was indeed a short season for us, but it was still enjoyable and we look forward to what next year brings us."



RYAN RUZEK

Ryan Ruzek has been involved in WHEP since 2005. He is currently the Public Works Director for Mendota Heights and selects and coordinates the wetlands to be monitored. Ryan has served as a volunteer on the Mendota Heights team in the past to gain a better understanding of the program. He commented, “Mendota Heights monitors two wetlands every year. One wetland is monitored year after year, and the city selects a second wetland where future BMP’s are proposed to be installed. The City will then monitor that wetland again to see if the BMP was a success. WHEP has also been a great community involvement and education tool. Residents regularly stop by and inquire about the project.”

Krista Spreiter is the Natural Resources Technician for Mendota Heights. She commented, “the City is very appreciative of the work that the WHEP team is doing in Mendota Heights, and finding a way to continue their work through the pandemic. We rely on their data to gauge the health of our wetlands and also help us to make informed decisions regarding our wetlands and surface water resources. We thank Darcy, the WHEP team, and WHEP staff for their continued efforts!”



KRISTA SPREITER

Mendota Heights General Wetland Health



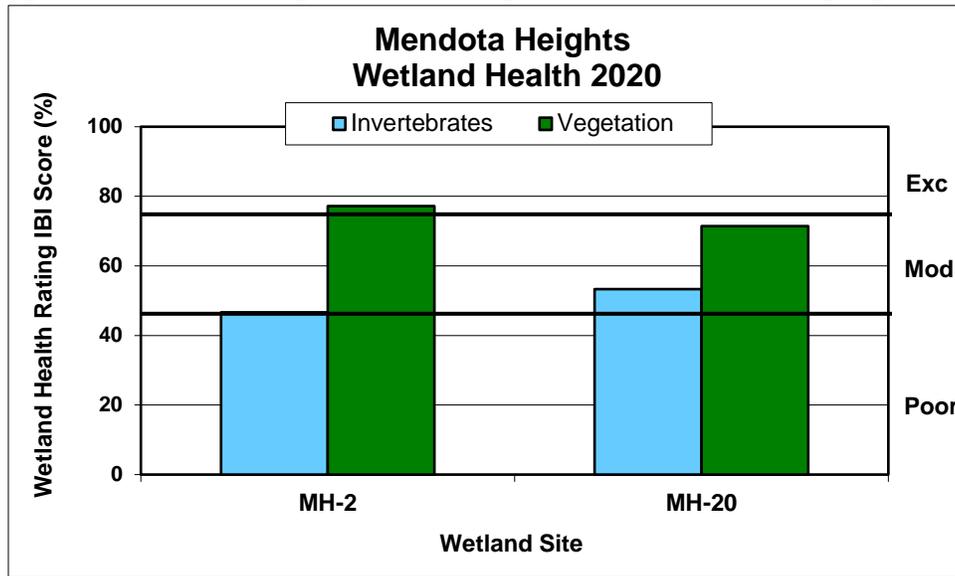
MARY STADE



CAMILLE WANG, JOAN O'DONNELL, MARY STADE, GAYL GUSTAFSON, NIKO HESS

Figure 4.7 presents an overall view of wetland health for all of the 2020 monitoring sites in Mendota Heights based on the IBI scores for invertebrates and vegetation presented as a percent. Figure 4.7 also illustrates the consistency between the IBI scores (in percent form) for each wetland sampled. Invertebrate and vegetation scores that differ by ten percent or less are considered consistent. Based on the IBI scores, a wetland health rating is assigned as excellent, moderate or poor. Two wetlands were monitored in 2020. Invertebrate and vegetation scores ranged from poor to excellent wetland health. Invertebrate and vegetation scores for MH-2 and MH-20 were inconsistent with each other, differing by 30 percent and 18 percent, respectively. Both sites have lower invertebrates scores than vegetation scores. MH-2 scores have showed this inconsistency several years.

Figure 4.7 Mendota Heights' site scores (percent) for the 2020 sampling season



4.7.1 Copperfield (MH-2)

Copperfield (MH-2) is a 5.8-acre, type 5 wetland within the Lower Mississippi River watershed. Its watershed is 965.4 acres and is 30.1 percent impervious. There is one inlet in the northeast corner of the wetland, one inlet in the southeast corner, and one inlet in the southwest corner. There is one outlet in the northwest corner, near Huber Drive. The wetland is included in the City’s stormwater management plan and is designated as NWI-PABG. The pond serves as a natural resource with a surrounding paved trail and gravel nature trail. The wetland management goal is to maintain water quality and flood rate control. A majority of the drainage area includes several additional treatment ponds. Copperfield is connected to an adjacent wetland when water levels are high. Many of these ponds receive surface runoff from residential and road development.



This area is a City-owned open space, and is intended for educating the public on native plantings and the importance of water management. The pond is located in a wooded area with mature trees. Some invasive buckthorn, amur maple, and garlic mustard are present in the area. The surrounding area includes residential neighborhoods in Mendota Heights.

Wetland Health

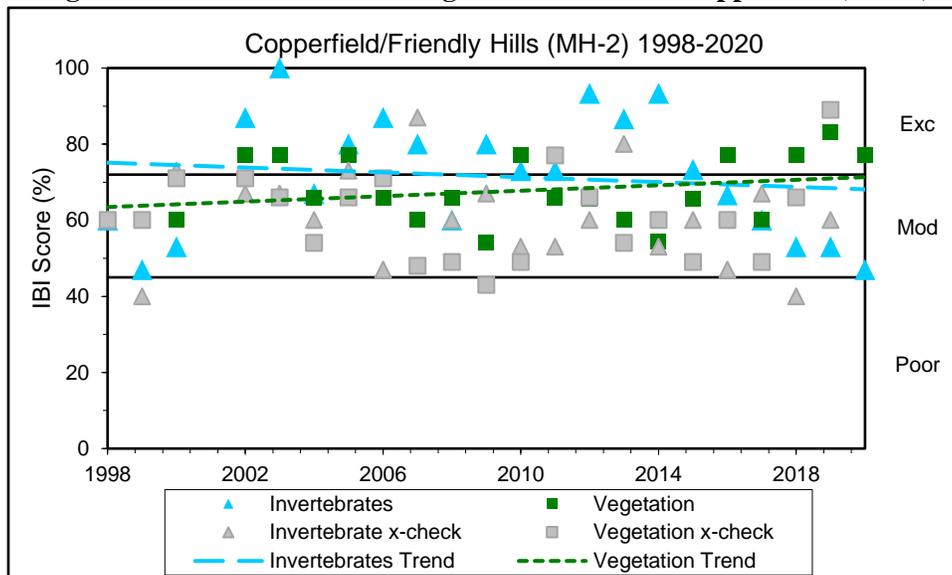
Site Observations: Copperfield is part of a chain of ponds within an established neighborhood, but is City-owned with no houses around it. The pathway to the pond is flat and wooded, with a buffer strip of grasses, ferns, irises, goldenrod around the water’s edge. The wetland slope is uneven, and the substrate is very

mucky. Duckweeds (*Lemna* sp. and *Spirodela* sp.), water-meal (*Wolffia* sp.), and white water-lily (*Nymphaea* sp.) crowd the surface of the water. Coontail (*Ceratophyllum* sp.), water-nymph (*Najas* sp.), pondweed (*Potamogeton* sp.), waterweed (*Elodea* sp.), and bladderwort (*Utricularia* sp.) make up the submergent zone of vegetation. Cattail (*Typha* sp.), arrowhead (*Sagittaria* sp.), reed canary grass (*Phalaris arundinacea*), and several other emergent plants were identified within the vegetation plot. Leeches, dragonflies, damselflies, mayflies, caddisflies, snails, fingernail clams, trueflies, crustaceans, and bugs and beetles were collected.

Table 4.7.1 Copperfield (MH-2) Wetland Health based on Index of Biotic Integrity

	Invertebrates 	Vegetation 
2020 Data (MH-2)		
Wetland Health Rating (IBI score)	Poor (14)	Excellent (27)
Trend 1998-2020	Variable	Variable

Figure 4.7.1 Invertebrate and vegetation trends for Copperfield (MH-2)



Site Summary: This is the 22nd year that MH-2 has been monitored since 1998. There is a lot of variability in the data throughout the years of monitoring. Both health data sets show steady trends. Fluctuation in water levels from year to year may impact data results. The invertebrate and vegetation scores are inconsistent again, differing by 30 percent in 2020. This isn't the only year that health scores have diverged.

4.7.2 City Hall-Orchard Heights (MH-20)

City Hall-Orchard Heights (MH-20) is a 10.6-acre, type 5 wetland located within the Lower Mississippi River Watershed. The water level has risen in recent years, and the wetland type has likely changed from a Type 3/Type 4 to a Type 5. The watershed is 80.9 acres and 30 percent impervious. There is one inlet on the northwest side of the wetland, and three inlets on the east side of the wetland. One stormwater inlet has a pretreatment sump manhole. There is also one outlet on the south side of the wetland. It is part of the City’s stormwater management plan and is designed as NWI – PUBG/PEM1F/PEM1C, as a Public Water on the Minnesota DNR’s PWI. The wetland management goal is to maintain water quality and flood rate control.



This wetland contains purple loosestrife, cattails (non-native), and some upland invasive species including buckthorn. Vegetation management of the upland areas, invasive species control, and recent development on the north side/shore cause disturbance concerns. The new development to the north includes two stormwater ponds with infiltration features, nearly complete. Curb-cut raingardens were completed in the neighborhood to the east, in summer 2019. A large portion of the area (south and east) is public open space and contains a raingarden, pollinator garden, and native prairie planting within the solar garden area. It is intended to help educate the public on the importance of stormwater Best Management Practices.

Wetland Health

Site Observations: The wetland slope is gentle, and the substrate mucky. The releve included a lot of cattail (*Typha* sp.) and floating mats with plants that created a maze of waterways. Duckweeds (*Lemna* sp. and *Spirodela* sp.) and water-meal (*Wolffia* sp.) covered the surface of the water. Coontail (*Ceratophyllum* sp.) dominated the water column and a small population of bladderwort (*Utricularia* sp.) was found.



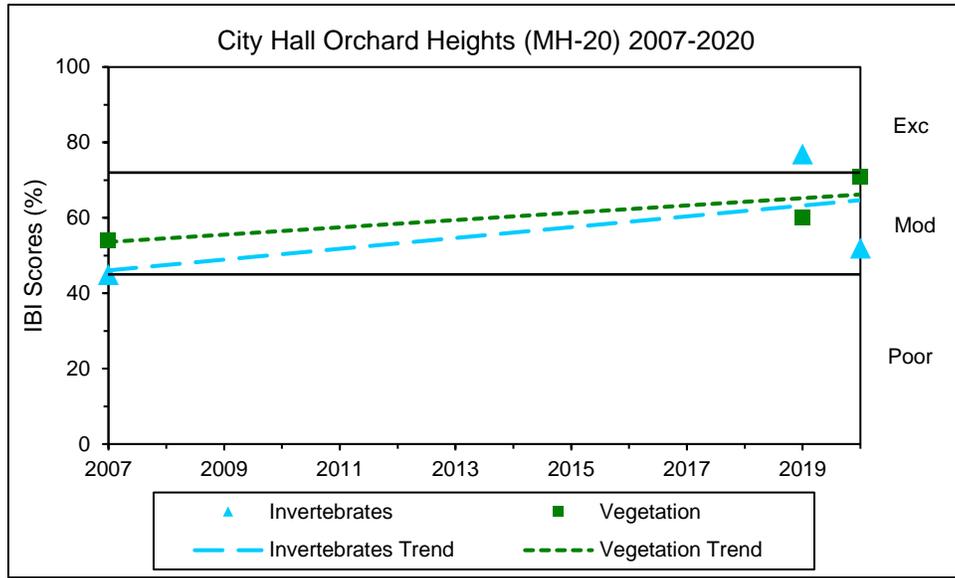
CAMILLE WANG, DARCY TATHAM

Smartweed (*Polygonum* sp.), spike-rush (*Eleocharis* sp.), sedges (*Carex* sp.), and several emergent forbs were represented. Leeches, snails, trueflies, crustaceans, and bugs and beetles were collected. Common reed grass (*Phragmites* sp.) was found; however, it has not been verified as the invasive variety.

Table 4.7.2 City Hall-Orchard Heights (MH-20) Wetland Health based on Index of Biotic Integrity

	Invertebrates 	Vegetation 
2020 Data (MH-20)		
Wetland Health Rating (IBI score)	Moderate (16)	Moderate (25)
Trend 2007-2020	Not enough data	Not enough data

Figure 4.7.2 Invertebrate and vegetation trends for City Hall-Orchard Heights (MH-20)



Site summary: This is the third time that MH-20 has been monitored for WHEP since 2007. The invertebrate and vegetation scores are inconsistent with each other, differing by 18 percent. The invertebrate score declined in 2020. The team commented that it was challenging to obtain dipnet and bottle trap samples due to a very silty water column. More years of data collection will help determine a more reliable health trend.

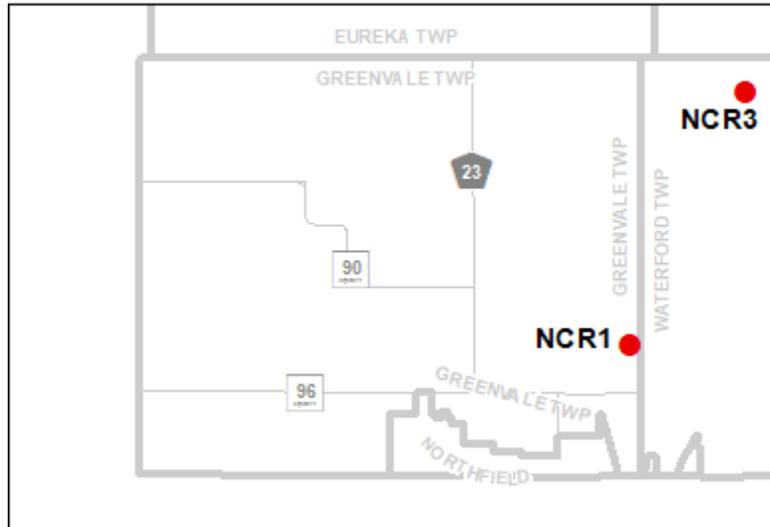
4.8 North Cannon River Watershed Management Organization

Two wetlands were monitored for North Cannon River Watershed Management Organization in 2020. This is the fourth year that North Cannon River WMO has monitored wetlands with WHEP. Three wetlands have been monitored for NCRWMO since their inclusion in WHEP.

Team Leader: Tom Loretto

Team Members: Ambria Kuchinka and Colleen Vitek

North Cannon River WMO WHEP Sites Monitored in 2020





TOM LORETTO

Tom Loretto is the WHEP team leader for the North Cannon River Watershed Management Organization. Tom stated “I have worked with WHEP since 2017. My family has a partnership with Main Street Project – a regenerative agriculture non-profit based in Northfield. Main Street Project has a partnership with Dakota County; I was put in touch with WHEP through our work with Dakota County’s conservation easement program. The southern end of the land we lease to Main Street Project for their demonstration farm is classified RIM (Reinvest in Minnesota) land by the Minnesota Board of Water and Soil Resources. One of the wetlands our WHEP team is responsible for is on this RIM land.”

Tom said, “This year we had a small but enthusiastic crew of volunteers on our team. Our forays in waders, in the muck, through the canary grass and cattails, proved most enjoyable to our team, as we retrieved and located flora and fauna which were – for them - bounty. With the data we collected, we are in good position to monitor the health trends of RIM and other wetlands within the Cannon River watershed.”



ASHLEY GALLAGHER

Ashley Gallagher is a Resource Conservationist for Dakota County Soil and Water Conservation District. She explained, “We serve as the Administrator for the North Cannon River Watershed Management Organization (NCRWMO). The NCRWMO is a watershed in the southern part of Dakota County. A Board of managers with representation from eight townships and three cities oversees watershed management and planning in the North Cannon River Watershed area. One goal within the NCRWMO watershed management plan is ‘to inform landowners, children, and local units of government, about the watershed and human impacts on water quality and quantity, and to invite public participation in watershed management processes.’ In 2017, the Board decided to participate in WHEP for the first time. They are pleased with the way the program uses volunteers to conduct the monitoring, which helps increase public awareness of the watershed and the issues it faces.

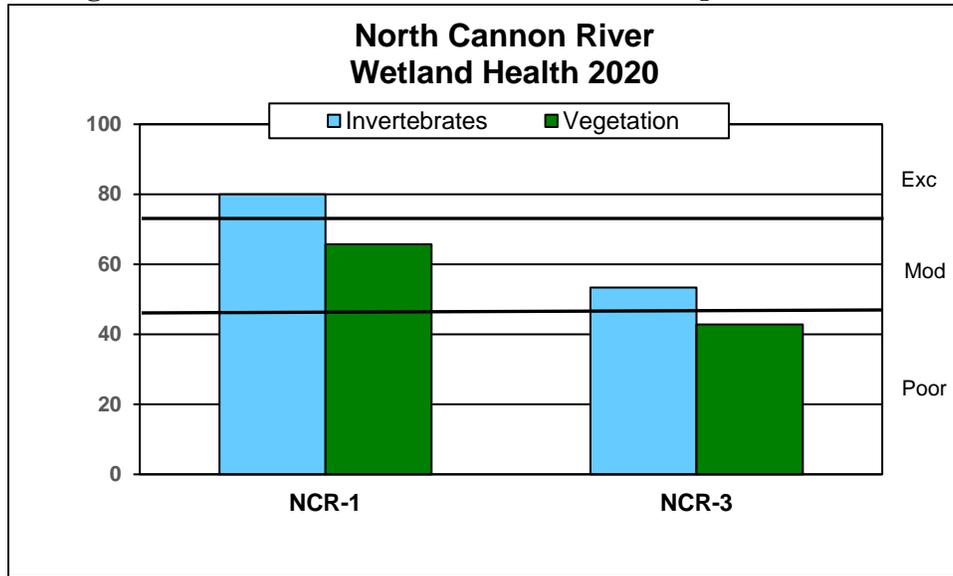
North Cannon River WMO General Wetland Health

Figure 4.8 presents an overall view of wetland health for all the 2020 monitoring sites in North Cannon River WMO based on the scores for invertebrates and vegetation presented as a percent. Figure 4.8 also illustrates the consistency between the IBI scores (in percent form) for each wetland sampled. Invertebrate and vegetation scores that differ by ten percent or less are considered consistent. Based on the IBI scores, a wetland health rating is assigned as excellent, moderate or poor. Invertebrate and vegetation scores for NCR-1 were inconsistent with each other, differing by 14 percent. This is the first year to survey NCR-3.



AMBRIA KUCHINKA

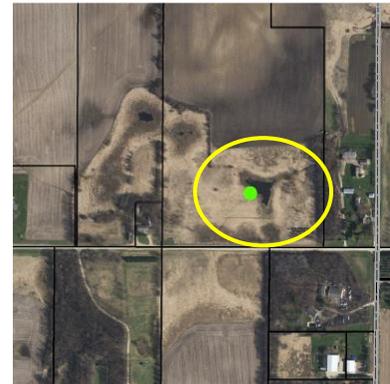
Figure 4.8 North Cannon River WMO site scores (percent) for 2020



4.8.1 Loretto Wetland (NCR-1)

Loretto Wetland (NCR-1), formerly known as Wasner, is a 0.5-acre, type 4 wetland within the Cannon River watershed. The wetland watershed is 160 acres with four percent impervious surface. A wetland restoration was completed in 1996. The wetland management goal is to maintain the wetland and determine the effectiveness of the restoration.

This wetland is located within the Greenvale Township in southwest Dakota County. The surrounding area is predominately agricultural. There is potential for future development in the area.



TOM LORETTO AND COLLEEN VITEK

Wetland Health

Site Observations: The wetland slope is gentle, and the substrate is fairly mucky. An organic farm is north of the wetland and a conventional farm is to the west. Cattails (*Typha* sp.), reed canary grass (*Phalaris arundinacea*), and bur-reed (*Sparganium*) dominate the shoreline. Duckweeds (*Lemna* sp. and *Spirodela* sp.) cover the water surface. Pondweed (*Potamogeton* sp.), bladderwort (*Utricularia* sp.), bulrush (*Scirpus* sp.), spike-rush (*Eleocharis* sp.), and sedges (*Carex* sp.) were also present. Leeches, dragonflies, damselflies, caddisflies, snails, fingernail clams, trueflies, crustaceans, and bugs and beetles were collected.

Table 4.8.1 Loretto Wetland (NCR-1) Wetland Health based on Index of Biotic Integrity

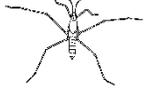
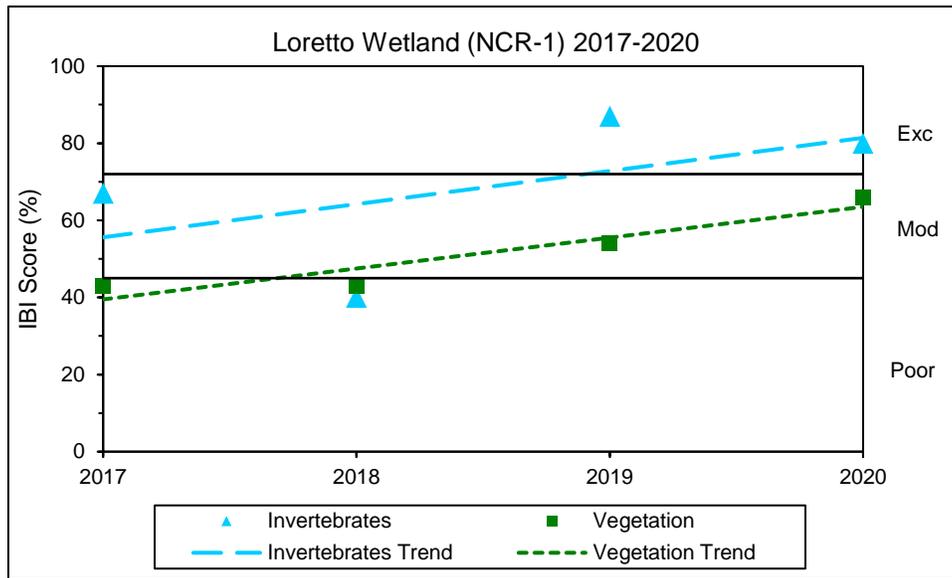
	Invertebrates 	Vegetation 
2020 Data (NCR-1)		
Wetland Health Rating (IBI score)	Excellent (24)	Moderate (23)
Trend 2017-2020	Not enough data	Not enough data

Figure 4.8.1 Invertebrate and vegetation trends for Loretto Wetland (NCR-1)

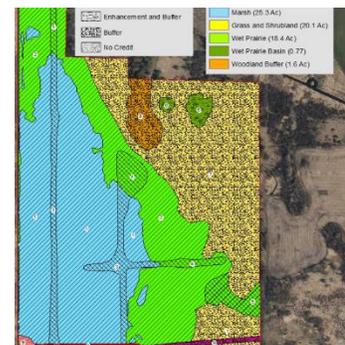


Site summary: This is the fourth consecutive year that Loretto Wetland has been monitored by WHEP volunteers. The invertebrate and vegetation health scores were inconsistent, differing by 14 percent. The invertebrate score indicates excellent health for the second year. The vegetation scores show slight improvement each year. More years of data will help determine a more reliable health trend.

4.8.2 Jordan Wetland (NCR-3)

Jordan Wetland (NCR-3) is a 25-acre, type 3 shallow marsh within the Cannon River watershed. The wetland watershed is 33 acres with nine percent impervious surface. The wetland management goal is to restore for the State of Minnesota Wetland Bank.

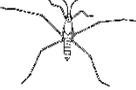
The surrounding area includes agriculture and roads. The site was cropped until 2018 when restoration work began. The drainage ditches were filled and a berm was built to hold back water. Vegetation work and seeding throughout the easement have created various wetland and upland habitats.



Wetland Health

Site Observations: The wetland slope is fairly gentle, and the substrate is fairly solid. There are no trees or submergent vegetation. The surface of the water is covered by duckweed (*Lemna* sp.) and floating leaved pondweed (*Potamogeton* sp.). Water-plantain (*Alisma* sp.), arrowhead (*Sagittaria* sp.), rushes (*Juncus* sp.), bulrush (*Scirpus* sp.), prairie cord-grass (*Spartina pectinata*), reed canary grass, and beggar-ticks (*Bidens*) were represented. Leeches, dragonflies, snails, trueflies, crustaceans, and bugs and beetles were collected.

Table 4.8.2 Jordan Wetland (NCR-3) Wetland Health based on Index of Biotic Integrity

	Invertebrates	Vegetation
2020 Data (NCR-3)		
Wetland Health Rating (IBI score)	Moderate (16)	Poor (15)
Trend 2020	Not enough data	Not enough data

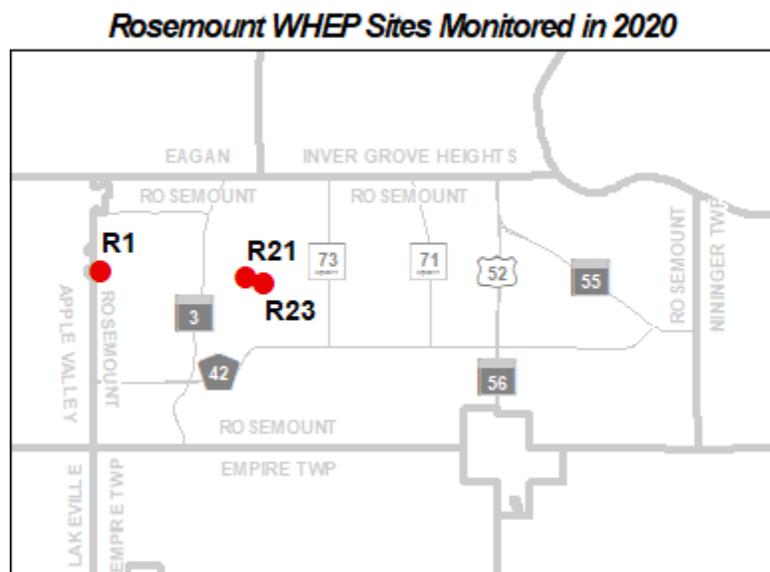
Site summary: This is the first year that Jordan wetland has been monitored by WHEP volunteers. The invertebrate and vegetation scores were consistent, but differing by 10 percent. The invertebrate data indicated moderate wetland health, while the vegetation data indicated poor wetland health. The vegetation was lacking in submergent vegetation. Perhaps as the restoration stabilizes, the vegetation diversity will increase and provide more habitat for invertebrates. Additional years of monitoring will help to determine more reliable wetland health trends.

4.9 Rosemount Wetlands

Three wetlands were monitored in the City of Rosemount in 2020. The City has 23 years of WHEP data! Twenty-four wetlands have been monitored in Rosemount since the start of WHEP.

Team Leaders: Amy Jo Forslund and Lisa Wolfe

Team Members: Charles Bauman, Agnes Dina, Gregory Dina, Sophie Dina, Kaelee Henrichs, Caleb Jones, Eric Nelson, and Jane Porterfield.



Amy Jo Forslund is the co-team leader for Rosemount. She was originally an Eagan volunteer from 2007 to 2012. In 2016, I returned as the Rosemount team leader. She has worked as an environmental educator and with several metro area parks including Three Rivers Park District, Dakota County Parks, and Tamarack Nature Center. She explained, “as an environmental educator I have taught many elementary age children about natural history topics, and one of my favorite topics is wetlands. Being a part of WHEP has been a great opportunity to delve deeper into the wetland world. I want to thank the WHEP Rosemount team for their dedication, knowledge, and their masterful skills. I also want to thank co-leader Lisa Wolfe. I love our team! It is honor to be a part of such a wonderful Citizen Science project.”



AMY JO FORSLUND



LISA WOLFE

Lisa Wolfe is the co-team leader for the Rosemount team. She said, “I started volunteering for WHEP in 2018 and really loved the program. It was so well organized and very adaptive to the interests and commitment levels of the volunteers. What I love about WHEP the most is that not only does it benefit the local environment and ecology, but it also brings neighbors together in the community. The COVID-19 pandemic presented new challenges for our team this year, but I am so glad we were able to continue our work while keeping each other safe. It is a testament to the strength of the WHEP program, and the dedication of the volunteers, staff, and all who keep the program going.”

Jane Byron is the Stormwater Specialist and WHEP coordinator at the City of Rosemount. She has been involved in WHEP for many years, formerly involved at the City of Apple Valley. She commented, “Our WHEP volunteers provide us with a valuable service. All the hard work and time they put in shows in the high quality data we continue to receive year after year.”



JANE BYRON

Rosemount General Wetland Health

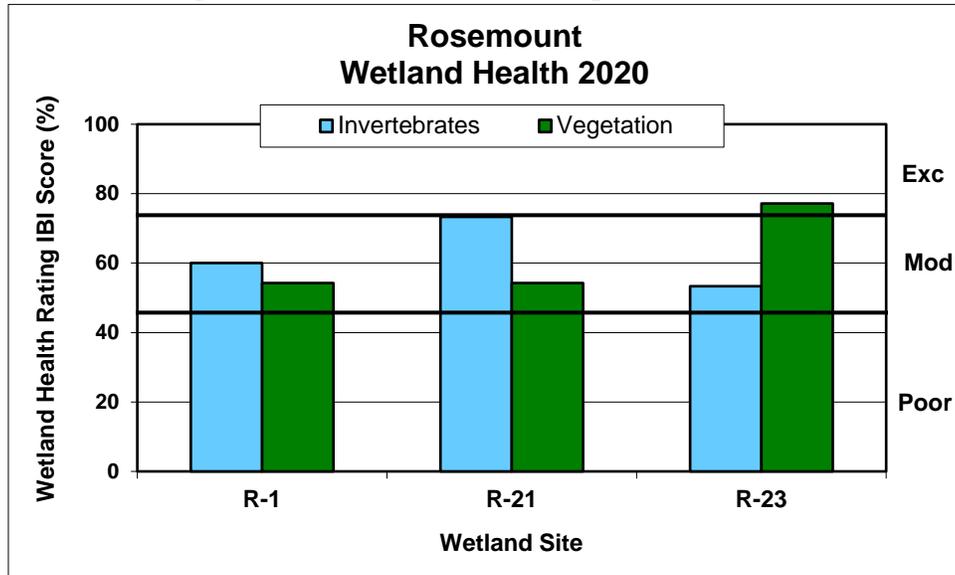
The City of Rosemount has a wetland management plan which includes four different categories of protection. Vegetated buffers are required around wetlands in new developments, with the buffer size determined by the wetland protection designation.

<u>Wetland designation</u>	<u>Required buffer</u>
Preserve Wetlands	75 feet
Manage I Wetlands	50 feet
Manage II Wetlands	30 feet
Utilize Wetlands	15 feet in non-agricultural areas only



Figure 4.9 presents an overall view of wetland health for all the 2020 monitoring sites in Rosemount based on the scores for invertebrates and vegetation presented as a percent. Figure 4.9 also illustrates the consistency between the IBI scores (in percent form) for each wetland sampled. Invertebrate and vegetation scores that differ by ten percent or less are considered consistent. Based on the IBI scores, a wetland health rating is assigned as excellent, moderate or poor. The three wetlands scored moderate to excellent health. The invertebrate and vegetation scores for wetland sites R-21 and R-23 were inconsistent, differing by 19 percent and 14 percent, respectively.

Figure 4.9 Rosemount site scores (percent) for 2020



4.9.1 Kelly Marsh (R-1)

Kelly Marsh (R-1), also known as WMP #362, is a 1.3 acre, type 5 wetland within the Birger Pond subwatershed of the Vermillion River watershed. The subwatershed is 897 acres with 80 percent impervious surface. There is one inlet on the north side and one outlet on the south side of the wetland. Kelly Marsh is part of the City’s stormwater management plan and is designated to preserve with a management goal to maintain wetland without loss of function and value, and to maximize potential for education purposes by taking advantage of surrounding residential area and park.



The wetland is located in a basin surrounded by a housing development and City park. The wetland basin is affected by storm water runoff from the nearby development which is encroaching upon the existing 75-foot buffer.

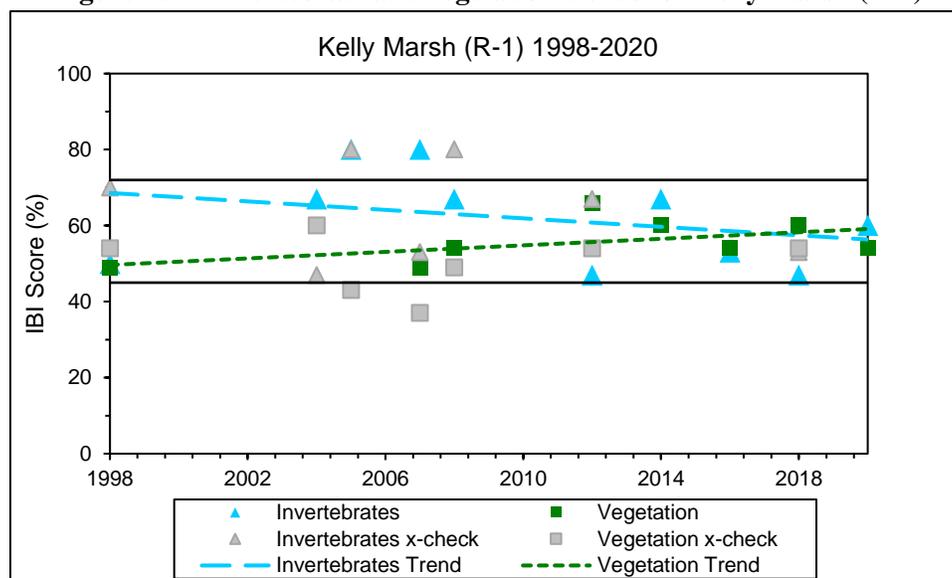
Wetland Health

Site Observations: The wetland substrate is steep. The wetland is within Innisfree Park and surrounded by trees including willows (*Salix* sp.) Duckweeds (*Lemna* sp. and *Spirodela* sp.), water-meal (*Wolfia* sp.), and white water lilies (*Nymphaea* sp.) crowd the surface of the water. Denes populations of coontail (*Ceratophyllum* sp.), waterweed (*Elodea* sp.), and pondweed (*Potamogeton* sp.) fill the submergent zone. Spike rush (*Eleocharis* sp.) and reed canary grass (*Phalaris arundinacea*) were also present. No other emergent forbs were observed in the vegetation plot. Leeches, beetles, true bugs, dragonflies, damselflies, caddisflies, snails, fingernail clams, trueflies, and crustaceans were collected.

Table 4.9.1 Kelly Marsh (R-1) Wetland Health based on Index of Biotic Integrity

	Invertebrates 	Vegetation 
2020 Data (R-1)		
Wetland Health Rating (IBI score)	Moderate (18)	Moderate (19)
Trend 1998-2020	Stable	Stable

Figure 4.9.1 Invertebrate and vegetation trends for Kelly Marsh (R-1)



Site summary: This is the tenth time Kelly Marsh has been monitored since 1998. The invertebrate and vegetation health scores are consistent with each other in 2020. The invertebrate score indicates moderate wetland health. With the exception of an excellent score in 2007, the invertebrate scores have waivered between high and low-moderate. The vegetation scores are consistently indicating moderate wetland health, and the health trend is stable.

4.9.2 CR-38 Mitigation Site 1 (R-21)

CR-38 Mitigation Site 1 (R-21) is a 1.7-acre, type 3 wetland in the Kegan Lake subwatershed of the Vermillion River watershed. The subwatershed is 1,530 acres and 30 percent impervious. The wetland has one inlet on the east side which receives stormwater overflow from a storm pond. There are no outlets. R-21 is included in the City’s stormwater management plan. It is designated as Manage II, and is managed to maintain the wetland quality and monitor wetland mitigation.



R-21 is a depressional shallow marsh wetland. The southern portion of this wetland complex was constructed as mitigation for impacts to other wetlands as a result of street reconstruction, and is an extension of an existing wetland dominated by reed canary grass. The nutrient loading from adjacent agriculture and reed canary grass impede upon this wetland.

Wetland Health

Site Observations: The slope of the wetland is steep upon entry, but levels out. The wetland substrate is very mucky with decomposing vegetation. The wetland is choked with cattail (*Typha* sp.) and only offers a small area of open water. A dense population of bladderwort (*Utricularia* sp.) dominated the water column. Duckweed (*Lemna* sp. and *Spirodela* sp.), pondweed (*Potamogeton* sp.), spike-rush (*Eleocharis* sp.), slender Riccia (*Riccia fluitans*), and reed canary grass (*Phalaris arundinacea*) were also found within vegetation plot. Leeches, dragonflies, damselflies, caddisflies, snails, fingernail clams, trueflies, crustaceans, and bugs and beetles were collected. Bald eagles and nesting red-winged blackbirds were observed.



AMY JO FORSLUND, SOPHIE DINA, GREGORY DINA, CALEB JONES, AND JANE PORTERFIELD

Table 4.9.2 CR-38 Mitigation Site 1 (R-21) Wetland Health based on Index of Biotic Integrity

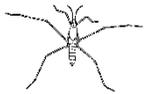
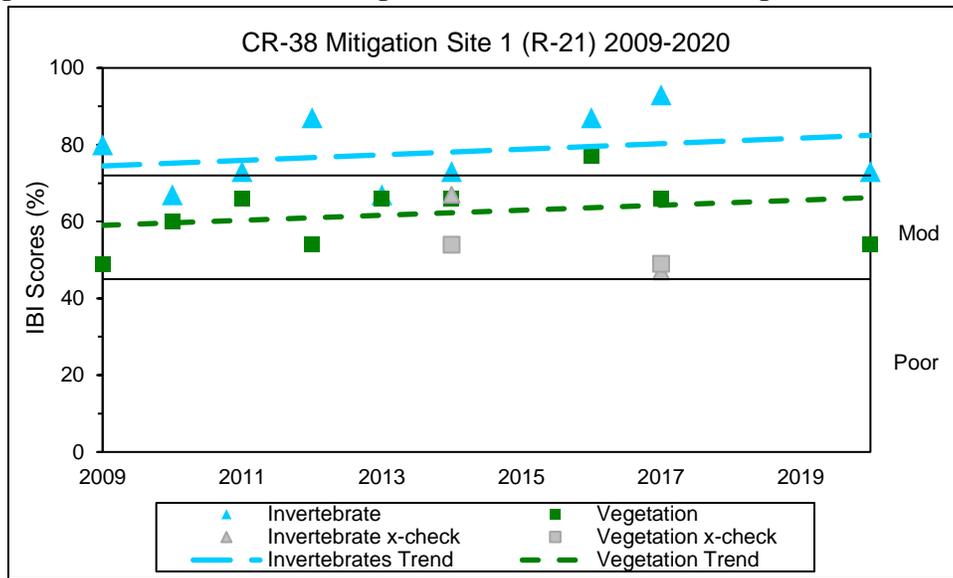
	Invertebrates 	Vegetation 
2020 Data (R-21)		
Wetland Health Rating (IBI score)	Moderate (22)	Moderate (19)
Trend 2009-2020	Stable	Stable

Figure 4.9.2 Invertebrate and vegetation trends for CR-38 Mitigation Site 1 (R-21)



Site summary: This is the ninth time that R-21 has been monitored since 2009. The invertebrate and vegetation scores both indicate moderate wetland health: however, the scores were inconsistent, differing by 19 percent. Both trends appear stable. The wetland contains low diversity of vegetation, but plenty of habitat for invertebrate species.

4.9.3 CR-38 Mitigation Site 2 (R-23)

CR-38 Mitigation Site 2 (R-23) is 0.3-acre, type 3 wetland in the White Lake subwatershed within the Vermillion River watershed. The White Lake subwatershed is 998 acres of which 30 percent is impervious surface. There are no inlets or outlets. This wetland is not part of the City’s stormwater management plan. It was created in 2008 after the plan was developed. The wetland management goal is to maintain the wetland without any loss of function and value, and to monitor the success of this wetland’s creation.



R-23 is a small depressional shallow marsh wetland. The wetland was constructed to mitigate impacts to other wetlands as a result of street reconstruction. It was constructed near an existing wetland that is dominated by reed canary grass.

Wetland Health

Site Observations: The wetland is shallow and small with a gentle slope and firm substrate. It is adjacent to Mare Pond North. Moderate populations of pondweed (*Potamogeton* sp.), waterweed (*Elodea* sp.), spike-rush (*Eleocharis* sp.), bulrush (*Scirpus* sp.), and reed canary grass (*Phalaris arundinacea*) exist.

Manna grass (*Glyceria* sp.), coontail (*Ceratophyllum* sp.), bladderwort (*Utricularia* sp.), smartweed (*Polygonum* sp.), cattail (*Typha* sp.), and duckweed (*Lemna* sp.) were also present in the vegetation plot. Leeches, dragonflies, damselflies, snails, fingernail clams, trueflies, crustaceans, and beetles and bugs were collected.

Table 4.9.3 CR-38 Mitigation Site 2 (R-23) Wetland Health based on Index of Biotic Integrity

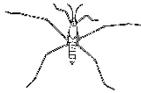
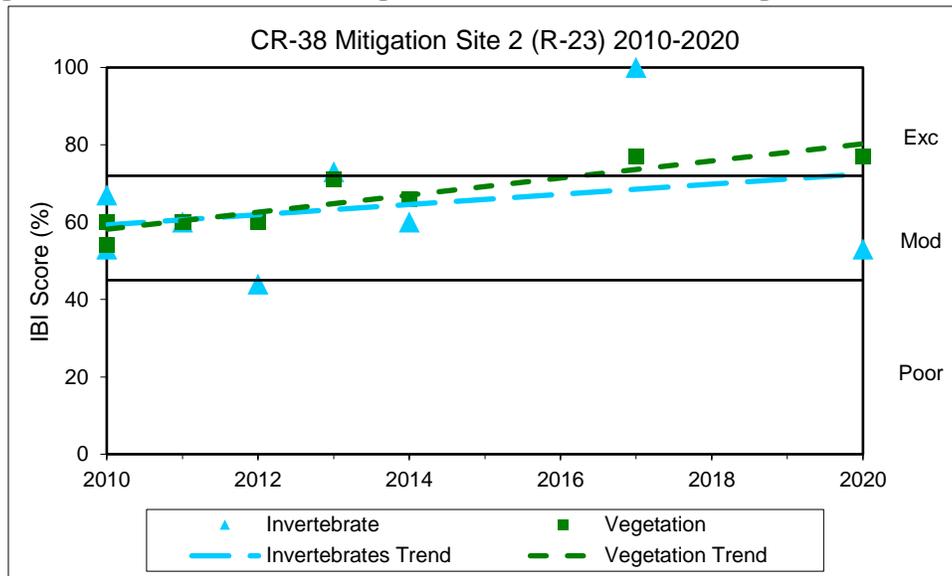
	Invertebrates 	Vegetation 
2020 Data (R-23)		
Wetland Health Rating (IBI score)	Moderate (16)	Excellent (27)
Trend 2010-2020	Variable	Improving

Figure 4.9.3 Invertebrate and vegetation trends for CR-38 Mitigation Site 2 (R-23)



Site summary: This is the seventh time that R-23 has been monitored by the WHEP volunteers since 2010. The invertebrate and vegetation scores were inconsistent, differing by 24 percent. Invertebrate data indicates excellent wetland health while vegetation data indicates moderate wetland health. The invertebrate data is variable while the vegetation data indicates a slightly improving health trend.

4.10 South St. Paul Wetlands

Two wetlands were monitored in South St. Paul in 2020 by the South St. Paul team. The City has 19 years of WHEP data! Four wetlands have been monitored in South St. Paul since the start of the WHEP program.

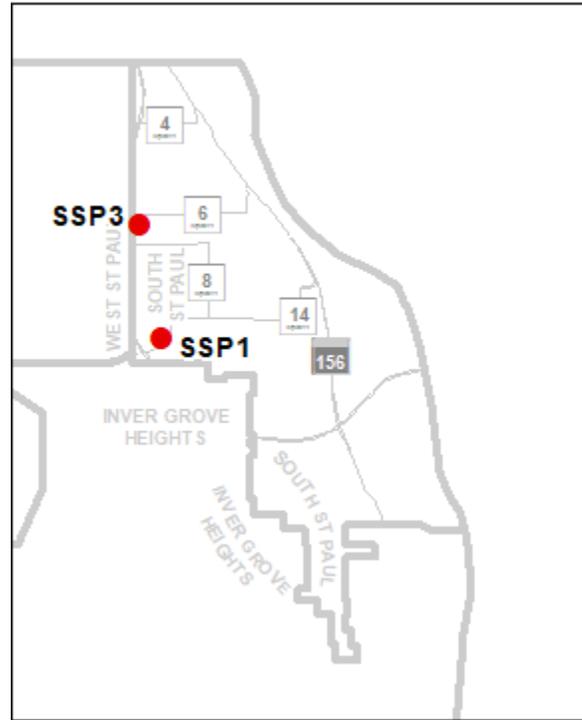
Team Leaders: Rachel Funke

Team Members: Jeff Brenner, Julie Brenner, Luann Hoganson, Nathan Johnston, Ashley Lakes, Cecilia Pugh, and Cindy Swaim.



This was Rachel's second year as a WHEP team leader. Rachel currently works for Capitol Region Watershed District in Saint Paul, where she assists with various water quality improvement projects. She said, "It was exciting to have a mix of old and new volunteers and to see how our wetlands have changed since last year."

South St. Paul WHEP Sites Monitored in 2020



The City of South St. Paul has relatively few wetlands compared to most Cities which is why it is important to monitor the functionality and health of this limited natural resource in the community to ensure it is protected. The City appreciates the WHEP program, and its volunteers help in monitoring the wetlands' health, and will continue to support the program.

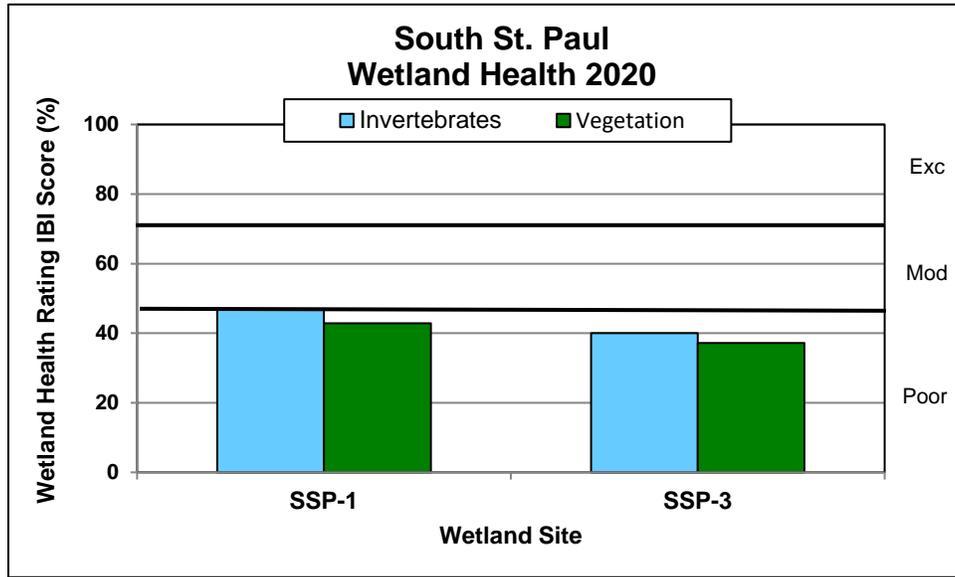
South St. Paul General Wetland Health

Figure 4.10 presents an overall view of wetland health for all of the 2020 monitoring sites in South St. Paul based on the IBI scores for invertebrates and vegetation presented as a percent. Figure 4.10 also illustrates the consistency between the IBI scores (in percent form) for each wetland sampled. Invertebrate and vegetation scores that differ by ten percent or less are considered consistent. Based on the IBI scores, a wetland health rating is assigned as excellent, moderate or poor. In 2020, the invertebrates and vegetation health rated poor in both wetlands surveyed. The invertebrates and vegetation scores for each wetland were consistent.



CINDY SWAIM AND NATHAN JOHNSTON SETTING BOTTLE TRAPS

Figure 4.10 South St. Paul site scores (percent) for the 2020 sampling season



4.10.1 Anderson Pond (SSP-1)

Anderson Pond (SSP-1) is a 2.4-acre, type 4 wetland within the Lower Mississippi River watershed. The drainage area is 168 acres, and is approximately 15 percent impervious. It is publicly owned. It has three inlets: one inlet on the north side of the wetland, one inlet on the west side, and one inlet on the south side. There is also an outlet on the south side of the wetland. It is part of the City's Stormwater Management Plan.



Virtually all of the area that contributes to this wetland is fully developed. In 2008, the City performed an extensive dredging of Anderson Pond. The cattails are returning on the east and west sides of the pond. A separate maintenance cell was created near the northwest inlet in order to facilitate future dredging and other maintenance activities. Additional dredging was done in late 2011 and 2012. In 2009, Southview Pond was constructed as a pre-treatment measure for the runoff from Highway 52 and West St. Paul, prior to conveyance into Anderson Pond. Highway 52 is a major contributor to Anderson Pond as is the City of West St. Paul (over 90% of the pond's watershed is in West St. Paul). The pond is in an older established residential area surrounded by roads, apartment blocks, and houses.

Wetland Health

Site Observations: The wetland slope is gentle. The wetland substrate is mucky. A thick band of cattails (*Typha* sp.) surrounds about 75 percent of the wetland shoreline. The area without the cattails has large overhanging trees. Coontail (*Ceratophyllum* sp.) dominated the vegetation plot. Pondweed (*Potamogeton*

sp.), waterweed (*Elodea* sp.), duckweed (*Lemna* sp. and *Spirodela* sp.), smartweed (*Polygonum* sp), jewelweed (*Impatiens* sp.), purple loosestrife (*Lythrum salicaria*), and sedges (*Carex* sp.) were also present. Leeches, snails, trueflies, crustaceans, and truebugs were collected. Chinese mystery snails (*Cipangopaludina chinensis*) were abundantly present. A local resident commented that this was a great year for observing wildlife including blue herons, white egrets, ducks, geese, and red-wing blackbirds.

Table 4.10.1 Anderson Pond (SSP-1) Wetland Health based on Index of Biotic Integrity

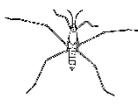
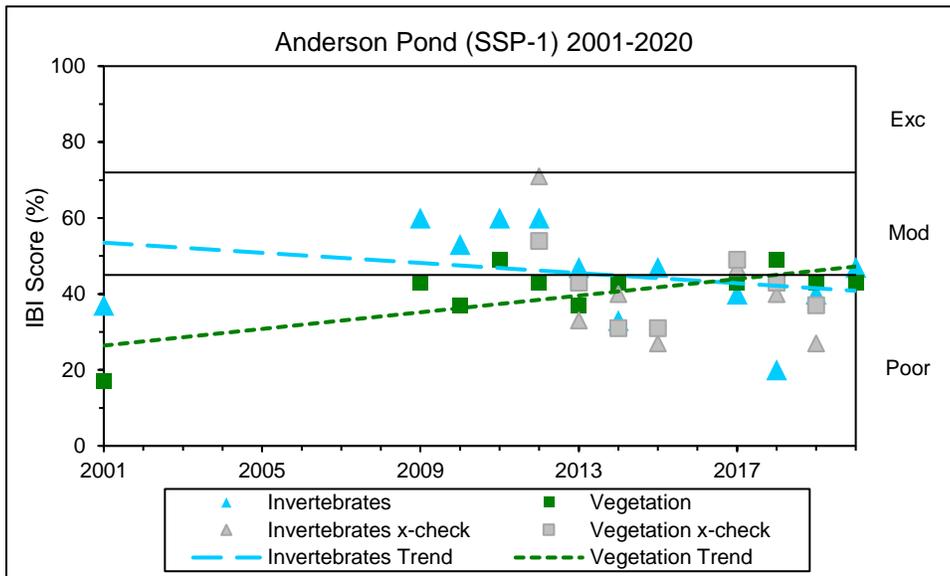
	Invertebrates 	Vegetation 
2020 Data (SSP-1)		
Wetland Health Rating (IBI score)	Poor (14)	Poor (15)
Trend 2001-2020	Stable	Stable

Figure 4.10.1 Invertebrate and vegetation trends for Anderson Pond (SSP-1)



Site Summary: This is the twelfth time that SSP-1 has been monitored since 2001. The invertebrate and vegetation scores are very consistent, in 2020. The vegetation description and invertebrate collection were very similar to 2018 and 2019. The invertebrate score has rebounded to what appears to be stable score bordering the poor to moderate health division. The vegetation scores appear to be stable, with an exception for the first year of surveys. This wetland is described as a poor site, and the scores are reflecting its physical image. Highway 52 contributes stormwater input to the wetland.

4.10.2 LeVander Pond (SSP-3)

LeVander Pond, also known as SSP-3, is a 3.4-acre, type 4 wetland within the Lower Mississippi River Watershed. Its watershed is 37.9 acres which is approximately 20 percent impervious. It is part of a City of South St. Paul easement. There is one inlet on the west side, one on the north side, and one on the east side. There is one outlet on the north side of the wetland. It is part of the City's stormwater management plan.

Virtually all of the area that contributes to this wetland is fully developed. In 2008, LeVander Estates, a new development was completed on the east side of LeVander Pond. A trail was constructed down to the pond. During an upgrade at the Wentworth/Thompson interchanges, Mn/DOT installed a pretreatment basin south of the pond to improve drainage. Highway 52 is a major contributor to LeVander Pond as is the City of West St. Paul.



Wetland Health

Site Observations: The wetland slope is gentle. The substrate is very mucky. The wetland surface is covered in duckweed (*Lemna* sp. and *Spirodela* sp.) and water-meal (*Wolffia* sp.). Coontail (*Ceratophyllum* sp.) and pondweed (*Potamogeton* sp.) are abundant. Cattails (*Typha* sp.) surround the wetland. Leeches, snails, fingernail clams, trueflies, crustaceans, and bugs and beetles were collected.



LUANN HOGANSON, JEFF BRENNER,
NATHAN JOHNSTON

Table 4.10.2 LeVander Pond (SSP-3) Wetland Health based on Index of Biotic Integrity

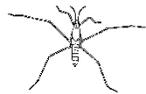
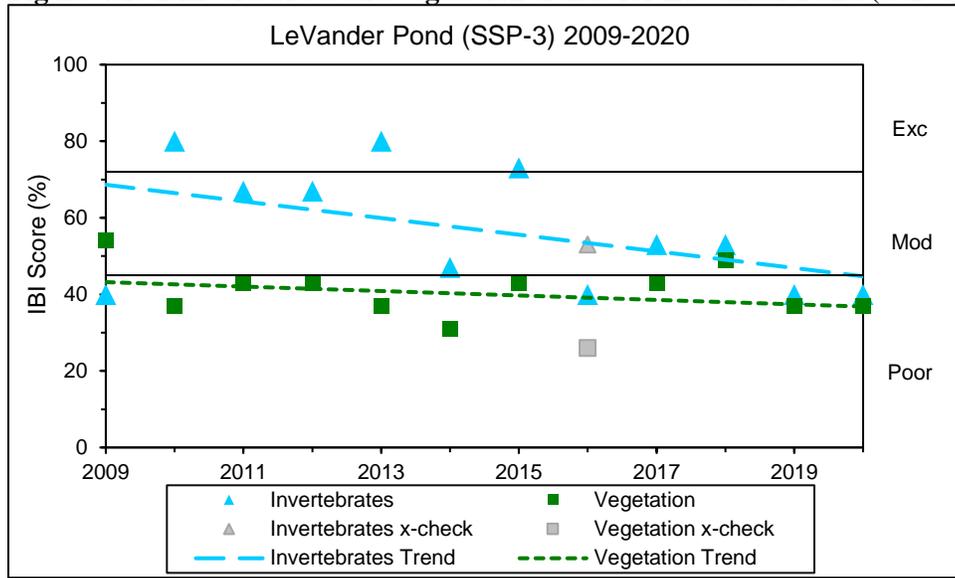
	Invertebrates 	Vegetation 
2020 Data (SSP-3)		
Wetland Health Rating (IBI score)	Poor (12)	Poor (13)
Trend 2009-2020	Declining	Stable

Figure 4.10.2 Invertebrate and vegetation trends for LeVander Pond (SSP-3)



Site summary: This is the twelfth consecutive year of monitoring LeVander Pond. The vegetation and invertebrates scores were consistent with each other in 2020, and both indicate poor wetland health. The invertebrate scores have fluctuated between poor and excellent over the years; however, the trend appears to be declining as the invertebrate scoring has been lower since 2016. The vegetation trend appears stable.

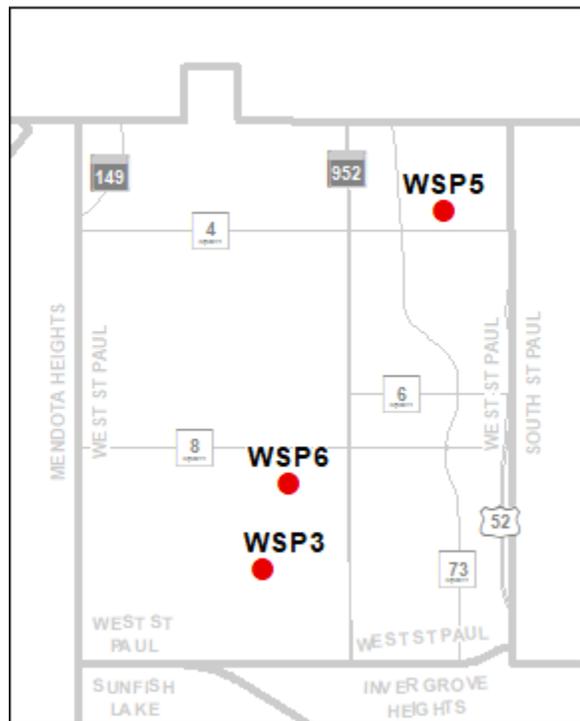
4.11 West St. Paul Wetlands

Three wetlands were monitored in West St. Paul in 2020 by the West St. Paul team. The City of West St. Paul has 21 years of WHEP data! Eleven wetlands have been monitored in West St. Paul since the City became involved with WHEP in 1999.

Team Leader: Maggie Karschnia

Team Members: Grace Karadza, Alana Karschnia, Delaney Karschnia, Rick Karschnia, Katie Scheurer, and Heidi Sundet.

West St. Paul WHEP Sites Monitored in 2020





MAGGIE KARSCHNIA

Maggie returned as the team leader for the West St. Paul team in 2020. She has been participating as a WHEP volunteer or team leader since 2007.

Ross Beckwith is the City of West St. Paul’s City Engineer/Public Works and Parks Director. He commented, “With the onset of COVID this year, I figured there wouldn’t be a WHEP program. It goes to show the resilience of the program leaders and volunteers who challenged themselves to keep collecting this data in a safe manner for everyone involved. The ability to look at



ROSS BECKWITH

trend lines of the health of our wetlands is a valuable educational tool for staff, environmental committees, and the public. It helps us steer projects and/or policies that will protect these precious resources. The City of West St. Paul is grateful for all the volunteers that made 2020, a very difficult year, another success!”



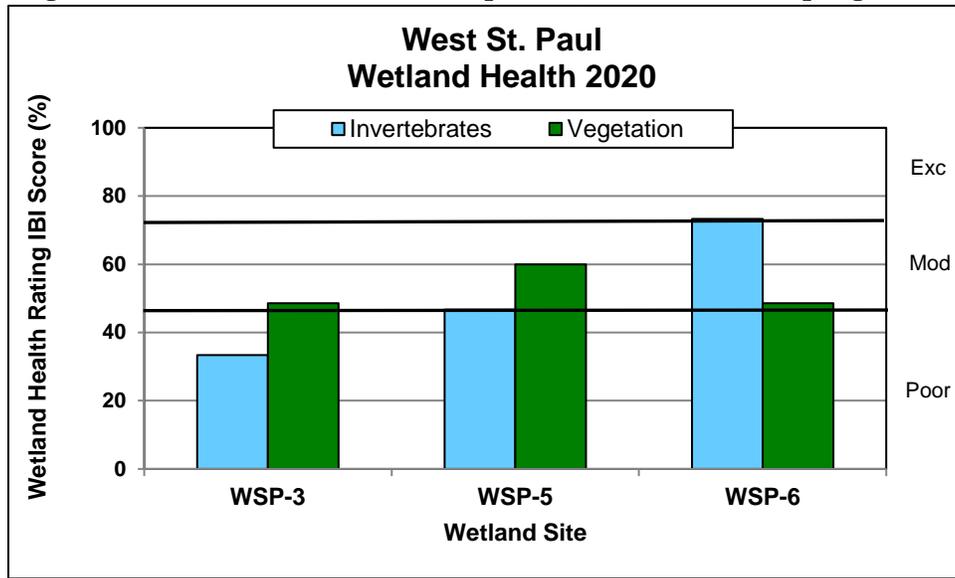
DAVE SCHLETTY

Dave Schletty is the Assistant Parks & Recreation Director at the City of West St Paul. He assists with the City’s coordination of the program. Dave helps select which wetlands to monitor each year and then reviews the data. With so few wetlands within the 95 percent-developed 5-square-mile City, Dave understands the importance of keeping them healthy. He also supervises the City’s Environmental Committee and shares the WHEP data with the group, so together they help educate residents about improving water quality and how to implement best practices.

West St. Paul General Wetland Health

Figure 4.11 presents an overall view of wetland health for all of the 2020 monitoring sites in West St. Paul based on the IBI scores for invertebrates and vegetation presented as a percent. Figure 4.11 also illustrates the consistency between the IBI scores (in percent form) for each wetland sampled. Invertebrate and vegetation scores that differ by ten percent or less are considered consistent. Based on the IBI scores, a wetland health rating is assigned as excellent, moderate or poor. The West St. Paul wetland ratings ranged from poor to moderate wetland health in 2020. The invertebrate and vegetation scores for all three wetlands were inconsistent, differing by 16 percent, 13 percent, and 24 percent.

Figure 4.11 West St. Paul site scores (percent) for the 2020 sampling season



4.11.1 Duck Pond (WSP-3)

Duck Pond (WSP-3) is a 2.5-acre, type 5 wetland within the Highway 110-494 subwatershed within the Lower Mississippi River watershed. The subwatershed is 65 acres. It is publicly owned, and is part of the City’s stormwater management plan. It is designated as A4P Duck Pond. There is an inlet on the north side of the wetland, and an outlet on the east side. Although Duck Pond is located within a densely populated area, it is largely surrounded by trees and not widely visible from the road. The shoreline contains woody debris from fallen branches or trees.



Wetland Health

Site Observations: The wetland slope is gentle. The wetland substrate is mucky. The wetland is surrounded by trees. There was no submergent vegetation present. Water-meal (*Wolfia* sp.) covered the surface of the water. A small amount of duckweed (*Lemna* sp.) was also present. Several emergent forbs and grasses were included in the vegetation plot, including iris (*Iris* sp.), cattail (*Typha* sp.), sedges (*Carex* sp.), and bulrush (*Scirpus* sp.). Few other species of vegetation were represented in the plot. Reed canary grass (*Phalaris arundinacea*) dominated the shoreline. Leeches, damselflies, trueflies, crustaceans, and bugs and beetles were collected.

Table 4.11.1 Duck Pond (WSP-3) Wetland Health based on Index of Biotic Integrity

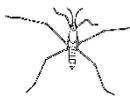
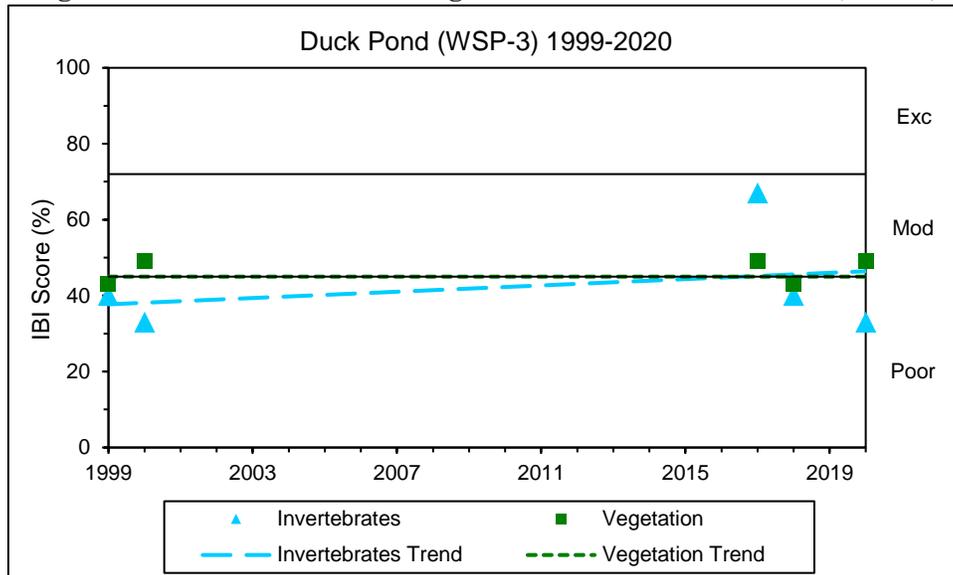
	Invertebrates 	Vegetation 
2020 Data (WSP-3)		
Wetland Health Rating (IBI score)	Poor (10)	Moderate (17)
Trend 1999-2020	Stable	Stable

Figure 4.11.1 Invertebrate and vegetation trends for Duck Pond (WSP-3)



Site Summary: This is the fifth time that Duck Pond has been surveyed by WHEP volunteers, since 1999. Prior to 2017, it had not been surveyed since 2000. The invertebrate and vegetation scores were inconsistent with each other, differing by 16 percent. The invertebrates score indicates poor wetland health, while the vegetation score indicates moderate wetland health. The wetland has low diversity of vegetation which likely impacts the invertebrates community, especially since it lacks submergent vegetation.

4.11.2 Lily Lake (WSP-5)

Lily Lake (WSP-5), also known as RW24P, is a 6.4-acre, type 3 wetland within the Riverview Tunnel Drainage District. Its watershed is 22 acres. It is publicly owned. There is one inlet from Carrie Street east of the Carrie Stanley intersection. There is an outlet on the north end to Bernard Street. It is part of the City's stormwater management plan.



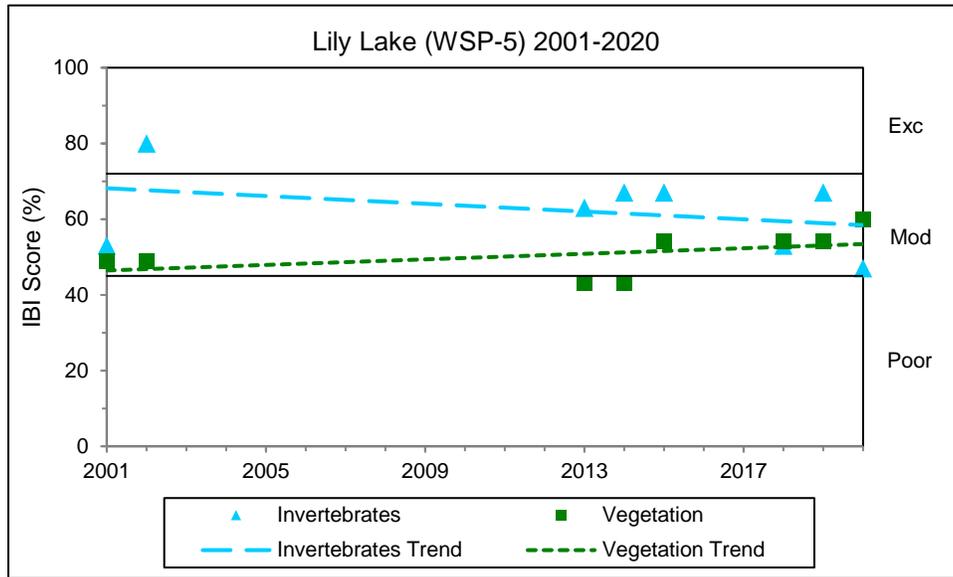
Wetland Health

Site Observations: The wetland slope is gentle, and the substrate is solid. The surrounding area is densely residential. Patches of trees and shrubs provide buffer between the homes and the lake. The 5x20 meter plot was placed in the northeast corner of the wetland in water depths over four feet. A dense population of coontail (*Ceratophyllum* sp.) dominates the water column. Pondweed (*Potamogeton* sp.) and water nymphs (*Najas* sp.) were also present. White water lily (*Nymphaea* sp.), duckweed (*Lemna* sp.), and water-meal (*Wolffia* sp.) covered the wetland surface. Cattail (*Typha* sp.), bulrush (*Scirpus* sp.), beggar-ticks (*Bidens* sp.), and reed canary grass (*Phalaris arundinacea*) made up the emergent zone of the vegetation plot. Purple-fringed Riccia (*Ricciocarpus natans*) was abundant. Leeches, damselflies, snails, trueflies, crustaceans, and bugs and beetles were collected. Chinese mystery snails (*Cipangopaludina chinensis*) are present.

Table 4.11.2 Lily Lake (WSP-5) Wetland Health based on Index of Biotic Integrity

2020 Data (WSP-5)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Poor (14)	Moderate (21)
Trend 2001-2020	Stable	Stable

Figure 4.11.2 Invertebrate and vegetation trends for Lily Lake (WSP-5)



Site Summary: This is the eighth time that Lily Lake has been surveyed since 2001. The invertebrates and vegetation scores were inconsistent with each other, differing by 13 percent; however, both indicate moderate wetland health. The invertebrate score declined in 2020, but minnows were found in three of six bottle traps which may have impacted invertebrate diversity. With the exception of 2020 invertebrate score, both invertebrate and vegetation trends appear stable. More years of data will help determine the health trend.

4.11.3 Marthaler Park (WSP-6)

Marthaler Park (WSP-6) is a 4.5-acre, type 5 wetland within the Simons Ravine District drainage area. Its watershed is 23 acres. It is publicly owned, and it is part of the City’s stormwater management plan. It is designated as SR4P Marthaler Pond. There is one inlet on the east side, but no outlets.



The wetland is located within Marthaler Park. Most of the surrounding area is undisturbed with trees and other vegetation. Humboldt Avenue runs along the eastern side of the wetland. Residential neighborhoods exist to the south and east of the wetland. The West St. Paul Sports Center is northeast of the wetland.

Wetland Health

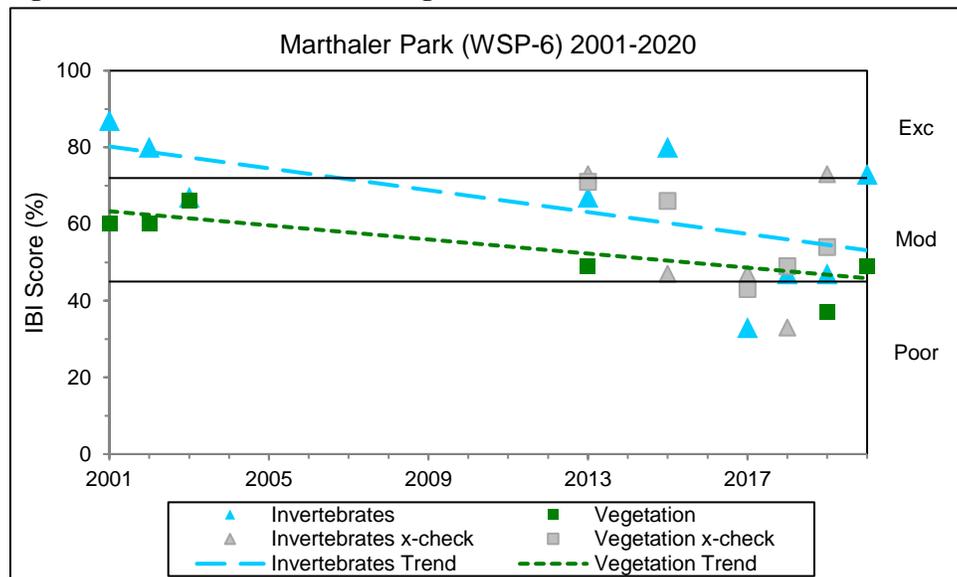
Site Observations: The wetland slope is gentle. The wetland substrate is solid. The 5x20 meter plot was set along the southern shoreline in water depths over four feet which flooded into the treeline. Coontail (*Ceratophyllum* sp.), waterweed (*Elodea* sp.), and pondweed (*Potamogeton* sp.) was present. Water-meal (*Wolffia* sp.) covered the surface of the water. Upland emergent and woody species including willows

(*Salix* sp.), cottonwoods (*Populus* sp.), maple (*Acer* sp.), and oak (*Quercus* sp.) were noted in the vegetation plot. Leeches, dragonflies, damselflies, mayflies, snails, trueflies, crustaceans, and bugs and beetles were collected.

Table 4.11.3 Marthaler Park (WSP-6) Wetland Health based on Index of Biotic Integrity

	Invertebrates 	Vegetation 
2020 Data (WSP-6)		
Wetland Health Rating (IBI score)	Moderate (22)	Moderate (17)
Trend 2001-2020	Declining	Declining

Figure 4.11.3 Invertebrate and vegetation trends for Marthaler Park (WSP-6)



Site summary: This is the ninth time that Marthaler Park has been monitored since 2001. The invertebrates and vegetation scores were inconsistent, differing by 24 percent. Both invertebrate and vegetation scores indicate moderate wetland health. Though scores improved in 2020, the overall trends for both invertebrates and vegetation scores are declining. The wetland scores for this wetland may be affected by plot placement.

Appendix A-1. Invertebrate Metric Scores

Site Number	Leech Metric	Corixid Metric	Odonata Metric	ETSD Metric	Snail Metric	Total Taxa Metric	Total IBI Score
AV-1	3	5	3	3	1	5	20
AV-11	3	5	1	3	3	5	20
AV-18	3	1	3	1	3	5	16
AV-20	5	5	1	3	1	5	20
DC-2	3	3	1	1	1	3	12
DC-3	3	3	1	1	1	3	12
DC-4	3	1	1	3	1	5	14
DC-5	1	1	1	1	3	3	10
DC-6	1	1	1	3	1	3	10
DC-7	1	1	1	3	1	3	10
E-1	3	5	1	3	1	3	16
E-10	3	5	1	1	3	3	16
E-32	3	5	1	1	5	3	18
F-3	1	5	3	3	1	3	16
F-7	3	5	3	3	1	3	18
F-9	1	3	1	3	3	3	14
H-4	3	5	1	1	1	3	14
H-6	1	5	1	3	5	3	18
H-57	3	1	1	1	1	3	10
L-7	1	3	1	3	1	3	12
L-8	1	1	1	3	1	5	12
MH-2	1	3	1	5	1	3	14
MH-20	5	5	1	1	1	3	16
NC-1	3	5	3	3	5	5	24
NC-3	3	5	1	1	3	3	16
R-1	3	3	1	5	1	5	18
R-21	3	3	3	3	5	5	22

Site Number	Leech Metric	Corixid Metric	Odonata Metric	ETSD Metric	Snail Metric	Total Taxa Metric	Total IBI Score
R-23	1	3	1	3	3	5	16
SSP-1	3	5	1	1	1	3	14
SSP-3	1	3	1	1	3	3	12
WSP-3	3	1	1	1	1	3	10
WSP-5	3	1	1	1	3	5	14
WSP-6	3	5	1	3	5	5	22

Appendix A-2. Vegetation Metric Scores

Site #	Vascular Genera	Nonvascular Taxa	Grasslike Genera	Carex Cover	Utricularia Presence	Aquatic Guild	Persistent Litter	Total IBI Score
AV-1	3	1	1	1	1	5	1	13
AV-11	3	1	3	1	1	3	5	17
AV-18	3	1	3	1	1	3	5	17
AV-20	3	1	3	1	1	5	5	19
DC-2	3	1	3	3	1	3	5	19
DC-3	5	1	5	3	5	3	5	27
DC-4	3	5	3	1	1	5	5	23
DC-5	1	5	1	1	1	5	5	19
DC-6	3	1	3	1	5	5	3	21
DC-7	5	5	5	5	1	5	5	31
E-1	3	1	3	1	5	5	5	23
E-10	3	1	3	1	1	5	5	19
E-32	3	3	3	1	1	5	5	21
F-3	3	1	3	1	5	5	1	19
F-7	1	1	1	1	1	3	5	13
F-9	3	3	3	1	1	3	1	15
H-4	5	3	3	3	1	3	5	23
H-6	3	3	3	1	1	5	5	21
H-57	3	1	3	1	1	3	3	15
L-7	5	5	5	3	5	3	3	29
L-8	3	3	5	1	1	5	5	23
MH-2	5	1	5	1	5	5	5	27
MH-20	3	5	3	3	5	5	1	25
NC-1	3	1	3	3	5	3	5	23
NC-3	3	1	3	1	1	1	5	15
R-1	3	1	3	1	1	5	5	19
R-21	1	5	3	1	5	3	1	19

Site #	Vascular Genera	Nonvascular Taxa	Grasslike Genera	Carex Cover	Utricularia Presence	Aquatic Guild	Persistent Litter	Total IBI Score
R-23	3	5	3	1	5	5	5	27
SSP-1	3	1	1	3	1	3	3	15
SSP-3	1	3	1	1	1	3	3	13
WSP-3	3	1	5	1	1	1	5	17
WSP-5	3	3	3	1	1	5	5	21
WSP-6	3	3	1	1	1	3	5	17

Appendix B. Invasive Species Presence 2012-2020

Site	Purple loose-strife	Reed canary grass	Curly-leaf pond-weed	Eurasian Water-milfoil	Honey-suckle	Buckthorn	Chinese mystery snail	Banded mystery snail
AV-1		1						
AV-6		1					1	
AV-7		1						
AV-8		1						
AV-10		1				1		
AV-11		1					1	
AV-12		1				1		
AV-13		1					1	
AV-18		1	1				1	
AV-19		1						
AV-20		1				1		
B-1	1	1						
B-1A	1	1						
B-2		1				1		
B-3							1	1
B-4		1						
B-6		1						
B-7		1						
B-8	1	1						
B-9	1	1						
B-10		1						
B-12		1				1		
B-13	1	1		1			1	1
B-17	1	1						
B-18		1						
DC-1		1					1	

Site	Purple loose-strife	Reed canary grass	Curly-leaf pond-weed	Eurasian Water-milfoil	Honey-suckle	Buckthorn	Chinese mystery snail	Banded mystery snail
DC-2		1						
DC-3		1						
DC-4		1				1		
DC-5		1						
DC-6		1		1				
DC-7		1						
DC-8		1						
DC-9		1						
DC-10		1						
E-1		1					1	
E-7		1						
E-9	1	1						
E-10		1	1					
E-11		1						
E-18		1				1		
E-20		1						
E-22		1						
E-31		1						
E-32		1	1				1	
E-33		1						
E-34	1	1						
E-35		1						
E-36		1						
E-37		1						
E-38		1						
E-40		1					1	
E-41		1				1		

Site	Purple loose-strife	Reed canary grass	Curly-leaf pond-weed	Eurasian Water-milfoil	Honey-suckle	Buckthorn	Chinese mystery snail	Banded mystery snail
E-42		1						
E-43						1		
E-44								
E-45		1						
F-3	1	1		1				
F-6		1						
F-7		1						
F-9		1						
H-4	1	1	1				1	
H-6	1	1	1			1		
H-56	1	1						
H-57	1	1					1	
L-7	1	1						
L-8		1						
L-9		1						
L-10		1						
LD-1	1	1						
MH-2	1	1				1		
MH-4		1						
MH-16		1						
MH-17		1						
MH-19						1		
MH-20	1							
NCR-1	1	1						
NCR-2		1						
NCR-3		1						
R-1		1						

Site	Purple loose-strife	Reed canary grass	Curly-leaf pond-weed	Eurasian Water-milfoil	Honey-suckle	Buckthorn	Chinese mystery snail	Banded mystery snail
R-2		1					1	
R-4		1	1					
R-6		1						
R-14		1						
R-15		1						
R-20		1						
R-21	1	1						
R-23	1	1						
R-25		1						
R-26		1						
SSP-1	1	1	1			1	1	
SSP-3		1				1		
SSP-4	1							
WSP-1	1	1					1	
WSP-2		1						
WSP-3		1				1		
WSP-4	1	1				1		
WSP-5		1					1	
WSP-6	1	1			1	1	1	
WSP-7		1						
WSP-8		1						
WSP-9		1						
WSP-10		1					1	
WSP-12	1							
WSP-18	1							
Totals:	27	97	8	3	1	18	19	2

Appendix C. Site Score Averages of Created, Stormwater, and Natural Wetland 2008-2020

Wetland	Invertebrates			Vegetation		
	Created Wetlands	Stormwater Wetlands	Natural Wetlands	Created Wetlands	Stormwater Wetlands	Natural Wetlands
AV-1		20			13	
AV-5			15			18
AV-6		15			18	
AV-7		11			14	
AV-8		15			20	
AV-10			11			12
AV-11			20			17
AV-12		14			18	
AV-13		21			12	
AV-14		12			9	
AV-15		11			13	
AV-16					17	
AV-17			18			19
AV-18		16			17	
AV-19			20			16
AV-20			20			19
B-1			21			26
B-1 Alt.			20			23
B-2			16			17
B-3		20			19	
B-4			18			15
B-6		19			18	
B-7		17			18	
B-8			22			14
B-9		13			12	
B-10		20			14	

Wetland	Invertebrates			Vegetation		
	Created Wetlands	Stormwater Wetlands	Natural Wetlands	Created Wetlands	Stormwater Wetlands	Natural Wetlands
B-11		18			21	
B-12			17			15
B-13		18			19	
B-17			21			21
B-18			18			23
DC-1			21			24
DC-2			12			19
DC-3			12			27
DC-4			14			23
DC-5			10			19
DC-6			10			21
DC-7			10			31
DC-8			17			21
DC-9			14			22
DC-10			12			13
E-1		16			23	
E-7		22			20	
E-9			16			23
E-10		16			19	
E-11		17			19	
E-18		15			20	
E-20		19			23	
E-21		20			17	
E-22		19			19	
E-25		16			19	
E-26		14			15	
E-27		18			21	

Wetland	Invertebrates			Vegetation		
	Created Wetlands	Stormwater Wetlands	Wetland	Created Wetlands	Stormwater Wetlands	Wetland
E-28		16			21	
E-29			14			27
E-31		21			15	
E-32		18			21	
E-33		16			21	
E-34		24			23	
E-35			12			27
E-36		16			17	
E-37		18			17	
E-38		24			19	
E-39		16			11	
E-40		18			15	
E-41		22			23	
E-42		12			19	
E-43		22			19	
E-44		14			23	
E-45			10			25
F-1		14			16	
F-3		16			19	
F-4	11			15		
F-5		17			16	
F-6		16			10	
F-7		18			13	
F-8	17			16		
F-9		14			15	
H-4	14			23		
H-6		18			21	

Wetland	Invertebrates			Vegetation		
	Created Wetlands	Stormwater Wetlands	Wetland	Created Wetlands	Stormwater Wetlands	Wetland
H-30	14			14		
H-56		21			17	
H-57	10			15		
L-4	16			20		
L-7		12			29	
L-8			12			23
L-9	17			17		
L-10			13			11
LD-1			14			17
MH-2		14			27	
MH-4		19			17	
MH-8		10			9	
MH-9		22			24	
MH-13		16			21	
MH-14		22			25	
MH-15		16			21	
MH-16		24			29	
MH-17	12			15		
MH-18		22			27	
MH-19		14			15	
MH-20		16			25	
NCR-1			24			23
NCR-2			19			16
NCR-3			16			15
R-1		18			19	
R-2		22			17	
R-4		18			14	

Wetland	Invertebrates			Vegetation		
	Created Wetlands	Stormwater Wetlands	Wetland	Created Wetlands	Stormwater Wetlands	Wetland
R-6			18			18
R-14			22			24
R-18			26			19
R-20		17			17	
R-21	22			19		
R-22		22			22	
R-23	16			27		
R-25		13			27	
R-26			15			17
SSP-1		14			15	
SSP-3		12			13	
SSP-4		18			11	
WSP-1			19			18
WSP-2		17			16	
WSP-3		10			17	
WSP-4		16			21	
WSP-5			14			21
WSP-6			22			17
WSP-7		19			18	
WSP-8			20			16
WSP-9			12			11
WSP-10		22			17	
WSP-12		10			15	
AVERAGES	13	17	17	17	18	20

Appendix D. Wetland and Watershed Data for 2008-2020

Site ID	Site Name	Wetland size (Acres)	Watershed Size (Acres)	% Imperv	Invert. Score	Veg. Score
AV-1	Hidden Valley	2	21	35	20	13
AV-5	Cedar Knolls Pond	0.5	8	20	14	19
AV-6	Belmont Park	1.3	202	20	14	17
AV-7	Podojil Pond	1.3	8	25	14	15
AV-8	Chaparral Pond	1.5	110	30	16	17
AV-10	Alimagnet Park	0.5	25	20	8	17
AV-11	Farquar Lift Station	2.2	373	25	20	17
AV-12	EVR-P12 Public Water	5.7	571	25	14	21
AV-13	EVR-P14	3.6	26	35	18	9
AV-14	EVR-P43, Apple Valley East Park	0.8	2738	35	12	9
AV-15	Carrollwood	1.2	398	30	10	13
AV-16	Nordic Park	1	17	25	NA	17
AV-17	AL-P9.1 Alimagnet Lift Station Chain of Ponds	0.25	7	20	18	19
AV-18	Sunset Park Pond	1	252	30	16	17
AV-19	AL-P9.3 Alimagnet Lift Station Chain of Ponds	0.25	28.5	25	18	17
AV-20	Valleywood Golf Course	1.5	12	0	20	19
B-1	Crystal Lake West	0.9	444.5	5	26	25
B-1 Alt	Crystal Lake West Alternate	6	550	0	24	19
B-2	Cam Ram	0.41		0	18	23
B-3	Kraemer	30	93	30	24	13
B-4	Alimagnet	0.9	701	20	16	15
B-6	Alimagnet East/Dog Park	2.5	34	15	16	17
B-7	Terrace Oaks North	2.2	15.7	5	20	19
B-8	Red Oak	3	115	25	22	11
B-9	Crosstown West	7.2	388	50	14	15

Site ID	Site Name	Wetland size (Acres)	Watershed Size (Acres)	% Imperv	Invert. Score	Veg. Score
B-10	AP-3 Cedar Pond	3.1	212	22	10	15
B-11	Valley View	1	80	10	16	13
B-12	Terrace Oaks	1.7	68	5	20	15
B-13	Sunset Lake	30	436	50	18	17
B-17	Terrace Oaks Buckthorn Pond	2.7	24	5	22	17
B-18	Terrace Oaks Central	0.34	2.89	0	18	23
DC-1	Empire Lake	21	1152	NA	18	21
DC-2	Buck Pond	1.6	25	0	12	19
DC-3	Tamarack Swamp	7.7	40	0	12	27
DC-4	Jenson Lake	50	330	7	14	23
DC-5	Wood Pond	0.8	22	0	10	19
DC-6	BB's Wetland	NA	NA	NA	10	21
DC-7	Lilypad Pond	NA	NA	NA	10	31
DC-8	Star East	NA	NA	NA	20	23
DC-9	Star West	NA	NA	NA	14	25
DC-10	Duck Pond	NA	NA	NA	12	13
E-1	Thomas Lake Park Pond	0.4	4	37	16	23
E-7	Discovery Pond	4.1	16.5	0	20	21
E-9	Wilderness Run/LP-50	1.5	25	20	14	17
E-10	AP-3 Cedar Pond	3.1	212	25	16	19
E-11	Central Park Pond	1.8	130	20	14	21
E-18	Moonshine Park Pond	2.5	34	25	14	17
E-20	Shanahan Lake	10.9	56.4	1	10	17
E-21	FP-11.5	0.26	1.6	0	20	19
E-22	FP-11.6	0.58	2.7	0	28	27
E-25	FP 4.5	1	35	55	16	19
E-26	DP-6.2, Northwoods Business Park	3.2	25	44	14	15

Site ID	Site Name	Wetland size (Acres)	Watershed Size (Acres)	% Imperv	Invert. Score	Veg. Score
E-27	LP-26.54, Thomas Woods Site	0.2	5.3	29	18	21
E-28	HDP-1, Kennerick Addition Site	0.8	39	18	16	21
E-29	LP-15, Lily Pond in Lebanon Hills Pk	6.5	21.8	5.5	12	27
E-31	Walnut Hill Pond	0.65	20	10	22	17
E-32	City Hall Pond	6.6	81.3	14	18	21
E-33	Coventry Pond	5.5	60	35	16	21
E-34	McCarthy Lake	11.3	220	15	24	23
E-35	Prairie Pond	0.8	5.1	0	NA	27
E-36	Mooney Pond	7	41	25	16	17
E-37	Kettle Pond	0.8	23	30	18	17
E-38	Gerhardt Lake	13.5	32	5	24	19
E-39	Black Hawk Middle School	0.3	24	31	16	11
E-40	Heine Pond	7.4	17	15	18	15
E-41	O'Leary Lake	16	84	40	22	23
E-42	LP-44	2.4	49	30	12	19
E-43	LP-41	4	37	30	22	19
E-44	Oak Hills Church Pond	1.5	87	60	14	23
E-45	Oak Chase Pond	0.75	7.5	5	10	25
F-1	Pine Knoll	35	107.5	10.4	NA	13
F-3	Kral Pond	10	41.8	6.6	16	19
F-4	Lake Julia	10	233	21.2	8	11
F-5	Autumn Glen	2.9	10	NA	20	21
F-6	Vermillion River	6.3	16	30	12	9
F-7	Autumn Glen	2.9	10	4	18	13
F-8	Mystic Meadows	6.19	8.23	NA	12	15
F-9	Cambodia	5	24	9	14	15
H-4	Stonegate Treated	1	9.5	35	14	23

Site ID	Site Name	Wetland size (Acres)	Watershed Size (Acres)	% Imperv	Invert. Score	Veg. Score
H-6	Lake Rebecca	19	56	1	18	21
H-30	Sand Coulee	1	107	25	8	13
H-56	180th Street Marsh	20	340	1	22	21
H-57	Cari Park Pond	0.78	29	14	10	15
L-4	Water Treatment Wetland Bank	22.85	99.8	20	14	15
L-7	DNR 387	10	2087	29	12	29
L-8	DNR 393	9.6	4987	17	12	23
L-9	NC 54	13.8	183	12	20	11
L-10	DNR#349W	40	213	NA	12	11
LD-1	Pickereel Lake				14	17
MH-2	Copperfield/Friendly Hills	9.4	865.3	20	14	27
MH-4	Industrial Park				16	17
MH-8	Victoria Pond	0.4	209.2	40	10	9
MH-9	Hagstrom-King	3	20	25	22	27
MH-13	MH Par 3	0.5	36	3	20	21
MH-14	Wagon Wheel	0.9	18.1	10	22	25
MH-15	Upper Bridgeview	4.1	66.4	NA	16	21
MH-16	Field Stone	6.9	577.9	20	24	29
MH-17	Marie Pond	0.6	64.2	20	12	15
MH-19	Lexington Marie Pond	1.1	46.5	30.1	14	15
MH-20	City Hall Orchard Heights	10.6	965.4	30.1	16	25
NCR-1	Loretto Wetland	0.5	160	4	24	23
NCR-2	Peterson	2	55	0	22	15
NCR-3	Jordan Wetland	25	33	9	16	15
R-1	Kelly Marsh - Derryglen Ct in 2004	1	12.5	80	18	19
R-2	White Lake	333	998	30	26	17
R-4	Schwarz Pond	10.9	144.5	20	24	15

Site ID	Site Name	Wetland size (Acres)	Watershed Size (Acres)	% Imperv	Invert. Score	Veg. Score
R-6	Keegan Lake/WMP 310	35	1530	30	22	19
R-14	WMP #379	4.8	81	30	22	21
R-15	Birger Pond	27.1	60.6	13.8	18	21
R-18	WMP #279	4.5	33.7	30	26	19
R-20	Unnamed/WMP 332	1	897	80	NA	21
R-21	CR-38 Mitigation Site 1	1.7	1530	30	22	19
R-22	Mare Pond, South	8	81	10	24	19
R-23	CR-38 Mitigation Site 2	0.3	81	30	16	27
R-25	WMP #306	1.7	81	30	14	31
R-26	Erickson Pond	1.9	1832	25	22	27
SSP-1	Anderson Pond	2.4	168	15	14	15
SSP-3	LeVander	3.4	37.9	20	12	13
SSP-4	Villaume Pond	1.66	25	30	18	11
WSP-1	Mud Lake	3.1	34.2	NA	24	17
WSP-2	Thompson Lake 48W	9	175	50	16	17
WSP-3	Duck Pond	2.5	65	NA	10	17
WSP-4	Weschcke Pond	1.3	42.4	0	20	23
WSP-5	Lilly Lake	6.4	22	NA	14	21
WSP-6	Marthaler Park	4.5	23	0	22	17
WSP-7	Humboldt Pond/Vivian Pond	1.2	23	NA	18	19
WSP-8	DNC Prairie Pond	2.9	113	0	16	17
WSP-9	Marie Avenue	4	15	NA	12	11
WSP-10	Emerson Pond South	2.3	23	NA	22	15
WSP-12	Wentworth Pond	6	71.2	NA	8	15

*Scores reflect most recent data