

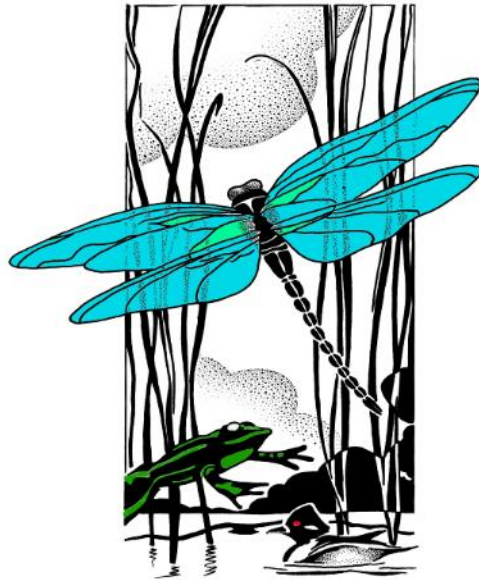
2022

# Wetland Health Evaluation Program

Dakota County, Minnesota

# 2022 Wetland Health Evaluation Program Report

## Dakota County, MN



**Coordinated By:**  
**Dakota County**  
**14955 Galaxie Avenue**  
**Apple Valley, MN 55124-8579**

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**Report**  
**Prepared by:**

**Bolton & Menk, Inc.**

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## **Local Government:**

Dakota County Environmental Resources Department  
Dakota County Parks Department  
City of Apple Valley  
City of Burnsville  
City of Eagan  
City of Farmington  
City of Hastings  
City of Lakeville  
City of Mendota Heights  
City of Rosemount  
City of South St. Paul  
City of West St. Paul  
North Cannon River Watershed Management Organization

## **Special Recognition:**

Mark Gernes, Joel Chirhart, Michael Bourdaghs, John Genet; MPCA Technical Experts  
Paula Liepold, Dakota County WHEP Coordinator  
Jeff Korpik, Citizen Monitoring Coordinator  
Katie Farber, Carolyn Dindorf; Bolton & Menk, Inc.

## **Cover design by:**

Paula Liepold

## **Photos by:**

Tom Taintor (AV), Caitlin Hughes-Parry (B), Hanna Figura (E), Rick Schuldt (F), Jessie Eckroad (H), Kim Menard (L), Darcy Tatham (MH and SSP), Katie Hoffman (NCR), Jane Porterfield (R), Katie Schletty (WSP), and Katie Farber.

Special thanks to all the WHEP volunteers who donated their time.

*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](http://www.mnwhep.org).*

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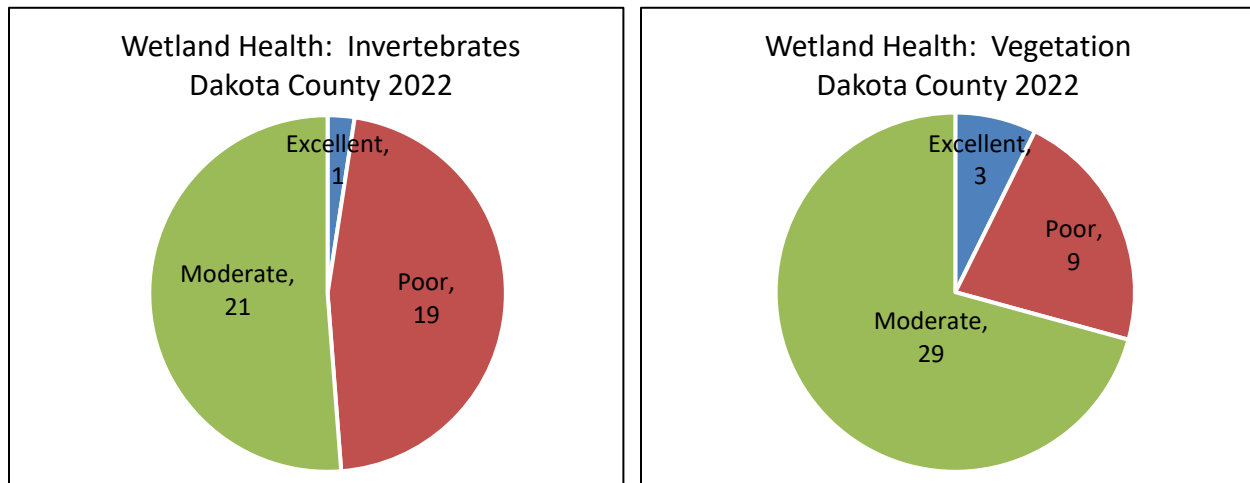
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# Executive Summary

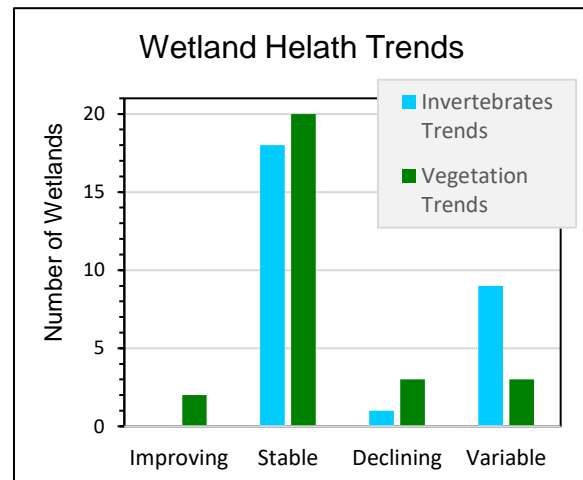
## Dakota County Wetland Health Evaluation Program 2022

Dakota County began sponsoring the Wetland Health Evaluation Program (WHEP) in 1997. Since then, 201 wetlands have been monitored by many volunteers across the County. In 2022, ten cities, one watershed management organization, and Dakota County Parks sponsored WHEP teams, monitoring 41 different wetlands. One of these wetlands (DC-13) was monitored for the first time in 2022. Trained volunteers collected macroinvertebrates (insects and other small animals without backbones) that live in the wetland, and survey for vegetation (plants) present in the wetlands. 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 2022 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 scored in the moderate category for invertebrates (51%) and vegetation (71%). One wetland site rated excellent for invertebrates: Loretto Wetland (NC-1). Three wetland sites rated excellent for vegetation: Sunset Park Pond (AV-18), Tamarack Swamp (DC-3), and BB's Wetland (DC-6). Nineteen wetlands scored poor for invertebrates (46%) and nine wetlands scored poor for vegetation (22%). In general, water levels were lower again in 2022, after drought conditions in 2021. This likely impaired invertebrate collection and challenged vegetation revegetation placement that would encompass both shoreline and open water.

A trend analysis was conducted for each of the wetlands monitored in 2022 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, 18 wetlands are stable and one is declining. Vegetation trends show two of the wetlands improving, 20 are stable, and three are declining. Nine wetlands show variable invertebrate data over the years of their monitoring and three wetlands show variable vegetation data. Fourteen 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.

In 2022, 134 Dakota County WHEP volunteers donated more than 2,361 hours in training, invertebrate sample collections and invertebrate identification, and vegetation surveys to capture and report this valuable biological data. 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, watersheds, 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.

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.



JUDY HELGEN,  
PROGRAM CO-FOUNDER



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



Dakota County, participating cities, and North Cannon River Watershed Management Organization provide funding for Dakota County WHEP. Today, the program is strong and thriving in Dakota County, 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 riverbanks.

**Municipal/Industrial:** 374 acres

Municipal/Industrial wetlands include diked areas.

**Total wetland area in Dakota County:** 24,501 acres

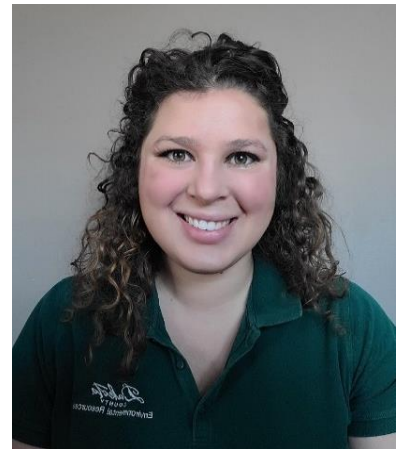
Many federal and state agencies are involved in wetland regulation, protection, and restoration. In Minnesota, the state wetland regulations are overseen by the Board of Water and Soil Resources and Department of Natural Resources. To learn more about regulations and programs that affect or protect wetlands, visit [www.bwsr.state.mn.us](http://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



PAULA LIEPOLD

Paula Liepold and Emily Gable manage WHEP, a Dakota County program since 1997. Paula and Emily state, “We are proud of the volunteers and team leaders who are engaged in their communities by monitoring wetlands and providing quality data. We thank them for their dedication to attending training, monitoring wetlands, and working together. Also, thank you to the communities, watersheds and Dakota County for investing and supporting this program. The program is also strong due to the training provided by the Minnesota Pollution Control Agency. We also appreciate the important work provided by Bolton & Menk.”



EMILY GABLE



JEFF KORPIK

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, “Another fun and interesting year on the wetlands. As always, it is rewarding to visit and help with all of the teams and explore Dakota County. Since I started with the program in 2007 as a volunteer, team leader and field monitor, I definitely see the importance of not only testing the wetlands, but also just getting people involved in an outdoor activity that has value to the community. Thanks to all of the volunteers and team leaders, as well as Paula, Emily, Katie, Carolyn, Mark, and Joel (I hope I didn’t leave anyone out.)”

## 2.0 Methods

### 2.1 Training

Training for citizen monitors is arranged by Dakota County and taught by technical experts from the MPCA and Bolton & Menk, Inc. 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](http://www.mnwhep.org).



TRAINING DAY

### 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 provides WHEP vegetation training and technical assistance. Joel Chirhart provides WHEP macroinvertebrate training and technical assistance. Michael Bourdaghs and John Genet provide technical support.



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)***

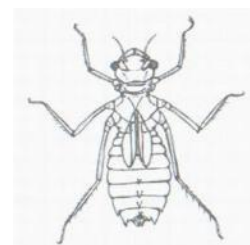
Vegetation is analyzed using a 100 square meter releve plot. All species within the sampling plot are identified to the genus level, and documented on the field data sheet. Vegetation is divided into categories based on their ecological function or relationship. The categories include nonvascular, woody, 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](http://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 WHEP team is responsible for evaluating one wetland of another WHEP team 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 (Bolton & Menk, Inc.) provides Quality Control (QC) review of the completed data sheets, and invertebrate and vegetation identification.

In 2022, Bolton & Menk, Inc., assisted MPCA in training sessions, provided quality assurance of data, and prepared the annual report. Bolton & Menk Water Resources staff, formerly Fortin Consulting, has been working with Dakota County on WHEP since 2007.



CONNIE FORTIN, CAROLYN DINDORF,  
KATIE FARBER, DOUG KLIMBAL,  
CARALIE RANDOLPH

Over the duration of the program, team cross-checks and third-party cross-checks have been conducted on a rotational basis. The technical expert reviews 10 percent of the vegetation plots and one invertebrate collection from each team. In 2022, Bolton & Menk cross-checked the vegetation plots of four wetlands: Eagan's Mooney Pond (E-36), Farmington's Autumn Glen (F-7), Mendota Heights' Copperfield Pond (MH-2), and Rosemount's Kelly Marsh (R-1). Bolton & Menk also reviewed the invertebrate samples from sites AV-1, B-9, DC-6, E-41, F-9, H-6, L-8, MH-2, NC-1, R-1, SSP-1, and WSP-7. 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 WHEP team's data incorporating any corrections made during the technical quality control checks (vegetation cross-check, and datasheet review) conducted by FCI.

## 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 2022 Sampling Season Results

During the 2022 sampling season, thirteen citizen teams (Apple Valley, Burnsville, 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 41 wetlands in ten cities in Dakota County, one watershed management organization, and Dakota County Parks. Thirteen of these wetlands were sampled twice through citizen cross-checks. Four wetland vegetation samples and thirteen invertebrate samples were checked for accuracy through the quality control check performed by Bolton & Menk, Inc.

Figure 3.1.1 and Table 3.1.1 show the invertebrate and vegetation ratings for all the wetlands assessed during the 2022 sampling season. Based on invertebrate scores, one of the wetlands rated excellent, 21 rated moderate and 19 rated poor. Invertebrate scores ranged from 8 to 24 out of a maximum of 30 points. Based on vegetation scores, 3 wetlands rated excellent, 29 rated moderate, and 9 rated poor. Vegetation scores ranged from 11 to 29 out of a maximum of 35 points.

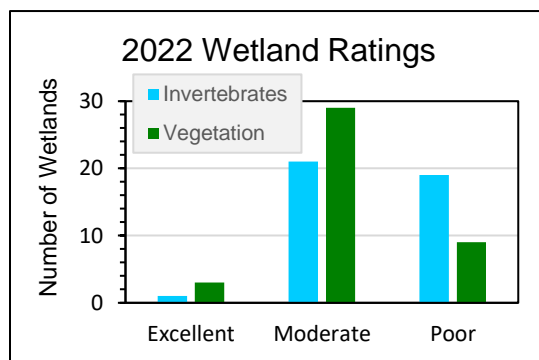


FIGURE 3.1.1 WETLAND RATINGS

Several of the sites showed different ratings for vegetation versus invertebrates. Eighteen 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. Each metric can achieve a score of 1, 3, or 5. Metric scores per wetland for the current year can be found at [www.mnwhep.org](http://www.mnwhep.org).

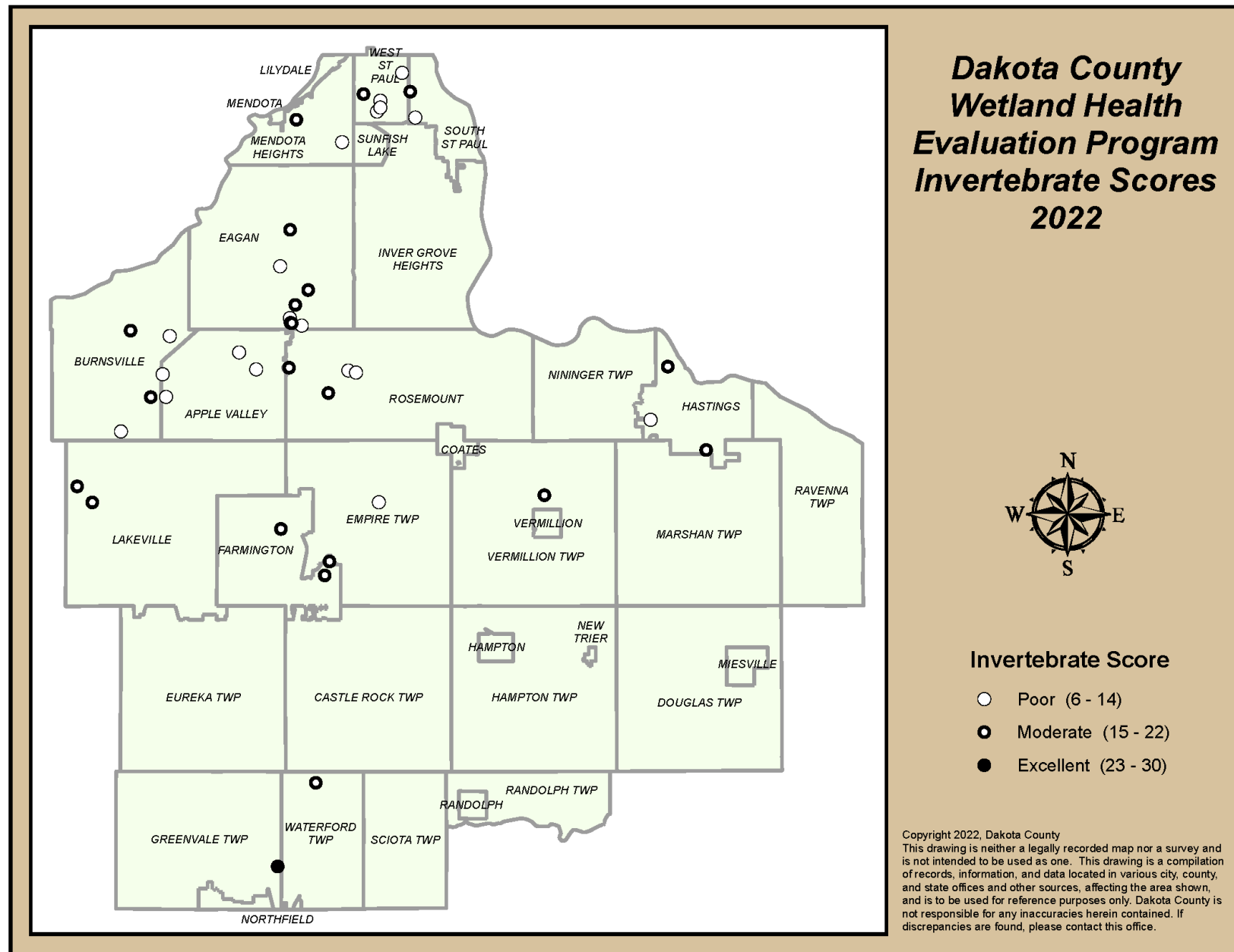
**Table 3.1.1 Wetland Ratings by City Based on IBI Scores**

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

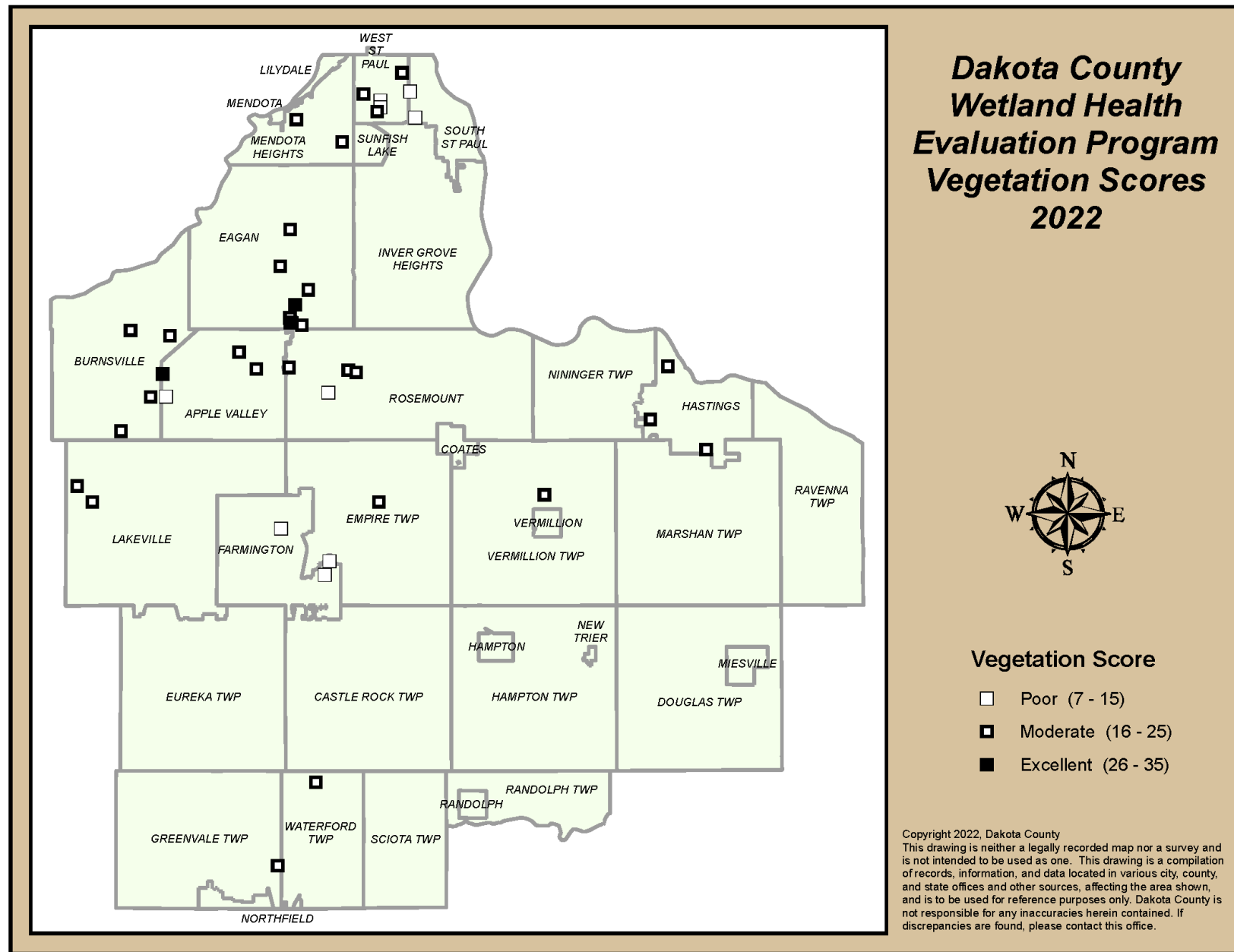
City	Poor	Moderate	Excellent
Apple Valley (AV)	4/1	0/2	0/1
Burnsville (B)	2/0	2/4	0/0
Dakota County (DC)	4/0	3/5	0/2
Eagan (E)	1/0	2/3	0/0
Farmington (F)	0/3	3/0	0/0
Hastings (H)	1/0	3/4	0/0
Lakeville (L)	0/0	2/2	0/0
Mendota Heights (MH)	1/0	1/2	0/0
North Cannon River (NCR)	0/0	1/2	1/0
Rosemount (R)	2/1	2/3	0/0
South Saint Paul (SSP)	1/2	1/0	0/0
West Saint Paul (WSP)	3/2	1/2	0/0
<b>Totals</b>	<b>19/9</b>	<b>21/29</b>	<b>1/3</b>

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

**Figure 3.1.2 2022 Invertebrate Scores.** Shows the distribution of wetland health ratings for each site monitored in 2022.



**Figure 3.1.3 2022 Vegetation Scores.** Shows the distribution of wetland health ratings for each site monitored in 2022.





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. In Dakota County, flowering rush (limited number) has been found in Lake Byllesby, and yellow iris has been found in Lakeville at Kingsley Lake and Orchard Lake.

WHEP teams are expected to report the presence of invasive species in the wetlands that they monitor. Findings in 2022 were as predicted. Many of the WHEP wetlands have been found to contain invasive species. In 2022, a species of mosquito fern (*Azolla* sp.) was found in two WHEP wetlands: Apple Valley's Hidden Valley (AV-1) and Burnsville's Terrace Oaks North Central (B-18). Reed canary grass (*Phalaris arundinacea*), purple loosestrife (*Lythrum salicaria*), curly-leaf pondweed (*Potamogeton crispus*), Eurasian water-milfoil (*Myriophyllum spicatum*), and mystery snails (*Cipangopaludina chinensis*) are common wetland invaders that were observed in wetlands monitored in 2022. Reed canary grass was observed in 33 of the wetlands, purple loosestrife was observed in 7 of the wetlands, mystery snails were found in 10 of the wetlands, curly-leaf pondweed was observed in 4 of the wetlands, and Eurasian water-milfoil was found in one 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. The history of invasive species presence in WHEP monitored wetlands can be found at [www.mnwhep.org](http://www.mnwhep.org).

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 overall score averages of each site indicate that created, stormwater, and natural wetlands are scoring similarly. 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 8, 8, 8. The highest invertebrate scores, respectively, are 17, 24, 26. The lowest vegetation scores for created, stormwater, and natural wetlands, respectively, are 14, 9, 11. The highest vegetation scores, respectively, are 29, 29, 29.

Wetland health scores vary from year to year. In 2022, 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 [www.mnwhep.org](http://www.mnwhep.org) for associated 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%)<sup>1</sup>. 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. See [www.mnwhep.org](http://www.mnwhep.org) for wetland and watershed data.

<sup>1</sup>Schueler, 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 within the vegetation plot sites. The lowest water level measured within the plots was zero feet, the highest water level was 4.9 feet (1.5 m), and the average water level was 1.3 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.

### 3.1.5 Winter Salt Watch

In 2022, Dakota County WHEP participated in Winter Salt Watch, a chloride monitoring program managed by Izaak Walton League of America (IWLA), in partnership with Minnesota Pollution Control Agency. The purpose is to measure chloride levels in surface waters and connect the data nationwide. IWLA provided Winter Salt Watch kits for the WHEP teams to measure chloride levels in each of the monitored wetlands.

Chloride is a water pollutant of concern. Salt applied to roads and walkways during Minnesota winters contains chloride. Stormwater readily transports chloride from the hard surfaces to the rivers, lakes, wetlands, and groundwater. Once dissolved in the water, there is no easy way to remove the chloride. Increased chloride levels in surface waters can be harmful to aquatic life and disrupt natural functions of surface waters. The State and Federal Chronic Water Quality Standard for Chloride is 230 mg/L<sup>2</sup>. This is about 1 teaspoon of salt in 5 gallons of water. Chloride levels exceeding this standard are toxic to fish, aquatic invertebrates, and amphibians.

WHEP teams collected chloride measurements in May/June (during invertebrate collection) using Hach Quantab Chloride titration test strips. The test strips are simply placed in a clean container of water from the wetland site for approximately ten minutes. The test strip and associated chart indicate the level of chloride present in the water. The Quantab strips are certified to have an accuracy of  $\pm 10$  percent ( $\pm 0.2$  Quantab Units)<sup>3</sup>.

Thirty-five of the 41 wetlands were tested for chloride. Winter Salt Watch results for the current year can be seen at [www.mnwhep.org](http://www.mnwhep.org). A wide-range of chloride concentrations were observed. The majority of the wetlands measured less than 30 ppm. Only one wetland measured chloride levels exceeding the chronic standard, MH-20, which also exceeded levels in 2021. Figure 3.1.5 shows the comparison of chloride levels to the invertebrate and vegetation scores calculated in 2022. Only one sample was collected from each wetland. There is not enough data to analyze a trend or complete statistical analysis.

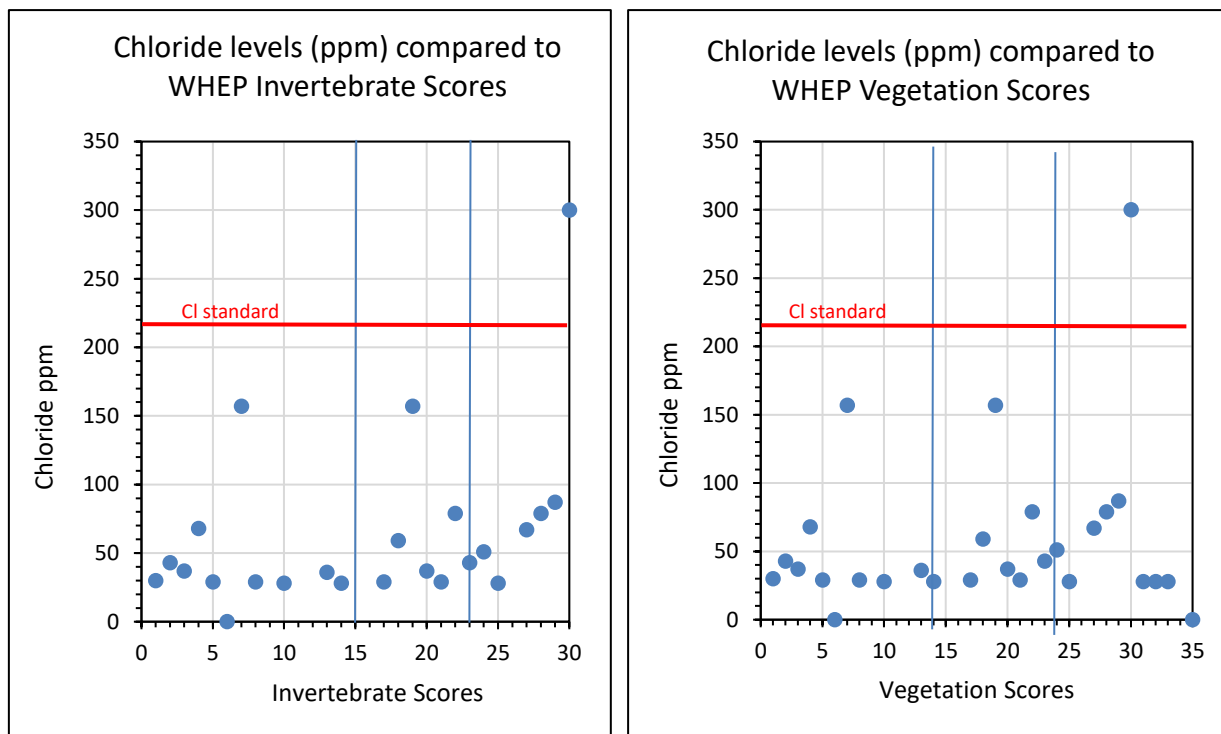
Chloride concentrations in the wetlands are likely to be higher during the winter and in the spring than what is found in May or June. Chloride will also be higher in the bottom of the wetland rather than at the surface where the samples were collected per the procedures of the test kit. A study on a shallow wetland in Madison, Wisconsin showed that ice thickening over the winter can increase chloride concentrations that are above natural background beyond the toxicity threshold for much of the winter.<sup>4</sup> Additional monitoring of the wetlands with elevated chloride concentrations would be helpful to determine if and for how long they are exceeding the chloride standard.

<sup>2</sup>Minnesota Pollution Control Agency. 2018. TCMA Chloride TMDL – Applicable Water Quality Standards and Numeric Water Quality Targets. [stormwater.pca.state.mn.us](http://stormwater.pca.state.mn.us)

<sup>3</sup>Hach. 2020. What is the accuracy of the Quantab Chloride Titration Test Strips? [support.hach.com](http://support.hach.com)

<sup>4</sup>Hilary A. Dugan , Greta Helmueller, John J. Magnuson, Ice Formation and the risk of chloride toxicity in shallow wetlands and lakes. *Limnology and Oceanography Letters* 2, 2017, 150-158.

**Figure 3.1.5 Chloride Levels Compared to WHEP Invertebrate and Vegetation Scores**



## 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.

### 3.2.1 2022 Cross-checks

In a typical year, each team is responsible for evaluating one wetland of another team (Table 3.2.1). This citizen cross-check provides a second sample for the selected wetland. The purpose of this check is to determine if two different samples provide similar results for the vegetation and invertebrate IBI. Large wetlands and wetlands with complex plant communities may have different site scores, depending on where the samples are collected. The two samples are considered consistent if the IBI scores differ by six points or less. The majority of the samples are consistent (Table 3.2.1 and Figure 3.2.1). Invertebrate scores for E-41, L-8, and MH-2 were inconsistent, differing by 6, 10, and 8 points, respectively. Vegetation scores for site AV-1, DC-2, DC-4, E-41, L-8, and SSP-1 were inconsistent, differing by 6, 10, 10, 8, 8, and 10 points, respectively. The varied scores may indicate a difference in sampling technique, a change in conditions between sample dates, differences in identification accuracy, or some other cause. Below lists the obvious differences in scoring for those wetlands that were inconsistent. Data collected by the original

citizen team is used for the individual wetland analysis in Section 4.0 of this report. Invertebrate scores between citizen team and cross-check team for site AV-1, F-9, and NC-1 were identical. Many other site cross-check scores were close in comparison. A general explanation of differences between inconsistent scores are as follows:

Invertebrate cross-check score inconsistencies:

- *E-41*: The Eagan team identified a more diverse invertebrate community than the cross-check team. This affected the Leech, Odonata, ETSD, and Total Taxa Metrics. The cross-check team also calculated a higher Corixidae ratio which affected the Corixidae Metric.
- *L-8*: The Lakeville team identified a more diverse invertebrate community than the cross-check team. This affected the ETSD, Snail, and Total Taxa Metrics. The cross-check team also calculated a higher Corixidae ratio which affected the Corixidae Metric.
- *MH-2*: The Mendota Heights team identified a less diverse community of leeches than the cross-check team. This affected the Leech Metric. The cross-check team also calculated a lower Corixidae ratio which affected the Corixidae Metric.

Vegetation cross-check score inconsistencies:

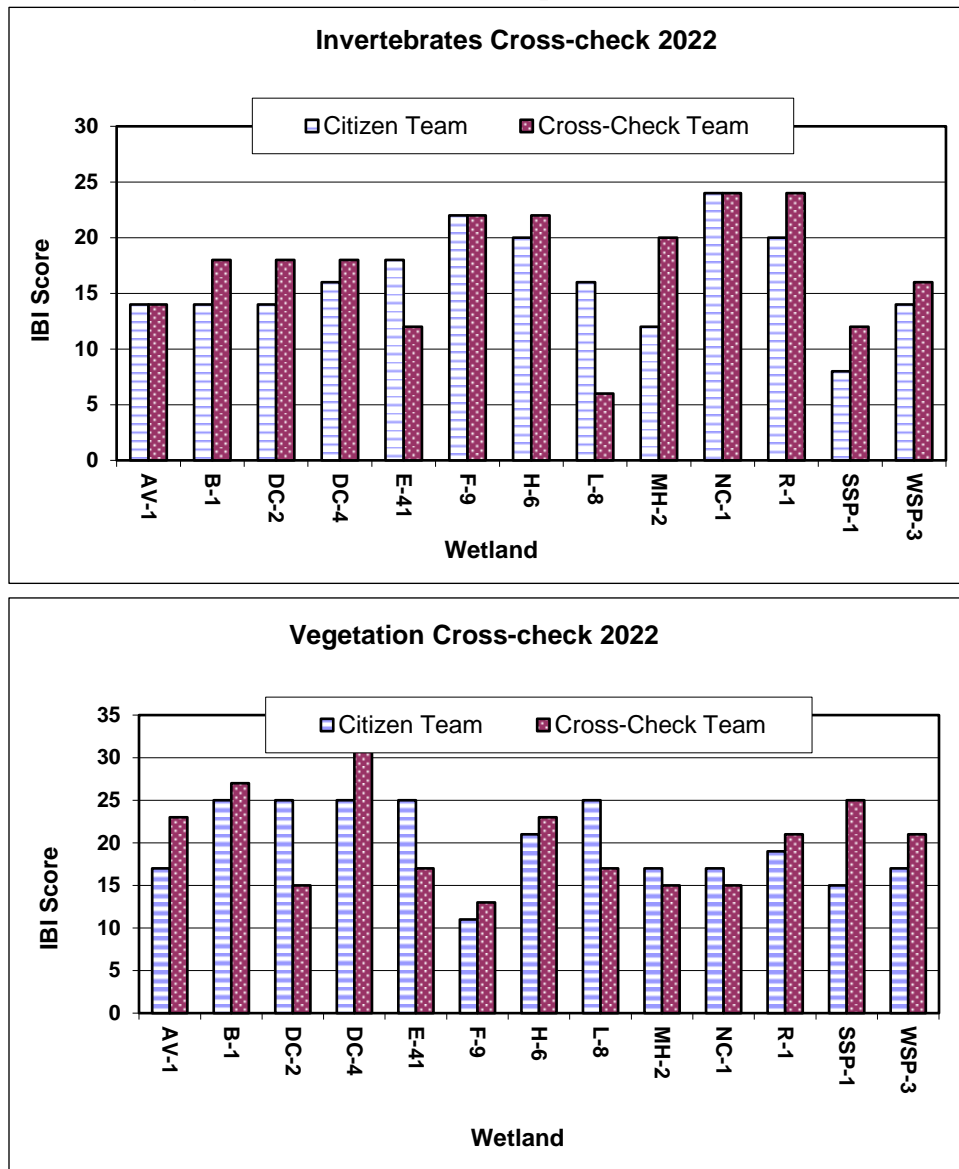
- *AV-1*: The Apple Valley team identified a less diverse vegetation community than the cross-check team. This affected the Non-vascular and Persistent Litter Metrics.
- *DC-2*: The DCP Team #2 identified a more diverse vegetation community than the cross-check team. This affected the Vascular, Non-vascular, Grass, and Aquatic Guild Metrics.
- *DC-4*: The DCP Team #1 identified a more diverse nonvascular community, a larger *Carex* population, and *Utricularia*. This affected the Nonvascular, *Carex*, and *Utricularia* Metrics.
- *E-41*: The Eagan Team identified a more diverse vegetation community than the cross-check team. This affected the Vascular, Nonvascular, and Grasslike Metrics.
- *L-8*: The Lakeville Team identified a more diverse vegetation community than the cross-check team. This affected the Vascular, Nonvascular, Grasslike, and Aquatic Guild Metrics.
- *SSP-1*: The South St. Paul Team identified a less diverse vegetation community than the cross-check team. This affected the Vascular, Nonvascular, Grasslike, and *Carex* Metrics.

**Table 3.2.1 Citizen cross-checks (those considered inconsistent are shown in bold)**

Citizen Team	Cross-Check Team	Wetland Evaluated	Invertebrate Score Comparison		Vegetation Score Comparison	
			Citizen	x-check	Citizen	x-check
Apple Valley	NCRWMO	AV-1	14	14	<b>17</b>	<b>23</b>
Burnsville	West St. Paul	B-1	14	18	25	27
DCP Team #1	DCP Team #2	DC-4	16	18	<b>25</b>	<b>35</b>
DCP Team #2	DCP Team #1	DC-2	14	18	<b>25</b>	<b>15</b>
Eagan	South St. Paul	E-41	<b>18</b>	<b>12</b>	<b>25</b>	<b>17</b>
Farmington	Mendota Heights	F-9	22	22	11	13
Hastings	Rosemount	H-6	20	22	21	23
Lakeville	Apple Valley	L-8	<b>16</b>	<b>6</b>	<b>25</b>	<b>17</b>
Mendota Heights	Farmington	MH-2	<b>12</b>	<b>20</b>	17	15
NCRWMO	Lakeville	NC-1	24	24	17	15
Rosemount	Hastings	R-1	20	24	19	21
South St. Paul	Eagan	SSP-1	8	12	<b>15</b>	<b>25</b>
West St. Paul	Burnsville	WSP-3	14	16	17	21



**Figure 3.2.1 Cross-check Comparisons of IBI Scores**



### 3.2.2 2022 Quality Control Checks

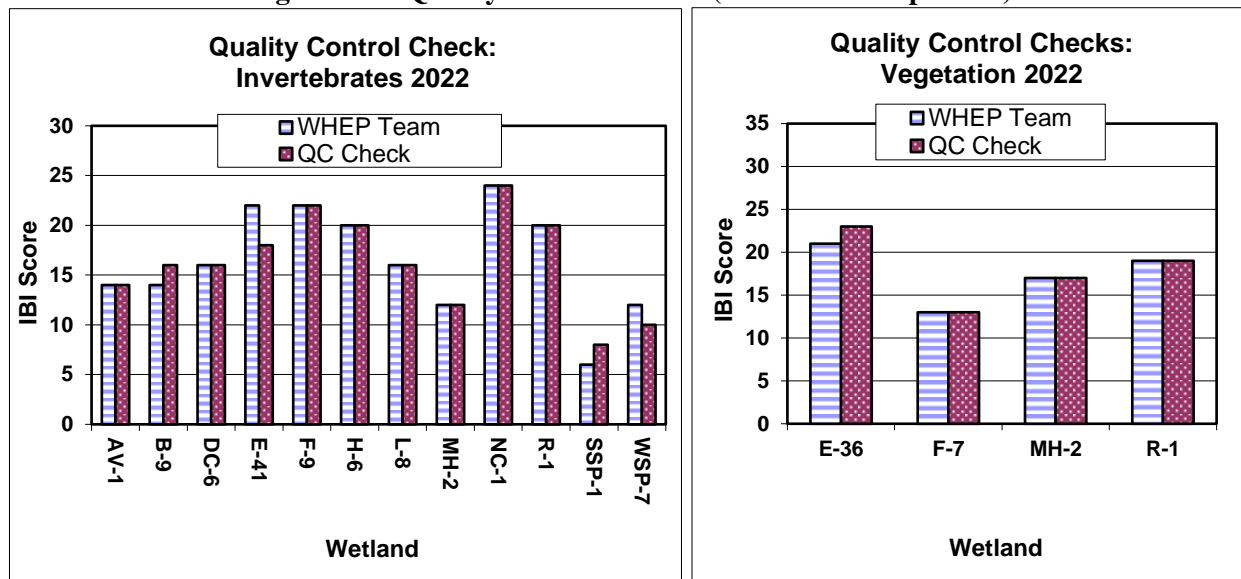
Quality control checks were conducted at four sites for vegetation and thirteen sites for invertebrates in 2022 (Figure 3.3.2) by Bolton & Menk, Inc. The invertebrate check was conducted by reviewing one identified and preserved invertebrate sample per team. The vegetation check was conducted by re-sampling the area marked off by the citizen team using the WHEP procedures and comparing results. The quality



control review was done independently of the citizen team. The following sites were checked as a measure of quality control: AV-1, B-9, DC-6, E-41, F-9, H-6, L-8, MH-2, NC-1, R-1, SSP-1, and WSP-7 were reviewed for invertebrate identification accuracy; E-36, F-7, MH-2, and R-1 were reviewed for vegetation identification accuracy.

All team invertebrate and vegetation scores were found to be consistent with the quality control checks. Each WHEP team did very well in both their invertebrate identification and vegetation surveys. This shows that with a high-quality program that provides good training and oversight, citizen volunteers can collect good usable data.

**Figure 3.2.2 Quality Control Checks (IBI Score Comparison)**



WHEP also provides review of the data sheets for scoring and data transfer errors. This review is conducted by Bolton & Menk, Inc. There were 4 transfer errors, 7 metric calculation errors, and 1 math error. The transfer errors were due to either the data collected was incorrectly transferred to their proper metrics or metric scores were not successfully transferred from one set of calculations to the next. Corrections affected the scores by zero to seven 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.

### 3.3 WHEP Historical Data

Since WHEP began in 1997, 201 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](http://www.mnwhep.org). Section 4.0 includes the sites sampled in 2022 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

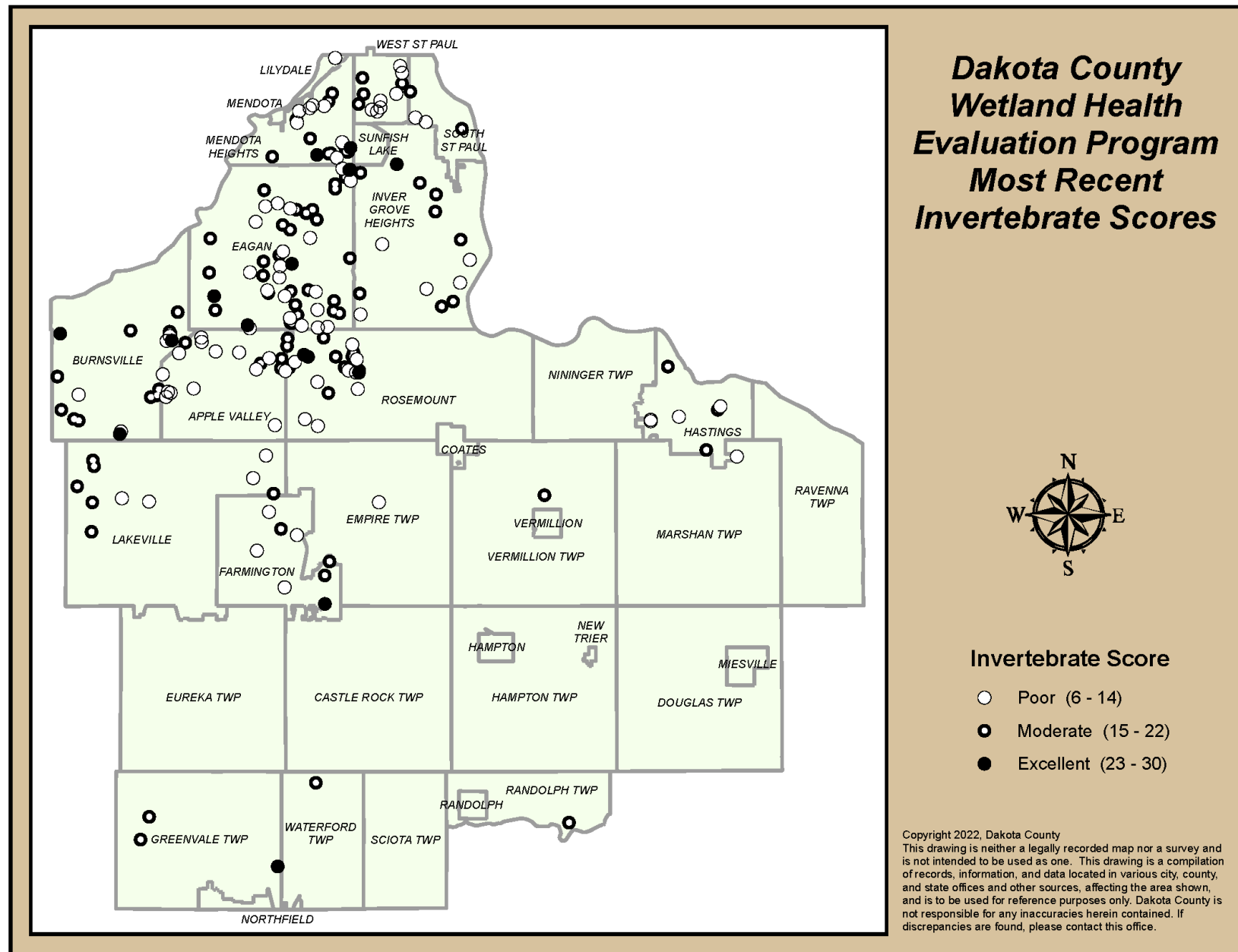
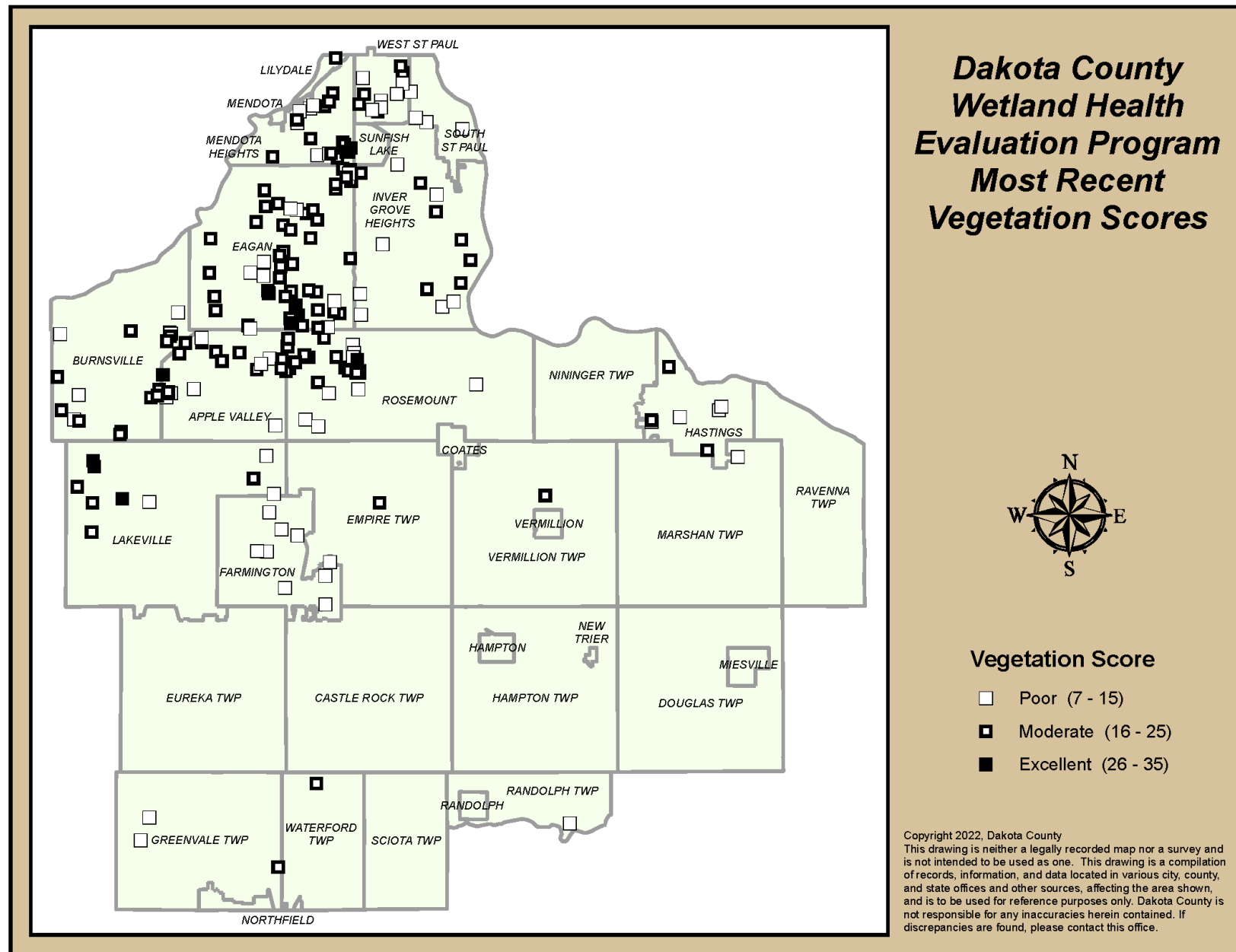


Figure 3.3.2 Most Recent Vegetation Scores



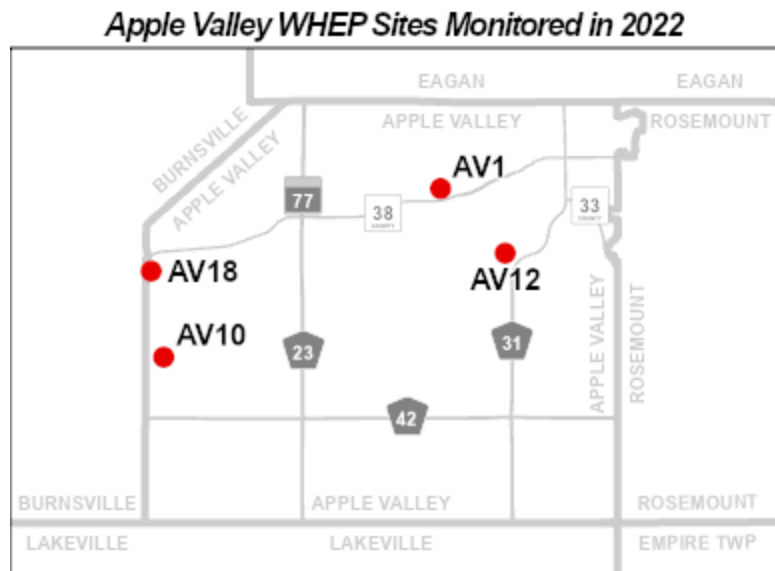
## 4.0 Wetland Evaluations

### 4.1 Apple Valley Wetlands

Four wetlands were monitored within the City of Apple Valley in 2022. This is the 25<sup>th</sup> 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 and Cindy Taintor

**Team Members:** Brad Blackett, Reed Ellingson, Dexter Ellingson, Kyle Jackson, Karen Levisen, Amanda Mathiesen, Matt Monaghan, Harper Monaghan, Grace Monaghan, Jim Platt, John Port, Maya Ricard, Rachel Ricard, and Jill Smook.



TOM AND CINDY TAINTOR

This is Tom Taintor's third year as team leader of the Apple Valley WHEP team. Tom and Cindy agree, "Tom was lured into WHEP a few years ago as our team photographer, and now is the official team leader. We appreciate the support of the City of Apple Valley, via Samantha Berger. And we appreciate all our volunteers that make WHEP possible."

Samantha Berger is entering her fourth year coordinating the WHEP program. In 2022, she enjoyed attending the WHEP volunteer appreciation dinner and seeing all the passionate volunteers. She commented, "In the

upcoming years, the City is excited to utilize the WHEP program to help track wetlands in Alimagnet Park as the City continues work with Dakota County to create a Natural Resource Management plan for the park. The plan will embrace restoring native habitats and plant communities, including wetlands. WHEP will provide vital data as we begin making improvements to the landscape."



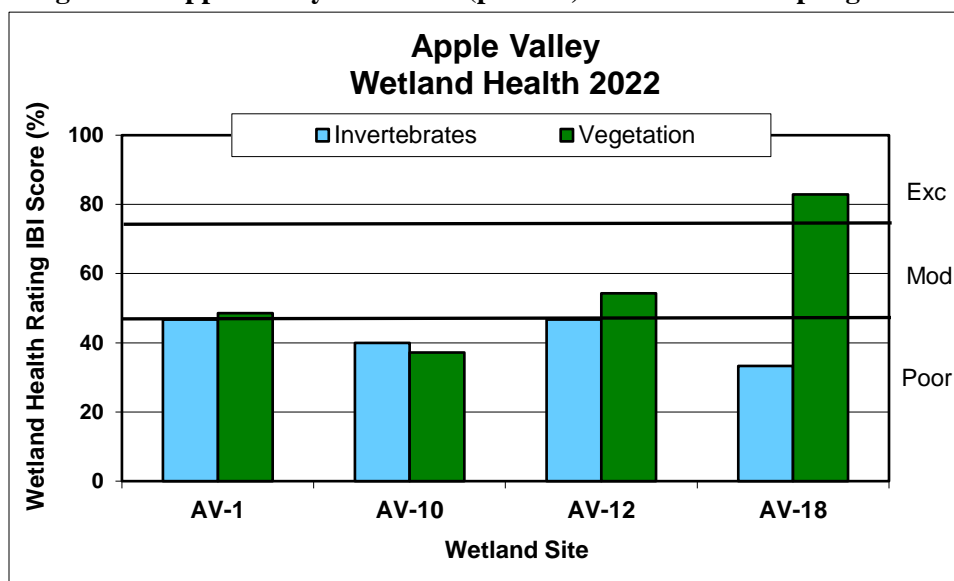
SAMANTHA BERGER



## Apple Valley General Wetland Health

Figure 4.1 presents an overall view of wetland health for all the 2022 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 poor to excellent wetland health based on vegetation data. All four wetlands scored poor wetland health based on invertebrate data. The invertebrates and vegetation scores for AV-18 were inconsistent, differing by 50 percent.

**Figure 4.1 Apple Valley site scores (percent) for the 2022 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 it 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. Shallow sumps have been placed at the inlets. This wetland is part of the City's stormwater management plan, and it is designated as a Manage 2 wetland with a goal to continue monitoring over time as a reference wetland. 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. A vegetation buffer exists between the wetland and homes/roads. Historic aerial photos 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.



VOLUNTEER COLLECTING MACROINVERTEBRATES

## 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. Water levels were low again in 2022. Cattails (*Typha* sp.) and reed



VOLUNTEERS IN THE WETLAND



canary grass (*Phalaris arundinacea*), which surround the wetland, were mostly out of the water. A homeowner commented that the wetland was dry over winter. Water-nymph (*Najas* sp.) dominated the water column.

Mosquito fern (*Azolla* sp.) covered most of the water surface. Pondweed (*Potamogeton* sp.), smartweed (*Polygonum* sp.) and bulrush (*Scirpus* sp.) were common. Spike-rush (*Eleocharis* sp.), three-way sedge (*Dulichium arundinaceum*), water crowfoot (*Ranunculus* sp.), water plantain (*Alisma* sp.), bur-reed (*Sparganium* sp.), and swamp milkweed (*Asclepias incarnata*) were also present. Species of leeches, dragonflies, damselflies, caddisflies, snails, trueflies, crustaceans, and beetles and bugs were collected.

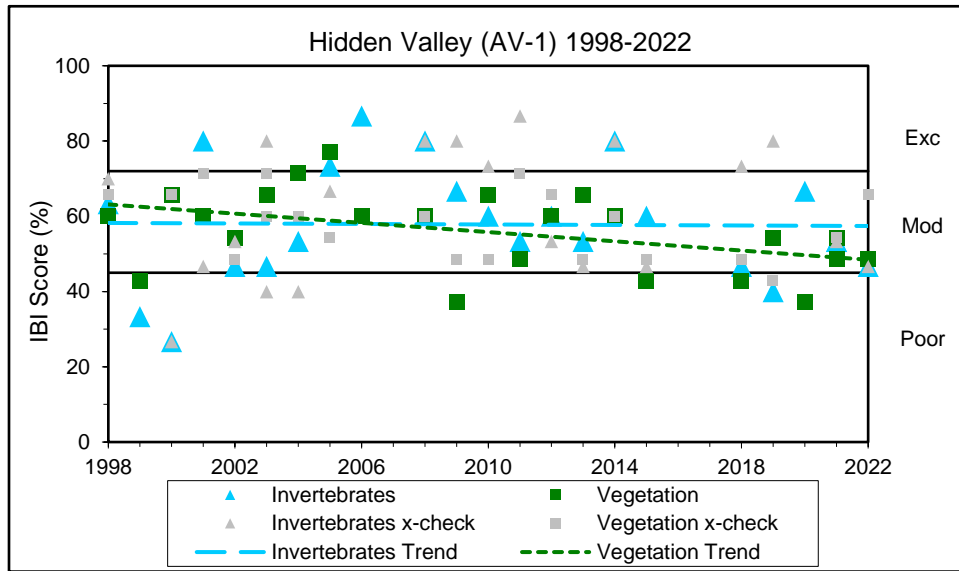


APPLE VALLEY TEAM

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

2022 Data (AV-1)	Invertebrates 	Vegetation 
<b>Wetland Health Rating (IBI score)</b>	Poor (14)	Moderate (17)
<b>Cross-check Rating (IBI score)</b>	Poor (14)	Moderate (23)
<b>Trend 1998-2022</b>	Variable	Variable

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



**Site Summary:** Hidden Valley has been surveyed 22 times since 1998. The invertebrate and vegetation health scores were consistent in 2022, and both indicated poor wetland health. The invertebrate and vegetation scores have been variable over the years fluctuating between excellent and poor. The fluctuations may be due to factors such as changes in water level and plot placement. The presence of mosquito fern, fish, and tadpoles may have impaired the 2022 scores. AV-1 was cross-checked by another team in 2022. The invertebrate scores between the teams were the same, though findings were slightly different. The vegetation scores between the two teams were inconsistent, differing by 17 percent. Though the teams observed similar vegetation, the cross-check team scored higher for nonvascular taxa and persistent litter which affected the vegetation score. The Apple Valley team did not mark *Azolla* and *Riccia* in their plots, though they do note it in the site description.

#### 4.1.2 Alimagnet Park Ridgeview Drive Parking Lot Wetland (AV-10)

Alimagnet Park Ridgeview Drive Parking Lot Wetland (AV-10), also known as AL-P9.6, is a 0.5-acre, type 5 wetland within the Alimagnet Lake subwatershed of the Vermillion River Watershed, and lies just southeast of Alimagnet Lake. The wetland watershed is 25 acres with 5 acres of direct drainage, and it is 20 percent impervious. There is one inlet in the southeast corner of the wetland and one outlet along the western border. It is designated as a Manage 2 wetland with a goal to continue to monitor over time. It is within the Alimagnet TMDL drainage. With grants received from the County, the City will establish a Natural Resource Management Plan in Alimagnet Park and establish baseline data for future improvements under the plan.



The wetland is located within an active park that features a frisbee golf course. The surrounding area includes wooded parkland and residential neighborhoods. Some minor disturbances to the understory have occurred within the parkland from installation of the frisbee golf course; however, disturbances within this watershed are limited. A raingarden was installed upstream of the wetland, by the parking lot, in 2008. It will treat some of the stormwater that flows to this wetland. One stormwater pond and one upstream wetland also serve as BMPs.





VOLUNTEERS SORTING INVERTEBRATES

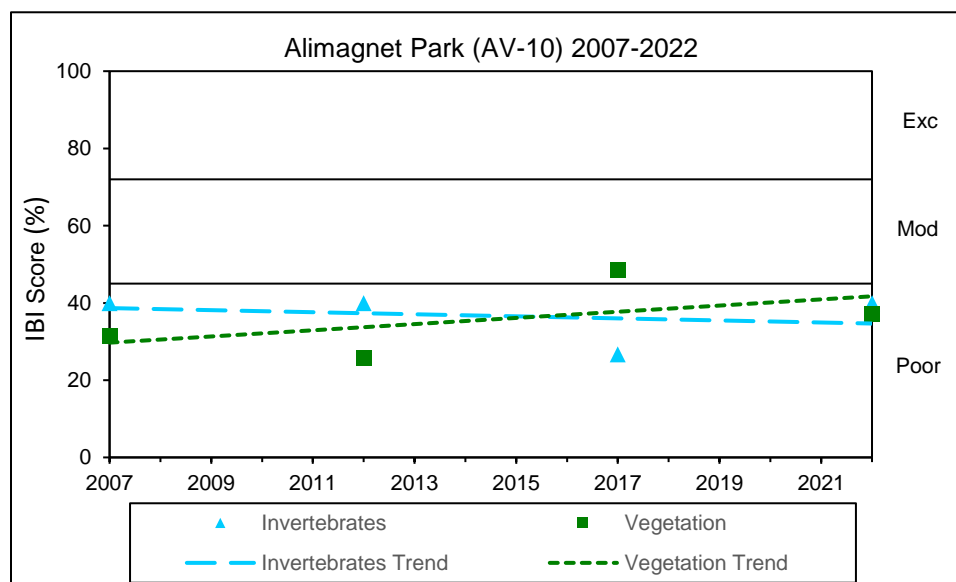
## Wetland Health

**Site Observations:** The wetland slope is gentle and the substrate is very mucky. There were no floating or submergent vegetation within plot; however, notes indicate that duckweed covered the entire water surface. Emergent forbs including iris (*Iris* sp.), beggar-ticks (*Bidens* sp.), willow-herb (*Epilobium* sp.), clearweed (*Pilea* sp.), and smartweed (*Polygonum* sp.) were observed in small populations. Species of leeches, dragonflies, snails, trueflies, crustaceans, and beetles and bugs were collected.

**Table 4.1.2 Alimagnet Park Ridgeview Drive Parking Lot (AV-10) Wetland Health based on IBI**

2022 Data (AV-10)	Invertebrates 	Vegetation 
<b>Wetland Health Rating (IBI score)</b>	Poor (12)	Poor (13)
<b>Trend 2007-2022</b>	Stable	Stable

**Figure 4.1.2 Alimagnet Park Ridgeview Drive Parking Lot Wetland (AV-10)**





**Site summary:** This is the fourth time that this wetland has been monitored for WHEP since 2007. The invertebrate and vegetation scores were consistent, both scoring health ratings of poor. Very little vegetation was recorded in 2022 which may impact invertebrate habitat. Though, more data would help to determine a more reliable health trend, the data appears stable.

### 4.1.3 Everest Pond (AV-12)

Everest Pond (AV-12), also known as EVR-P12 and Public Water 19-225W, is a 5.7-acre, type 5 wetland within the EVR-P12 subwatershed within the Vermillion River Watershed. The watershed has approximately 527 acres of total drainage in which 61 acres drain directly. There is one inlet in the northwest corner of the wetland, and one inlet along the southwestern shoreline. There is one outlet in the northwest corner of the wetland, and one outlet along the northeastern shoreline. Everest Pond is part of the City's stormwater management plan and is designated as a Manage 1 wetland. Wetlands in this classification have medium floral diversity/integrity, but also have direct stormwater input. The wetland must have high or exceptional restoration potential and be located in public or open space in order to meet the restoration classification.



This wetland is a key drainage area to Long Lake and Farquar lake, both of which are impaired for phosphorus. Approximately 68 percent of the external phosphorus load entering Long Lake comes from this pond. Several projects have been completed in the pond and the overall drainage as part of addressing the TMDL, including an iron-enhanced sand filter and raingardens upstream. The area surrounding this wetland is primarily residential. More than half of the wetland is surrounded by a wooded buffer, and the rest by manicured lawn. There are algal blooms in the summer, and the presence of goldfish has been noted.





COLLECTING MACROINVERTEBRATES

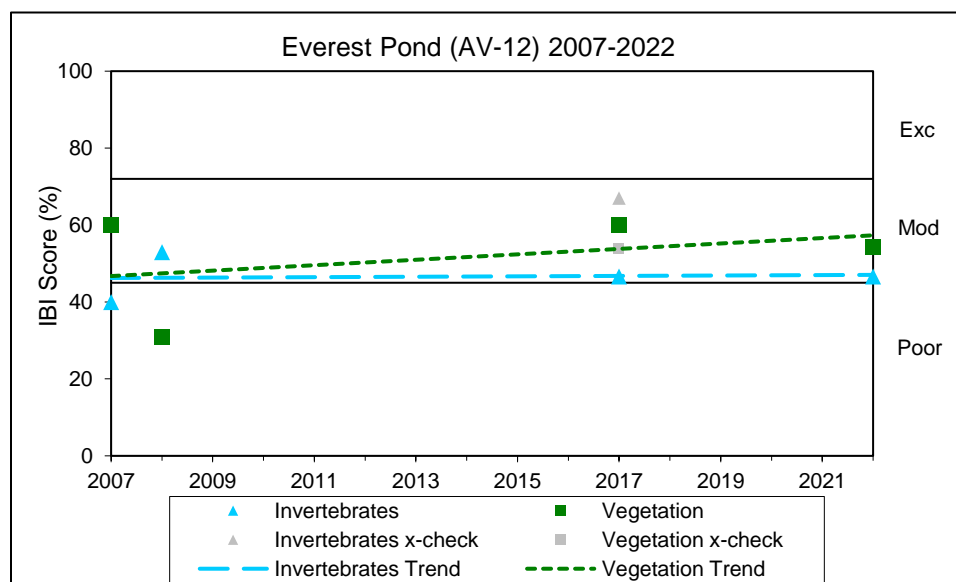
### Wetland Health

**Site Observations:** The wetland slope is gentle and the substrate mucky. Trees surround the wetland, including willow (*Salix* sp.), maple (*Acer* sp.), and ash (*Fraxinus* sp.). Fallen branches and logs lie underwater. Coontail (*Ceratophyllum* sp.), waterweed (*Elodea* sp.), and horned pondweed (*Zannichellia palustris*) make-up the water column. Water-meal (*Wolffia* sp.) is the only floating vegetation. Very little emergent vegetation was present, but included sedges (*Carex* sp.), reed canary grass (*Phalaris arundinacea*) beggar-ticks (*Bidens* sp.), willow-herb (*Epilobium* sp.), and bugle weed (*Lycopus* sp.). Species of leeches, dragonflies, damselflies, snails, trueflies, crustaceans, and beetles were collected. Mystery snails were also present.

**Table 4.1.3 Everest Pond (AV-12) Wetland Health based on IBI**

2022 Data (AV-12)	Invertebrates 	Vegetation 
<b>Wetland Health Rating (IBI score)</b>	Poor (14)	Moderate (19)
<b>Trend 2007-2022</b>	Not enough data	Not enough data

**Figure 4.1.3 Invertebrate and vegetation trends for Everest Pond (AV-12)**



**Site summary:** This is the fourth time that AV-12 has been monitored since the initial survey in 2007. The invertebrate and vegetation scores are consistent, even though the invertebrates score indicates poor wetland health and the vegetation score indicates moderate wetland health. More data would help to determine a reliable health trend.

#### 4.1.4 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 iron-enhanced sand filters (IESF) project. In 2019, a new IESF 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. This wetland is part of the





City's stormwater management plan, and is designated as a Manage 2 wetland with a goal to continue to monitor wetland health following IESF project.

The area surrounding the wetland is residential and parkland. The buffer around the pond was impacted by the IESF project, and is being actively managed. A fountain operates at this site.





IDENTIFYING VEGETATION

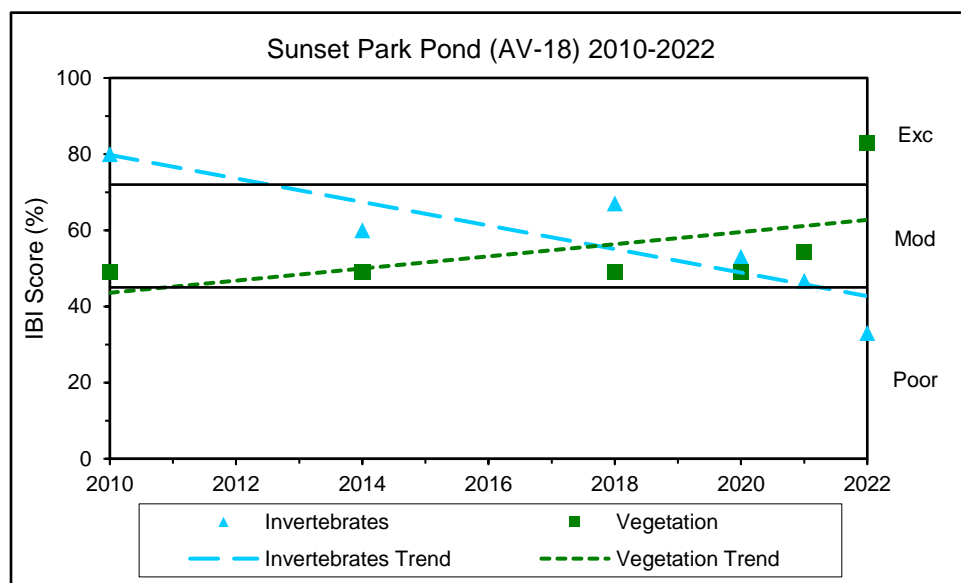
## Wetland Health

**Site Observations:** The wetland slope is gentle and the substrate very mucky. Many overhanging trees surround the wetland shoreline, including willow (*Salix* sp.), maple (*Acer* sp.), cottonwood (*Populus* sp.), and oak (*Quercus* sp.). Coontail (*Ceratophyllum* sp.) dominated the vegetation plot. Waterweed (*Elodea* sp.), pondweed (*Potamogeton* sp.), and water beggar-ticks (*Megalodonta beckii*) were also observed in the water column. Duckweed (*Lemna* sp.) and water-meal (*Wolffia* sp.) scattered the surface of the water. Sedges (*Carex* sp.), spike-rush (*Eleocharis* sp.), rush (*Juncus* sp.), bulrush (*Scirpus* sp.), arrowhead (*Sagittaria* sp.), smartweed (*Polygonum* sp.), and several other emergent vegetation were present. Species of damselflies, snails, trueflies, crustaceans, and bugs and beetles were collected. Tadpoles, fish, and crayfish were found in bottle traps. Mystery snails are present at this wetland.

**Table 4.1.4 Sunset Park Pond (AV-18) Wetland Health based on IBI**

2022 Data (AV-18)	Invertebrates 	Vegetation 
<b>Wetland Health Rating (IBI score)</b>	Poor (10)	Excellent (29)
<b>Trend 2010-2022</b>	Stable	Declining

**Figure 4.1.4 Invertebrate and vegetation trends for Sunset Park Pond (AV-18)**



**Site summary:** This is the sixth time that AV-18 has been monitored since the initial survey in 2010. The invertebrate and vegetation scores are very inconsistent, differing by 50 percent. The vegetation score indicates excellent wetland health while the invertebrates score indicates poor wetland health. There was high vegetation diversity in 2022, but low invertebrate diversity. Fish, crayfish, and tadpoles were reported and may be preying on the invertebrates impairing the invertebrates score. The vegetation trend has remained stable until a steep spike in 2022. The vegetation trend appears to be declining since 2010.



SETTING BOTTLE TRAPS

## 4.2 Burnsville Wetlands

Four wetlands were monitored within the City of Burnsville in 2022. This is the 25<sup>th</sup> year the City has participated in WHEP! Seventeen wetlands have been monitored in Burnsville since the initiation of WHEP in 1997.

**Team Leader:** Caitlin Hughes-Parry

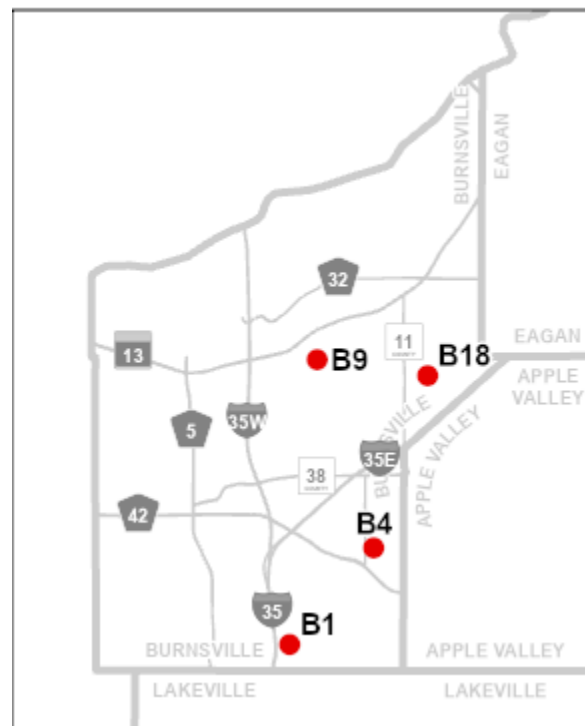
**Team Members:** Don Ackerman, Kristen Anderson, Lisa Bronson, Mara Brooks, Sarah Buresch, Stacy Erickson, Alec Erickson, Kirk Hellweg, Nic Jacobs, Eunice Luman, Sally McNamara, Quin McNamara, Frances Nielsen, Abi Sutcliffe, Tom Ward, Rae Winegardner, Elena Yudovina, and Chris Zator



CAITLIN HUGHES-PARRY

This was Caitlin's second year leading the Burnsville team. She expressed, "We had another great year gathering data in Burnsville's wetlands. With an enthusiastic group of new volunteers joining a handful of Burnsville WHEP veterans, we were again able to successfully survey five wetlands. While many of Burnsville's wetlands changed drastically throughout the summer as the weather became progressively drier, the Burnsville WHEP Team was able to apply its WHEP training to continue to identify good sampling areas to ensure that the data collected was representative of each wetland surveyed."

*Burnsville WHEP Sites Monitored in 2022*



Linnea Wier is the city contact for the Burnsville WHEP team. Her role is to select wetlands for evaluation, help recruit volunteers, and provide support as needed. WHEP volunteers have been collecting data on Burnsville wetlands for 25 years. Linnea says “This long-term data set is really valuable information that the City of Burnsville can use to track wetland health over time. Protecting water quality and native habitat is an important part of our Natural Resources program, and we are thankful to the volunteers who help us achieve those goals.



LINNEA WIER

“Through the volunteer component of the program, WHEP has helped connect many Burnsville residents over the years with a chance to discover new parks, learn new skills and get outdoors! I appreciate the commitment of 2022’s volunteer team, and the leadership of team leader Caitlin. Thank you for all your hard work this year.”

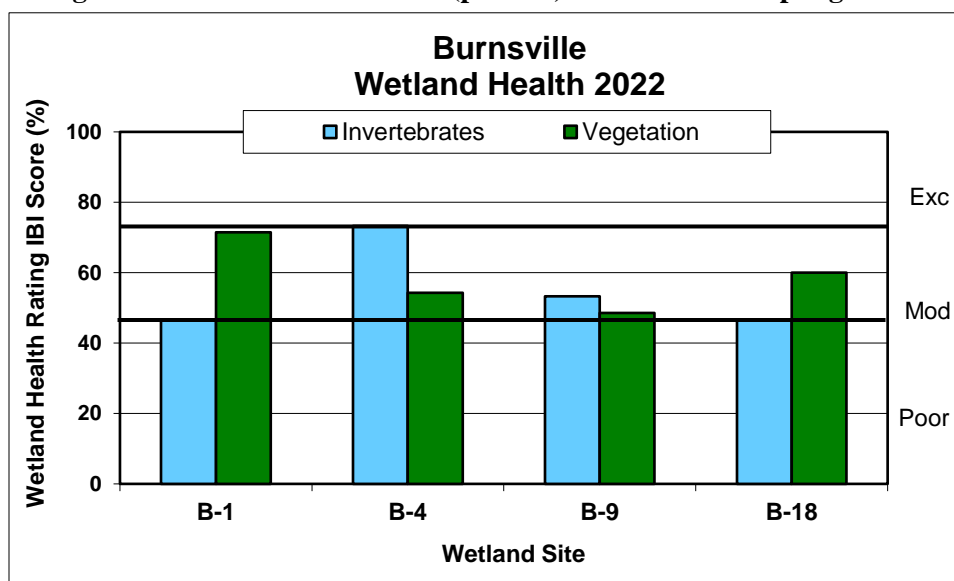
## Burnsville General Wetland Health

Figure 4.2 presents an overall view of wetland health for all the 2022 monitoring sites in Burnsville 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. The Burnsville wetlands exhibited poor to moderate wetland health based on invertebrate and vegetation data. The invertebrates and vegetation scores for B-1, B-4, and B-18 were inconsistent, differing by 24, 19, and 13 percent, respectively.



CAITLIN HUGHES-PARRY, RAE WINEGARDNER, AND BILLY BOLAND

**Figure 4.2 Burnsville site scores (percent) for the 2022 sampling season**



### 4.2.1 Crystal Lake West (B-1)

Crystal Lake West (B-1) is a one-acre, type 3 wetland located in the CL6 Drainage Area of Crystal Lake subwatershed within the Black Dog Watershed Management Organization. The CL6 Drainage area is 444.5 acres, and it is five percent impervious. There are no inlets or outlets in the wetland. The wetland is part of the wetland management plan and is designated as an Improvement Class. The goal for the wetland is to improve its quality. The wetland has invasive species problems, including reed canary grass. There are some recreational vehicle disturbances (mostly in the winter). The wetland is very close to a bay on the west side of Crystal Lake, and is within a large, naturally vegetated, city park.





### Wetland Health

**Site Observations:** The wetland slope is gentle. The wetland substrate is very mucky. A walking trail leads to the wetland. It is regularly used by walkers and anglers. Buckthorn adjacent to the wetland has been recently cleared. Many small frogs were observed in the wetland. The open water is covered in white water lily (*Nymphaea* sp.). Coontail (*Ceratophyllum* sp.) and bladderwort (*Utricularia* sp.) dominated the vegetation plot. Duckweed (*Lemna* sp.), arrowhead (*Sagittaria* sp.), burred (*Sparganium* sp.), iris (*Iris* sp.), sedge (*Carex* sp.), spike-rush (*Eleocharis* sp.), bulrush (*Scirpus* sp.) and cut grass (*Leersia* sp.) were also present. Reed canary grass (*Phalaris arundinacea*) and purple loosestrife (*Lythrum salicaria*) were noted. Species of leeches, damselflies, snails, trueflies, crustaceans, and beetles and bugs were collected.



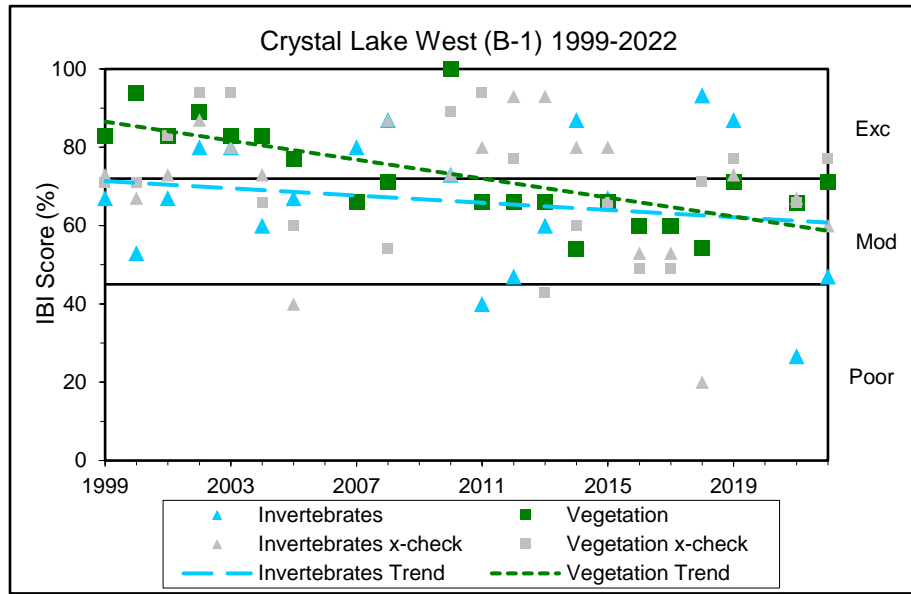
LISA BRONSON AND TOM WARD

**Table 4.2.1 Crystal Lake West (B-1) Wetland Health based on Index of Biotic Integrity (IBI)**

2022 Data (B-1)	Invertebrates 	Vegetation 
<b>Wetland Health Rating (IBI score)</b>	Poor (14)	Moderate (25)
<b>Cross-check Rating (IBI score)</b>	Moderate (18)	Excellent (27)
<b>Trend 1999-2022</b>	Variable	Stable



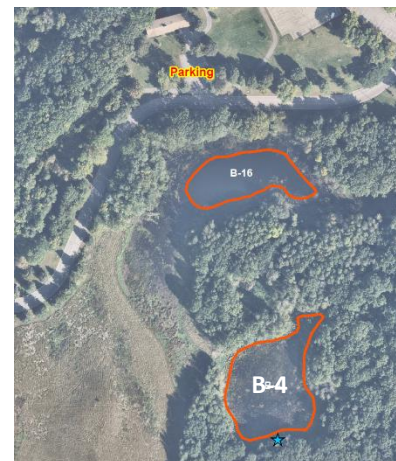
**Figure 4.2.1 Invertebrate and vegetation trends for Crystal Lake West (B-1)**



**Site Summary:** Crystal Lake West has been surveyed 21 times since 1999. The invertebrate and vegetation health scores were very inconsistent in 2022, differing by 24 percent. The invertebrate score indicates poor wetland health while the vegetation score indicates moderate wetland health. Invertebrate scores have been variable over the years fluctuating between excellent and poor. The extreme fluctuations may be due to factors such as changes in water level and plot placement. The presence of tadpoles and crayfish may also impair the invertebrate population. Though vegetation scores were higher in the early 2000's, it appears that the vegetation trend has become more stable in the last decade. B-1 was cross-checked by another team in 2022. Vegetation scores between the teams were consistent, and the teams found similar vegetation communities. The invertebrate scores between the teams were inconsistent, differing by 13 percent. The cross-check team found dragonflies and mayflies which enhanced the ETSD Metric, as well as, a lower Corixidae Proportion. Differences in invertebrate scores could be due to sampling location or date.

#### 4.2.2 Alimagnet Wetland (B-4)

Alimagnet Wetland (B-4) is a 0.9-acre, type 3 wetland located within the LA4 drainage area of the Lake Alimagnet subwatershed within the Vermillion River Watershed. The LA4 drainage area is 701 acres with 20 percent impervious surface. Alimagnet wetland has no inlets or outlets. It is a protected wetland as part of the City's wetland management plan; recognized as a natural wetland adjacent to natural communities. It is being managed to maintain or improve the existing habitat. Management of the surrounding land includes tree removal of the woodland habitat, prescribed burns in woodland and prairie habitats, and herbicide control of invasive species.





Alimagnet wetland is located in the southwest portion of Alimagnet Park. It is one of two shallow marsh areas within a 4.9-acre area connected by a wet meadow. The park road (Alimagnet Parkway) borders the northern end of this area.

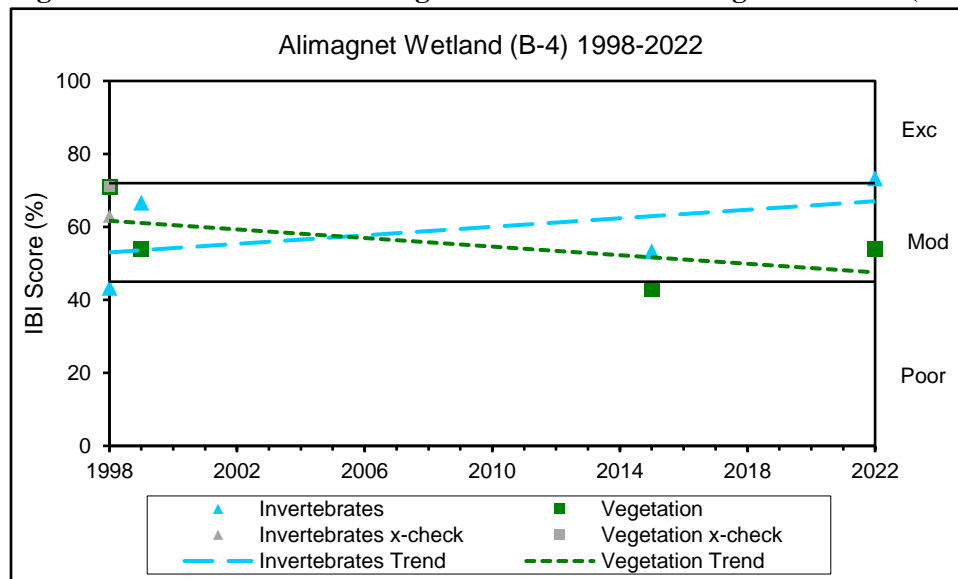
## Wetland Health

**Site Observations:** The wetland slope is gentle. The wetland substrate is fairly solid with persistent litter debris. Over half of the wetland is grown over with reed canary grass (*Phalaris arundinacea*). Duckweed (*Lemna* sp.), purple-fringed Riccia (*Ricciocarpus natans*), and slender Riccia (*Riccia fluitans*) cover the open water. Reed canary grass, bulrush (*Scirpus* sp.) and water plantain (*Alisma* sp.) dominated the emergent zone of the vegetation plot. Smaller populations of water beggar-ticks (*Megalodonta beckii*), arrowhead (*Sagittaria* sp.), bur-reed (*Sparganium* sp.), cattail (*Typha* sp.), spike-rush (*Eleocharis* sp.), and beggar-ticks (*Bidens* sp.) were also present. Species of leeches, dragonflies, damselflies, caddisflies, snails, crustaceans, and bugs and beetles were collected.

**Table 4.2.2 Alimagnet Wetland (B-4) Wetland Health based on IBI**

2022 Data (B-4)	Invertebrates 	Vegetation 
<b>Wetland Health Rating (IBI score)</b>	Moderate (22)	Moderate (19)
<b>Trend 1998-2022</b>	Not enough data	Not enough data

**Figure 4.2.2 Invertebrate and vegetation trends for Alimagnet Wetland (B-4)**



**Site summary:** This is the fourth year of recorded data for this wetland since 1998. Though both health scores indicate moderate wetland health, the invertebrate and vegetation scores were inconsistent, differing by 19 percent. Much of the wetland is consumed by reed canary grass. There was very little submergent vegetation, and low emergent vegetation diversity. The invertebrate population appears to be thriving in the habitat. More data will help to determine a more reliable health trend.



### 4.2.3 Crosstown West (B-9)

Crosstown West (B-9) is an 8-acre, type 5 wetland located within the D12 drainage area of Central subwatershed (2,133 acres) of the Black Dog Watershed. The D12 drainage area is 375 acres with approximately 50 percent impervious surface. The wetland has three inlets with one in the southwest corner, one in the south-central shoreline, and one in the southeast corner. There is one outlet on the west-central shoreline. The wetland is part of the City's stormwater management plan and wetland management plan. It is designated as an Improvement Class wetland and is being managed to improve the function and value of the wetland.





Crosstown West is a shallow wetland within Crosstown West Park located south of Highway 13 and east of Nicollet Avenue. There are trails that border many sections of the wetland and a boardwalk that stretches across the middle of the wetland. Sediment build-up is periodically removed as needed. In 2006, wetland plants were installed along the northwest shoreline; however, this was not a full-scale shoreline restoration.

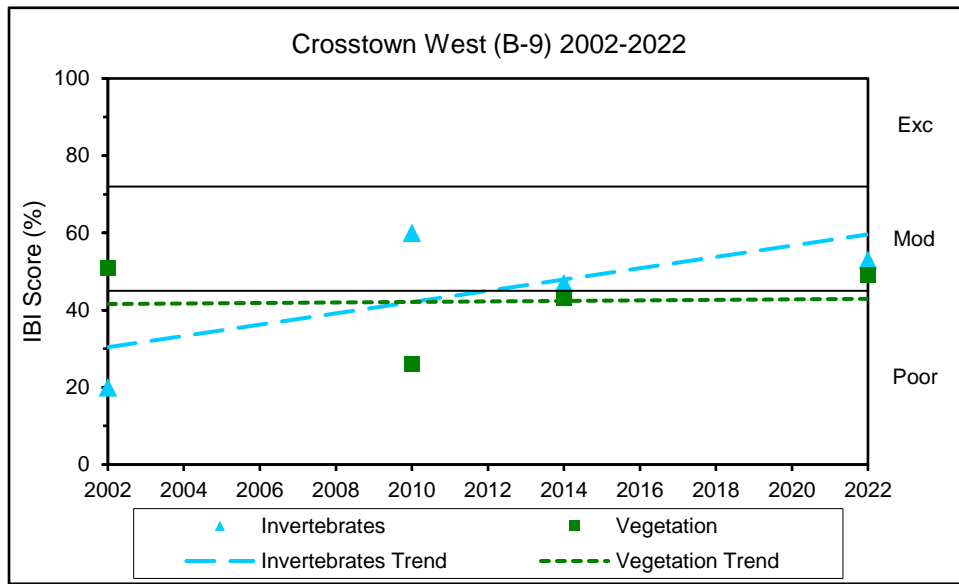
### Wetland Health

**Site Observations:** The wetland slope is gentle. The wetland substrate has a thick layer of organic debris, but not overly sticky. The invertebrate and vegetation sampling occurred near the pedestrian bridge. Cattails (*Typha* sp.), ash trees (*Fraxinus* sp.), willow trees (*Salix* sp.), and elm trees (*Ulmus* sp.) line the shore. Duckweed (*Lemna* sp. and *Spirodela* sp.) and water-meal (*Wolffia* sp.) cover the surface of open water. Coontail (*Ceratophyllum* sp.) dominates the water column. Waterweed (*Elodea* sp.) is also present. Very few other forbs or grasses were documented. Leeches, damselflies, snails, trueflies, crustaceans, and beetles and bugs were collected.

**Table 4.2.3 Crosstown West Wetland (B-9) Wetland Health based on IBI**

2022 Data (B-9)	Invertebrates 	Vegetation 
<b>Wetland Health Rating (IBI score)</b>	Moderate (16)	Moderate (17)
<b>Trend 2002-2022</b>	Not enough data	Not enough data

**Figure 4.2.3 Invertebrate and vegetation trends for Crosstown West (B-9)**



**Site summary:** This is the fourth time that Crosstown West has been monitored since 2002. The invertebrate and vegetation scores are consistent, and both indicate moderate wetland health. The vegetation health trend appears stable, while the invertebrate health trend has shown improvement. More data would help determine a more reliable health trend.

#### 4.2.4 Terrace Oaks North Central (B-18)

Terrace Oaks North Central (B-18) is a 0.35-acre, type 3 wetland located within the E-23 watershed. The watershed is 68 acres and includes 5 percent impervious surface. There are no inlets or outlets. The wetland is part of the City’s stormwater management plan and wetland management plan. It is being managed to improve existing habitat.



Terrace Oaks North Central wetland is located in Terrace Oaks Park, south of Burnsville Parkway and east of County Road 11. The wetland is in a depression surrounded in an area with rolling hills. Beginning in late winter 2015, an oak savanna restoration project began in the northwest corner of Terrace Oaks Park. Part of this restoration area lies within the drainage area of the wetland. In addition, restoration of 26 acres surrounding the wetland began in February of 2019, and restoration of 22 acres draining to the wetland began in the winter of 2022. These projects involve a large-scale woody harvest, seeding with cover crop and native grasses and wildflowers, and follow-up control of invasive species.



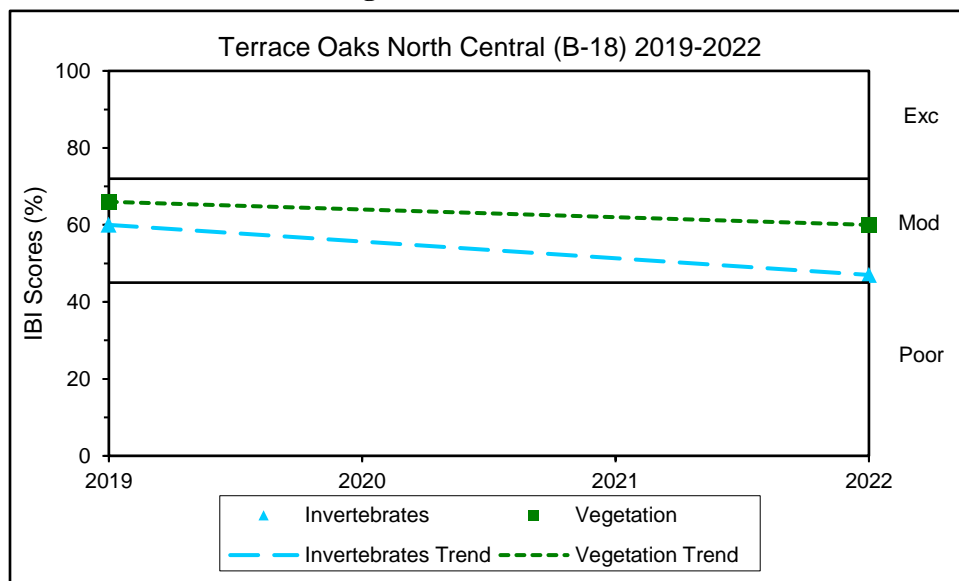
## Wetland Health

**Site Observations:** The wetland has a gentle slope and a solid substrate. It is within a widely-used park, with hiking and biking trails nearby. The wetland is very small, and the water levels were very low in 2022. A very small population of bladderwort (*Utricularia* sp.) was the only submergent vegetation present in the vegetation releve. Duckweed (*Lemna* sp. and *Spirodela* sp.) sparsely covered the surface of the water. Small populations of manna grass (*Glyceria* sp.), rush (*Juncus* sp.), bulrush (*Scirpus* sp.), sweet flag (*Acorus* sp.), water plantain (*Alisma* sp.), water parsnip (*Sium suave*) and beggar-ticks (*Bidens* sp.) were the only other vegetation species represented. Leeches, dragonflies, snails, fingernail clams, crustaceans, and bugs and beetles were collected.

**Table 4.2.4 Terrace Oaks North Central (B-18) Wetland Health based on IBI**

2022 Data (B-18)	Invertebrates 	Vegetation 
<b>Wetland Health Rating (IBI score)</b>	Poor (14)	Moderate (21)
<b>Trend 2021-2022</b>	Not enough data	Not enough data

**Figure 4.2.4 Invertebrate and vegetation trends for Terrace Oaks North Central (B-18)**



**Site summary:** This is the second time that this particular Terrace Oaks wetland has been monitored for WHEP. There are others within Terrace Oaks Park that have been monitored over the years. The invertebrate and vegetation scores were inconsistent, differing by 13 percent. The invertebrates score indicates poor wetland health while the vegetation score indicates moderate wetland health. Low water levels in 2022 may have impacted the scores, and more years of data would help determine a reliable health trend.

### 4.3 Dakota County Parks Wetlands

Two teams monitored seven wetlands for Dakota County Parks in 2022. This is the eighth year that Dakota County has monitored wetlands with WHEP. Ten wetlands have been monitored for the Parks Department since 2015.

#### Team Leaders:

Marianne McKeon Buck (Team 1)

Jennifer Kanz and Jordan Hesse (Team 2)

#### Team 1 Members:

Thomas Schmiesing, Nancy Schmiesing, Abigail Sloat, and Chris Klatt

**Team 2 Members:** Alaina Grzeskowiak, Philip Hernick, Alexander Jack, Mike Lynn, and Beth Nelson

Marianne McKeon Buck led the Dakota County Parks Team #1 in 2022. Marianne has been involved in WHEP since 2007, and was Eagan's team leader for many years.

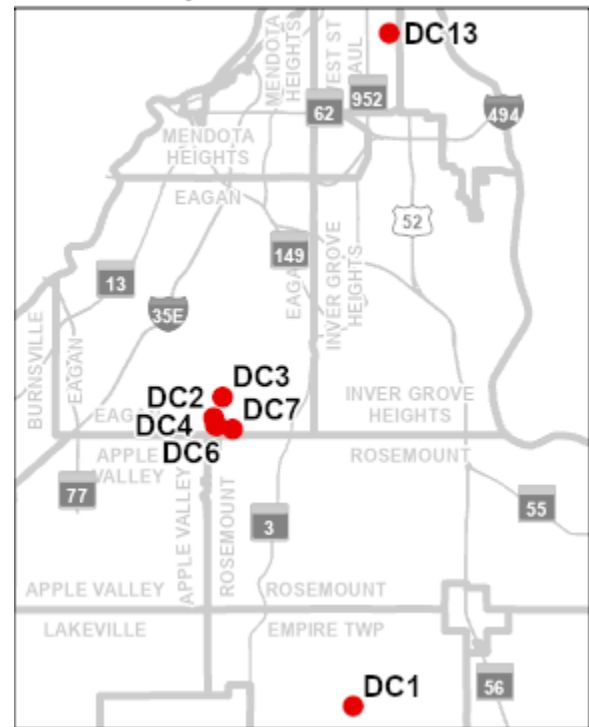
Jennifer Kanz and Jordan Hesse co-led the Dakota County Parks Team #2 in 2022. It was Jennifer's second year and Jordan's first year as team leaders.

Chris Klatt is Dakota County Parks' WHEP contact. He stated, "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 1,000 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. We are grateful for the opportunity WHEP provides 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."



CHRIS KLATT

Dakota County WHEP Sites Monitored in 2022



### 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 m<sup>2</sup> 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.

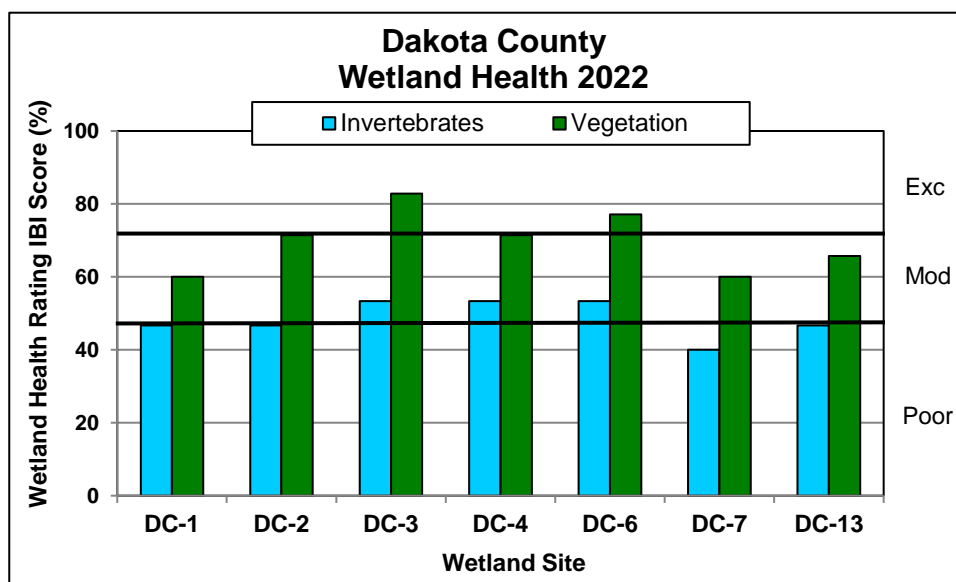
In addition, to surveying the vegetation plot, Dakota County WHEP volunteers may have conducted an optional 20-minute meander survey. This was to be completed after the 100 m<sup>2</sup> plot sampling. Meander surveys involve walking “randomly” through a wetland site and noting each species found. Meander 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 4.3 presents an overall view of wetland health for all of the 2022 monitoring sites in Dakota County Parks 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. The wetland health invertebrates scores ranged from poor to moderate. The wetland health vegetation scores ranged from moderate to excellent. Wetlands DC-3 and DC-6 exhibited excellent wetland health based on vegetation data. Invertebrate and vegetation scores were inconsistent for all seven wetlands, differing by 13, 24, 30, 18, 24, 20, and 19 percent. DC-8 was scheduled for monitoring in 2022; however, dry wetland conditions were cause to omit it from sampling.

**Figure 4.3 Dakota County Parks site scores (percent form) for the 2022 sampling season**





### 4.3.1 Empire Lake (DC-1)

Empire Lake (DC-1) is a 25.1-acre, type 5 wetland located in the Vermillion River Watershed. The subwatershed is approximately 4,000 acres with 5 percent impervious surface. Empire Lake is the man-made result of impounding an unnamed tributary stream to the Vermillion River. This dike was built in 1965. Some improvements have been made to the dike since the original construction, and it was reconstructed with an outlet in 2019. Management goals are to monitor the lake to track affects of recent restoration and ongoing management of invasive species.



Empire Lake is located within Whitetail Woods Regional Park. The watershed includes agricultural fields, natural areas, and gravel mining. The adjacent woodland is highly disturbed by invasive buckthorn which was removed during restoration activities between 2015-2019. Upstream wetlands to the north and west of this site were not completely restored during previous restoration efforts, such that continuous monitoring will be needed to observe differences during and after those activities. A Natural Resources System Management Plan was completed for the Park in 2020. A water quality survey was completed on this lake in 2009 measuring healthy phosphorus levels, much below the Shallow Lake State Standard. Secchi disk measurements also indicate higher water clarity, a critical component in encouraging and maintaining rooted submergent vegetation.



### Wetland Health

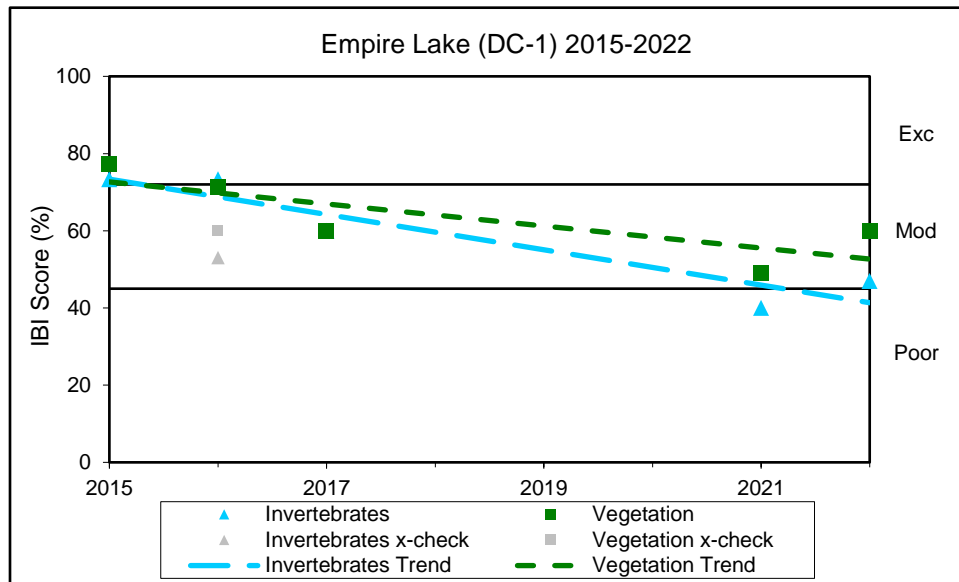
**Site Observations:** The wetland slope is very gentle near the shoreline. The wetland substrate is fairly mucky with many fallen logs. Algae covers much of the water surface. Small representations of several plants are present including duckweeds (*Lemna* sp. and *Spirodela* sp.), water-meal (*Wolffia* sp.), coontail (*Ceratophyllum* sp.), waterweed (*Elodea* sp.), water-nymph (*Najas* sp.), pondweed (*Potamogeton* sp.), water plantain (*Alisma* sp.), arrowhead (*Sagittaria* sp.), cattail (*Typha* sp.), sedges (*Carex* sp.), bulrush (*Scirpus* sp.), reed canary grass (*Phalaris arundinacea*), dogwood (*Cornus* sp.), willows (*Salix* sp.), ash trees (*Fraxinus* sp.), and several other upland forbs. Leeches, dragonflies, damselflies, caddisflies, snails, fingernail clams, and trueflies were collected.

**Table 4.3.1 Empire Lake (DC-1) Health based on Index of Biotic Integrity**

2022 Data (DC-1)	Invertebrates 	Vegetation 
<b>Wetland Health Rating (IBI score)</b>	Poor (14)	Moderate (21)
<b>Trend 2015-2022</b>	Not enough data	Not enough data



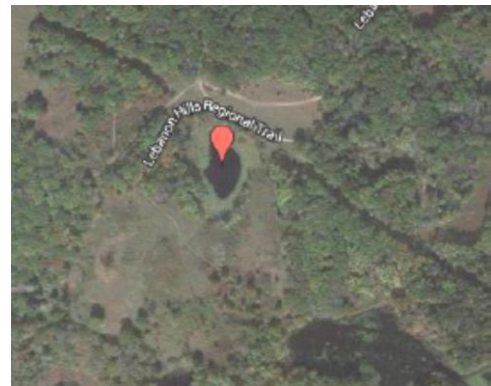
**Figure 4.3.1 Invertebrate and vegetation trends for Empire Lake (DC-1)**



**Site summary:** This is the fifth time that Empire Lake has been monitored by WHEP. The invertebrate and vegetation scores were inconsistent, differing by 13 percent. The invertebrate score indicates poor wetland health while the vegetation score indicates moderate wetland health. This wetland has a higher diversity of vegetation; however, the plants are only sparsely represented and may not provide adequate habitat for the invertebrate population. More years of data will help determine a more reliable wetland health trend.

### 4.3.2 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 depressional pond/wetland located near the center of Lebanon Hills Regional Park. It is an isolated 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". The wetland and surrounding area were recently restored. Previously, the wetland was surrounded by smooth brome-dominated uplands and overgrown savanna/woodland, which have now been restored to native prairie vegetation. Prior to restoration, the wetland was dominated by reed canary grass (*Phalaris arundinacea*), and deposition from the surrounding land had caused build-up in the wetland covering the native seed bank. Historically, the area was likely grazed and/or farmed.



Dakota County began implementing major ecological restoration of this wetland in December 2015 and continued through June 2018. In December of 2015, 1.5 feet of farmland deposits were scraped 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 document the effects of the project on the wetland.





BUCK POND

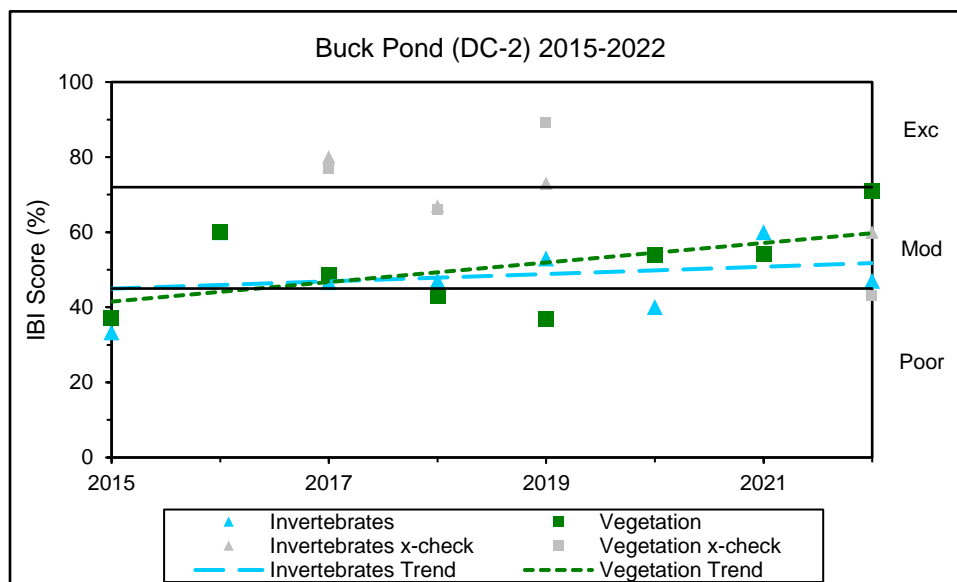
## Wetland Health

**Site Observations:** The wetland slope is gentle. The wetland substrate is mucky. Many species of vegetation were represented in the vegetation releve, including coontail (*Ceratophyllum* sp.), water-crowfoot (*Ranunculus* sp.), pondweed (*Potamogeton* sp.), water-shield (*Brasenia schreberi*), smartweed (*Polygonum* sp.), water plantain (*Alisma* sp.), arrowhead (*Sagittaria* sp.), sedges (*Carex* sp.), spike-rush (*Eleocharis* sp.), bulrush (*Scirpus* sp.), cut grass (*Leersia* sp.), and reed canary grass (*Phalaris arundinacea*). Tree species including willows (*Salix* sp.), cottonwood (*Populus* sp.), oak (*Quercus* sp.), and elm (*Ulmus* sp.), and several other upland forbs and grasses were also present. Leeches, snails, trueflies, crustaceans, and bugs and beetles were collected.

**Table 4.3.2 Buck Pond (DC-2) Health based on Index of Biotic Integrity**

2022 Data (DC-2)	Invertebrates 	Vegetation 
<b>Wetland Health Rating (IBI score)</b>	Poor (14)	Moderate (25)
<b>Cross-check Rating (IBI score)</b>	Moderate (18)	Poor (15)
<b>Trend 2015-2022</b>	Stable	Improving

**Figure 4.3.2 Invertebrate and vegetation trends for Buck Pond (DC-2)**



**Site summary:** This is the eighth consecutive year that Buck Pond has been monitored by WHEP. The invertebrate and vegetation scores were inconsistent, differing by 24 percent. The invertebrates score indicates poor wetland health while the vegetation score indicates moderate wetland health. This wetland has a higher diversity of vegetation; however, there may not be adequate habitat for the invertebrate population. The invertebrate trend is stable. The vegetation score in 2022 is showing improvement in the health trend, especially since completion of the restoration in the area. This wetland was cross-checked by another WHEP team in 2022. The cross-check team collected a higher diversity of leeches and trueflies which enhanced the invertebrates score. The vegetation releve for the cross-check team included fewer woody, grasslike, and forb species. Sampling location may have affected data results.

### 4.3.3 Tamarack Swamp (DC-3)

Tamarack Swamp (DC-3) is a 7.7-acre, type 3 wetland located in the Lower Minnesota River watershed. This tamarack occurrence is the southernmost example of tamarack swamp remaining in Minnesota. 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. It receives runoff from surrounding land, and there is a small outlet that runs into Holland Lake that was restored in 2020 and only flows during high water periods.



This remnant tamarack swamp is located in Lebanon Hills Regional Park. 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. The monitoring will help determine the effectiveness of the restoration efforts of Tamarack Swamp. 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.





TAMARACK SWAMP

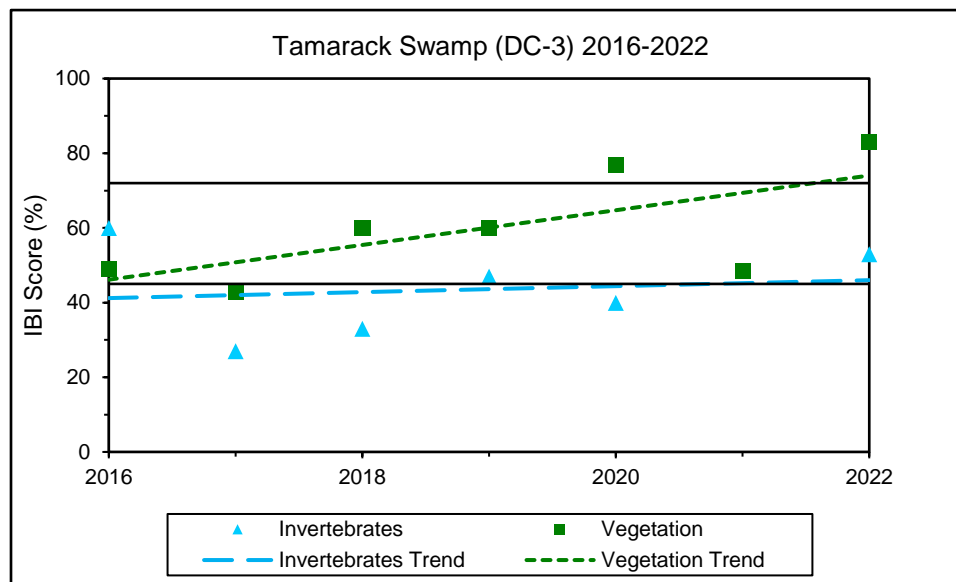
## Wetland Health

**Site Observations:** The wetland slope is gentle and the substrate mucky. The wetland was described as dry at the time of the vegetation survey in early July. Some pondweed (*Potamogeton* sp.) and water-crowfoot (*Ranunculus* sp.) are present in existing low water. Smartweed (*Polygonum* sp.), arrowhead (*Sagittaria* sp.), and cattail (*Typha* sp.) were the most prominent species found in the vegetation releve. Sedges (*Carex* sp.), spike-rush (*Eleocharis* sp.), bulrush (*Scirpus* sp.), manna-grass (*Glyceria* sp.), reed canary grass (*Phalaris arundinacea*), swamp milkweed (*Asclepias incarnata*), and several other upland forbs were also represented. Leeches, dragonflies, damselflies, fingernail clams, trueflies, and bugs and beetles, including many *Corixidae* species were collected.

**Table 4.3.3 Tamarack Swamp (DC-3) Health based on Index of Biotic Integrity**

2022 Data (DC-3)	Invertebrates 	Vegetation 
<b>Wetland Health Rating (IBI score)</b>	Moderate (16)	Excellent (29)
<b>Trend 2016-2022</b>	Stable	Improving

**Figure 4.3.3 Invertebrate and vegetation trends for Tamarack Swamp (DC-3)**



**Site summary:** This is the seventh consecutive year that Tamarack Swamp has been monitored by WHEP. The invertebrate and vegetation scores were inconsistent, differing by 30 percent. The vegetation score indicates excellent wetland health. A higher representation of emergent woody, grasslike, and forb species add to the vegetation diversity. The invertebrate score indicates moderate wetland health; however, invertebrate scores at this site have been repeatedly poor. Fluctuating wetland levels may not aid sufficient invertebrate habitat. Tadpoles were also reported in the bottle traps which may impair the invertebrate collection. There is a high proportion of *Corixidae*, which is an indicator of poor wetland health. The invertebrate wetland health trend appears stable while the vegetation trend appears to be improving.

#### 4.3.4 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. There are raingardens that filter runoff from the Jensen Lake Trailhead parking lots, as well as, native plantings downslope of these infiltration basins.





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-facing woodland slope of Jensen Lake was identified by the MN DNR as a high quality Mesic Oak Forest. The north and east woodlands were more degraded with invasive species like buckthorn and honeysuckle which were removed and treated during restoration of this area. There are patches of reed canary grass and non-native cattails still present. 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

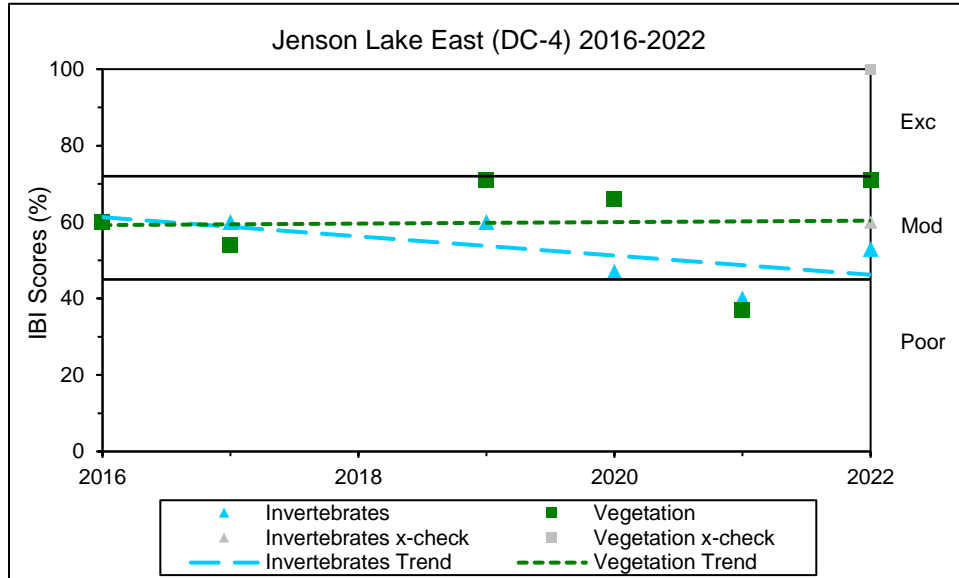
**Site Observations:** The wetland slope is gentle. The wetland substrate is very mucky, and made traversing the wetland difficult. Vegetation within the releve was largely diverse, though low in population sizes. Coontail (*Ceratophyllum* sp.), waterweed (*Elodea* sp.), water-nymph (*Najas* sp.), and pondweed (*Potamogeton* sp.) were found in the water column. Duckweed (*Lemna* sp.), yellow water-lily (*Nuphar* sp.), and white water-lily (*Nymphaea* sp.) sparsley floated on the water surface. Dogwood (*Cornus* sp.), cottonwood (*Populus* sp.), oak (*Quercus* sp.), sedge (*Carex* sp.), three-way sedge (*Dulichium arundinaceum*), bulrush (*Scirpus* sp.), water plantain (*Alisma* sp.), iris (*Iris* sp.), arrowhead (*Sagittaria* sp.), bur-reed (*Sparganium* sp.), and several other emergent forbs and grasses were represented. Leeches, dragonflies, snails, fingernail clams, trueflies, crustaceans, and bugs and beetles were collected.



**Table 4.3.4 Jensen Lake East (DC-4) Health based on Index of Biotic Integrity**

2022 Data (DC-4)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (16)	Moderate (25)
Cross-check Rating (IBI score)	Moderate (18)	Excellent (35)
Trend 2016-2022	Stable	Stable

**Figure 4.3.4 Invertebrate and vegetation trends for Jensen Lake East (DC-4)**



**Site summary:** This is the sixth year that Jensen Lake East has been monitored by WHEP since 2016. The invertebrate and vegetation scores were inconsistent with each other, differing by 18 percent; however, both scores indicate moderate wetland health. The invertebrate and vegetation data both appear stable. There is a high representation of vegetation and exist in small populations. No species dominates the area. This site was cross-checked by another WHEP teams. The invertebrate scores between the teams was consistent. The vegetation scores were inconsistent, differing by 29 percent. The cross-check team calculated a perfect vegetation score, finding bladderwort (*Utricularia* sp.), a larger population of sedges, and several non-vascular species which enhanced the vegetation wetland health score. Plot placement may have been a factor in the score differences.

### 4.3.5 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.





BBS WETLAND

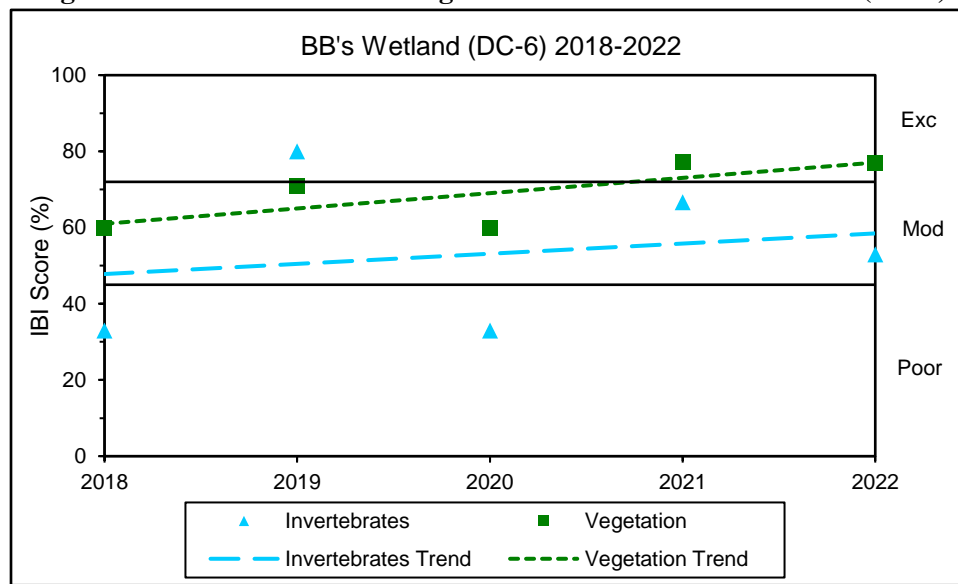
## Wetland Health

**Site Observations:** The wetland slope is gentle, and the wetland substrate is mucky. A hiking trail runs along the northern portion of the wetland. White water lily (*Nymphaea* sp.) and duckweeds (*Lemna* sp. and *Spirodela* sp.) float on the water surface. Coontail (*Ceratophyllum* sp.), water-milfoil (*Myriophyllum* sp.), and water-crowfoot (*Ranunculus* sp.) fill the water column. Sedges (*Carex* sp.), three-way sedge (*Dulichium arundinaceum*), spike rush (*Eleocharis* sp.), bulrush (*Scirpus* sp.), reed canary grass (*Phalaris arundinacea*), water plantain (*Alisma* sp.), iris (*Iris* sp.), bur-reed (*Sparganium* sp.), smartweed (*Polygonum* sp.), swamp milkweed (*Asclepias incarnata*), beggar-ticks (*Bidens* sp.), and several upland forbs and woody species were present. Leeches, dragonflies, damselflies, caddisflies, snails, trueflies, crustaceans, and bugs and beetles were collected.

**Table 4.3.5 BB's Wetland (DC-6) Health based on Index of Biotic Integrity**

2022 Data (DC-6)	Invertebrates 	Vegetation 
<b>Wetland Health Rating (IBI score)</b>	Moderate (16)	Excellent (27)
<b>Trend 2018-2022</b>	Variable	Stable

**Figure 4.3.5 Invertebrate and vegetation trends for BB's Wetland (DC-6)**



**Site summary:** This is the fifth consecutive year that BB's Wetland has been monitored by WHEP. The invertebrate and vegetation scores were inconsistent with each other, differing by 24 percent. The invertebrate score indicates moderate wetland health, and the vegetation score indicates excellent wetland health. Vegetation health trend appears stable, while the invertebrates health trend is variable. A high diversity of vegetation is present at this site. There is a high *Corixidae* proportion which is not favorable to wetland health.

#### 4.3.6 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 on the north side. 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 medium quality with a management goal to protect the area from reed canary grass and cattail invasion.



#### Wetland Health

**Site Observations:** The wetland slope is moderate, and the wetland substrate is mucky. Duckweed (*Lemna* sp.) and smartweed (*Polygonum* sp.) float on the water surface. There are no submergent vegetation species represented in the vegetation releve. Sedges (*Carex* sp.) flatsedge (*Cyperus* sp.), three-way sedge (*Dulichium arundinaceum*), bulrush (*Scirpus* sp.), reed canary grass (*Phalaris arundinacea*), water plantain (*Alisma* sp.), arrowhead (*Sagittaria* sp.), cattail (*Typha* sp.), and other upland forbs, grasses, and woody species were represented in vegetation releve. Leeches, damselflies, fingernail clams, crustaceans, and bugs and beetles were collected.

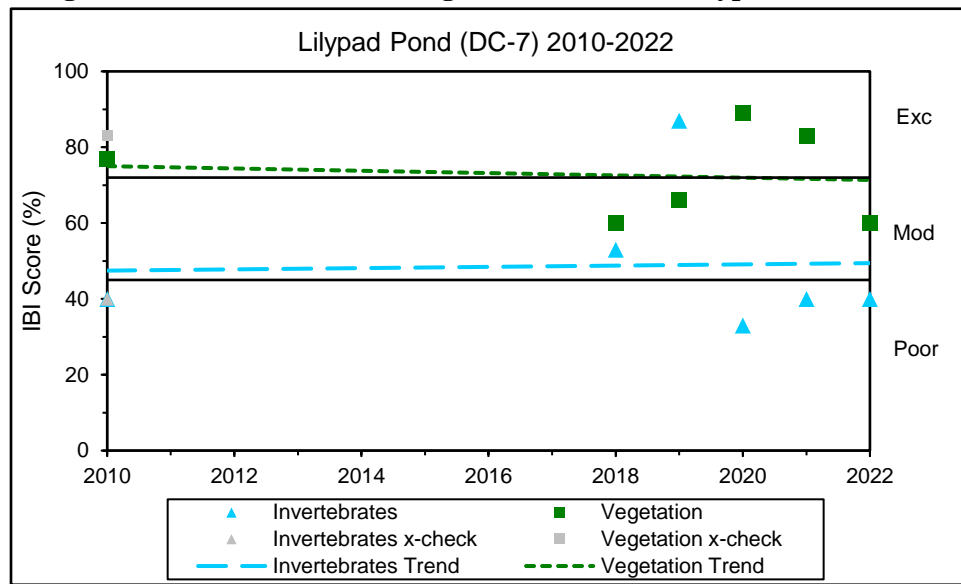


LILYPAD POND

**Table 4.3.6 Lilypad Pond (DC-7) Health based on Index of Biotic Integrity**

2022 Data (DC-7)	Invertebrates 	Vegetation 
<b>Wetland Health Rating (IBI score)</b>	Poor (12)	Moderate (21)
<b>Trend 2010-2022</b>	Stable	Stable

**Figure 4.3.6 Invertebrate and vegetation trends for Lilypad Pond (DC-7)**



**Site summary:** This is the sixth year (fifth consecutive) year that Lilypad Pond has been monitored, and by WHEP. It was first monitored in 2010 by the Eagan Team. The invertebrate and vegetation scores were inconsistent with each other, differing by 20 percent. Invertebrate data indicates a poor wetland health. The vegetation data indicates moderate wetland health. Data scores in 2020 and 2021 indicated excellent wetland health; however, vegetation health trends appear stable. Vegetation diversity is high; however, little submergent and floating vegetation presence may impact invertebrate habitat potential. Tadpoles were present and may have also affected the invertebrate population. Invertebrate scores have been consistent since 2020, but showing poorer results than in 2018 and 2019. The invertebrate trend appears stable.

### 4.3.7 Thompson Lake (DC-13)

Thompson Lake (DC-13) is a 10-acre, type 5, wetland located in the Lower Minnesota River watershed. There is an inlet on the north side from Lily Lake. There is a manmade outlet on the south side of the wetland. The lake has open water with cattails along the shoreline. An aspen woodland is along the east side of the lake. An oak dominated woodland spreads along the west side. There is a lot of buckthorn in the wooded areas. A native plant shoreline restoration was completed along the north and east sides in 2021. The wetland management goal is to monitor the success of this restoration.





This wetland is highly disturbed. Residential development is to the north and south. St. Croix Lutheran Academy and turf fields are to the east. There is a paved trail around the lake and a community center on the property. There is a lot of construction occurring within the park as it develops.

## Wetland Health

**Site Observations:** The wetland bank is steep with gentle slope upon entry. The wetland substrate is fairly firm. This wetland is often used for WHEP field methods training. Many species were represented in the vegetation releve, though all were observed in low population sizes. Duckweeds (*Lemna* sp. and *Spirodela* sp.) and water-smartweed (*Polygonum* sp.) floated on the surface of the water. Coontail (*Ceratophyllum* sp.), waterweed (*Elodea* sp.), water-milfoil (*Myriophyllum* sp.), and pondweed (*Potamogeton* sp.) were in the water column. Sedges (*Carex* sp.), flatsedge (*Cyperus* sp.), three-way sedge (*Dulichium arundinaceum*), rush (*Juncus* sp.), bulrush (*Scirpus* sp.), water plantain (*Alisma* sp.), pickerelweed (*Pontedaria cordata*), arrowhead (*Sagittaria* sp.), bur-reed (*Sparganium* sp.), and several other emergent grasses, forbs, and woody species were present. Dragonflies, damselflies, snails, true flies, and two bugs and beetles were collected.

**Table 4.3.7 Thompson Lake (DC-13) Health based on Index of Biotic Integrity**

2022 Data (DC-13)	Invertebrates 	Vegetation 
<b>Wetland Health Rating (IBI score)</b>	Poor (14)	Moderate (23)
<b>Trend 2022</b>	Not enough data	Not enough data

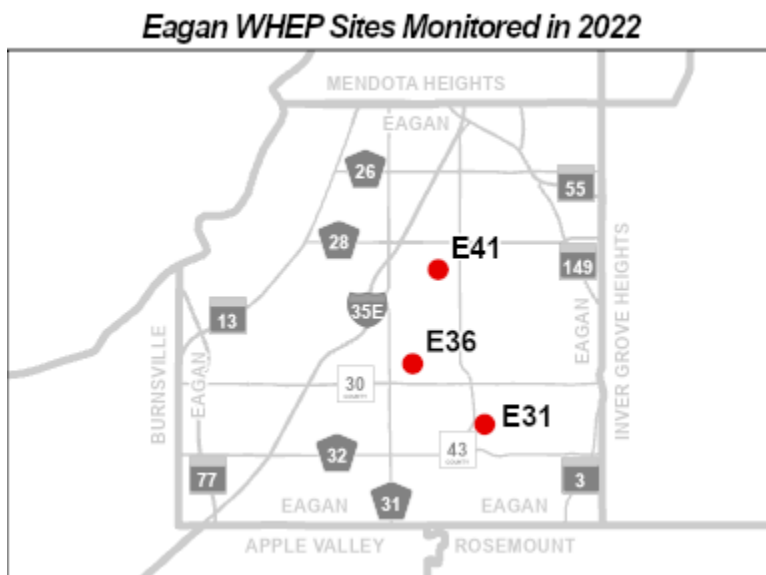
**Site summary:** This is the first year that Thompson Lake has been monitored by WHEP. The invertebrate and vegetation scores were inconsistent with each other, differing by 19 percent. The invertebrate score indicates poor wetland health while the vegetation score indicates moderate wetland health. Vegetation diversity is high; however, little submergent and floating vegetation presence may impact invertebrate habitat potential. More years of monitoring are needed to determine reliable wetland health trends.

## 4.4 Eagan Wetlands

Three wetlands were monitored within the City of Eagan in 2022. The City has 25 years of data! Forty-five wetlands have been monitored in Eagan since the initiation of WHEP in 1997.

**Team Leader:** Hannah Figura and Chris Figura

**Team Members:** Joel Aggerholm, Kayla Boettcher, Nicole Deziel, Rick Eller, Craig Harnagel, Jeanne Hines, Diane Lazarus, Rob McKenna, Mark Niznik, Brian Raney, and Greg Svendsen





This is Hannah Figura’s third year as Eagan WHEP team leader, with her father Chris assisting as an equipment and administrative assistant. Hannah is currently a junior at the University of Wisconsin–Stevens Point where she is majoring in Water Resource Management with a focus in wetland delineation. “Each WHEP season brings new experiences and new challenges. This season was better than last, as water levels were up and we found a few new varieties of vegetation and invertebrates. We had solid participation from our volunteers, especially for our labs. Eagan was once again blessed with an excellent team of experienced returning volunteers and eager first timers.”



HANNAH FIGURA



JESSIE KOEHLE AND ERIC MACBETH

Eric Macbeth has managed Eagan’s water resources programs since 1999, to protect and improve surface waters and prevent stormwater pollution. Eric is retiring at the end of 2022, and we celebrate his 23-plus dedicated years serving the Eagan community! Eagan has a total of four full-time Water Resources staff including Specialist Jessie Koehle who joined the City in 2007 with a fisheries and aquatic science background. City staff members select WHEP sampling sites, communicate with Eagan’s WHEP team leader, and provide local support as needed. Eric and Jessie greatly appreciate the time and effort spent by WHEP volunteers, and they recognize the importance of having

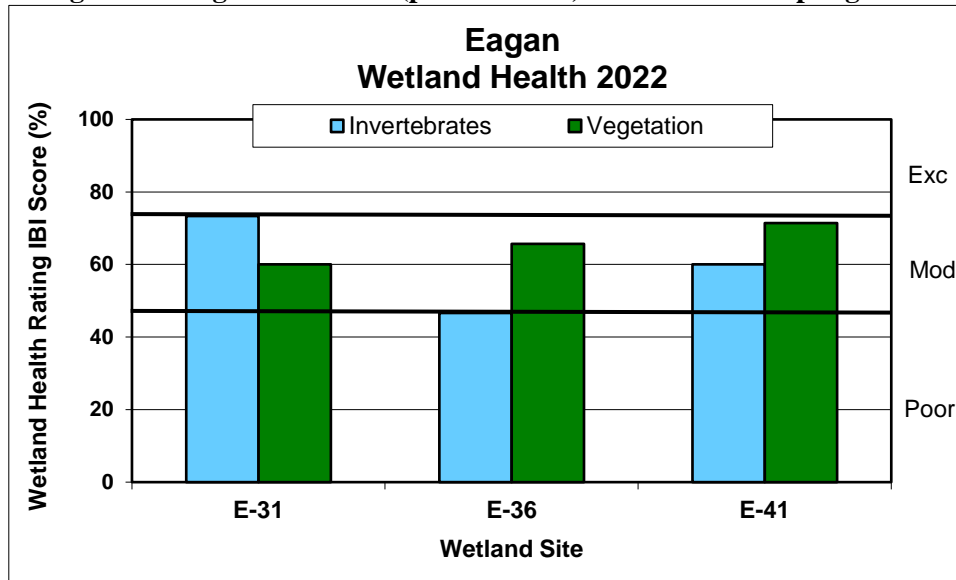
informed and caring residents who want to help protect local wetlands. Eagan WHEP data can help identify areas of special concern and historical perspectives on wetland health. Eagan has hundreds of natural waterbodies offering residents daily opportunities to encounter water and wildlife; WHEP helps strengthen the community’s appreciation of these resources and enhances public support of our programs.

## Eagan General Wetland Health

Figure 4.4 presents an overall view of wetland health for all of the 2022 monitoring sites in Eagan 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. Three wetlands were monitored in the City of Eagan in 2022. The Eagan wetlands exhibited poor to moderate wetland health based on invertebrate and vegetation data. The invertebrates and vegetation scores for all three wetlands were inconsistent in 2022, differing by 13, 19, and 11 percent.

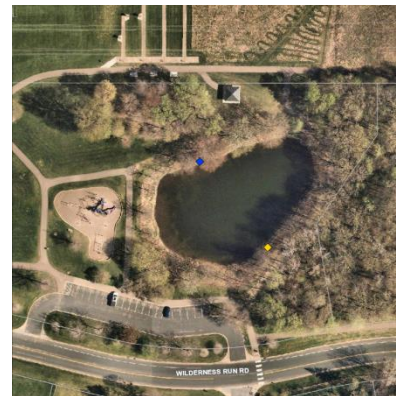


Figure 4.4 Eagan site scores (percent form) for the 2022 sampling season



#### 4.4.1 LP-69.1 (E-31)

LP-69.1 (E-31) at Walnut Hill Park is a 0.65-acre, type 5 wetland within the Eagan-Inver Grove Heights Watershed. The watershed has 20.5 acres of direct drainage with approximately 10 percent impervious surface. There is one inlet on the north side of the wetland and one outlet on the far southeast side. The wetland is included in the City's stormwater management plan. The City has a general wetland management plan. 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 wetland is surrounded by flat, grassy parkland and paved walking trails. A 20-foot wide no-mow buffer and 10-year old native planting which is minimally maintained, surround the wetland. The adjacent land is slightly sloped.

#### Wetland Health

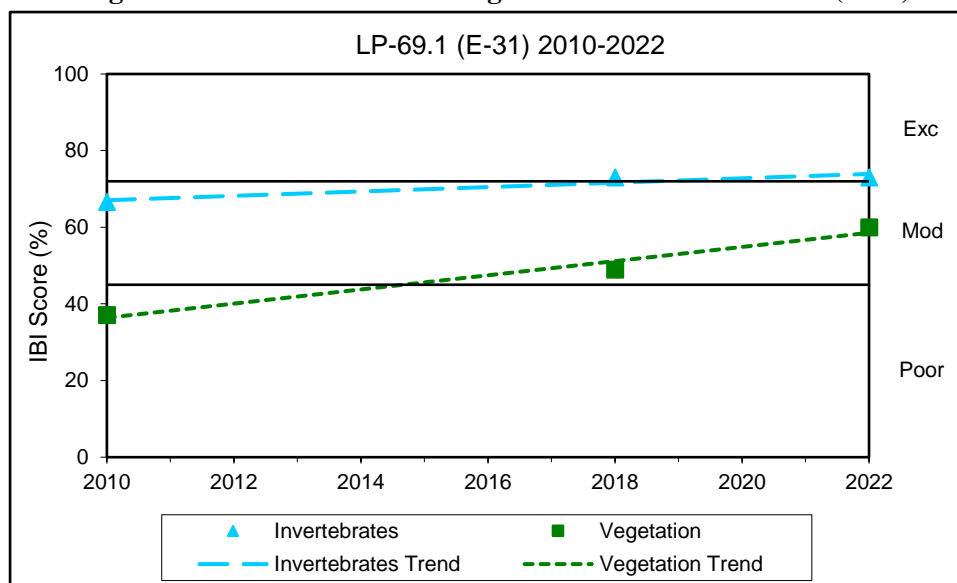
**Site Observations:** The wetland is immediately next to a playground. Coontail (*Ceratophyllum* sp.) densely dominates the water column. Duckweed (*Lemna* sp. and *Spirodela* sp.) and purple-fringed Riccia (*Ricciocarpus natans*) covered much of the wetland surface. Burreed (*Sparganium* sp.), arrowhead (*Sagittaria* sp.), water plantain (*Alisma* sp.), sedge (*Carex* sp.), spike-rush (*Eleocharis* sp.), cut grass (*Leersia* sp.), reed canary grass (*Phalaris arundinacea*) were also present. Cattails (*Typha* sp.) and larger populations of bulrush (*Scirpus* sp.) were noticed around the wetland, but not identified in the vegetation

releve. Dragonflies, damselflies, mayflies, caddisflies, snails, trueflies, crustaceans, and beetles and bugs were collected. Woodducks, mallards, and toads were also observed.

**Table 4.4.1 LP-69.1 (E-31) Wetland Health based on Index of Biotic Integrity**

2022 Data (E-31)	Invertebrates 	Vegetation 
<b>Wetland Health Rating (IBI score)</b>	Moderate (22)	Moderate (21)
<b>Trend 2010-2022</b>	Not enough data	Not enough data

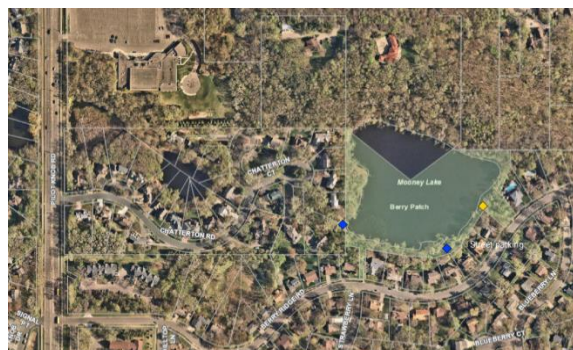
**Figure 4.4.1 Invertebrate and vegetation trends for LP-69.1 (E-31)**



**Site summary:** This is the third time that E-31 has been surveyed since 2010. The invertebrates and vegetation scores were inconsistent, differing by 13 percent; however, both scores indicate moderate wetland health. More years of data will help determine a more reliable wetland health trend.

#### 4.4.2 Mooney Pond (E-36)

Mooney Pond (E-36), also known as Mooney Lake, is a 7.5-acre, type 5 wetland within the Eagan-Inver Grove Heights Watershed, within the City’s “J” stormwater district that eventually drains to Fish Lake. The watershed has 40.9 acres of direct drainage with 25 percent impervious surface. There are three inlets along the southern shoreline and one outlet on the eastern shoreline. It is part of the City’s stormwater management plan. The City has a general wetland management plan. Eagan designates Mooney Pond as





a Class L3 lake, with management goals to protect and improve water quality, support wildlife habitat, educational opportunities, and aesthetics.

Mooney Pond is located in a wooded, hilly, mostly residential area. This lake gets runoff from the surrounding residential areas and may be vulnerable to nutrient pollution from stormwater runoff. In most cases, City-owned park land, providing wooded buffer, exists between the residential back yards and the water. Goldfish have been seen in past decades but may have been affected by winterkill. Minnows are present which may impact invertebrate sampling.

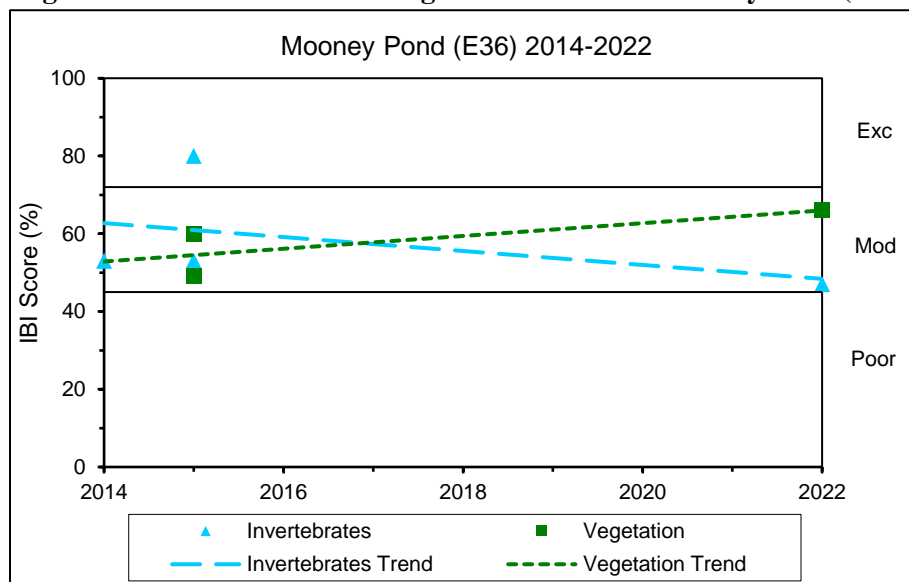
## Wetland Health

**Site Observations:** The wetland slope is gentle. The wetland substrate is mucky. Coontail (*Ceratophyllum* sp.), pondweed (*Potamogeton* sp.), and water-nymph (*Najas* sp.) fill the water column. Duckweed (*Lemna* sp. and *Spirodela* sp.), sparsely float on the open water. Bulrush (*Scirpus* sp.), sedge (*Carex* sp.), cut grass (*Leersia* sp.), and reed canary grass (*Phalaris arundinacea*), and small representations of other emergent forbs were also present. Leeches, dragonflies, mayflies, caddisflies, snails, crustaceans, and bugs and beetles were collected. Turtles, frogs, and muskrats were observed.

**Table 4.4.2 Mooney Pond (E-36) Wetland Health based on Index of Biotic Integrity**

2022 Data (E-36)	Invertebrates 	Vegetation 
<b>Wetland Health Rating (IBI score)</b>	Poor (14)	Moderate (23)
<b>Trend 2014-2022</b>	Not enough data	Not enough data

**Figure 4.4.2 Invertebrate and vegetation trends for Mooney Pond (E-36)**



**Site summary:** This is the third time that E-36 has been surveyed for WHEP since 2014. The invertebrate and vegetation scores were inconsistent, differing by 19 percent. The invertebrates score indicates poor wetland health while the vegetation score indicates moderate wetland health. This vegetation relevé at this site was cross-checked by Bolton & Menk. Vegetation identification was similar between the Eagan team and the third-party review. Minnows are present and may impact the invertebrate sample. Minnows were observed by Eagan team and Bolton & Menk surveyor. The fish population may be impacting the invertebrate population and affecting the wetland health score. More years of data will help determine more reliable health trends.

#### 4.4.3 O’Leary Lake (E-41)

O’Leary Lake (E-41) is a 16-acre, type 5 wetland within the Eagan-Inver Grove Heights Watershed which eventually flows to LeMay Lake. The watershed receives 48 acres of direct drainage with approximately 35 percent impervious surface. The wetland is irregularly shaped and consists of three basins connected by narrow channels. There are six inlets around the perimeter of the wetland, and one outlet on the far eastern shoreline. The wetland is included in the City’s stormwater management plan. The City has a general wetland management plan. Eagan designates O’Leary Lake as a Class L3 lake, with management goals to protect and improve water quality, support wildlife habitat, educational opportunities, and aesthetics. Stormwater ponds and an iron-sand filter are upstream of O’Leary Lake for water that is coming from the nearby business area.





The wetland shoreline is both publicly and privately owned. It has a wooded buffer. City-owned park land is between residential yards and Mooney Pond, in most cases. A City park path runs on the south side.

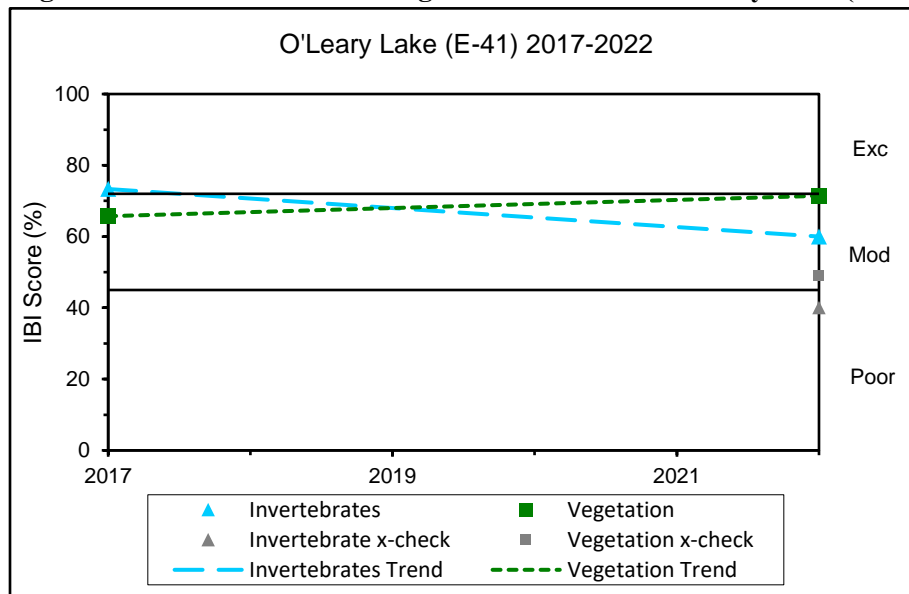
#### Wetland Health

**Site Observations:** The wetland slope is gentle. The wetland substrate is mucky and uneven. Willow trees (*Salix* sp.), oak trees (*Quercus* sp.), ash trees (*Fraxinus* sp.), maple trees (*Acer* sp.), and elm trees (*Ulmus* sp.) grow along the shoreline. Coontail (*Ceratophyllum* sp.), waterweed (*Elodea* sp.), and pondweed (*Potamogeton* sp.) filled the water column. White water-lily (*Nymphaea* sp.) covered the surface of the water. Duckweeds (*Lemna* sp. and *Spirodela* sp.) and water-meal (*Wolffia* sp.) sparsely float on the open water. Several emergent forbs and grasslike plants were represented in small populations, including bulrush (*Scirpus* sp.), iris (*Iris* sp.), bur-reed (*Sparganium* sp.), and smartweed (*Polygonum* sp.). Leeches, dragonflies, damselflies, caddisflies, snails, crustaceans, and bugs and beetles were collected. Ducks and minnows were observed.

**Table 4.4.3 O'Leary Lake (E-41) Wetland Health based on Index of Biotic Integrity**

2022 Data (E-41)	Invertebrates 	Vegetation 
<b>Wetland Health Rating (IBI score)</b>	Moderate (18)	Moderate (25)
<b>Cross-check Rating (IBI score)</b>	Poor (12)	Moderate (17)
<b>Trend 2017-2022</b>	Not enough data	Not enough data

**Figure 4.4.3 Invertebrate and vegetation trends for O'Leary Lake (E-41)**



**Site summary:** This is the second time that E-41 has been surveyed for WHEP since 2017. The invertebrates and vegetation scores were inconsistent, differing by 11 percent; however, both scores indicate moderate wetland health. The presence of minnows may have impacted invertebrate samples. This site was cross-checked by another team. The scores were inconsistent. The invertebrate scores for each team differed by 20 percent and the vegetation scores for each team differed by 22 percent. The invertebrate score indicates moderate wetland health while the vegetation score indicates poor wetland health. Overall, the Eagan team collected a larger diversity of invertebrates. Minnows were found in the bottle traps of both teams. Crayfish were also observed by the cross-check team. Plot placement likely affected the difference in vegetation scores, as the Eagan team identified several species of emergent forbs and grasslike plants while the cross-check did not have any within the vegetation releve. More years of data will help determine more reliable health trends.



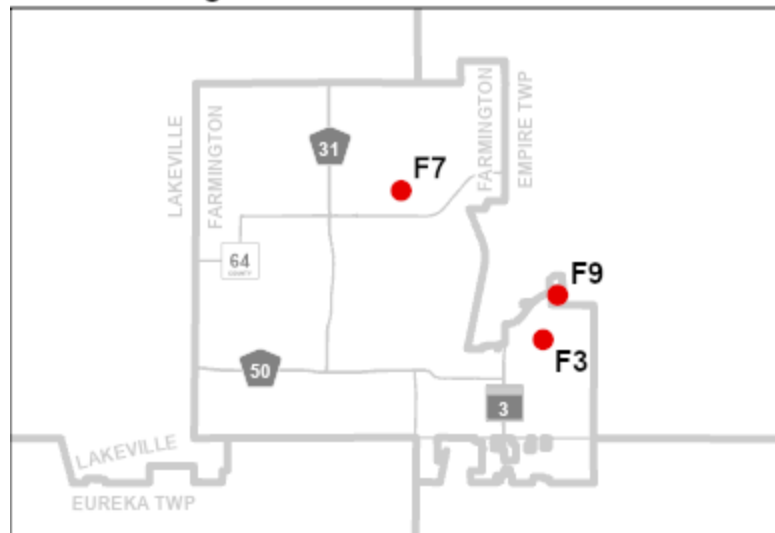
## 4.5 Farmington Wetlands

Three wetlands were monitored within the City of Farmington in 2022. The City has 25 years of data! Nine wetlands have been monitored in Farmington since the initiation of WHEP in 1997.

**Team Leader:** Rick Schuldt

**Team Members:** Tracy Crofoot, Josiah Hakala, Chan Harries, Denise Hennigar, Katie Koch-Laveen, Marcia Richter, and Calan Schuldt.

### *Farmington WHEP Sites Monitored in 2022*



RICK SCHULDt

Rick Schuldt has been involved with the Farmington WHEP Team for 12 years including 6 years as Team Leader. As a graduate of the University of Minnesota with a degree in wildlife management, (let us just say many years ago) he has always enjoyed the outdoors. He spent 15 years assessing sea lamprey populations in Great Lakes tributaries with the US Fish and Wildlife Service's Sea Lamprey Control Program. Management of the program in the Regional Office at Fort Snelling brought him back to his native Minnesota. In retirement, WHEP affords him an opportunity to follow year to year changes in the character of the biota and flora of local wetlands.

He says, "It is a pleasure to work with other volunteers who have an interest in the health of our local wetlands." Several school teachers have been the backbone of the team since its inception. This year Marcia Richter, a volunteer for the past 19 years, left the team to move to the state of Virginia. She referred to wetland volunteering as "putting on waders to muck around in the swamp". He admits, "We will miss her expertise in plant identification and wish her well. We enjoy having young people join our team as they bring an interesting perspective and are eager to learn." Rick was pleased this year to have his grandson Calan, a Lakeville North junior, join us.



EDWARD RUTLEDGE

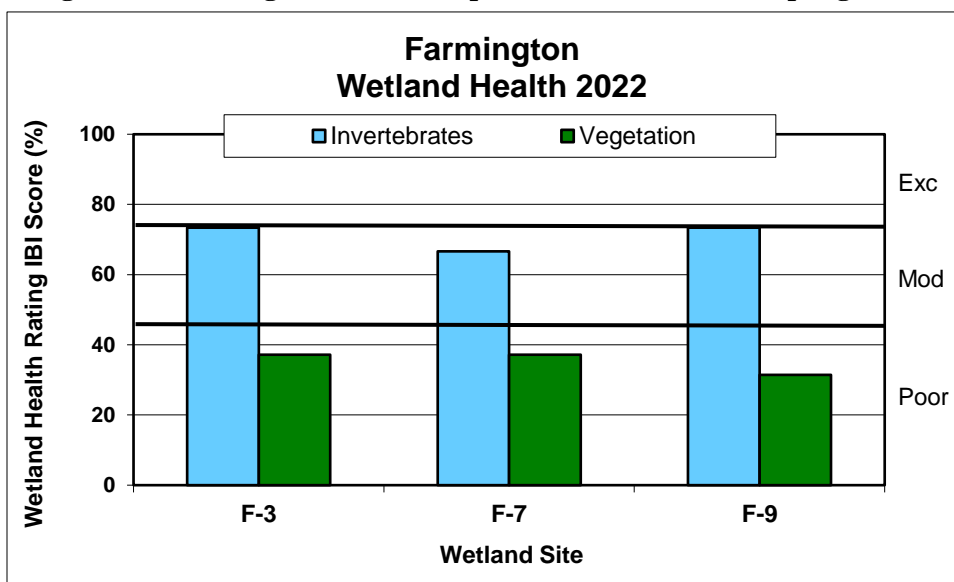
Edward Rutledge is the new (as of August 2022) Natural Resource Specialist for the City of Farmington. He explains, "As Natural Resource Specialist I am responsible for coordinating the City's natural resource activities which includes, managing the city's urban forest, enforcement of erosion control and wetland buffers, pond revitalization and various other duties related to natural resource management. The role of the City in WHEP is to decide which wetlands are to be monitored, provide administrative support to the volunteers, review the data, and publicize the program through local media sources.

“WHEP is important as it helps us monitor changes in our wetland system as Farmington continues to develop. Our WHEP volunteers are skilled and dedicated. The City is grateful for their hard work and we value the data that comes out of the monitoring. I’m looking forward to getting to know the volunteers next sampling season. Coming into my new role I was impressed that the City has had a WHEP volunteer group since 1997. Because of this long track record of data, we can observe trends with better confidence.”

## Farmington General Wetland Health

Figure 4.5 presents an overall view of wetland health for all the 2022 monitoring sites in Farmington 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. All three wetlands indicate poor wetland health based on vegetation scores and moderate wetland health based on invertebrate scores. Invertebrate and vegetation health scores were inconsistent for all three wetlands, differing by 36, 30, and 42 percent.

**Figure 4.5 Farmington site scores (percent) for the 2022 sampling season**



### 4.5.1 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 stormwater management plan. It is also 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. The management goal is to monitor and document how different land uses impact man-made wetlands over time. There is development to the north, south, and west, and agriculture to the east. Native vegetation serves as a buffer around the wetland.

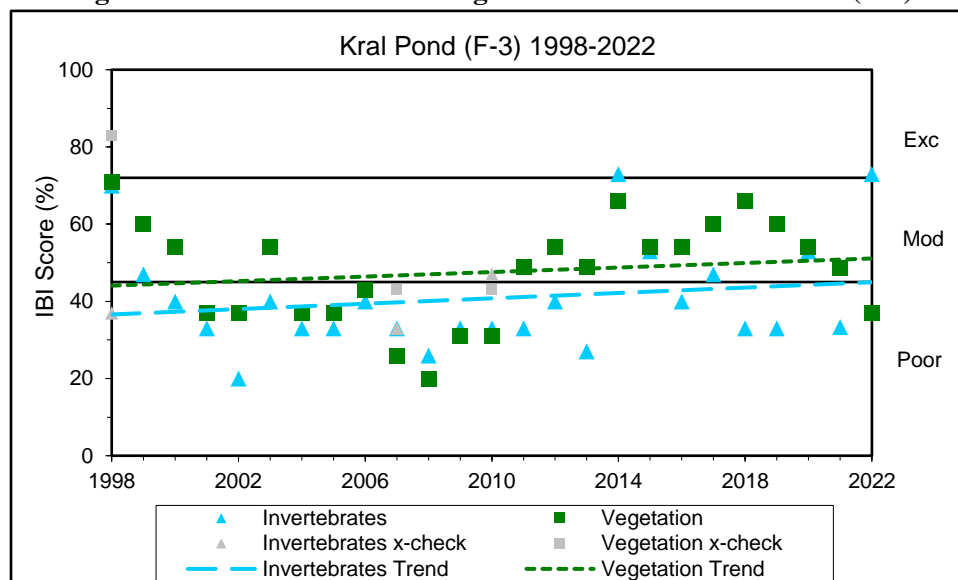
## Wetland Health

**Site Observations:** The wetland slope is steep. The wetland substrate is muddy. This is a large wetland (lake) with an extensive ring of cattails. Anglers use this site to launch kayaks, canoes, and small boats, though not heavily accessed. This is the second year (2021 and 2022) of low water conditions. Emergent plants were not included in the vegetation plot due to the retreating shoreline (same as 2021). Duckweed (*Lemna* sp. and *Spirodela* sp.) and water-meal (*Wolffia* sp.) covered the open water present. Pondweed (*Potamogeton* sp.), water milfoil (*Myriophyllum* sp.), water-nymph (*Najas* sp.), and coontail (*Ceratophyllum* sp.) were present in the water column. Invasive species, including curly-leaf pondweed (*Potamogeton crispus*) and Eurasian water-milfoil (*Myriophyllum spicatum*) were present. Leeches, dragonflies, damselflies, snails, crustaceans, and a two beetles were collected.

**Table 4.5.1 Kral Pond (F-3) Wetland Health based on Index of Biotic Integrity**

2022 Data (F-3)	Invertebrates 	Vegetation 
<b>Wetland Health Rating (IBI score)</b>	Moderate (22)	Poor (13)
<b>Trend 1998-2022</b>	Variable	Variable

**Figure 4.5.1 Invertebrate and vegetation trends for Kral Pond (F-3)**



**Site summary:** Kral Pond has been monitored for 25 consecutive years. The invertebrate and vegetation scores were inconsistent in 2021, differing by 36 percent. The invertebrates score indicates moderate wetland health while the vegetation score indicates poor wetland health. This is opposite of many previous years of surveys. Vegetation scores are more often higher than invertebrate scores. In 2022, shoreline emergent vegetation was not represented due to levee placement in the receding water. The team commented that “the lack of rain over the last two seasons has reduced water levels in all Farmington sites but was especially noticeable at this shallow wetland. For the second year it is going into winter without water. Snow melt and spring rains refreshed the site and we were surprised at the recovery of macroinvertebrates and plants there this summer.” The data throughout the years has been variable. The vegetation scores have gradually declined and improved each decade. The invertebrate scores are consistently poor with exception data collected in 1998, 2014, and 2022. A larger diversity of mayflies, caddisflies, and snails were present in invertebrate collection in 2022, which enhanced the metric scoring for the invertebrate wetland health score.



JOSIAH HAKALA USING BOARD IN MUCKY SUBSTRATE



CALAN SCHULTZ RETRIEVING A BOTTLE TRAP

#### 4.5.2 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 water ultimately flows to North Creek. 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 monitor and document the health of a wetland surrounded by forest, agriculture, and residential with possible future development.



Autumn Glen lies within City-owned land. It 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. Forest and agricultural landscapes exist to the east and includes Jim Bell Park and Preserve. Man-made basins exist adjacently north and south of the wetland. There is residential development to the north, south, and west of the land.



## Wetland Health

**Site Observations:** The wetland slope is gentle and the substrate is mucky. A bicycle path runs along the south side of the wetland. Water levels were very low in 2022, dropping more in July during vegetation survey. A meadow of reed canary grass (*Phalaris arundinacea*) surrounds the wetland. Water-nymph (*Najas* sp.) and water-crowfoot (*Ranunculus* sp.) were densely matted in the shallow water. Spike-rush (*Eleocharis* sp.), bulrush (*Scirpus* sp.), and water plantain (*Alisma* sp.) were dominant, as well. The Farmington team noted that this is first time in six years that water plantain has been represented. It is being heavily browsed. Leeches, dragonflies, mayflies, caddisflies, snails, trueflies, crustaceans, and bugs and beetles were collected.

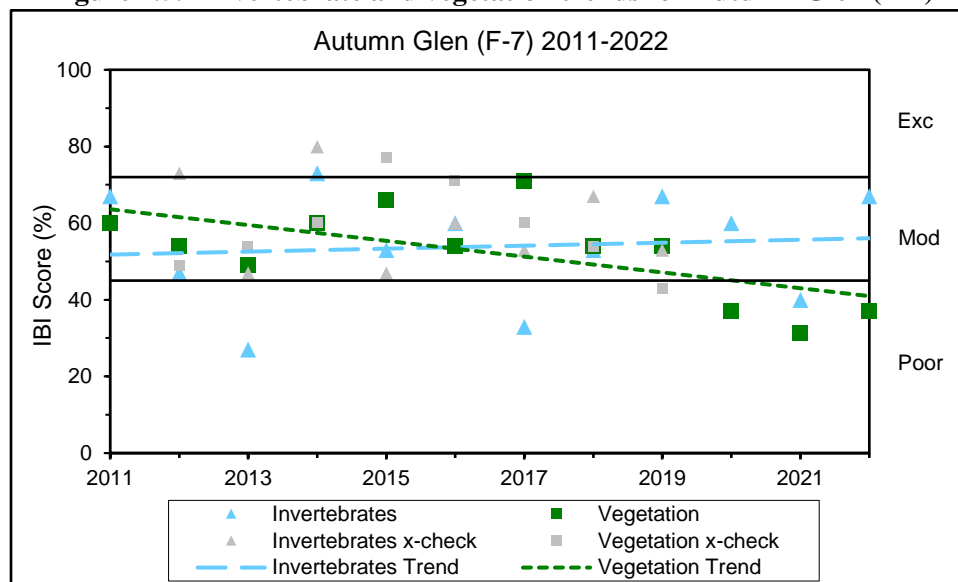


KATIE KOCH-LAVEEN, MARCIA RICHTER, AND  
CHAN HARRIES SORTING SAMPLES IN LAB

**Table 4.5.2 Autumn Glen (F-7) Wetland Health based on Index of Biotic Integrity**

2022 Data (F-7)	Invertebrates 	Vegetation 
<b>Wetland Health Rating (IBI score)</b>	Moderate (20)	Poor (13)
<b>Trend 2011-2022</b>	Variable	Variable

**Figure 4.5.2 Invertebrate and vegetation trends for Autumn Glen (F-7)**





**Site Summary:** This is the twelfth consecutive year that Autumn Glen has been monitored. The invertebrate and vegetation scores were not consistent with each other, differing by 30 percent. The invertebrate score indicates moderate wetland health while the vegetation score indicates poor wetland health. Vegetation diversity has been lower since 2019. The 2022 invertebrate scores appear similar to most years. The vegetation releve at this site was cross-checked by Bolton & Menk in 2022. Vegetation identification was similar for the Farmington team and the third-party surveyor. Long term health trends for invertebrates appear stable. The vegetation health trend are showing signs of decline. The encroaching reed canary grass may be impacting the vegetation diversity.



DENISE HENNIGAR TAKING NOTES

### 4.5.3 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 exists to the north and west of the wetland.

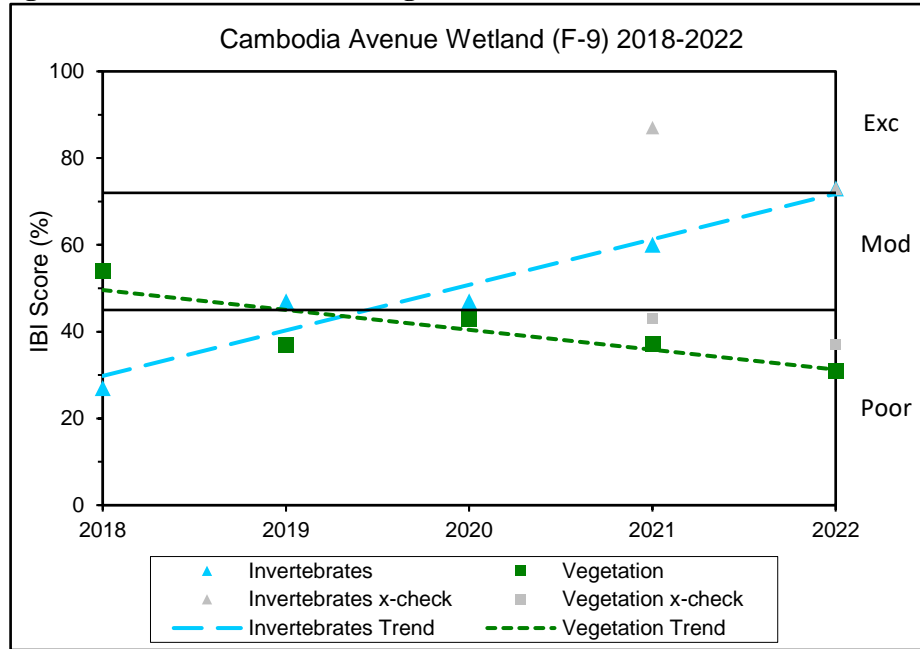
### Wetland Health

**Site Observations:** The wetland slope is gentle, and the substrate is sandy and uneven. It is a small wetland with open water covered by white water lilies (*Nymphaea* sp.) and surrounded by cattails (*Typha* sp.). Dense populations of coontail (*Ceratophyllum* sp.) and pondweed (*Potamogeton* sp.) dominated the water column. Duckweeds (*Lemna* sp. and *Spirodela* sp.) were also present. No other emergent vegetation was found in releve. Sedges (*Carex* sp.) and blue grass (*Poa* sp.) were also present. Leeches, dragonflies, damselflies, mayflies, caddisflies, snails, trueflies, crustaceans, and bugs and beetles were collected.

**Table 4.5.3 Cambodia Avenue (F-9) Wetland Health based on Index of Biotic Integrity**

2022 Data (F-9)	Invertebrates 	Vegetation 
<b>Wetland Health Rating (IBI score)</b>	Moderate (22)	Poor (11)
<b>Cross-check Rating (IBI score)</b>	Moderate (22)	Poor (13)
<b>Trend 2018-2022</b>	Not enough data	Not enough data

**Figure 4.5.3 Invertebrate and vegetation trends for Cambodia Avenue (F-9)**



**Site Summary:** This is the fifth consecutive year that Cambodia Avenue wetland has been surveyed for WHEP. Invertebrate and vegetation scores were inconsistent with each other, differing by 42 percent. The invertebrates score indicates moderate wetland health while the vegetation score indicates poor wetland health. The wetland is crowded with vegetation providing invertebrate habitat; however, the diversity of vegetation is low. The team commented that, “an oddity in our collections at this site was the capture in a bottle trap of a small (4-inch) northern pike which per the DNR may have resulted from adults that traveled upstream from the Vermillion River to spawn.” This wetland was cross-checked by another team. The vegetation data was very similar between teams. The invertebrate data was also similar between teams. The cross-check team collected leeches while the Farmington team did not. This affected the leech metric and difference in invertebrate scoring between the teams. The vegetation trend appears stable. The invertebrates scores have improved each year surveyed. More years of data are needed to help determine a more reliable health trend.

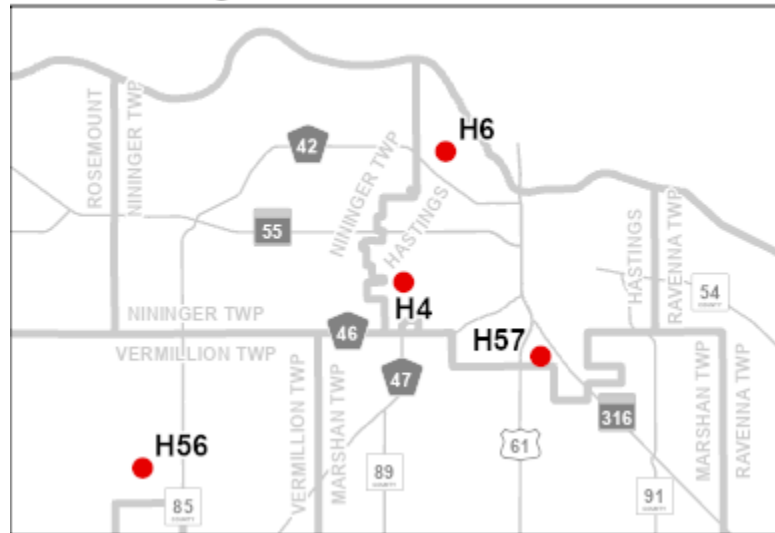
## 4.6 Hastings Wetlands

Four wetlands were monitored within the City of Hastings in 2022. The City has 24 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:** Tricia Bremer, Ivy Frater, John Kaufman, Sophie Keith, Rolf Lalone, Rick Logan, Mary McConnell, Mike Nelson, Jack Sadowski, Dwight Smith, and Alex Theisen.

*Hastings WHEP Sites Monitored in 2022*



JESSIE ECKROAD AND  
ALEX THEISEN

The 2022 season was Jessie Eckroad's eighth year as the Hastings WHEP team leader. As an environmental scientist, Jessie has been involved with several water quality monitoring and education projects over the last decade. Clean water is a cause that she is very passionate about, and she feels honored to be a part of citizen-science efforts like WHEP. While she views the scientific aspects of WHEP as being very valuable, her favorite part of WHEP is building relationships with her teammates and fellow Hastings residents. She enjoys getting to know people with a variety of personal and professional experiences, and feels fortunate to count many of her teammates as friends. Jessie's favorite WHEP activity is identifying macroinvertebrates in the lab and spending time in the field with her husband.

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 dedicated volunteers had another successful year to which is very much appreciated by the City of Hastings. The health of area ponds depend on the surrounding land management practices. The many hours of hard work provide the data necessary for City officials to make informed decisions. Thank you!"



JOHN CAVEN

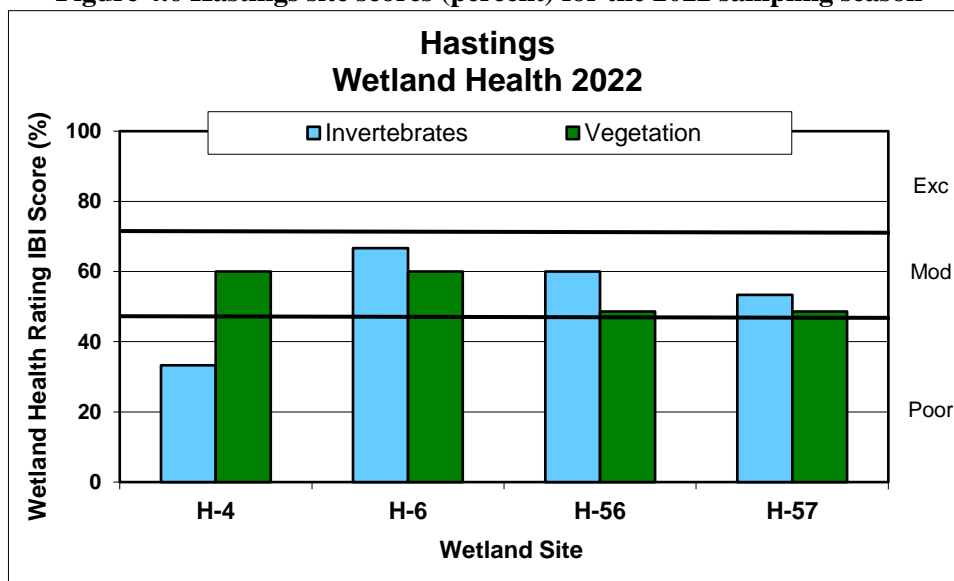
## Hastings General Wetland Health

Figure 4.6 presents an overall view of wetland health for all the 2022 monitoring sites in Hastings 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 wetlands showed poor to moderate wetland health in 2022. Invertebrate and vegetation scores for H-6, H-56, and H-57 were inconsistent, differing by 11, 17, and 18 percent, respectively.



JOHN KAUFMAN, DWIGHT SMITH, JENZ KAUFMAN, ROLF LALONE, AND JULIA KAUFMAN

**Figure 4.6 Hastings site scores (percent) for the 2022 sampling season**



### 4.6.1 Stonegate Treated Wetland (H-4)

Stonegate Treated Wetland (H-4) 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. The detention pond is 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 wetland is primarily residential with private property on three sides and a public trail along the south side. 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.

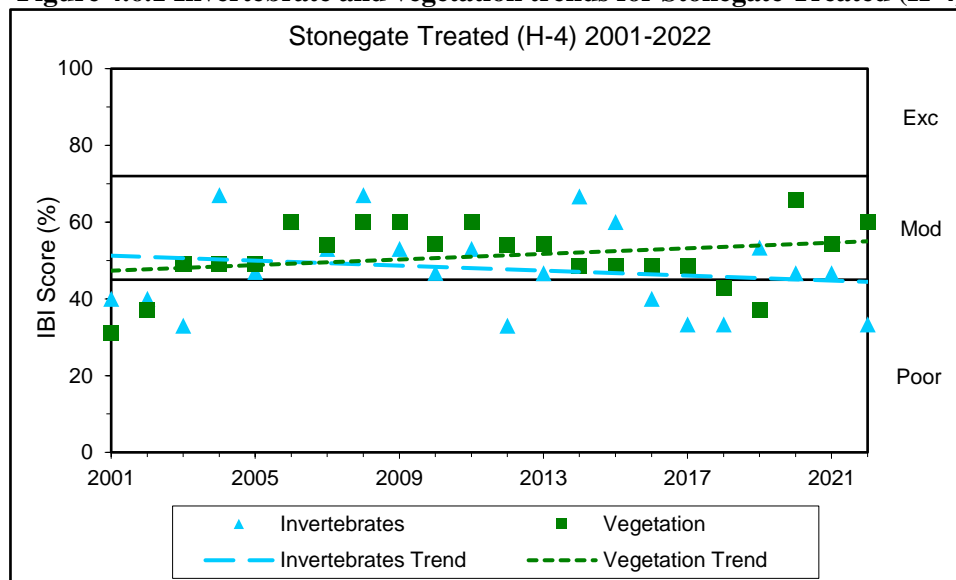
## Wetland Health

**Site Observations:** The wetland slope is gentle. The substrate is sandy and fairly solid. The 5x20 meter plot was set along the southern edge of the wetland in water up to 4 feet deep. Coontail (*Ceratophyllum* sp.) and pondweed (*Potamogeton* sp.) were the only submergent or floating forbs found in the water. Cattail (*Typha* sp.) and sensitive fern (*Onoclea sensibilis*) were present. Mostly emergent woody, grasses, and forbs were represented in the vegetation releve, including: willow trees (*Salix* sp.), dogwood trees (*Cornus* sp.), bulrush (*Scirpus* sp.), cut grass (*Leersia* sp.), sedges (*Carex* sp.), cattail (*Typha* sp.), swamp milkweed (*Asclepias incarnata*), bugle weed (*Lycopus* sp.), smartweed (*Polygonum* sp.), and several other upland species. Leeches, caddisflies, true flies, and three individual bugs and beetles were collected.

**Table 4.6.1 Stonegate Treated (H-4) Health based on Index of Biotic Integrity**

2022 Data (H-4)	Invertebrates 	Vegetation 
<b>Wetland Health Rating (IBI score)</b>	Poor (10)	Moderate (21)
<b>Trend 2001-2022</b>	Stable	Stable

**Figure 4.6.1 Invertebrate and vegetation trends for Stonegate Treated (H-4)**

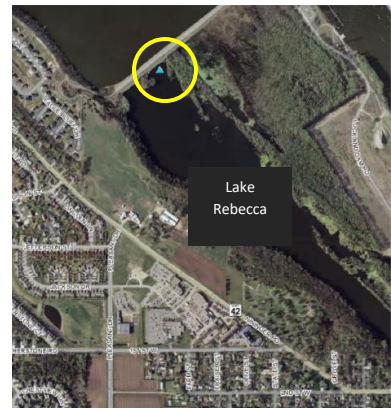




**Site summary:** This is the 22nd consecutive year that Stonegate Treated has been surveyed! The invertebrates and vegetation scores were inconsistent in 2022, differing by 27 percent. The invertebrate score indicates poor wetland health while the vegetation score indicates moderate wetland health. The scores are variable over the years. In general, the invertebrate scores are often lower than the vegetation scores. The vegetation diversity lacks submergent and floating species, but the vegetation score is aided by a larger emergent plant community along the shoreline. The lack of submergent and floating vegetation likely impairs the invertebrate community. The long-term trends for both vegetation and invertebrates appear stable.

#### 4.6.2 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 has 1 percent impervious surface. 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.





MIKE NELSON AND JACK SADOWSKI

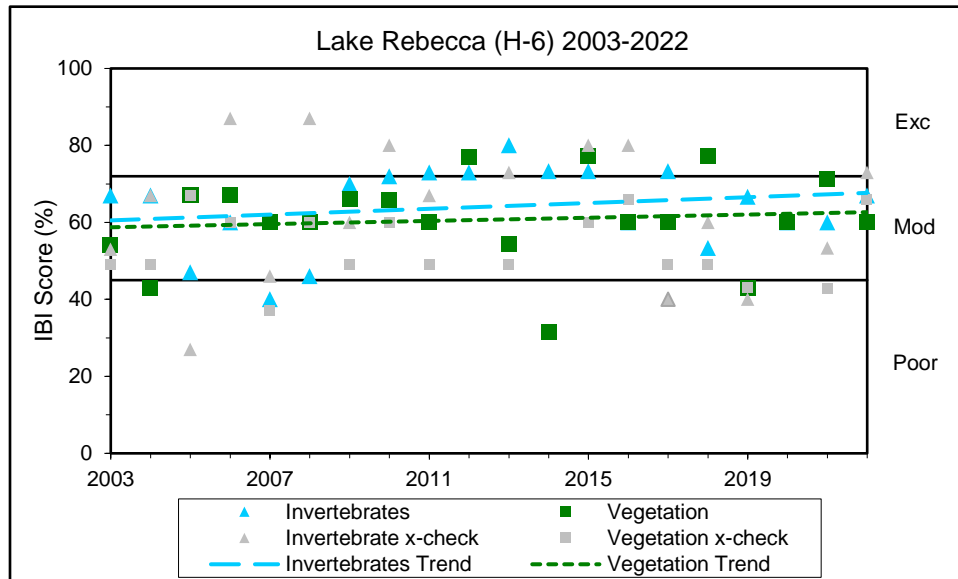
#### Wetland Health

**Site Observations:** The wetland slope is gentle. The wetland substrate is sandy and solid. Fallen logs are in the water. 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. Maple trees (*Acer* sp.) and ash trees (*Fraxinus* sp.) hang over the plot. Coontail (*Ceratophyllum* sp.), waterweed (*Elodea* sp.), and pondweed (*Potamogeton* sp.) fill the water column. Duckweed (*Lemna* sp.) and water-meal (*Wolffia* sp.) cover the open water. Sedges (*Carex* sp.), spike-rush (*Eleocharis* sp.), cut grass (*Leersia* sp.), smartweed (*Polygonum* sp.), water-plantain (*Alisma* sp.), and bur-reed (*Sparganium* sp.), and cattail (*Typha* sp.) were also present. Leeches, damselflies, mayflies, caddisflies, snails, trueflies, crustaceans, and bugs and beetles were collected.

**Table 4.6.2 Lake Rebecca (H-6) Wetland Health based on Index of Biotic Integrity**

2022 Data (H-6)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (20)	Moderate (21)
Cross-check Rating (IBI score)	Moderate (22)	Moderate (23)
Trend 2003-2022	Stable	Stable

**Figure 4.6.2 Invertebrate and vegetation trends for Lake Rebecca (H-6)**



**Site summary:** This is the 20th consecutive year of monitoring for Lake Rebecca. Invertebrate and vegetation scores are considered consistent, and both scores indicate moderate wetland health. With the exception of a few variable years, the invertebrates and vegetation scores show long-term stable health trends. This site was cross-checked by another team in 2022. The invertebrates and vegetation scores between the two teams were consistent with similar data.

### 4.6.3 180<sup>th</sup> Street Marsh (H-56)

180<sup>th</sup> Street Marsh (H-56) is a 20-acre open water wetland located in the Vermillion River Watershed. The wetland drainage area is 340 acres, and is less than one percent impervious. The wetland has one inlet on the west side. It also has one outlet that flows south to the Vermillion River from a culvert under 180<sup>th</sup> Street. This wetland is not part of the City's stormwater management plan; it is in Dakota County and not under the management of the City.



The wetland is a part of several natural ponds in this agricultural area. The ponds partially cover several parcels of land; each parcel owned by a different party. Management practices are dependent on individual property owners. The landowners have not communicated any plans on management of the wetland. Farming practices to the south restrict above ground outflow to the Vermillion River. Wildlife management is protected through the Farmland and Natural Area Program. The wetland management goal is for agriculture to continue, and wildlife habitat management to be practiced in the wetland areas.





RICK LOGAN, TRICIA BREMER, AND MIKE NELSON

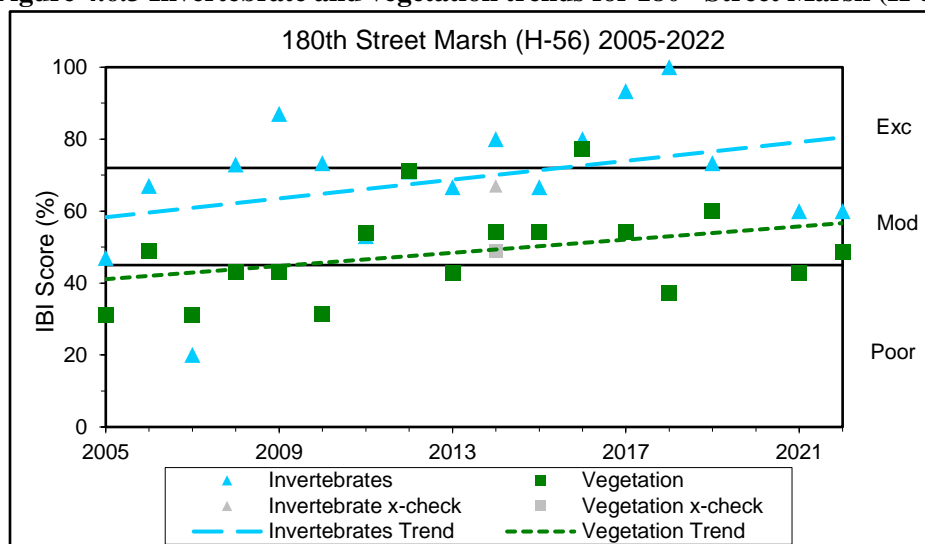
## Wetland Health

**Site Observations:** The wetland slope is gentle. The wetland substrate is silty muck. Water levels dropped between the macroinvertebrate and vegetation surveys. Many species in emergent plant community present during invertebrate sampling were gone in July during vegetation survey. Large portions of the wetland that held water in June were mud flats in July. Coontail (*Ceratophyllum* sp.) and pondweed (*Potamogeton* sp.) filled the water column. Duckweed (*Lemna* sp. and *Spirodela* sp.) sparsely floated on the water. Sedges (*Carex* sp.), reed canary grass (*Phalaris arundinacea*), cattail (*Typha* sp.), water plantain (*Alisma* sp.), arrowhead (*Sagittaria* sp.), and smartweed (*Polygonum* sp.) were also present. Dragonflies, damselflies, mayflies, caddisflies, snails, trueflies, crustaceans, and bugs and beetles were collected.

**Table 4.6.3 180<sup>th</sup> Street Marsh (H-56) Wetland Health based on Index of Biotic Integrity**

2022 Data (H-56)	Invertebrates 	Vegetation 
<b>Wetland Health Rating (IBI score)</b>	Moderate (18)	Moderate (17)
<b>Trend 2005-2022</b>	Stable	Stable

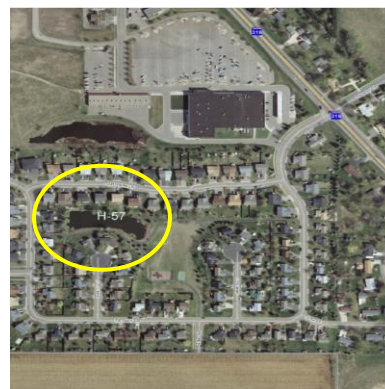
**Figure 4.6.3 Invertebrate and vegetation trends for 180<sup>th</sup> Street Marsh (H-56)**



**Site summary:** This is the seventeenth year that H-56 has been monitored for WHEP since 2005. The invertebrate and vegetation scores are considered inconsistent, differing by 11 percent; however, both scores indicate moderate wetland health. Low water levels affected vegetation releve placement which may have impacted the vegetation wetland health score. Despite some variability in scores, the wetland health trends appear fairly stable.

#### 4.6.4 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 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



TRICIA BREMER AND RICK LOGAN

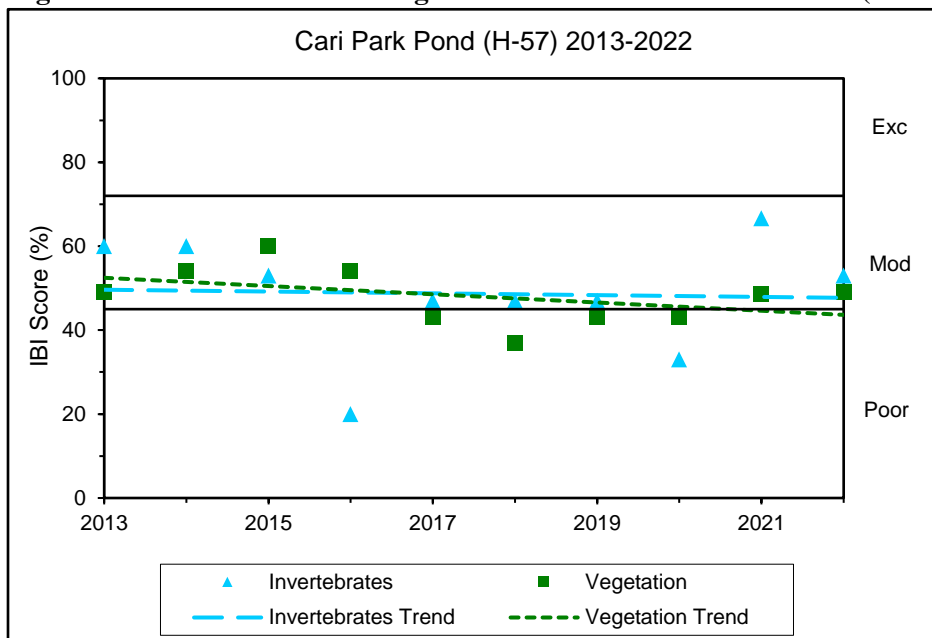
**Site Observations:** The wetland slope is gentle, and the substrate is very mucky. The wetland is surrounded by homes and a nearby park. Trees overhang portions of the wetland shoreline. Maple trees (*Acer* sp.) were present in the vegetation releve. Cattails (*Typha* sp.) and bulrush (*Scirpus* sp.) dominated the shoreline. Small populations of water plantain (*Alisma* sp.) and sedge (*Carex* sp.) were also present. Coontail (*Ceratophyllum* sp.) and pondweed (*Potamogeton* sp.) filled the water column. Duckweed (*Lemna* sp.) and slender riccia (*Riccia fluitans*) float on the water surface. Leeches, dragonflies, damselflies, snails, fingernail clams, trueflies, crustaceans, and bugs and beetles were collected. Mystery snails were found.

**Table 4.6.4 Cari Park Pond (H-57) Wetland Health based on Index of Biotic Integrity**

2022 Data (H-57)	Invertebrates 	Vegetation 
<b>Wetland Health Rating (IBI score)</b>	Moderate (16)	Moderate (17)
<b>Trend 2013-2022</b>	Stable	Stable



**Figure 4.6.4 Invertebrate and vegetation trends for Cari Park Pond (H-57)**



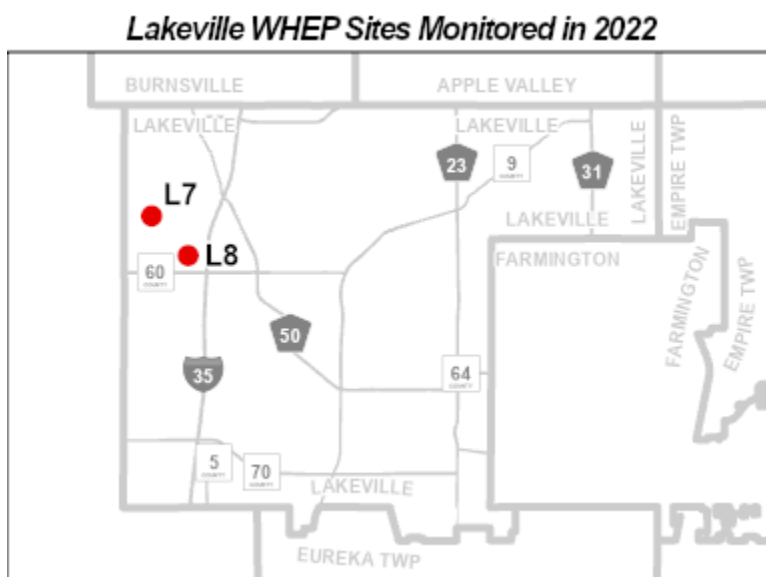
**Site summary:** This is the tenth consecutive year that Cari Park Pond has been monitored. The vegetation and invertebrate scores were consistent, and both scores indicate moderate wetland health. The long-term health trends appear stable.

## 4.7 Lakeville Wetlands

Two wetlands were monitored within the City of Lakeville in 2022. The City has 25 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, Loren Knutson, Kim Menard, Nora Renner, Jo Stuckert, Alexander Swartz, Laura Wolf, Lili Yu, and Ziran Yu.







STEVE WESTON

Steve Weston has participated in WHEP for over 20 years. He explained, “I have been a team leader of the Lakeville team since 2001 and it continues to be a high point of the year. I enjoy sharing the experience with volunteers, especially the high school students, several of whom have gone on to study biology in college and find environmental jobs. “This year we found the wetlands at their lowest water levels, suffering from the severe drought. The low survey results show that the Lakeville wetlands that we surveyed were significantly stressed.”

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.



ANN MESSERSCHMIDT

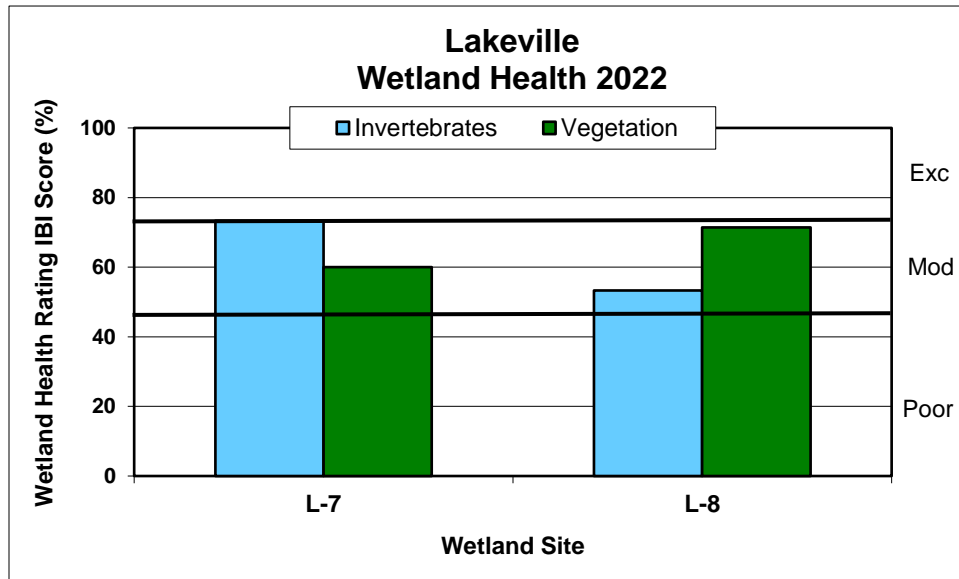
She says, "Over time, we hope to be able to see trends in the data." Ann believes, "The WHEP program is a great opportunity for residents interested in the natural environment to learn about wetland plants and invertebrates. This is a valuable asset to the volunteers. Because of the work by the volunteers, 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 4.7 presents an overall view of wetland health for all the 2022 monitoring sites in Lakeville 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. The wetlands showed moderate wetland health in 2022. The invertebrates and vegetation scores for sites L-7 and L-8 were inconsistent, differing by 13 and 18 percent, respectively.



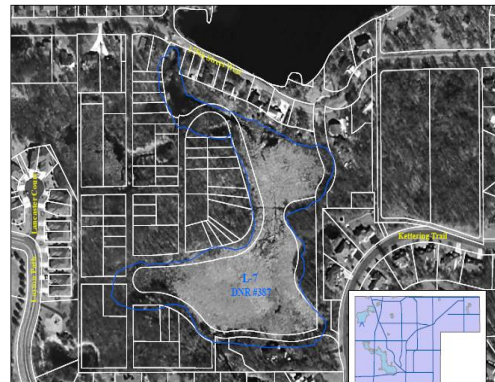
**Figure 4.7 Lakeville site scores (percent) for the 2022 sampling season**



#### 4.7.1 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 Orchard Lake. The aeration system is scheduled to run from April to October annually. The aerators were not in operation in 2022 due to the inability to obtain parts for refurbishment, or ability to purchase a new pump. The City will try to replace or repair the pump in 2023.





#### Wetland Health

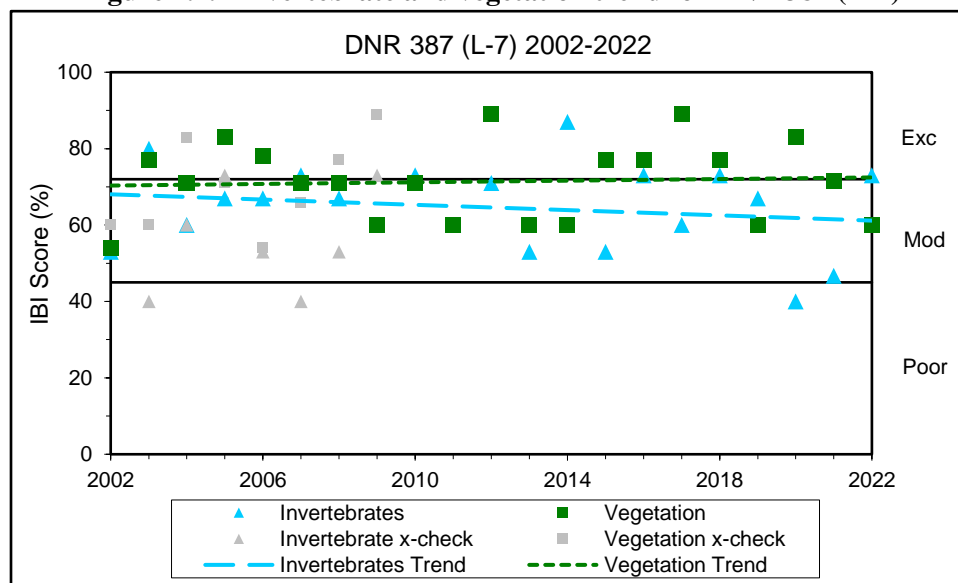
**Site Observations:** The wetland slope is gentle, and the substrate is mucky. *Carex* hummucks are prevalent in wetland. Only small amounts of pondweed (*Potamogeton* sp.) and duckweed (*Lemna* sp.) represented the submergent and floating plant community. Many emergent woody, grass, and forb species were

observed, though most in small population sizes. Reed canary grass (*Phalaris arundinacea*) dominated the vegetation releve. Sedges (*Carex* sp.), bulrush (*Scirpus* sp.), arrowhead (*Sagittaria* sp.), bur-reed (*Sparganium* sp.), cattail (*Typha* sp.), water plantain (*Alisma* sp.), swamp milkweed (*Asclepias incarnata*), water-hemlock (*Cicuta* sp.), smartweed (*Polygonum* sp.), jewelweed (*Impatiens* sp.), and purple loosestrife (*Lythrum salicaria*) were present. Leeches, dragonflies, caddisflies, snails, fingernail clams, trueflies, crustaceans, and bugs and beetles were collected.

**Table 4.7.1 DNR 387 (L-7) Health based on Index of Biotic Integrity**

2022 Data (L-7)	Invertebrates 	Vegetation 
<b>Wetland Health Rating (IBI score)</b>	Moderate (22)	Moderate (21)
<b>Trend 2002-2022</b>	Stable	Stable

**Figure 4.7.1 Invertebrate and vegetation trend for DNR 387 (L-7)**



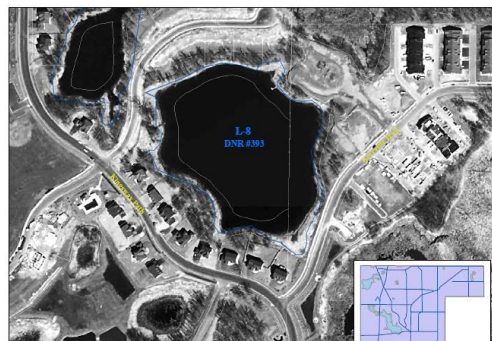
**Site summary:** This is the 21st consecutive year that DNR 387 has been monitored for WHEP. The invertebrate and vegetation scores were inconsistent in 2022, differing by 13 percent. Both scores indicate moderate wetland health. The diversity of invertebrates and vegetation were both high in 2022. The invertebrate and vegetation both appear to have long-term stable health trends.



LOREN KNUTSON AND KIM MENARD

### 4.7.2 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. Coontail (*Ceratophyllum* sp.) and pondweed (*Potamogeton* sp.) dominated the water column. Water milfoil (*Myriophyllum* sp.) and water-Nymph (*Najas* sp.) were also represented. Water-shield (*Brasenia schreberi*) and duckweeds (*Lemna* sp. and *Spirodela* sp.) floated the open water. Bulrush (*Scirpus* sp.), spike-rush (*Eleocharis* sp.), rush (*Juncus* sp.), three-way sedge (*Dulichium arundinaceum*), arrowhead (*Sagittaria* sp.), smartweed (*Polygonum* sp.), cattail (*Typha* sp.) , and several other emergent grasses and forbs were observed. Dragonflies, mayflies, snails, fingernail clams, trueflies, and one beetle and one truebug were collected.



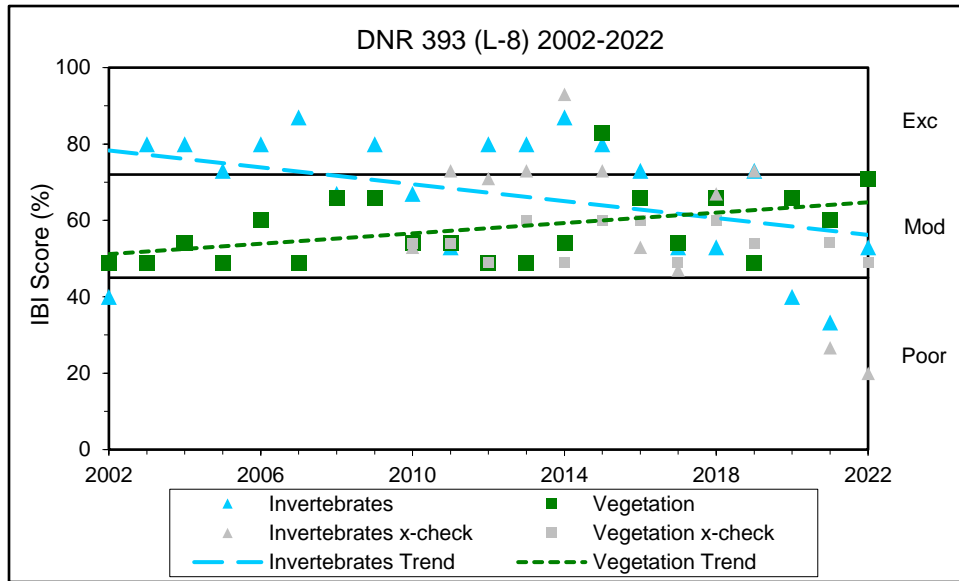
KIM MENARD AND ZIRAN YU

**Table 4.7.2 DNR Wetland 393 (L-8) Health based on Index of Biotic Integrity**

2022 Data (L-8)	Invertebrates 	Vegetation 
<b>Wetland Health Rating (IBI score)</b>	Poor (16)	Moderate (25)
<b>Cross-check Rating (IBI score)</b>	Poor (6)	Moderate (17)
<b>Trend 2002-2022</b>	Variable	Stable



**Figure 4.7.2 Invertebrate and vegetation trends for DNR 393 (L-8)**



**Site summary:** DNR 393 has been monitored 21 consecutive years. The invertebrate and vegetation scores were inconsistent, differing by 18 percent. Excluding a high score in 2015, the vegetation scores regularly indicate moderate wetland health, and the trend is stable. Until more recently, invertebrate health scores have indicated excellent wetland health. In general, the diversity of invertebrates has been declining through the years. The team noted that sunfish, large-mouth bass, crayfish, and tadpoles are present in the wetland which may impact the invertebrate population. Lower than normal water levels may have also impacted sampling results. This wetland was cross-checked by another team. Invertebrate and vegetation scores between the teams were inconsistent. Invertebrate scores differed by 33 percent and vegetation scores differed by 29 percent. The Lakeville team collected a larger diversity of snails, trueflies, and crustaceans than the cross-check team. The Lakeville team identified a larger diversity of emergent forbs and grasses. Likely, the differences are due to sampling location at the wetland.

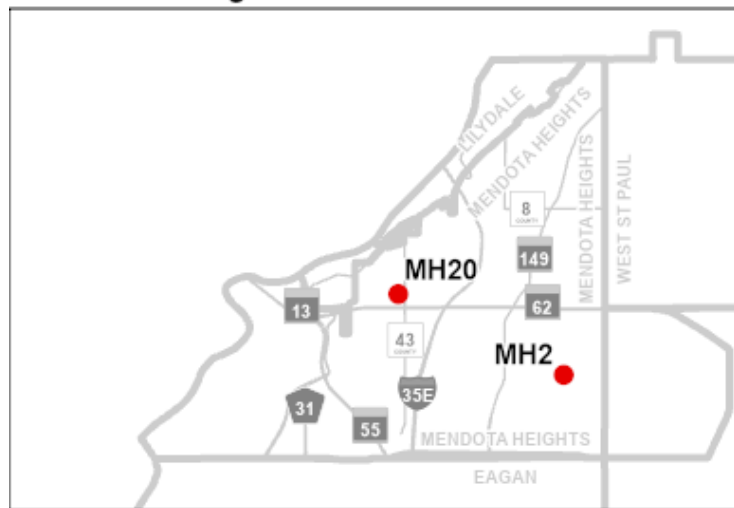
## 4.8 Mendota Heights Wetlands

Two wetlands were monitored within the City of Mendota Heights, in 2022. The City has 25 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:** Jim Chastek, Gayl Gustafson, Joan O'Donnell, Angela Richardson, Emma Richardson, Michelle Skog, Mary Stade, Camille Wang, Noelle Wang, and Bri Wilde.

**Mendota Heights WHEP Sites Monitored in 2022**







DARCY TATHAM

Mendota Heights’ team leader, Darcy Tatham, has been part of WHEP for more than 20 years, and a team leader all but her first year. She commented. She has led and assisted for the West St. Paul and South St. Paul teams, as well. She admitted, “Obviously, I keep coming back. My volunteers are fantastic, the county support team (Paula, Emily, and Jeff) and the consulting team (Katie) are very supportive, and my city contact (Krista) is great to work with.

“Have you ever wondered what happens to fish and macro-invertebrates during a dry year and how that affects the pond health? I have, but don’t have all of the answers. What I do know is that one of the things we can never predict is the weather. My Dad said he was always glad that no one was in control of it. These last couple of years we have had very dry summers with this year being worse than last year. Sometimes it doesn’t make much difference but it certainly does

with our reference site, Copperfield. The bottom of Copperfield is a lot of muck, not a solid layer of sand or soil. The muck just sucks the waders in & sometimes it seems impossible to get out. With the all-in-one waders, the boot gets sucked in and your foot comes loose in the waders. Noelle was really stuck this year when we did the vegetation sampling in July and it took a couple of people working at her boots to get her un-stuck. Others were stuck as well, including me, but not as bad. This is not the first time we have had a dry summer. Several years ago we had a similar situation also at Copperfield in Mendota Heights but also at another pond in Dakota County. I was brighter back then and brought along lumber (boards) from home. They worked great to distribute the weight so we could keep working – you just had to stay on top of the boards. It felt like a gymnastics exercise. Maybe if we have a dry summer next year, I will remember to bring some boards along, as long as I have an appropriate vehicle to take home the mucky boards later!”

Krista Spreiter is the Natural Resources Technician for Mendota Heights. She’s had the opportunity to work with the Mendota Heights WHEP team both the field and the lab, and was impressed with their dedication, experience, and knowledge. She said, “They put in a lot of time and effort. Some volunteers have participated in the program for many years, providing the City and the program with invaluable data. The City uses the data that the team collects to monitor our wetlands for changes that may occur over time and how they respond to pressure from development and other environmental stressors, and then the City looks for ways to protect and improve them. The City is very grateful for our WHEP team!”

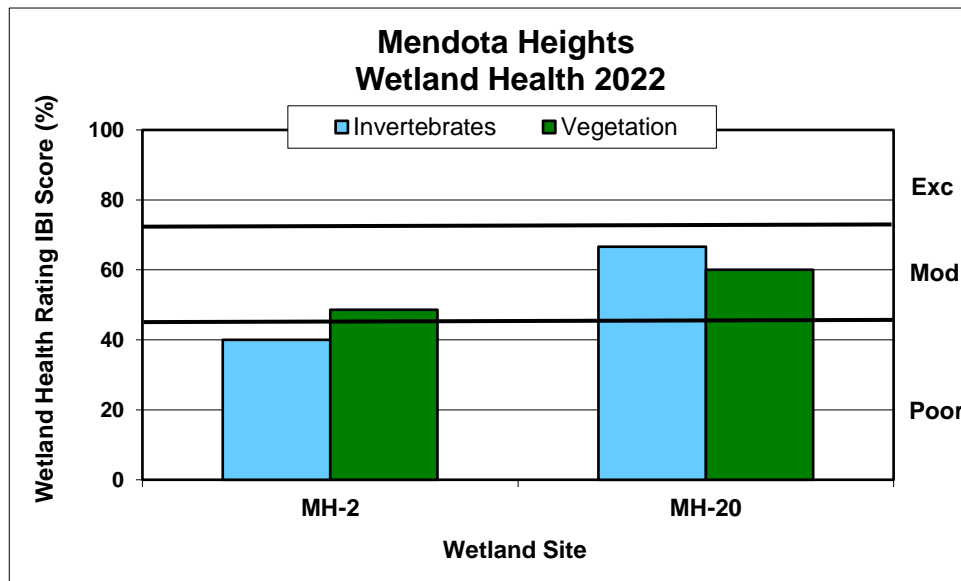


KRISTA SPREITER

## Mendota Heights General Wetland Health

Figure 4.8 presents an overall view of wetland health for all of the 2022 monitoring sites in Mendota Heights based on the IBI 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. Two wetlands were monitored in 2022. Invertebrate and vegetation scores indicate poor to moderate wetland health for MH-2 and moderate wetland health for MH-20.

**Figure 4.8 Mendota Heights' site scores (percent) for the 2022 sampling season**



### 4.8.1 Copperfield Pond (MH-2)

Copperfield Pond (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-PUBG. The pond serves as a natural resource with a surrounding paved trail and gravel nature trail. The wetland management goal is to protect and improve water quality, and provide wildlife habitat and flood storage. 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; however, the park and surrounding buffer is undergoing a native restoration in order to remove invasive species and re-establish a native vegetative buffer. The surrounding area includes residential neighborhoods in Mendota Heights.





JIM CHASTEK AND NOELLE WANG

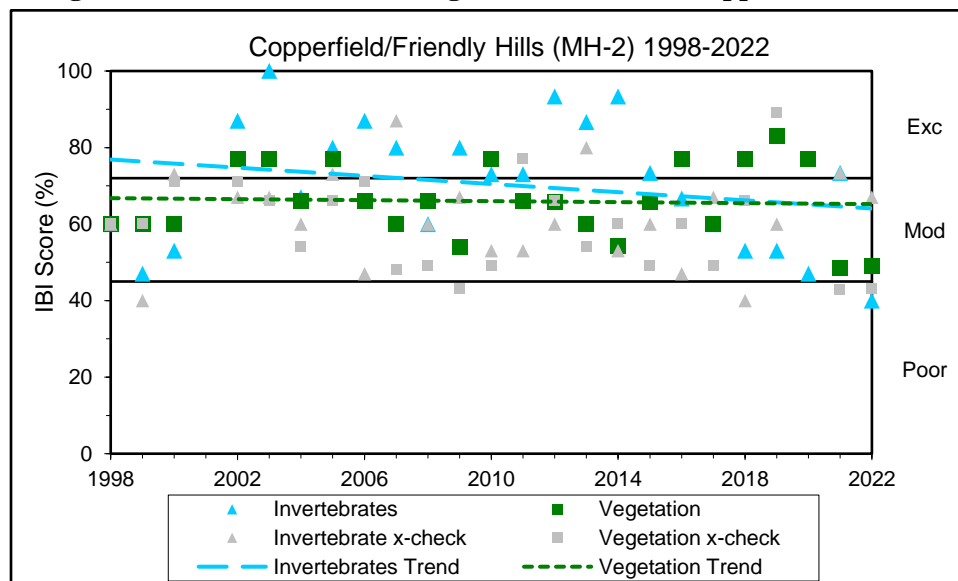
## Wetland Health

**Site Observations:** Copperfield is part of a chain of ponds within an established neighborhood, but it is City-owned with no houses around it. The pathway to the pond is flat and wooded, with a vegetated buffer around the water's edge. The wetland slope is gentle, and the substrate is "boot-swallowing" mucky. Water levels were very low in 2022 and the normal waterline was much receded. The wetland is choked with cattail (*Typha* sp.) and the surface of the water is covered with white water lily (*Nymphaea* sp.), duckweeds (*Lemna* sp. and *Spirodela* sp.), water-meal (*Wolffia* sp.). Very little submergent vegetation was present, including pondweed (*Potamogeton* sp.) and coontail (*Ceratophyllum* sp.). Spike rush (*Eleocharis* sp.) was the most prominent emergent plant. Several other small populations of emergent grasses and forbs were also present, including arrowhead (*Sagittaria* sp.), reed canary grass (*Phalaris arundinacea*), and purple loosestrife (*Lythrum salicaria*). Leeches, dragonflies, damselflies, caddisflies, snails, fingernail clams, trueflies, crustaceans, and bugs and beetles were collected.

**Table 4.8.1 Copperfield (MH-2) Wetland Health based on Index of Biotic Integrity**

2022 Data (MH-2)	Invertebrates 	Vegetation 
<b>Wetland Health Rating (IBI score)</b>	Moderate (12)	Moderate (17)
<b>Cross-check Rating (IBI score)</b>	Moderate (20)	Poor (15)
<b>Trend 1998-2022</b>	Variable	Stable

**Figure 4.8.1 Invertebrate and vegetation trends for Copperfield (MH-2)**



**Site Summary:** This is the 24<sup>th</sup> year that MH-2 has been monitored for WHEP. There is a lot of variability in the data throughout the years of monitoring. Both health data sets show steady long-term trends. Fluctuation in water levels from year to year may impact data results. The invertebrate and vegetation scores were consistent in 2022 which is often not the case. This wetland was cross-checked by another

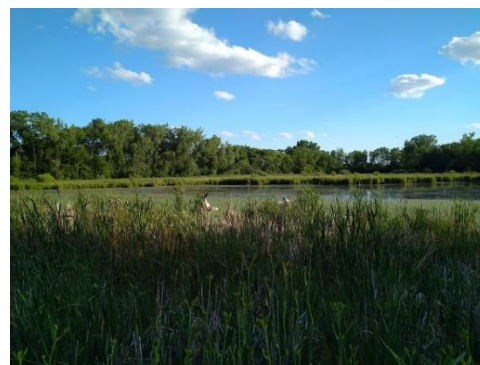
team. The invertebrate scores were inconsistent between the teams, differing by 27 percent. The cross-check team found a large diversity of leeches which enhanced the invertebrate score. In addition, the cross-check team did not have any *Corixidae* collected in the bottle traps while the City team found many, measuring different *Corixidae* Proportion Metric scores. The vegetation identification was similar between the two WHEP teams. This wetland was also cross-checked by Bolton & Menk who surveyed the same plot set by the Mendota Heights team. Vegetation findings were very similar. Water levels likely affect sampling location in the wetland, habitat type present, and diversity of species. In addition, tadpoles and fish may impact the invertebrate population.

#### 4.8.2 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 to a Type 4/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 designated on the National Wetland Inventory as wetland types PUBG/PEM1F/PEM1C, and is designated as a Public Water on the Minnesota DNR's PWI. The wetland management goal is to protect and improve water quality and wildlife habitat, and provide flood storage and 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. Curb-cut raingardens were completed in the neighborhood to the east, in the summer of 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.



MARY STADE AND DARCY TATHAM



### Wetland Health

**Site Observations:** The wetland slope is gentle, and the substrate very mucky and uneven. There were floating hummocks that made it difficult to traverse the wetland. It was noted that the population of giant reed grass (*Phragmites* sp.) growing west of the levee appears to be increasing in size. The levee included a lot of cattail (*Typha* sp.). Duckweeds (*Lemna* sp. and *Spirodela* sp.) and water-meal (*Wolffia* sp.) covered the surface of the water. There was no submergent vegetation found. Many emergent grasses and forbs

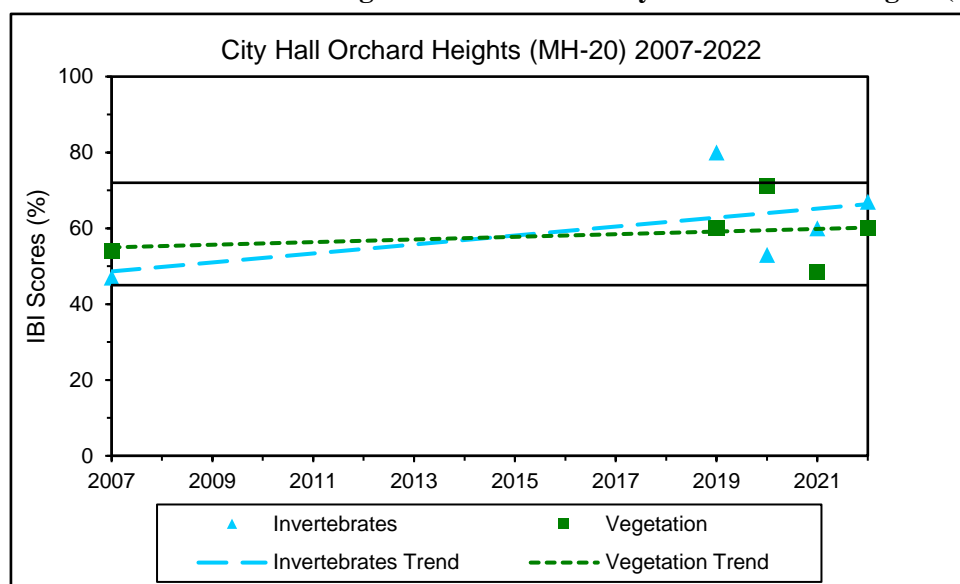


were present. Purple loosestrife (*Lythrum salicaria*), spike-rush (*Eleocharis* sp.), and sedges (*Carex* sp.) were the most prevalent. Leeches, dragonflies, damselflies, snails, trueflies, crustaceans, and beetles and bugs were collected.

**Table 4.8.2 City Hall-Orchard Heights (MH-20) Wetland Health based on Index of Biotic Integrity**

2022 Data (MH-20)	Invertebrates 	Vegetation 
<b>Wetland Health Rating (IBI score)</b>	Moderate (20)	Moderate (21)
<b>Trend 2007-2022</b>	Not enough data	Not enough data

**Figure 4.8.2 Invertebrate and vegetation trends for City Hall-Orchard Heights (MH-20)**



**Site summary:** This is the fourth consecutive time, and the fifth time overall, that MH-20 has been monitored for WHEP since 2007. The invertebrate and vegetation scores indicate moderate wetland health. Recent data has repeatedly indicated low submergent vegetation presence, but high floating vegetation presence. The dominance of floating vegetation and hummocks may shade-out submergent vegetation. Emergent vegetation on the shoreline and the hummocks provides habitat for the invertebrates. Trends already appear fairly stable. More years of data will help determine a more reliable health trend.



MICHELLE SKOG, GAYL GUSTAFSON,  
MARY STADE, AND DARCY TATHAM



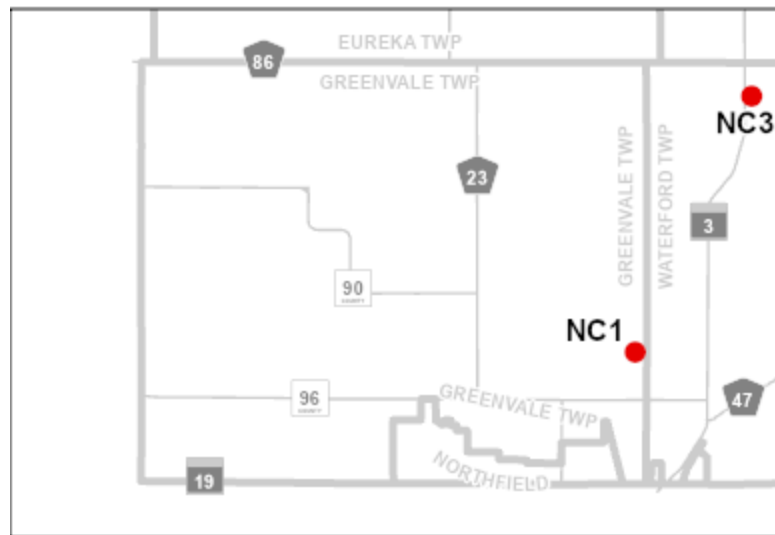
## 4.9 North Cannon River Watershed Management Organization

Two wetlands were monitored for North Cannon River Watershed Management Organization in 2022. This is the sixth year that NCRWMO has monitored wetlands with WHEP. Three wetlands have been monitored for NCRWMO since their inclusion in WHEP.

**Team Leader:** Katie Hoffman

**Team Members:** Shamus Collins

*North Cannon River WMO WHEP Sites Monitored in 2022*



KATIE HOFFMAN

This is Katie Hoffman's second year as team leader of the North Cannon River WHEP team. She said, “we had a small team this year, just two of us, but we were able to get everything done! A huge thanks to Shamus, and honorary team member Jeff, for their hard work. We collected inverts, set up transects, and identified vegetation and invertebrates. Some of my highlights for the year were seeing *Azolla* at the Hidden Valley Wetland (AV-1) and waiting out a much-needed rainstorm in the car during vegetation surveys. This year was exceptionally dry, and both of the North Cannon wetlands dried completely over the course of the summer.”

Ashley Gallagher is a Senior 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



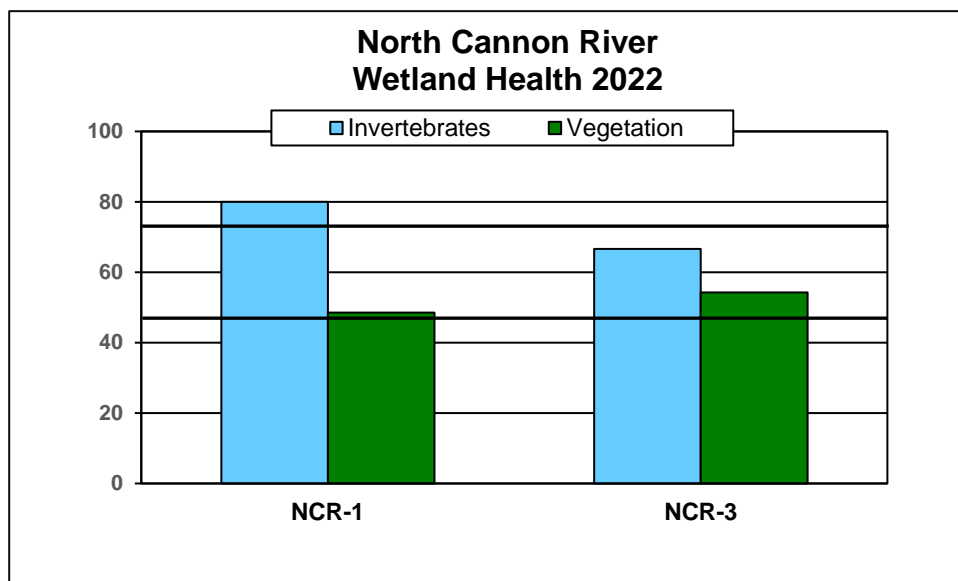
ASHLEY GALLAGHER

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 4.9 presents an overall view of wetland health for all the 2022 monitoring sites in North Cannon River WMO 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. Invertebrate and vegetation scores ranged from poor to moderate to excellent wetland health. Invertebrate and vegetation scores for both wetlands were inconsistent with each other, differing by 31 and 23 percent.

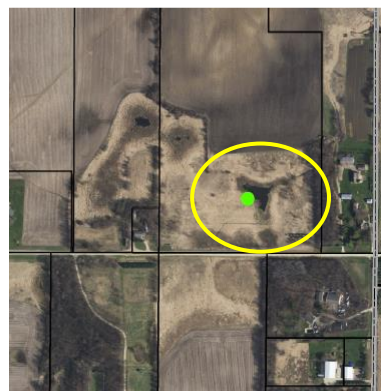
**Figure 4.9 North Cannon River WMO site scores (percent) for 2022**



### 4.9.1 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.



## Wetland Health

**Site Observations:** The wetland slope is gentle, and the substrate is very mucky. An organic farm is north of the wetland and a conventional farm is to the west. Water levels were very low again in 2022 and very difficult to sample for invertebrates. It rained during the vegetation survey. Pondweed (*Potamogeton* sp.), water-crowfoot (*Ranunculus* sp.), water beggar-ticks (*Megalodonta beckii*), and duckweeds (*Lemna* sp. and *Spirodela* sp.) crowded the existing puddles of water. Water plantain (*Alisma* sp.), cattails (*Typha* sp.), bulrush (*Scirpus* sp.), spike-rush (*Eleocharis* sp.), and manna-grass (*Glyceria* sp.) were the only other vegetation species represented in the releve. Leeches, dragonflies, damselflies, snails, fingernail clams, trueflies, crustaceans, and bugs and beetles were collected.





NC-1 IN JUNE

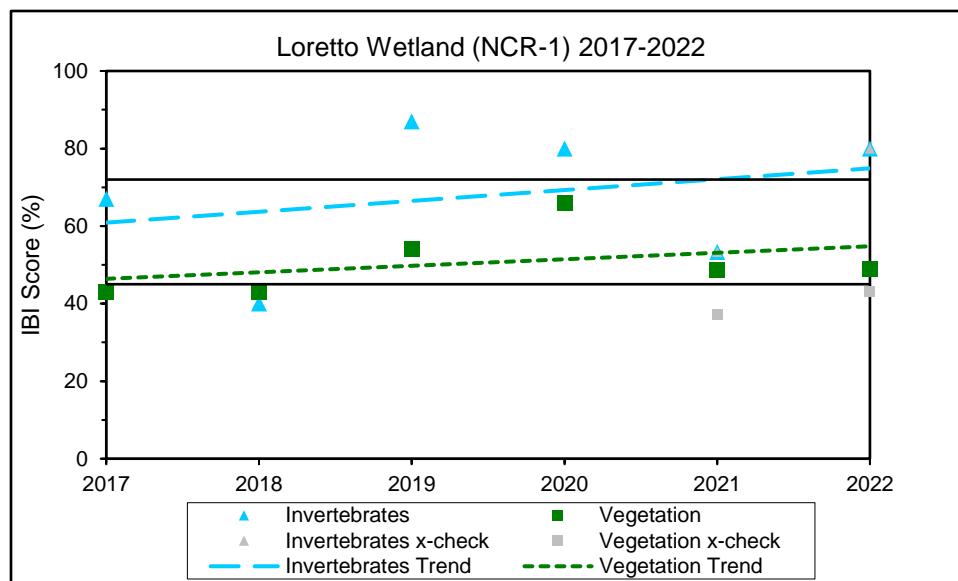


NC-1 IN JULY

**Table 4.9.1 Loretto Wetland (NCR-1) Wetland Health based on Index of Biotic Integrity**

2022 Data (NCR-1)	Invertebrates 	Vegetation 
<b>Wetland Health Rating (IBI score)</b>	Excellent (24)	Moderate (17)
<b>Cross-check Rating (IBI score)</b>	Excellent (24)	Poor (15)
<b>Trend 2017-2022</b>	Stable	Stable

**Figure 4.9.1 Invertebrate and vegetation trends for Loretto Wetland (NCR-1)**



**Site summary:** This is the sixth consecutive year that Loretto Wetland has been monitored by WHEP volunteers. The invertebrate and vegetation health scores were inconsistent, differing by 31 percent. The invertebrate score indicates excellent wetland health while the vegetation score indicates moderate wetland health. Despite low water levels a large diversity of invertebrates were collected; however, the drier conditions during the vegetation survey likely made releve placement challenging. The team noted that the vegetation was difficult to identify because it was drying out. The 2022 scores have realigned with past data. This wetland was cross-checked by another team. Data for both invertebrates and vegetation were very similar. Minor differences in the vegetation surveys (Grasslike, Aquatic Guild and Persistent litter Metrics) affected the vegetation scores. More years of data will help determine a more reliable health trend.



SHAMUS COLLINS

#### 4.9.2 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 two acres of impervious surface. The wetland management goal is to restore for the State of Minnesota Wetland Bank completed in 2019.



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.



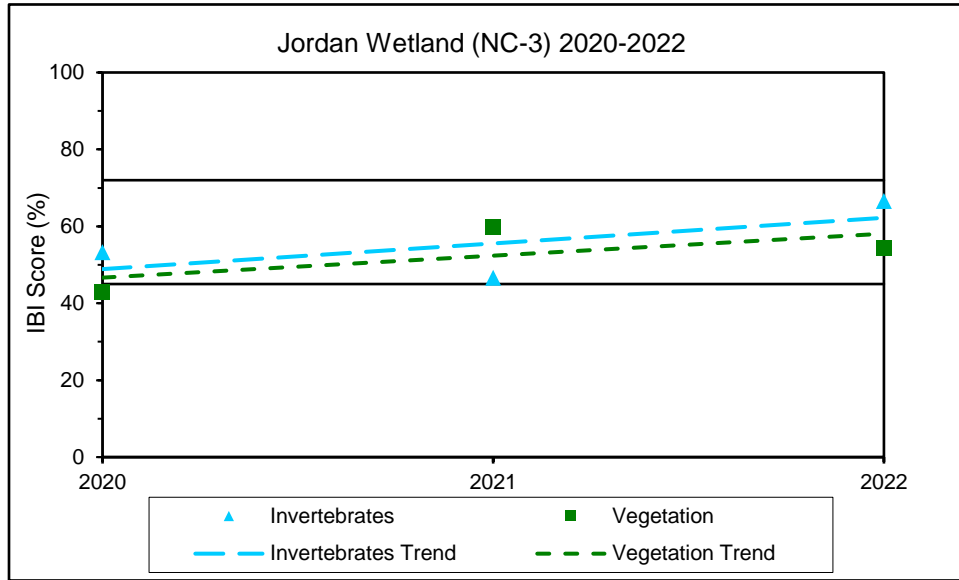
#### Wetland Health

**Site Observations:** The wetland slope is gentle, and the substrate is mucky. There are no trees, as it is located in the remnants of an agricultural field. The water is very shallow. Water-crowfoot (*Ranunculus* sp.) floated in the water. Water-plantain (*Alisma* sp.), arrowhead (*Sagittaria* sp.), cut grass (*Leersia* sp.), and cattail dominated the vegetation releve. Reed canary grass (*Phalaris arundinacea*), manna-grass (*Glyceria* sp.), three-way sedge (*Dulichium arundinaceum*), spike-rush (*Eleocharis* sp.), and iris (*Iris* sp.) were also present. Leeches, dragonflies, damselflies, snails, trueflies, crustaceans, and bugs and beetles were collected.

**Table 4.9.2 Jordan Wetland (NCR-3) Wetland Health based on Index of Biotic Integrity**

2022 Data (NCR-3)	Invertebrates 	Vegetation 
<b>Wetland Health Rating (IBI score)</b>	Moderate (20)	Moderate (19)
<b>Trend 2020-2022</b>	Not enough data	Not enough data

**Figure 4.9.2 Invertebrate and vegetation trends for Jordan Wetland (NCR-3)**



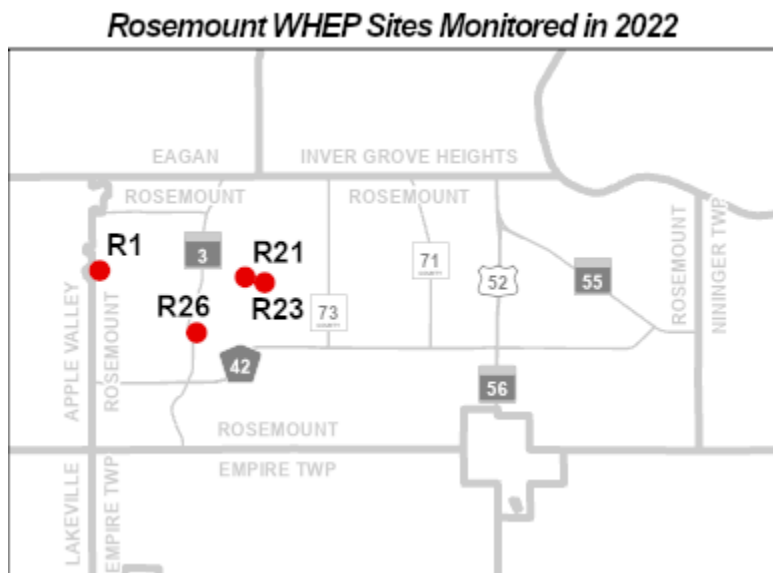
**Site summary:** This is the third consecutive year that Jordan wetland has been monitored by WHEP volunteers. The invertebrate and vegetation scores were inconsistent, differing by 13 percent. Both scores indicate moderate wetland health. The vegetation was lacking in submergent and floating vegetation. Low water levels likely impacted the wetland invertebrates and vegetation community. 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.

#### 4.10 Rosemount Wetlands

Four wetlands were monitored in the City of Rosemount in 2022. The City has 25 years of WHEP data! Twenty-four wetlands have been monitored in Rosemount since the start of WHEP.

**Team Leaders:** Jane Porterfield

**Team Members:** Rick Adams, John Chlebeck, Eli Chlebeck, Bob Harding, Emily Hoche, Stephan Hoche, Angela Hollie, Caleb Jones, Allan Valgamae, Wyatt Vetter, Greta Willander, and Tom Willander.







JANE PORTERFIELD

Jane Porterfield is the team leader for Rosemount. She has been involved in WHEP for 24 years. She has returned to her post as team leader in 2022, and commented, “The best part of being a team leader and a volunteer is working with so many wonderful people that care about wetlands.”

Jane Byron is the Stormwater Specialist and WHEP coordinator at the City of Rosemount. She has been involved in WHEP for many years. She commented, “We love our WHEP volunteers. They come through for us year after year. Because of all their hard work, we see how these wetlands are changing over



JANE BYRON

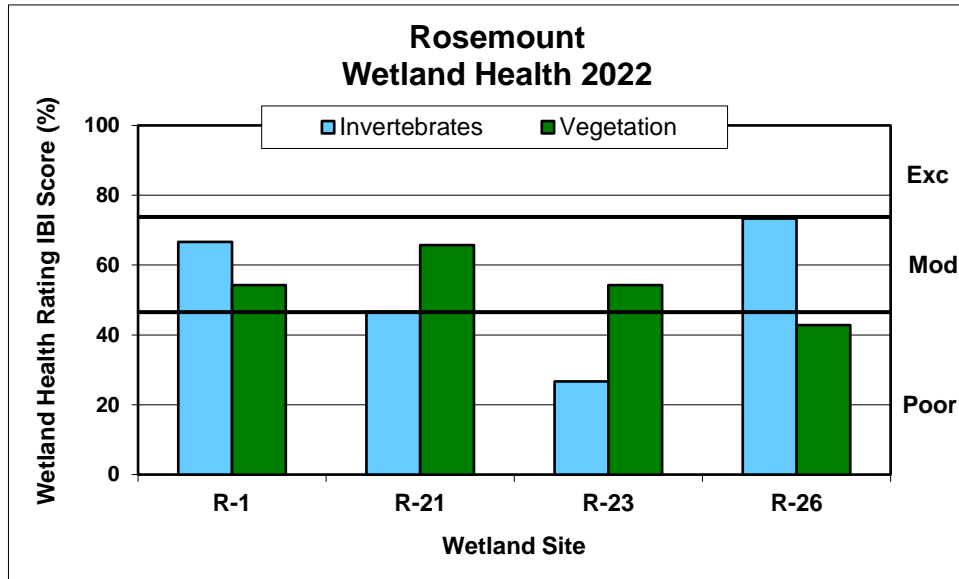
## Rosemount General Wetland Health

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 4.10 presents an overall view of wetland health for all the 2022 monitoring sites in Rosemount based on the 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. The invertebrate and vegetation scores indicate poor to moderate wetland health, and were inconsistent for all four wetlands, differing by 13, 19, 27, and 30 percent.

Figure 4.10 Rosemount site scores (percent) for 2022



#### 4.10.1 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 20 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 within a basin surrounded by residences and a city park. The wetland basin is affected by storm water runoff from the nearby development which is encroaching upon the existing 75-foot buffer. In 2021, willow trees were removed in portions of the vegetative buffer to prevent damage to the nearby trail.

#### Wetland Health

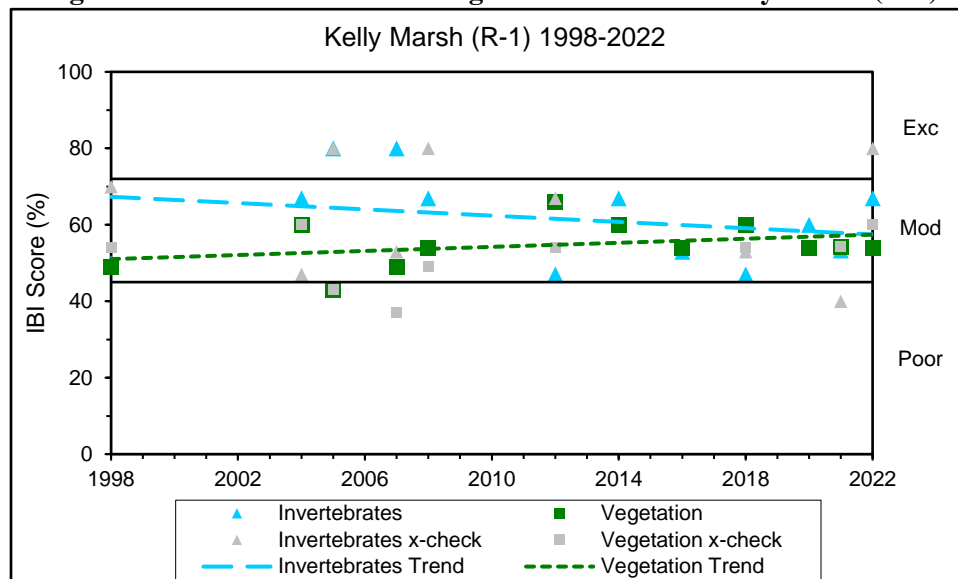
**Site Observations:** The wetland slope is gentle. The wetland substrate is sandy with a thin layer of mud. The wetland is within a depression area in Innisfree Park. Reed canary grass (*Phalaris arundinacea*) and woody vegetation including cottonwood trees (*Populus* sp.), willow trees (*Salix* sp.), sumac (*Rhus* sp.), and vines, surround the wetland. Most of the open water is covered with white water lillies (*Nymphaea* sp.). Coontail (*Ceratophyllum* sp.), waterweed (*Elodea* sp.), and pondweed (*Potamogeton* sp.) fill the water column. Duckweeds (*Lemna* sp. and *Spirodela* sp.), water-meal (*Wolffia* sp.), sparsely float on the surface

of the water. Spike rush (*Eleocharis* sp.), arrowhead (*Sagittaria* sp.), and smartweed (*Polygonum* sp.) were also present. Very few emergent plants were observed. Leeches, dragonflies, damselflies, snails, fingernail clams, trufles, crustacens, and beetles and bugs were collected.

**Table 4.10.1 Kelly Marsh (R-1) Wetland Health based on Index of Biotic Integrity**

2022 Data (R-1)	Invertebrates 	Vegetation 
<b>Wetland Health Rating (IBI score)</b>	Moderate (20)	Moderate (19)
<b>Cross-check Rating (IBI score)</b>	Excellent (24)	Moderate (21)
<b>Trend 1998-2022</b>	Stable	Stable

**Figure 4.10 .1 Invertebrate and vegetation trends for Kelly Marsh (R-1)**



**Site summary:** This is the twelfth time Kelly Marsh has been monitored since 1998. The invertebrate and vegetation health scores were inconsistent with each other in 2022, differing by 13 percent; however, both scores indicate moderate wetland health. This wetland has low representation of emergent and submergent vegetation; however, the number of floating plants and the lack of persistent litter positively affect the metric scores. Despite the lack of diversity in wetland vegetation, the invertebrate population thrives on what exists. Data trends for both invertebrates and vegetation are stable. This wetland was cross-checked by another team. The vegetation data findings for both teams was very similar. The invertebrates scores between teams are inconsistent, differing by 13 percent. The cross-check team collected more leeches and snails enhancing their invertebrate score. This vegetation releve at this site was also cross-checked by Bolton & Menk. Very similar plant species and wetland description were found by each group.



ELLIE AND JOHN CHLEBECK

#### 4.10.2 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. A portion of this wetland was constructed as mitigation for impacts to other wetlands as a result of street reconstruction.



#### Wetland Health

**Site Observations:** The slope of the wetland is steep upon entry, but levels out. The wetland substrate is solid. The wetland is choked with cattail (*Typha* sp.) and only offers a small area of open water. There are not many vegetation species within the wetland. Spike-rush (*Eleocharis* sp.), pondweed (*Potamogeton* sp.), bladderwort (*Utricularia* sp.), duckweeds (*Lemna* sp. and *Spirodela* sp.), slender Riccia (*Riccia fluitans*), and purple-fringed Riccia (*Ricciocarpus natans*) were found within the vegetation plot. Leeches, dragonflies, damselflies, caddisflies, snails, fingernail clams, trueflies, crustaceans, and bugs and beetles were collected.



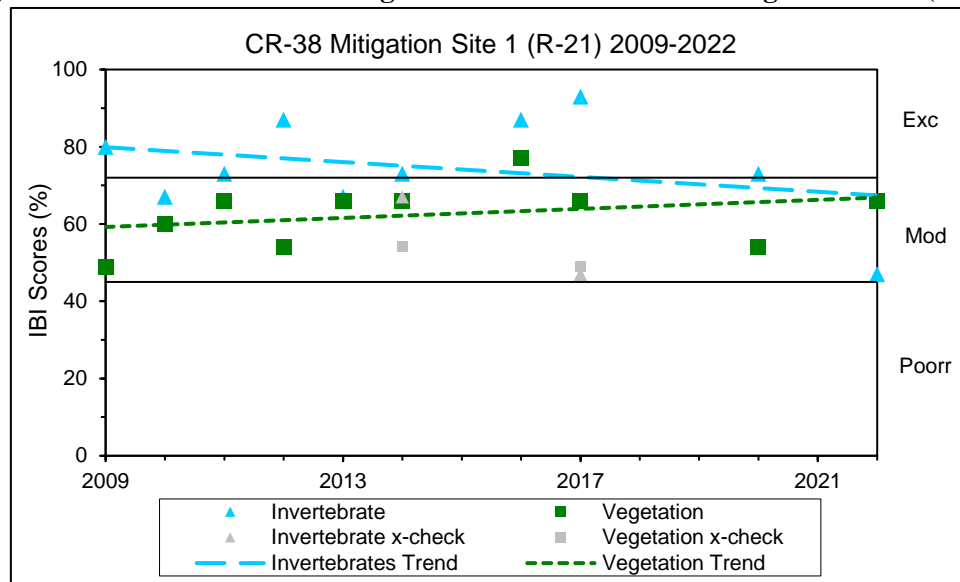
TOM AND GRETA WILLANDER

**Table 4.10.2 CR-38 Mitigation Site 1 (R-21) Wetland Health based on Index of Biotic Integrity**

2022 Data (R-21)	Invertebrates 	Vegetation 
<b>Wetland Health Rating (IBI score)</b>	Poor (14)	Moderate (23)
<b>Trend 2009-2022</b>	Variable	Stable



**Figure 4.10.2 Invertebrate and vegetation trends for CR-38 Mitigation Site 1 (R-21)**



**Site summary:** This is the tenth time that R-21 has been monitored since 2009. The invertebrates and vegetation scores were inconsistent, differing by 19 percent. The invertebrates score indicates poor wetland health while the vegetation score indicates moderate wetland health. The cattail may be impairing the emergent vegetation diversity; however, the invertebrates are thriving in the habitat present. The invertebrate scores are variable and lower in 2022. The vegetation trend appears stable.

### 4.10.3 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.



### Wetland Health

**Site Observations:** The wetland has a gentle slope and is fairly mucky. It is adjacent to Mare Pond North. There is a 1 to 2 meter ring of reed canary grass (*Phalaris arundinacea*) around the entire wetland. There are emergent plants throughout the wetland. Blue grass (*Poa* sp.) and water plantain (*Alisma* sp.) dominated the vegetation releve. Spike-rush (*Eleocharis* sp.), bulrush (*Scirpus* sp.), dock (*Rumex* sp.), arrowhead (*Sagittaria* sp.), and bur-reed (*Sparganium* sp.) were present. There was no submergent vegetation, and

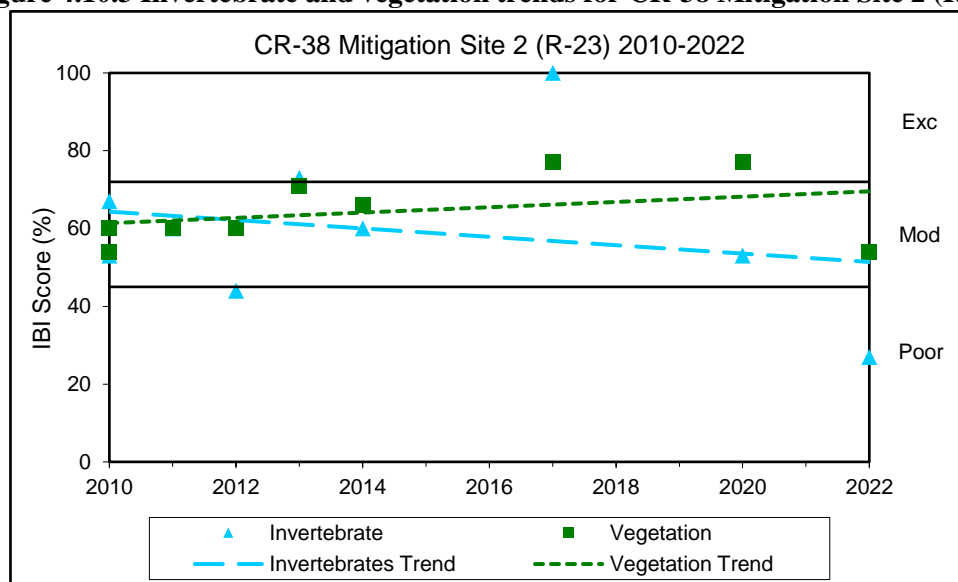


only a small population of duckweed (*Lemna* sp.) floating on the water. Snails, fingernail clams, trueflies, crustaceans, and beetles and bugs were collected.

**Table 4.10.3 CR-38 Mitigation Site 2 (R-23) Wetland Health based on Index of Biotic Integrity**

2022 Data (R-23)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Poor (8)	Moderate (19)
Trend 2010-2022	Stable	Stable

**Figure 4.10.3 Invertebrate and vegetation trends for CR-38 Mitigation Site 2 (R-23)**



**Site summary:** This is the eighth time that R-23 has been monitored by the WHEP volunteers since 2010. The invertebrate and vegetation scores were inconsistent, differing by 27 percent. Invertebrate data indicates poor wetland health while vegetation data indicates moderate wetland health. The water levels are low, and there was little to no submergent and floating vegetation. Lack of habitat along with the presence of tadpoles and frogs likely impacted the invertebrates score. Both scores are lower than typical for this wetland health history. The invertebrate data is variable while the vegetation data indicates a stable health trend.



STEPHAN AND EMILY HOCHÉ

#### 4.10.4 Erickson Pond (R-26)

Erickson Pond (R-26), also known as WMP #620, is a 1.9-acre, type 3 wetland in the Erickson Pond Watershed. The watershed is 1,832 acres of which 25 percent is impervious surface. There is one inlet with a rock spillway from the pond to the south, but no outlets. The wetland is included in the City's stormwater management plan and is designated to preserve with a management goal to reduce the presence of invasive wetland plant species and enhance the vegetative diversity of the wetland basin.





Erickson Pond lies in a depression surrounded by hiking trails, parks, oak forest, woodlands, and restored native prairie. The basin area was included in the City's Erickson Pond Water Quality and Habitat Enhancement Project. This project, constructed in 2008, provides improved stormwater treatment to treat runoff from the downtown area that drains to Erickson Pond. Prior to the project, large amounts of stormwater discharged directly into the wetland basin. The stormwater now enters treatment cells prior to discharge to the wetland. The wetland is also currently undergoing vegetation management to minimize invasive species and a five-acre native prairie has been planted in the adjacent upland. There is also a 75-foot buffer that helps pre-treat stormwater draining into the wetland.

This wetland infiltrates the stormwater from a large commercial area. There is some indication that this may be leading to high chloride levels during times of snow melt. The basin also receives water from the nearby splashpad which has led to more water in the basin than predicted during construction of the surrounding ponds and splash pad.

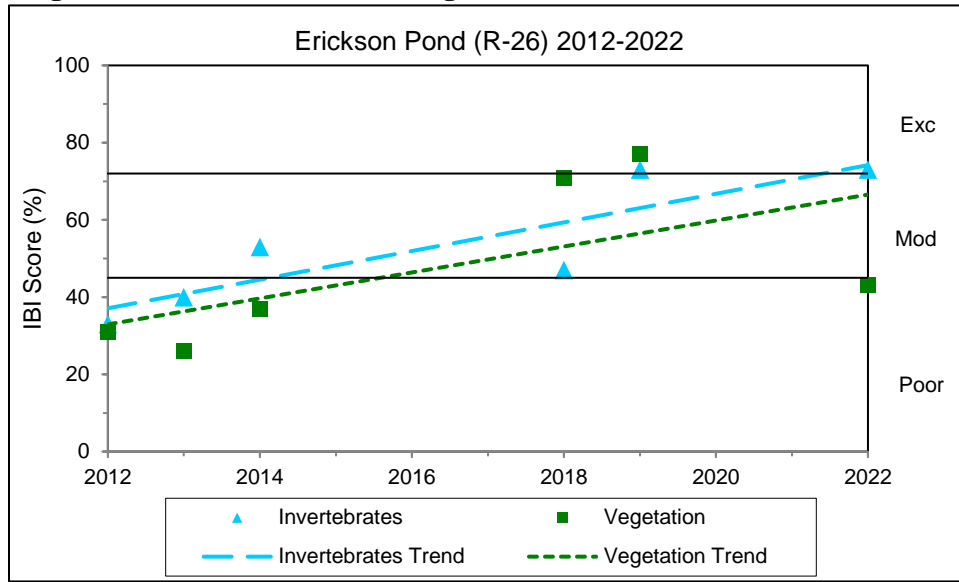
#### Wetland Health

**Site Observations:** The wetland slope is gentle and the substrate is very mucky. The wetland is choked with cattails (*Typha* sp.) so the invertebrate collections and vegetation releve were completed farther into the wetland to include open water. Coontail (*Ceratophyllum* sp.) dominated the water column, though pondweed (*Potamogeton* sp.) and water-nymmp (Najas sp.) were also present. Duckweeds (*Lemna* sp. and *Spirodela* sp.) and water-meal (*Wolffia* sp.) covered the open water. Arrowhead (*Sagittaria* sp.) and bulrush (*Scirpus* sp.) were the only other species found in the vegetation releve. Leeches, dragonlies, damselflies, snails, fingernail clams, true flies, crustaceans, and beetles and bugs were collected.

**Table 4.10.4 Erickson Pond (R-26) Wetland Health based on Index of Biotic Integrity**

2022 Data (R-26)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (22)	Poor (15)
Trend 2012-2022	Not enough data	Not enough data

**Figure 4.10.4 Invertebrate and vegetation trends for Erickson Pond (R-26)**



**Site summary:** This is the sixth time Erickson Pond has been monitored since 2012. The invertebrate and vegetation scores were inconsistent in 2022, differing by 30 percent. The invertebrate score indicates moderate wetland health while the vegetation score indicates poor wetland health. Scores are variable over the years for both invertebrates and vegetation. The dense cattail population and water level is affecting vegetation plot placement and may be impairing the emergent plant community. More years of surveys will help determine more reliable health trends.

#### 4.11 South St. Paul Wetlands

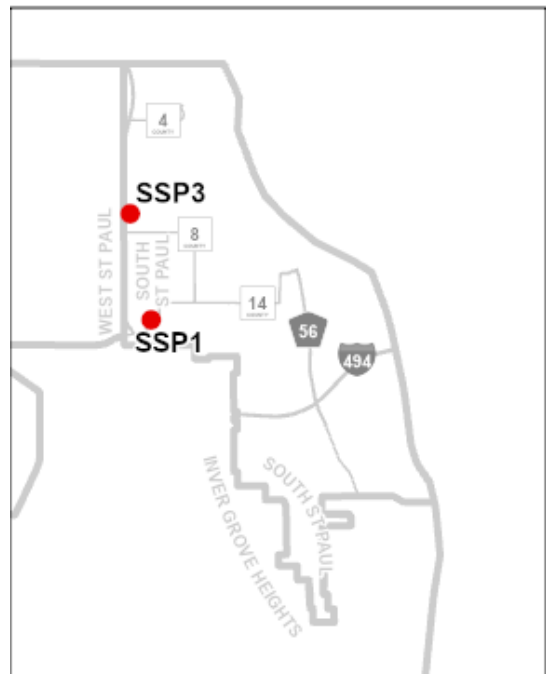
Two wetlands were monitored in South St. Paul in 2021 by the South St. Paul team. The City has 16 years of WHEP data! Four wetlands have been monitored in South St. Paul since the start of the WHEP program.

**Team Leader:** Cindy Swaim and Darcy Tatham

**Team Members:** Dllonna Clendenen, Emily Evans, Luann Hoganson, Conor Resnikoff, Michelle Skog, and Bri Wilde

Cindy Swaim and Darcy Tatham co-lead the South St. Paul team in 2023. This was Cindy Swaim's first year as a WHEP leader, though she has previously been involved in WHEP.

*South St. Paul WHEP Sites Monitored in 2022*



Darcy Tatham has been involved with WHEP for over 20 years and a team leader for all but her first year. Through the years, she has been involved with the West St. Paul team, the South St. Paul team, and the Mendota Heights team. She said, “I remember monitoring Anderson pond years ago when the cattails were filling in the pond, and then when it was dredged, and now several years after the dredging. I find it interesting looking at the results. Cattails definitely have their hold on the pond again, but not to the extent that they did in earlier years.



DARCY TATHAM

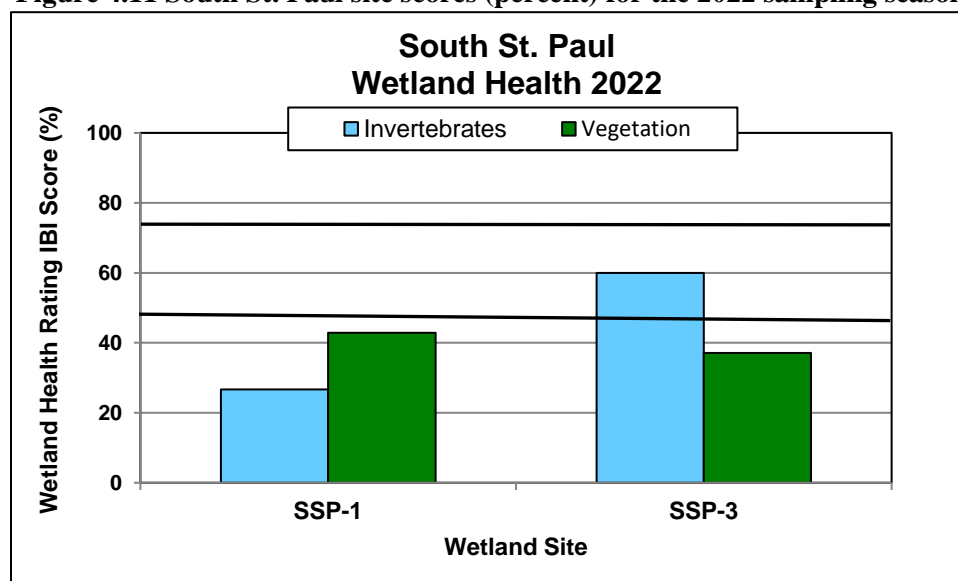
“One of my favorite moments this year happened at the LeVander pond. Just as we were finishing up collecting and putting away our equipment, some deer came out of the woods to the pond for a drink. They were very surprised to see us there, but quietly went on doing what they came for. A doe came with her twins and decided to go down one of the local streets. I know many people consider deer a nuisance, but I enjoyed seeing and watching them. It was my first time in all of these years to be that close with so many deer around at one of the ponds.”

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 4.11 presents an overall view of wetland health for all of the 2022 monitoring sites in South 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. In 2022, the invertebrates and vegetation health scores ranged from poor to moderate. The invertebrates and vegetation scores for SSP-1 and SSP-3 were inconsistent, differing by 16 and 23 percent, respectively.

**Figure 4.11 South St. Paul site scores (percent) for the 2022 sampling season**





#### 4.11.1 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 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 to facilitate future dredging and other maintenance activities. Additional dredging was done in 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.



Emily Evans, Luann Hoganson,  
and Cindy Swaim



#### Wetland Health

**Site Observations:** The wetland has a gentle entrance, but water deepens quickly. 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.) filled the water column. Waterweed (*Elodea* sp.), pondweed (*Potamogeton* sp.), duckweed (*Lemna* sp.) were the only other plant species in the vegetation releve. Mayflies, snails, trueflies, and crustaceans were the only invertebrates collected. Fish, crayfish, tadpoles, and mystery snails (*Cipangopaludina chinensis*) were abundantly present.



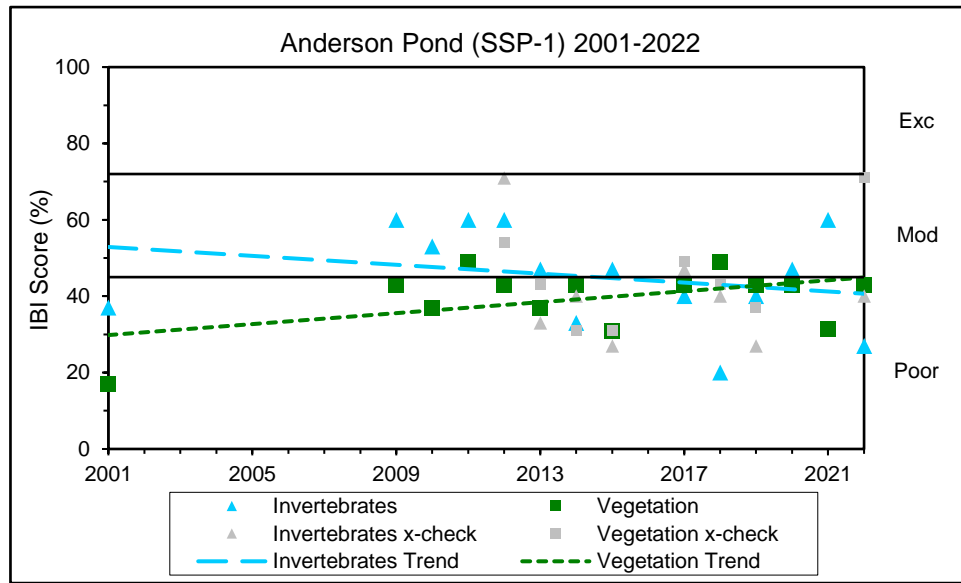
LUANN HOGANSON, CINDY SWAIM,  
AND EMILY EVANS

**Table 4.11.1 Anderson Pond (SSP-1) Wetland Health based on Index of Biotic Integrity**

2022 Data (SSP-1)	Invertebrates 	Vegetation 
<b>Wetland Health Rating (IBI score)</b>	Poor (8)	Poor (15)
<b>Cross-check Rating (IBI score)</b>	Poor (12)	Moderate (25)
<b>Trend 2001-2022</b>	Stable	Stable



**Figure 4.11.1 Invertebrate and vegetation trends for Anderson Pond (SSP-1)**



**Site Summary:** This is the fourteenth time that SSP-1 has been monitored since 2001. The invertebrate and vegetation scores are very inconsistent, differing by 16 percent. Both scores indicate poor wetland health. The vegetation trend appears stable. Highway 52 contributes stormwater input to the wetland. The encroachment of cattail and low water levels may complicate vegetation plot placement which makes or breaks the vegetation score. Predation may be impairing invertebrate collection. This site was cross-checked by another WHEP team. The invertebrate and vegetation scores between the two teams were inconsistent, differing by 13 and 28 percent. The cross-check team recorded several emergent forbs and grasses opposed to the City team who recorded none. This shows the dependence the vegetation scores are on plot placement, the importance of cross-checks, and the necessity for regularity of monitoring. The cross-check team collected more bugs, beetles, and dragonflies which enhance the *Corixidae* and Odonata Metrics.

#### 4.11.2 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 mucky. The wetland surface is covered in duckweed (*Lemna* sp. and *Spirodela* sp.) and water-meal (*Wolffia* sp.). Coontail (*Ceratophyllum* sp.) filled the water column. Pondweed (*Potamogeton* sp.) cattails (*Typha* sp.), willow trees (*Salix* sp.), and cottonwood trees (*Populus* sp.) were also present in the vegetation releve. No other emergent grasses or forbs present. Leeches, dragonflies, mayflies, snails, trueflies, crustaceans, and bugs and beetles were collected. Fairy shrimp (*Strtocyphalus sealii*) have been found in this wetland consistently since 2012.

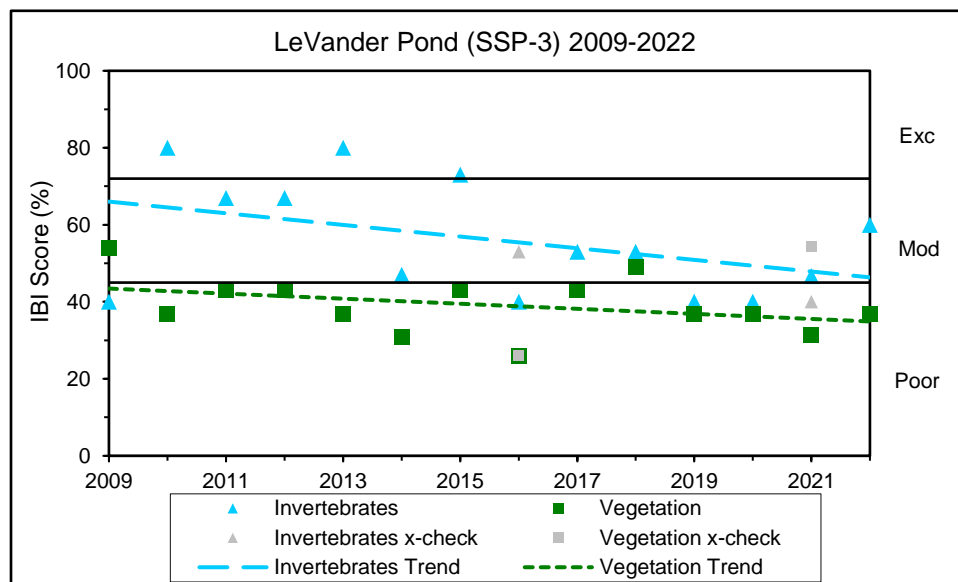


Darcy Tatham, Conor Resnikoff, Emily Evans, LuAnn Hoganson, and Cindy Swaim

**Table 4.11.2 LeVander Pond (SSP-3) Wetland Health based on Index of Biotic Integrity**

2022 Data (SSP-3)	Invertebrates 	Vegetation 
<b>Wetland Health Rating (IBI score)</b>	Moderate (18)	Poor (13)
<b>Trend 2009-2022</b>	Stabilizing	Stable

**Figure 4.11.2 Invertebrate and vegetation trends for LeVander Pond (SSP-3)**



**Site summary:** This is the fourteenth consecutive year of monitoring LeVander Pond. The vegetation and invertebrates scores were inconsistent with each other in 2022, differing by 23 percent. The invertebrate score indicates moderate wetland health and the vegetation score indicates poor wetland health. The invertebrate scores have fluctuated between poor and excellent over the years; however the invertebrate score in 2022 is higher than most recent records. The vegetation trend is stable. This wetland has historically lacked emergent vegetation representation, and other species of vegetation represented are found year after year.

## 4.12 West St. Paul Wetlands

Four wetlands were monitored in West St. Paul in 2022 by the West St. Paul team. The City of West St. Paul has 23 years of WHEP data! Eleven wetlands have been monitored in West St. Paul since the City became involved with WHEP in 1999.

**Team Leader:** James Chastek and Katie Schletty

**Team Members:** Ann Aegerter, William Chastek, Lizzie Gelderman, Julia Goldman, and Maverick Waltz



KATIE SCHLETTY, JIM CHASTEK, AND  
JULIA GOLDMAN

Though he has been an avid WHEP volunteer for about 20 years, this was his first year as a WHEP team leader for Jim Chastek, a role he shared with Katie Schletty. He commented, “What I have liked most about being a volunteer is just being in ponds. The view you get of the periphery from the water, is special, and

the plant life in the pond, especially when the pond is healthy. It is fun to see a rare plant, or one I have not seen before. I enjoy finding old favorites, too. The critters we observe, live or in the lab are fascinating in their diversity, and their intricate complexity.

*West St. Paul WHEP Sites Monitored in 2022*



It was a fun group to work with. As a leader there was planning, organizing, and paperwork, but what I really liked was sharing especially with members who were new to the plants and invertebrates. A high point for me was when one of the group saw a dipteran that was new to her and commented, "it's beautiful".

Dave Schletty is the Parks & Recreation Director at the City of West St Paul. He coordinates the City’s program and WHEP efforts. 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.

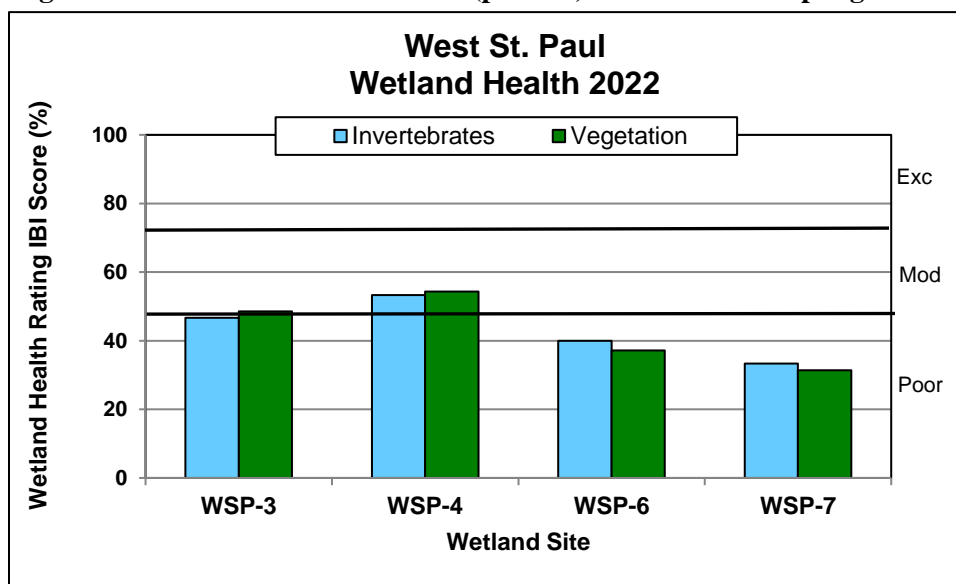


DAVE SCHLETTY

## West St. Paul General Wetland Health

Figure 4.12 presents an overall view of wetland health for all of the 2022 monitoring sites in West St. Paul based on the IBI scores for invertebrates and vegetation presented as a percent. Figure 4.12 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 2022. The invertebrate and vegetation scores for all four wetlands were consistent.

**Figure 4.12 West St. Paul site scores (percent) for the 2022 sampling season**



### 4.12.1 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. The lack of aquatic vegetation and the decline of wildlife in the area is of concern.





## Wetland Health

**Site Observations:** The wetland slope is gentle. The wetland substrate is very mucky. The water level appeared low in 2022. The wetland is surrounded by trees. Pondweed (*Potamogeton* sp.) filled the water column. Duckweed (*Lemna* sp.) and water-meal (*Wolffia* sp.) covered the surface of the water. Water plantain (*Alisma* sp.), beggar-tick (*Bidens* sp.), purple loosestrife (*Lythrum salicaria*), and reed canary grass (*Phalaris arundinacea*), were also present. Leeches, dragonflies, damselflies, mayflies, snails, fingernail clams, trueflies, crustaceans, and bugs and beetles were collected.

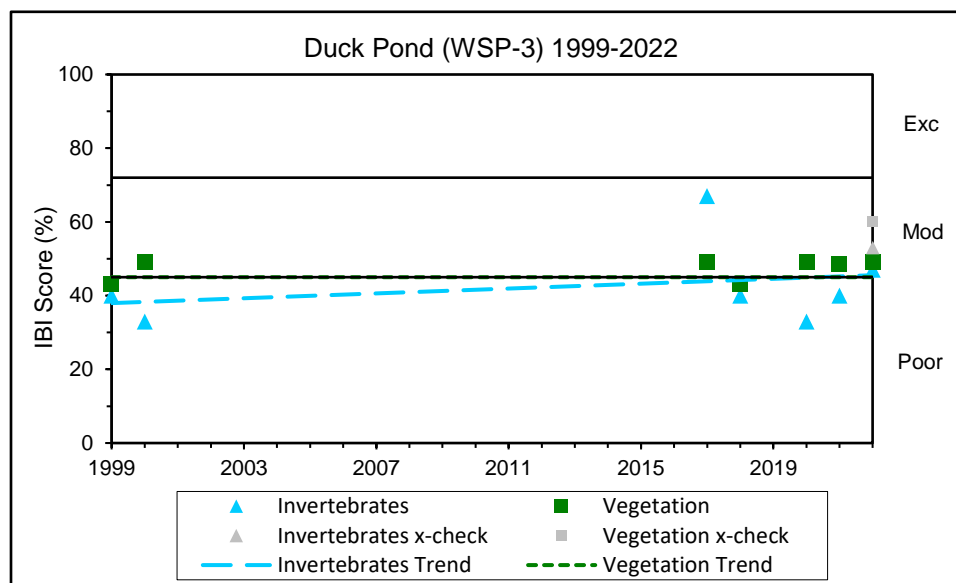


JIM CHASTEK AND JULIA GOLDMAN

**Table 4.12.1 Duck Pond (WSP-3) Wetland Health based on Index of Biotic Integrity**

2022 Data (WSP-3)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Poor (14)	Moderate (17)
Cross-check Rating (IBI score)	Moderate (16)	Moderate (21)
Trend 1999-2022	Stable	Stable

**Figure 4.12.1 Invertebrate and vegetation trends for Duck Pond (WSP-3)**



**Site Summary:** This is the seventh time that Duck Pond has been surveyed since 1999. The invertebrates and vegetation scores were consistent, and both scores indicate moderate wetland health. The vegetation trend is stable with similar scores from each monitoring event. The invertebrate scores have some variability, but the wetland health trend is stable. The wetland has low diversity of vegetation which likely



impacts the invertebrates community, especially since it lacks submergent vegetation. The health trends appear stable, and the data remains similar through the years of monitoring. This wetland was cross-checked by another WHEP team. The cross-check team documented *Chara* sp. and *Ricciocarpus natans* which enhanced the Nonvascular Metric. Otherwise, the vegetation data was very similar. The cross-check team recorded a smaller *Corixidae* proportion which enhanced the *Corixidae* Proportion Metric. Otherwise, invertebrate data was also similar.

#### 4.12.2 Weschcke Pond (WSP-4)

Weschcke Pond (WSP-4) is a 1.9-acre, type 4 wetland within the Ivy Falls Creek Watershed. The watershed is 42.4 acres. It is publicly owned, and part of the City's stormwater management plan. It is designated as IF1BP Weschcke Pond. It has one inlet on the south side and one outlet on the north side. This wetland was recently rebuilt and expanded with the Wentworth reconstruction.





#### Wetland Health

**Site Observations:** The wetland slope is gentle. The wetland substrate is mucky. The water level dropped in mid-July, during the vegetation survey compared to the invertebrate survey in early June. Cattails (*Typha* sp.) are prominent, but the soil mostly dry. There was no submergent vegetation. Duckweed (*Lemna* sp.) and water-meal (*Wolffia* sp.) are present. Several emergent forbs and grasses were also observed in the vegetation releve, including sedges (*Carex* sp.), spike-rush (*Eleocharis* sp.), bulrush (*Scirpus* sp.), reed canary grass (*Phalaris arundinacea*), water plantain (*Alisma* sp.), arrowhead (*Sagittaria* sp.), and smartweed (*Polygonum* sp.). Leeches, snails, trueflies, crustaceans, and beetles and bugs were collected.

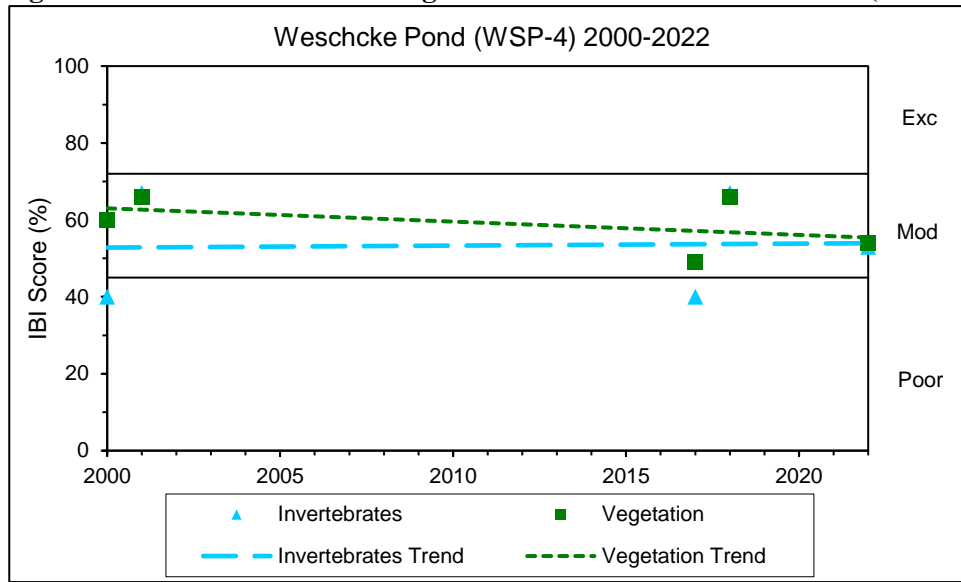


JIM CHASTEK AND JULIA GOLDMAN

**Table 4.12.2 Weschcke Pond (WSP-4) Wetland Health based on Index of Biotic Integrity**

2022 Data (WSP-4)	Invertebrates 	Vegetation 
<b>Wetland Health Rating (IBI score)</b>	Moderate (16)	Moderate (19)
<b>Trend 2000-2022</b>	Stable	Stable

**Figure 4.12.2 Invertebrate and vegetation trends for Weschcke Pond (WSP-4)**

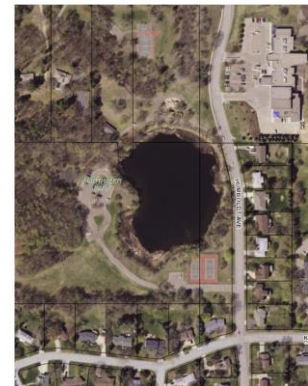


**Site Summary:** This is the fifth time that Weschcke Pond has been surveyed by WHEP volunteers, since 2000. The invertebrate and vegetation scores were consistent, and both scores indicate moderate wetland health. Low water levels impeded the growth of submergent and floating vegetation. Despite these conditions, high numbers of leeches, snails, and bugs and beetles supported moderate wetland health rating. Inclusion of several emergent forbs and grasses present in the vegetation releve also supported the moderate wetland health rating. Few years of data display stable health trends, and the data remains similar through the years of monitoring. More years of monitoring will help determine a more reliable health trend.

### 4.12.3 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

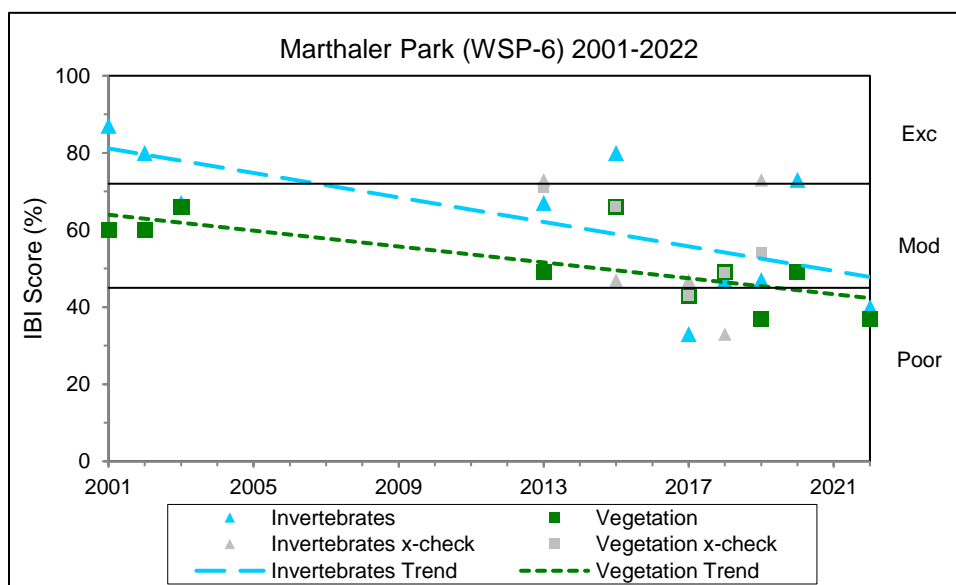
**Site Observations:** The wetland slope is gentle. The wetland substrate is sandy and solid. The wetland is surrounded by trees including willows (*Salix* sp.), but other emergent vegetation along the shoreline is nearly non-existent. Coontail (*Ceratophyllum* sp.), waterweed (*Elodea* sp.), and pondweed (*Potamogeton* sp.) densely fill the water column. Duckweed (*Lemna* sp.) and water-meal (*Wolffia* sp.) sparsely float upon

the surface of the water. Leeches, dragonflies, damselflies, mayflies, snails, fingernail clams, crustaceans, and 1 bug and 1 beetle were collected.

**Table 4.12.3 Marthaler Park (WSP-6) Wetland Health based on Index of Biotic Integrity**

2022 Data (WSP-6)	Invertebrates 	Vegetation 
<b>Wetland Health Rating (IBI score)</b>	Poor (12)	Poor (13)
<b>Trend 2001-2021</b>	Variable	Declining

**Figure 4.12.3 Invertebrate and vegetation trends for Marthaler Park (WSP-6)**





**Site summary:** This is the tenth time that Marthaler Pond has been monitored since 2001. The invertebrates and vegetation scores were consistent, both indicating poor wetland health. The invertebrate species collected from year to year has varied which is shown in the variable invertebrate wetland health scores over the years. The lack of emergent vegetation is repeatedly recorded at this site. The vegetation trend since 2013 appears stable. In past years, the water has been deep. Dramatic fluctuation of water levels may affect the ability for emergent plants to become established. It may also affect where monitoring can be conducted at this site and what species are collected and observed.

Humboldt Pond (WSP-7), once known as Vivian Pond, is a 1.2-acre, type 4 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 SR1P Humboldt Pond. There is one inlet on the east side, but no outlets. The wetland is located south of Marthaler Park, west of Robert Street.



**Site Observations:** The wetland slope is gentle. The wetland substrate is solid and there are many submerged sticks and branches. Water levels were low in 2022. There was no submergent vegetation present. Duckweeds (*Lemna* sp. and *Spirodela* sp.) only sparsely floated on the surface of the water. Trees surround the pond, but no other emergent forbs or grasses were within the vegetation releve. Leeches, caddisflies, trueflies, crustaceans, and bugs and beetles were collected.

<b>2022 Data (WSP-7)</b>	<b>Invertebrates</b> 	<b>Vegetation</b> 
<b>Wetland Health Rating (IBI score)</b>	Poor (10)	Poor (11)
<b>Trend 2001-2022</b>	Declining	Declining

**Humboldt Pond (WSP-7) 2001-2022**

The graph displays the IBI Score (%) for Invertebrates and Vegetation from 2001 to 2022. The Y-axis ranges from 0 to 100. The X-axis shows years from 2001 to 2021. Quality benchmarks are indicated on the right: Exc (Excellent) at 80%, Mod (Moderate) at 70%, and Poor at 45%.

Year	Invertebrates Score (%)	Invertebrates Trend (%)	Vegetation Score (%)	Vegetation Trend (%)
2001	80	82	55	57
2014	53	55	49	48
2016	60	50	55	46
2021	33	36	43	41

Dakota Co. WHEP  
2022 Report