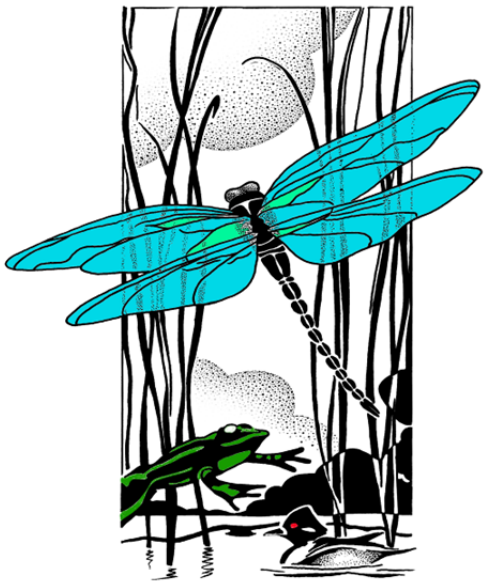
Minnesota

Wetland Health Evaluation Program

Dakota County 2015

2015 Wetland Health Evaluation Program Report
Dakota County, MN



Coordinated By:

Dakota County

14955 Galaxie Avenue

Apple Valley, MN 55124-8579

January 2016

Report
Prepared by:

FORTIN
CONSULTING, INC.
serving the environment

Acknowledgements

The following organizations participated in and provided funding for the 2015 Wetland Health Evaluation Program

Local Government:
Dakota County
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
Vermillion River Watershed

Special Recognition:
Mark Gernes, Joel Chirhart, Michael Bourdaghs, John Genet; MPCA Technical Experts
Paula Liepold, Dakota County WHEP Coordinator
Mary Karius, Hennepin County WHEP Coordinator
Mary Kay Lynch, Co-Citizen Monitoring Coordinator
Katie Farber, Carolyn Dindorf; Fortin Consulting

Cover design by:
Paula Liepold

Photos by:
Mary Kay Lynch, Maggie Karschnia,
Marianne McKeon, and Fortin Consulting, Inc.

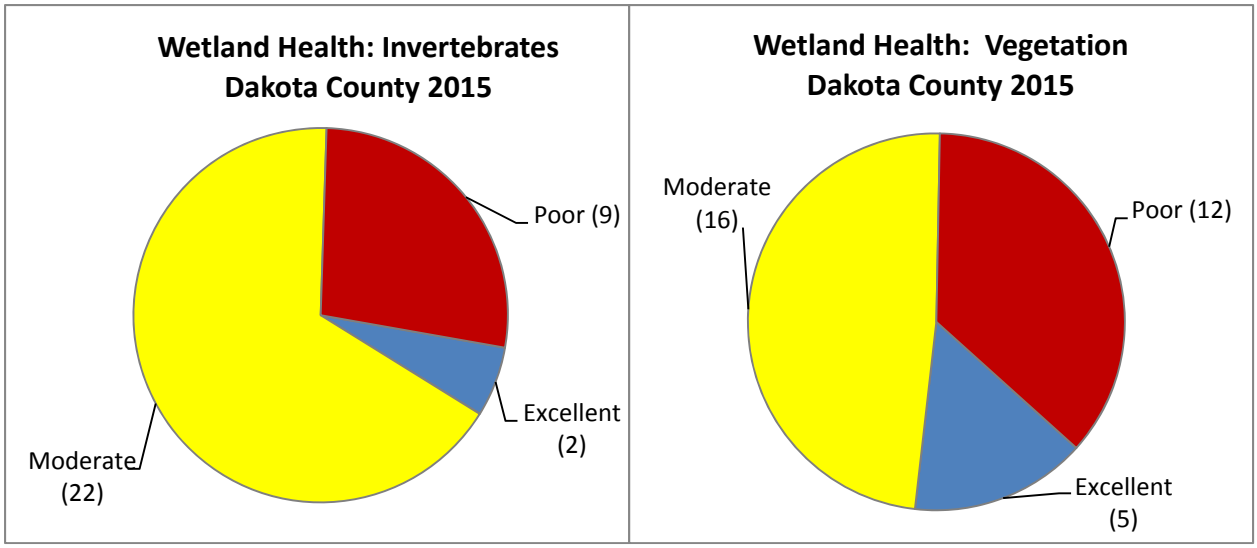
Special thanks to all of the WHEP volunteers who donated their time and were out in the wetlands or behind the microscopes.

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.***

Table of Contents

Executive Summary
Dakota County Wetland Health Evaluation Program 2015

Dakota County began sponsoring the Wetland Health Evaluation Program (WHEP) in 1997. Since then, 173 wetlands have been monitored by many volunteers across the County. In 2015, ten cities and Dakota County participated in WHEP, monitoring 33 different wetlands. Three of these wetlands were monitored for the first time in 2015, including two wetlands being monitored for the County. Trained volunteers collected data on the macroinvertebrates (insects and other small animals without backbones) that live in the wetlands as well as the vegetation (plants) in the wetlands. The plants and invertebrates identified by the volunteers were then used to calculate an Index of Biotic Integrity (IBI). This IBI can be used to provide an estimate of the health of each wetland.

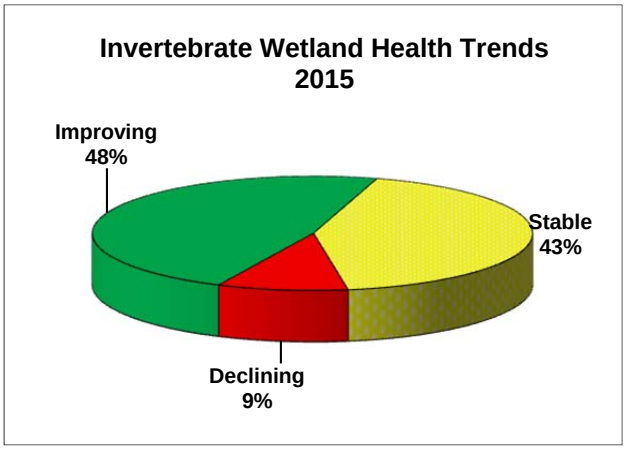


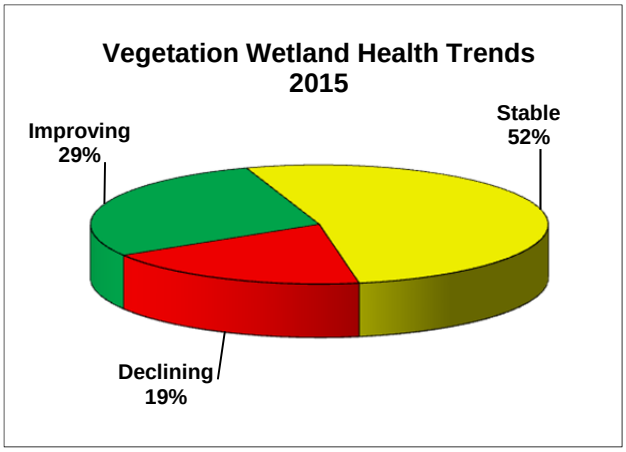
The results of the monitoring for 2015 showed a variety of wetland conditions. The Index of Biotic Integrity was used to determine wetland health ranging from poor to excellent. The majority of wetlands were in the moderate category for both macroinvertebrates (67%) and vegetation (49%). Two wetland sites rated excellent for macroinvertebrates and five wetland site rated excellent for vegetation. Twenty-seven percent of the wetlands received poor invertebrates scores and thirty-six percent of the wetlands received poor vegetation scores.

The City of Lakeville's DNR 393 (L8) had the highest invertebrates (24) and vegetation (29) scores in 2015. West St. Paul's Wentworth Pond (WSP18) also tied for the highest invertebrates score (24). Wetland sites L8 and WSP18 were the only two wetlands that scored excellent for invertebrates in 2015. Wetland sites DC1, H6, L7, L8, and MH9 scored excellent for vegetation. Dakota County's Buck Pond (DC2) had the lowest invertebrate scores (10). Farmington's Vermillion River Wetland (F6) had the lowest vegetation score (9) for the third consecutive year.

A trend analysis was conducted for all of the wetlands monitored in 2015 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, 48 percent of wetlands appear to be improving, nine percent are declining, and 43 percent are stable. For vegetation, 29 percent of the wetlands showed improved wetland health while 19 percent are declining. The data shows that 52 percent are stable. See graphs on next page.

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.





2015 Dakota County Wetland Health Trends*

*excludes wetlands that di d not have adequate data for trend analysis

In 2015, 103 Dakota County WHEP volunteers donated more than 1,917 hours in training, sample collection and sample identification in completion of this valuable monitoring. It gives citizens an opportunity to study the wetlands in their communities and see the impacts of human disturbance on our wetlands, and it provides valuable data to the cities and County. The data collected by the WHEP volunteers can be used for many purposes such as, to help track changes in wetlands over time and relate to changes in the watershed, help identify high quality wetlands that may need protection, track changes in wetland health with restoration projects, evaluate the success of wetland creation or impacts of new stormwater input, and to help find invasive species that threaten the wetlands. WHEP is a great example of a successful cooperative program between citizens, cities, counties and state government.

1.0 **Background**

1.1 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.

Judy Helgen, Program co-founder

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.

Mark Gernes, Program co-founder (demonstrating his "sedge three-ranked" pose)

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

Wetland sampling efforts began in 1997 in Dakota County. During 1998-2000, the program was managed by the Dakota Environmental Education Program. During these years, the project was funded by various sources, including the US EPA grant, Minnesota Legislature (LCCMR grant), and participating cities. Gradually, the number of cities participating in WHEP increased under the leadership of Charlotte Shover and Dan Huff, and now Paula Liepold at Dakota County, and others in Hennepin County. Up to eleven 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 Counties and communities.

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

1.2 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 creation 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 ground water, 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.

1.3 Wetland Types

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

Type 1 – Seasonally Flooded Basin or Flat: 5,995 acres
Seasonally Flooded Basins or Flats are fully saturated or periodically covered with water, usually with well-drained soils during much of the growing season. The vegetation varies from bottomland hardwoods to herbaceous plants depending on the season and length of flooding.

Type 2 – Wet Meadow: 551 acres
Wet Meadow wetlands usually do not have standing water, but have saturated soils within a few inches of the surface during the growing season. Grasses, sedges, rushes, and various broad-leaved plants dominate Wet Meadows. Common sites include low prairies, sedge meadows, and calcareous fens.

Type 3 – Shallow Marsh: 12,491 acres
Shallow Marsh wetlands often have saturated soils and six inches or more standing water during the growing season. Grasses, bulrush, spike rush, cattail, arrowhead, pickerelweed, and smartweed often grow in these wetlands.

Type 4 – Deep Marsh: 778 acres
Deep Marsh wetlands often have inundated soils and six inches to three feet or more standing water during the growing season. Cattail, reed, bulrush, spike rush, and wild rice grow in these wetlands. Pondweed, naiad, coontail, watermilfoil, waterweed, duckweed, water lily, and spatterdock can often be found in the open water areas.

Type 5 – Shallow Open Water: 1,213 acres
Shallow Open Water wetlands have standing water less than 10 feet deep. These wetland types include shallow ponds and reservoirs. Emergent plants are often found in these areas.

Type 6 – Shrub Swamp: 1,188 acres
Shrub Swamp wetlands are often covered with up to six inches of water, and the soils are usually completely saturated. The water table is usually at or near the surface of these areas. Alder, willow, buttonbush, dogwood, and swamp privet inhabit these areas.

Type 7 – Wood Swamp: 1,859 acres
Wood Swamp wetlands often have one foot of standing water, and the soils are completely saturated during the growing season. The water table is usually at or near the surface of these areas. Hardwood and coniferous swamps contain tamarack, northern white cedar, black spruce, balsam fir, balsam poplar, red maple, and black ash.

Type 8 – Bogs: 0 acres
Bogs are often supplied by the water table being at or near the surface of these areas. The acidic peat soils are usually saturated. Heath shrubs, sphagnum mosses, sedges, leatherleaf, Labrador tea, cranberry, and cottongrass dominate bogs.

Riverine: 52 acres
Wetlands associated with rivers and found between the river banks.

Municipal/Industrial: 374 acres
Municipal/Industrial wetlands include diked areas.

Total wetland area in Dakota County: 24,501 acres

Many federal and state agencies are involved in wetland regulation, protection, and restoration. In Minnesota, the state wetland regulations are overseen by the Board of Water and Soil Resources and Department of Natural Resources. To learn more about regulations and programs that affect or protect wetlands, visit www.bwsr.state.mn.us and click on wetlands. Many cities, watershed organizations and counties have adopted local administration of the state Wetland Conservation Act.

1.4 Dakota County Wetland Monitoring

There are many hands involved in the success of the Dakota County Wetland Health Evaluation Program (WHEP). It is invaluable to have a dedicated and enthusiastic group of people working together to continue the success and growth of the program each year.

Paula Liepold

Paula Liepold has coordinated the Dakota County's WHEP since 2006. Paula says, "Who would have thought that studying macroinvertebrates and plants in wetlands would bond so many different groups of people together for two decades – with no plans of stopping? WHEP benefits our community in so many ways: volunteers transform into citizen scientists after attending training and gaining experience in wetlands; cities receive credible data that helps inform decisions about land use and stormwater runoff; and the public understands more about the value of wetlands and takes greater action to protect them."

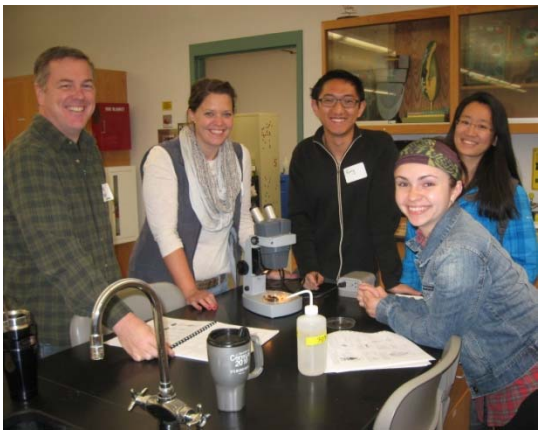
Mary Kay Lynch is the WHEP Field Monitoring Coordinator. She has a master's degree in biology and taught biology for 22 years, 20 of which were in Dakota County. She was a team leader in the pilot program as it was developed by Judy Helgen of the MPCA. She served as the Burnsville team leader for five years when the program began in Dakota County. She commented, "I'm happy to be able to play a role in a program that offers volunteers of all ages an opportunity to experience the wonder of wetlands. The dedication, hard work, good humor, and creativity of the volunteers and team leaders is impressive and inspiring. Our Dakota County wetlands have a fan club that can help assure their well-being."

Mary Kay Lynch

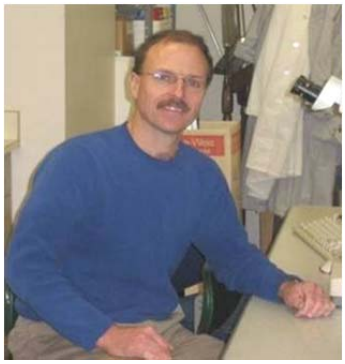
2.0 Methods

2.1 Training

Training for citizen monitors is arranged by Dakota and Hennepin Counties and taught by technical experts from the MPCA. 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.



Vegetation and Invertebrate Experts



Mark Gernes

Michael Bourdaghs

Joel Chirhart

John Genet

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

Mark Gernes 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."

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 (U.S.EPA www.epa.gov/bioindicators/html/about.html). 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.

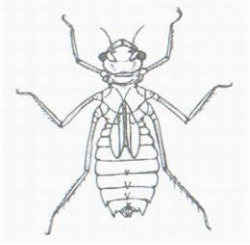
Vegetation Index of Biological Integrity (IBI)

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. 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 or kinds 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 project. There were no modifications to the methods after 2004. Previous changes in methodology have been documented in earlier summary reports.

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

2.3 Cross-Checks and Quality Control

Each city is responsible for evaluating one wetland in another city as a means of providing a cross-check. The citizen cross-check provides a second sample for the selected wetland. The purpose of the cross-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 Citizen Monitoring Coordinator (Mary Kay Lynch) provides advice regarding proper sampling methods and proper site selection. Fortin Consulting provides Quality Control (QC) review of the completed data sheets. This review identifies and corrects errors in scoring, transfer of data, and data analysis.

Katie Farber, Nancy Mulhern, Carolyn Dindorf, Connie Fortin, Lauren Tjaden and Roman Rowan

Fortin Consulting (FCI), the technical expert, provides quality assurance and report preparation. FCI has been working with Dakota County on the WHEP program since 2007. FCI conducts QC checks on the wetlands sampled by reviewing the vegetation sample plot that was selected and evaluated by the citizen team. FCI also checks the invertebrate identification of the citizen team for the invertebrate IBI; therefore, the invertebrate QC is not a second invertebrate sample of the same wetland site, but a review of the sample collected and evaluated by the citizen team.

Over the duration of the project, the work of each citizen team has been reviewed on a rotational basis. The technical expert reviews 10 percent of the vegetation plots and one invertebrate collection from each team. In 2015, Fortin Consulting cross-checked the vegetation plots of three wetlands, one in Apple Valley (AV19), Burnsville (B3), and Eagan (E36). Fortin Consulting also reviewed the invertebrate samples from sites AV1, B1, E36, F3, H6, L8, MH2, R20, SSP1, and WSP's cross-check (L8). 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 both the scoring checks and the technical quality control checks; it is the City team's data with any corrections found during the data transfer and mathematical checks, and the field vegetation and invertebrate identification checks conducted by FCI. Data for the cross-check's conducted by another City team is presented in Section 3.2.

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 2015 Sampling Season Results

During the 2015 sampling season, ten citizen teams monitored 33 wetlands in ten cities in Dakota County (Apple Valley, Burnsville, Eagan, Farmington, Hastings, Lakeville, Mendota Heights, Rosemount, South St. Paul, and West St. Paul). Ten of these wetlands were sampled twice through citizen cross-checks. Three wetland vegetation samples and ten invertebrate samples were checked for accuracy through the quality control check performed by Fortin Consulting.

Figure 3.1.1 Dakota County Wetland Ratings

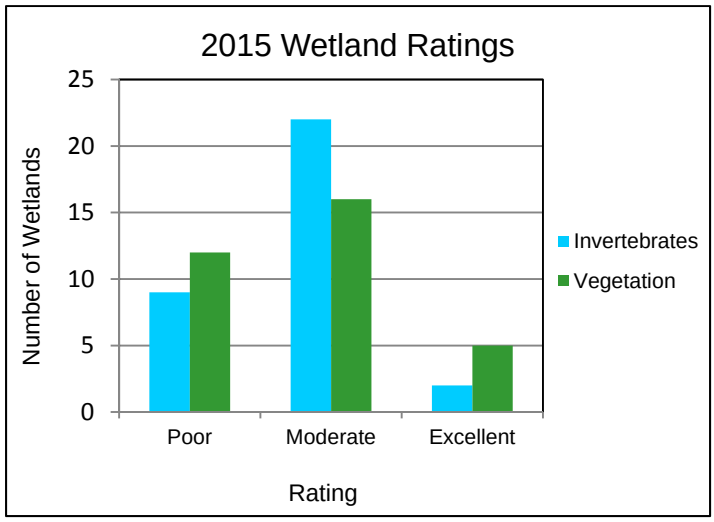


Figure 3.1.1 and Table 3.1.1 show the vegetation and invertebrate ratings for all of the wetlands assessed during the 2015 sampling season. Based on vegetation scores, five of the wetlands rated excellent, sixteen of the wetlands were rated moderate, and twelve rated poor. Vegetation scores ranged from 9 to 29 out of a maximum of 35 points.

The invertebrate analysis resulted in two wetlands rating excellent, twenty-two rating moderate and nine poor. Invertebrate scores ranged from 10 to 24 out of a maximum of 30 points.

Several of the sites showed different ratings for vegetation versus invertebrates. More wetlands rated moderate for invertebrates than vegetation and more wetlands rated excellent for vegetation than invertebrates. There are different factors that may be influencing the plant and invertebrate communities in each wetland. Possible factors affecting wetland quality are described in the next section.

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)	1/2	2/1	0/0
Burnsville (B)	1/2	3/2	0/0
Dakota County (DC)	1/1	1/0	0/1
Eagan (E)	2/1	1/2	0/0
Farmington (F)	1/1	2/2	0/0
Hastings (H)	0/0	4/3	0/1
Lakeville (L)	0/0	1/0	1/2
Mendota Heights (MH)	0/0	2/1	0/1
Rosemount (R)	1/2	3/2	0/0
South Saint Paul (SSP)	1/2	1/0	0/0
West Saint Paul (WSP)	1/1	2/3	1/0
Totals	**9/ 12**	**22/ 16**	**2/ 5**

Figures 3.1.2 and 3.1.3 show the distribution of wetland health ratings for each of the sites monitored in 2014.

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

Figure 3.1.2

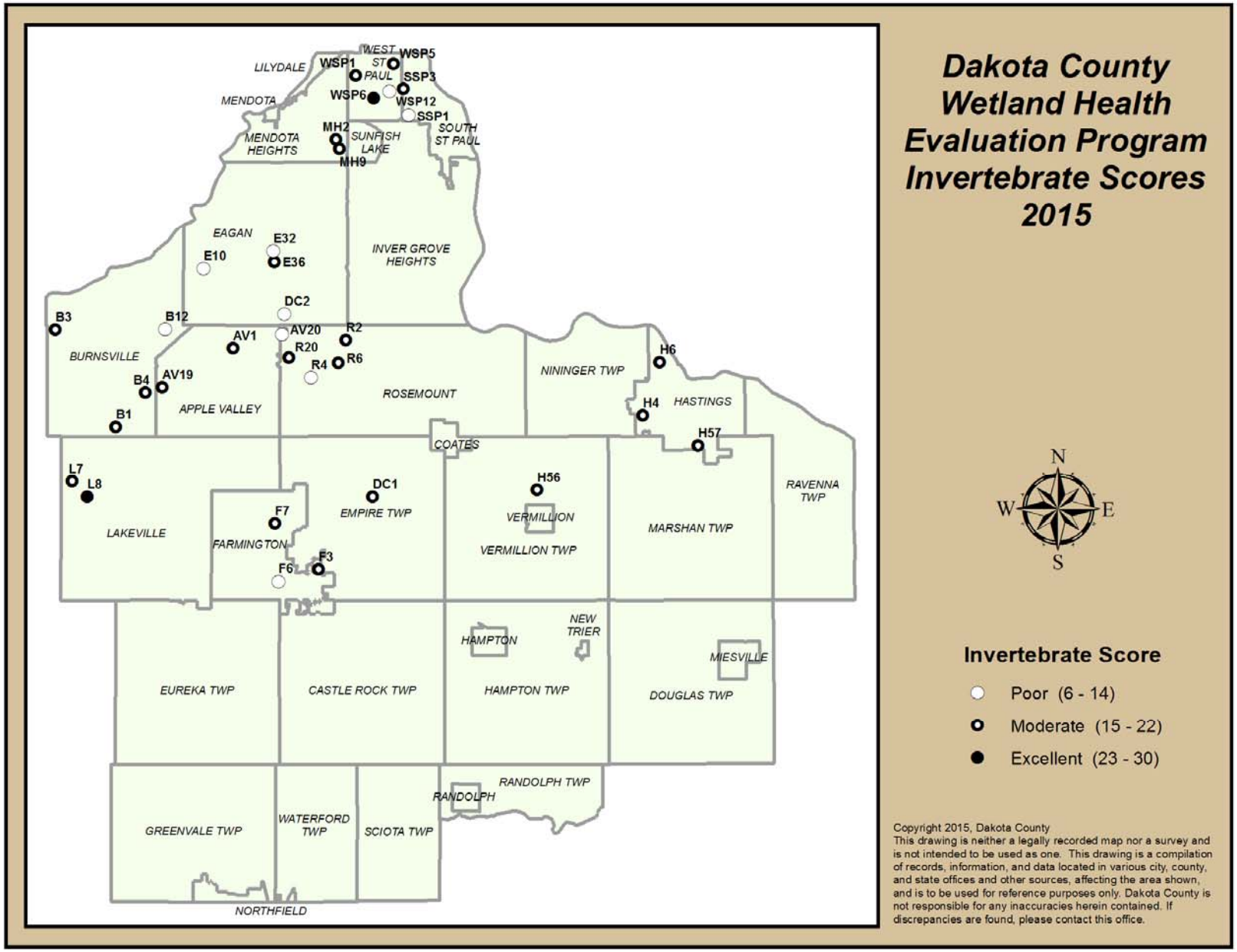
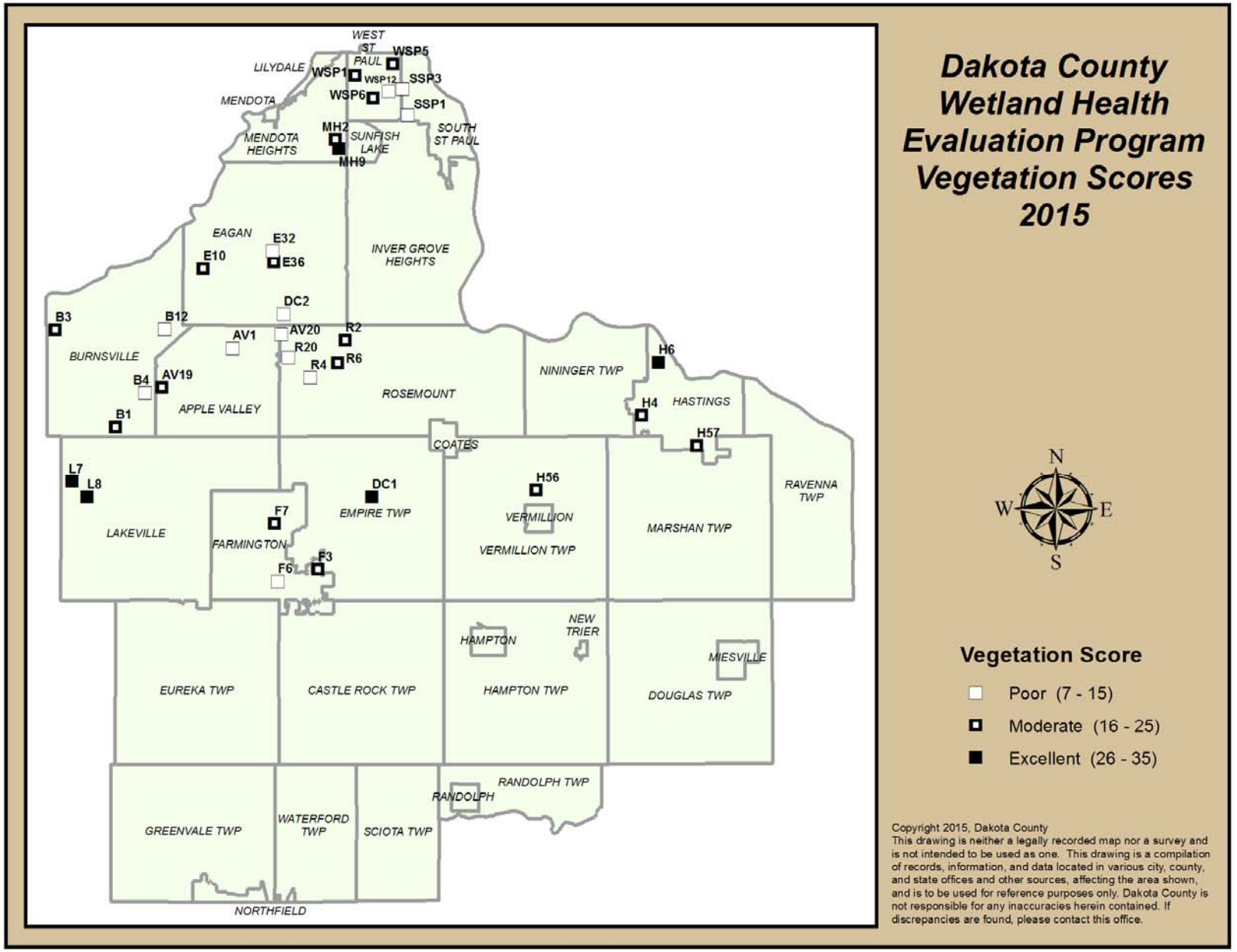

Dakota County
Wetland Health
Evaluation Program
Invertebrate Scores
2015
LILYDALE
WEST ST PAUL
MENDOTA
MENDOTA HEIGHTS
SUNFISH LAKE
SOUTH ST PAUL
EAGAN
INVER GROVE HEIGHTS
BURNSVILLE
APPLE VALLEY
ROSEMOUNT
NININGER TWP
HASTINGS
COATES
LAKEVILLE
FARMINGTON
EMPIRE TWP
VERMILLION
VERMILLION TWP
MARSHAN TWP
RAVENNA TWP
HAMPTON
NEW TRIER
MIESVILLE
EUREKA TWP
CASTLE ROCK TWP
HAMPTON TWP
DOUGLAS TWP
RANDOLPH TWP
RANDOLPH
GREENVALE TWP
WATERFORD TWP
SCIOTA TWP
NORTHFIELD
WSP1
WSP5
SSP3
WSP6
WSP12
SSP1
MH2
MH9
E32
E10
E36
DC2
B3
B12
AV1
AV20
R2
R20
R4
R6
H6
B4
AV19
B1
H4
H57
L7
L8
DC1
H56
F7
F3
F6
N
W
E
S
Invertebrate Score
Poor (6 - 14)
Moderate (15 - 22)
Excellent (23 - 30)
Copyright 2015, Dakota County
This drawing is neither a legally recorded map nor a survey and is not intended to be used as one. This drawing is a compilation of records, information, and data located in various city, county, and state offices and other sources, affecting the area shown, and is to be used for reference purposes only. Dakota County is not responsible for any inaccuracies herein contained. If discrepancies are found, please contact this office.

Figure 3.1.3


Dakota County
Wetland Health
Evaluation Program
Vegetation Scores
2015
WEST ST PAUL
LILYDALE
MENDOTA
MENDOTA HEIGHTS
SUNFISH LAKE
SOUTH ST PAUL
EAGAN
INVER GROVE HEIGHTS
BURNSVILLE
APPLE VALLEY
ROSEMOUNT
NININGER TWP
HASTINGS
COATES
LAKEVILLE
FARMINGTON
EMPIRE TWP
VERMILLION
VERMILLION TWP
MARSHAN TWP
RAVENNA TWP
HAMPTON
NEW TRIER
MIESVILLE
EUREKA TWP
CASTLE ROCK TWP
HAMPTON TWP
DOUGLAS TWP
RANDOLPH TWP
RANDOLPH
GREENVALE TWP
WATERFORD TWP
SCIOTA TWP
NORTHFIELD
WSP5
WSP1
WSP12
SSP3
WSP6
SSP1
MH2
MH9
E32
E10
E36
DC2
B3
B12
AV1
AV20
R2
R20
R4
R6
B4
AV19
B1
H6
H4
H57
L7
L8
DC1
H56
F7
F3
F6
N
W
E
S
Vegetation Score
Poor (7 - 15)
Moderate (16 - 25)
Excellent (26 - 35)
Copyright 2015, Dakota County
This drawing is neither a legally recorded map nor a survey and is not intended to be used as one. This drawing is a compilation of records, information, and data located in various city, county, and state offices and other sources, affecting the area shown, and is to be used for reference purposes only. Dakota County is not responsible for any inaccuracies herein contained. If discrepancies are found, please contact this office.

3.1.1 Natural versus Altered Wetlands

In an attempt to help identify why there are differences in wetland quality, different factors that impact the wetlands were evaluated. Wetlands were classified as natural, altered by stormwater input, or created based on information provided in the site identification form or from city staff. The most recent data since 2008 was used. Average IBI scores for each of the three categories were calculated. In the past, WHEP team leaders have commented that the created wetlands seem to exhibit poorer insect diversity. The most recent data (2008-2015) indicates stormwater and natural wetlands are scoring similarly on average, but better than manmade wetlands for vegetation and invertebrates on average (Table 3.1.2). 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.

Wetland health scores vary from year to year. In 2015, stormwater and natural wetlands did not affect the wetland health. 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. At this time, there is no statistical data indicating a decreased invertebrate community in natural versus disturbed or created wetlands. These results infer that the created wetlands are functioning similarly to the natural wetlands as far as the biological community.

Table 3.1.2 Most Recent IBI Scores (2008-2014) of Created, Stormwater and Natural Wetlands

	Invertebrates			Vegetation		
Wetland	Created Wetlands	Stormwater wetlands	Natural Wetlands	Created Wetlands	Stormwater wetlands	Natural Wetlands
AV-1		18			15	
AV-5			14			19
AV-6		14			15	
AV-7		10			13	
AV-8		16			23	
AV-10			12			9
AV-11			10			17
AV-12		16			11	
AV-13		24			15	
AV-14		12			9	
AV-15		10			13	
AV-16		NA			17	
AV-17			18			19
AV-18		18			17	
AV-19			18			17
AV-20			14			15
B-1			20			23
B-1 Alt.			15			23
B-2			12			11
B-3		20			17	
B-4			16			15

Wetland	Invertebrates			Vegetation		
	Created Wetlands	Stormwater wetlands	Natural Wetlands	Created Wetlands	Stormwater wetlands	Natural Wetlands
B-6		16			21	
B-7		12			17	
B-8			18			13
B-9		14			15	
B-10		10			15	
B-11		16			13	
B-12			14			15
B-13		14			19	
B-17			28			21
DC-1			22			27
DC-2			10			13
E-1		18			21	
E-7		20			21	
E-10		14			17	
E-11		14			21	
E-18		22			19	
E-20		20			27	
E-21		20			19	
E-22		20			17	
E-25		16			19	
E-26		14			15	
E-27		18			21	
E-28		16			21	
E-29			12			27
E-31		20			13	
E-32		14			15	
E-33		16			21	
E-34		24			23	
E-35			12			27
E-36		16			17	
E-37		18			17	
E-38		24			19	
F-1		NA			13	
F-3		16			19	
F-4	8			11		
F-5		NA			NA	
F-6		12			9	
F-7		16			23	
H-4	18			17		
H-6		22			27	
H-30	8			13		
H-56		20			19	
H-57	16			21		
L-4	14			15		
L-7		16			27	

	Invertebrates			Vegetation		
Wetland	Created Wetlands	Stormwater Wetlands	Natural Wetlands	Created Wetlands	Stormwater Wetlands	Natural Wetlands
L-8			24			29
L-9	20			11		
L-10			12			11
LD-1			14			17
MH-2		22			23	
MH-9		22			27	
MH-13		20			21	
MH-14		22			25	
MH-15		16			21	
MH-16		24			29	
MH-17	12			15		
MH-18		22			27	
R-1		20			21	
R-2		18			23	
R-4		14			13	
R-6			18			19
R-14			20			23
R-18			26			19
R-20		18			15	
R-21	22			23		
R-22		24			25	
R-23	18			23		
R-25		12			23	
R-26			16			13
SSP-1		14			11	
SSP-3		22			15	
WSP-1			22			17
WSP-2		16			17	
WSP-5			20			19
WSP-6			24			23
WSP-7		16			17	
WSP-9			12			11
WSP-10		22			19	
WSP-12		12			15	
Average	**15**	**18**	**18**	**17**	**18**	**18**

3.1.2 Effect of Invasive Species on Wetland Health

Many of the WHEP wetlands have been found to contain invasive species. Purple loosestrife **(***Lythrum salicaria*) and reed canary grass (*Phalaris arundinacea*) are two common wetland invaders. Invasive species are a problem in that they tend to take over a wetland, shading out the diversity of wetland vegetation that belongs in the wetlands. Reductions in plant species diversity can result in lower diversity in the invertebrate community. Purple loosestrife was found in 18% of the wetlands and reed canary grass in 79% of the wetlands monitored in 2015. Purple loosestrife will grow in deeper water than reed canary grass, which can grow in both upland and wetland conditions. It is possible that purple loosestrife

and reed canary grass exist in more wetlands, but just not made note of in the cases in which these plants were not located in the vegetation plots. An analysis of variance (ANOVA) was completed to determine if the differences were statistically significant. Differences in IBI scores for wetlands with invasive species present vs. not present were not statistically significant. Oriental mystery snails (*Bellamya* sp.) were found in five wetlands in 2015.

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 city. Wetlands with higher impervious areas in the watershed, likely receive more runoff and pollutants. Impervious areas ranged from 0 to 80% (Table 3.1.3). Studies have shown that stream degradation occurs at low levels of imperviousness (about 10%)[1]. A similar relationship may exist for wetlands too. Linear regressions completed in previous reports 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.

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

Table 3.1.3 Wetland and Watershed Data for 2008-2014

Site ID	Site Name	Wetland size (Acres)	Watershed Size (Acres)	% Imperv	Invert. Score	Veg. Score
AV-1	Hidden Valley	2	21	35	18	15
AV-5	Cedar Knolls Pond	0.5	8	20	14	19
AV-6	Belmont Park	1.3	202	20	14	15
AV-7	Podojil Pond	1.3	8	25	10	13
AV-8	Chaparal Pond	1.5	110	30	16	15
AV-10	Alimagnet Dog Park	0.5	25	20	12	9
AV-11	Farquar Lift Station	2.2	373	25	10	17
AV-12	EVR-P12 Public Water	5.7	571	25	16	11
AV-13	EVR-P14	3.6	26	25	24	15
AV-14	EVR-P43, Apple Valley East Park	0.8	2738	35	12	9
AV-15	Carrollwood	1.2	398	30	10	13
AV-16	Nordic Park	1	17	25		17
AV-17	AL-P9.1 Alimagnet Lift Station Chain of Ponds	0.25	7	20	18	19
AV-18	Sunset Park Pond	1	252	30	18	17
AV-19	AL-P9.3 Alimagnet Lift Station Chain of Ponds	0.25	28.5	25	18	17
AV-20	Valleywood Golf Course	1.5	12	0	14	15
B-1	Crystal Lake West	0.9	444.5	5	20	23
B-1 Alt	Crystal Lake West Alternate	6	550	0	15	23
B-2	Cam Ram	0.41	1392	10	12	11
B-3	Kraemer	30	93	30	20	17
B-4	Alimagnet	0.9	701	20	16	15
B-6	Alimagnet East/Dog Park	2.5	34	15	16	21
B-7	Terrace Oaks North	2.2	15.7	5	12	17

Site ID	Site Name	Wetland size (Acres)	Watershed Size (Acres)	% Imperv.	Invert. Score	Veg. Score
B-8	Red Oak	3	115	25	18	13
B-9	Crosstown West	7.2	388	50	14	15
B-10	AP-3 Cedar Pond	3.1	212	22	10	15
B-11	Valley View	1	80	10	16	13
B-12	Terrace Oaks	1.7	68	5	14	15
B-13	Sunset Lake	30	436	50	14	19
B-17	Terrace Oaks Buckthorn Pond	2.7	24	5	28	21
DC-1	Empire Lake	21	1152	NA	22	27
DC-2	Buck Pond	1.6	25	NA	10	13
E-1	Thomas Lake Park Pond	0.4	4	37	18	21
E-7	Discovery Pond	4.1	16.5	0	20	21
E-10	Cedar Pond	3.1	212	25	14	17
E-11	Central Park Pond	1.8	130	20	14	21
E-18	Moonshine Park Pond	2.5	34	25	22	19
E-20	Shanahan Lake	10.9	56.4	1	20	27
E-21	FP-11.5	0.26	1.6	0	20	19
E-22	FP-11.6	0.58	2.7	0	20	17
E-25	FP 4.5	1	35	55	16	19
E-26	DP-6.2, Northwoods Business Park	3.2	25	44	14	15
E-27	LP-26.54, Thomas Woods Site	0.2	5.3	29	18	21
E-28	HDP-1, Kennerick Addition Site	0.8	39	18	16	21
E-29	LP-15, Lily Pond inLebanon Hills Pk	6.5	21.8	5.5	12	27
E-31	Walnut Hill Pond	0.65	20	2.5	20	13
E-32	City Hall Pond	6.6	81.3	14	14	15
E-33	Coventry Pond	5.5	60	35	16	21
E-34	McCarthy Lake	11.3	220	15	24	23
E-35	Prairie Pond	0.8	5.1	0	12	27
E-36	Mooney Pond	7.0	41	25	16	17
E-37	Kettle Pond	0.8	23	30	18	17
E-38	Gerhardt Lake	13.5	32	5	24	19
F-1	Pine Knoll	35	107.5	10.4	NA	13
F-3	Kral Pond	10	41.8	6.6	16	19
F-4	Lake Julia	10	233	21.2	8	11
F-5	Autumn Glen	2.9	10	NA	20	21
F-6	Vermillion River	6.3	16	NA	12	9
F-7	Autumn Glen	2.9	10	NA	16	23
H-4	Stonegate Treated	1	9.5	35	18	17
H-6	Lake Rebecca	19	56	1	22	27
H-30	Sand Coulee	1	107	25	8	13
H-56	180th Street Marsh	20	340	1	20	19
H-57	Cari Park Pond	0.78	29	14	16	21
L-4	Water Treatment Wetland Bank	22.85	99.8	20	14	15
L-7	DNR 387	10	2087	21	16	27

Site ID	Site Name	Wetland size (Acres)	Watershed Size (Acres)	% Imperv.	Invert. Score	Veg. Score
L-8	DNR 393	9.6	4987	17	24	29
L-9	NC 54	13.8	183	12	20	11
L-10	DNR#349W	40	213	NA	12	11
LD-1	Pickerel Lake	108	NA	NA	14	17
MH-2	Copperfield/Friendly Hills	9.4	865.3	20	22	23
MH-9	Hagstrom-King	3	20	25	22	27
MH-13	MH Par 3	0.5	36	3	20	21
MH-14	Wagon Wheel	0.9	18.1	10	22	25
MH-15	Upper Bridgeview	4.1	66.4	NA	16	21
MH-16	Field Stone	6.9	577.9	20	24	29
MH-17	Marie Pond	0.6	64.2	20	12	15
MH-18	King Pond	5.2	34	20	22	27
R-1	Kelly Marsh - Derryglen Ct in 2004	1.3	897	80	20	21
R-2	White Lake	333	998	10	18	23
R-4	Schwartz Pond	10.9	144.5	20	14	13
R-6	Keegan Lake	35	1530	30	18	19
R-14	WMP #379	4.8	81	30	20	23
R-18	WMP #279	4.5	33.7	30	26	19
R-20	Unnamed	1	897	30	18	19
R-21	CR-38 Mitigation Site 1	1.7	1530	30	22	23
R-22	Mare Pond, South	8	81	10	24	19
R-23	CR-38 Mitigation Site 2	0.3	81	30	18	23
R-25	WMP #306	1.7	81	30	12	23
R-26	Erickson Pond	1.9	1832	25	16	13
SSP-1	Anderson Pond	2.4	168	15	14	11
SSP-3	LeVander	3.4	37.9	20	22	15
WSP-1	Mud Lake	3.1	34.2	NA	22	17
WSP-2	Thompson Lake 48W	9	73,920	50	16	17
WSP-5	Lilly Lake	6.4	22	NA	20	19
WSP-6	Marthaler Park	4.5	23	NA	24	23
WSP-7	Humboldt Pond/Vivian Pond	1.2	23	NA	16	17
WSP-9	Marie Avenue	4	15	NA	12	11
WSP-10	Emerson Pond South	2.3	23	NA	22	19
WSP-12	Wentworth Pond	6	71.2	NA	12	15

3.1.4 Effect of Wetland Water Levels on Wetland Health

Wetland water levels fluctuate from year to year. They may fluctuate daily in response to rainfall and drought, as well. Water levels may affect site sampling placement. High water levels may push plots farther upland than normally placed. Water levels may also affect the species dominance and diversity. Wetter conditions may encourage more submergent and emergent species of vegetation. Drought, of course, may reduce the population of invertebrates. Water levels were measured by volunteer WHEP teams in 2015 within the vegetation plot sites. The lowest water level measured within the plots in 2015 was zero feet, the highest water level was 10.5 feet, and the average water level was 1.9 feet. A linear

regression was completed to compare IBI scores to average plot depth. No significant relationship between IBI score and average plot depth was found for either invertebrates or vegetation. Results assume that vegetation and invertebrates sampling occurred in the same general vicinity of the wetland.

3.2 Is Volunteer Data Usable?

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

3.2.1 2015 Cross-checks

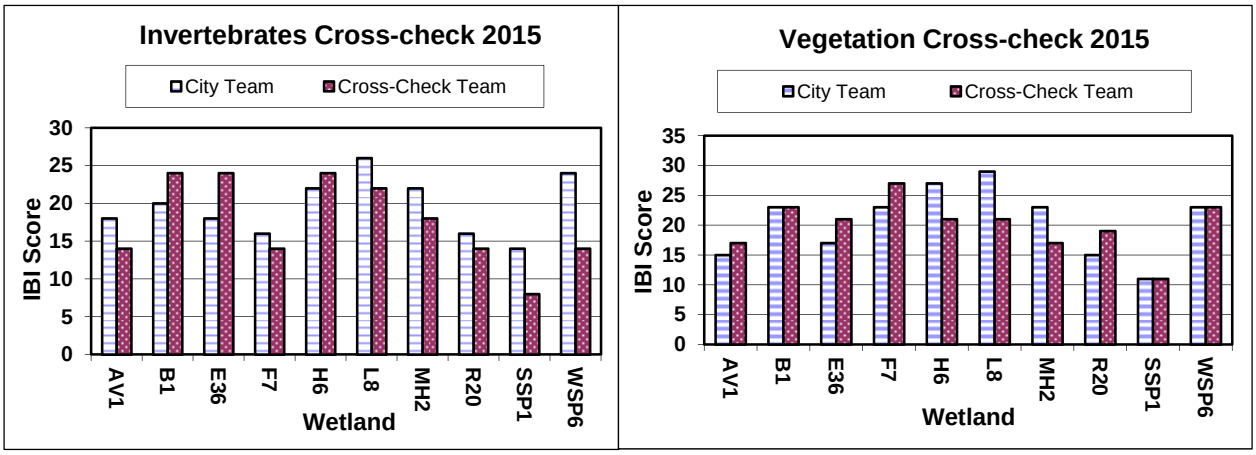
Each city team was responsible for evaluating one wetland in another city (Table 3.2.1). This citizen cross-check provides a second sample for the selected wetland. The purpose of this check is to determine if two different samples provide similar results for the vegetation and invertebrate IBI. Large 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 site E-36 and WSP-6 were inconsistent. There was an eight point and ten point differences in scores, respectively. The vegetation score for site L-8 was inconsistent with eight point differences in scores. 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 City team is used for the individual wetland analysis in Section 4.0 of this report. Vegetation scores between the City team and the cross-check team for site B-1, E-36, SSP-1, and WSP-6 were identical. Many scores were close in comparison.

- *E-36:* The cross-check team collected more diverse sample of invertebrates than the City team. This included several families of leeches, mayflies, caddisflies, and snails.
- *L-8*: The City team identified a more diverse vegetation plot than the cross-check team. This affected the Nonvascular, Grasses, *Carex,* and Aquatic Guild Metrics.
- *WSP-6*: The City team identified a more diverse sample of invertebrates than the cross-check team. This included several families of leeches, dragonflies, mayflies, and snails.

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

City Team	Cross-Check Team	Wetland Evaluated	Invertebrate Score Comparison		Vegetation Score Comparison	
			City	x-Check	City	x-Check
Apple Valley	Farmington	AV-1	18	14	15	17
Burnsville	Hastings	B-1	20	24	23	23
Eagan	Mendota Heights	E-36	**16**	**24**	17	17
Farmington	Apple Valley	F-7	16	14	23	27
Hastings	Burnsville	H-6	22	24	27	21
Lakeville	West St. Paul	L-8	24	22	**29**	**21**
Mendota Heights	Eagan	MH-2	22	18	23	17
Rosemount	South St. Paul	R-20	18	14	15	19
South St. Paul	Rosemount	SSP-1	14	8	11	11
West St. Paul	Lakeville	WSP-6	**24**	**14**	23	23

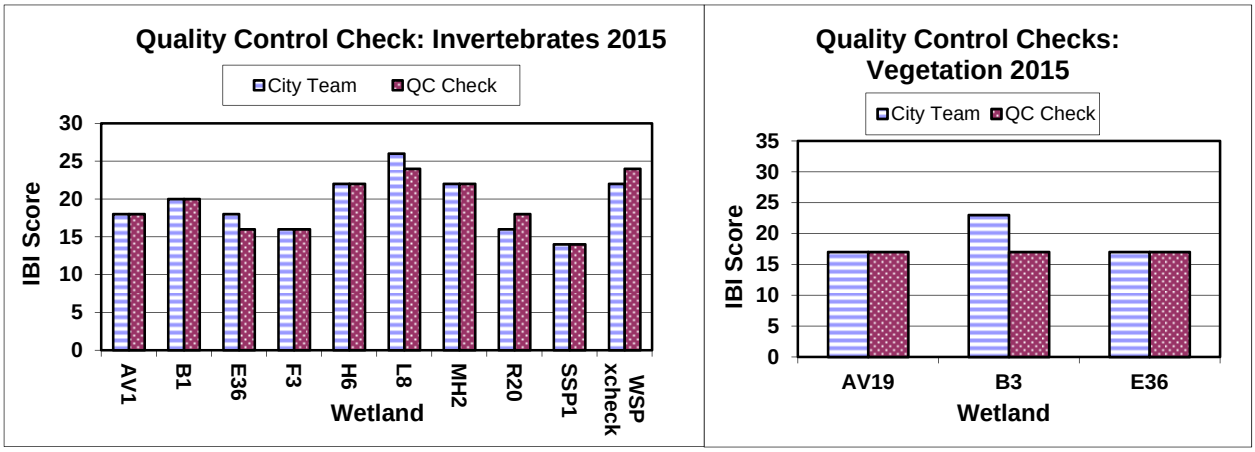
Figure 3.2.1 Invertebrate Cross-check Comparisons of IBI Scores



3.2.2 2014 Quality Control Checks

Quality control checks were conducted at three sites for vegetation and ten sites for invertebrates in 2015 (Figure 3.3.2) by Fortin Consulting (FCI). The vegetation check was conducted by re-sampling the area marked off by the citizen team using the WHEP procedures and comparing results. For the invertebrates, FCI reviewed the insect samples collected and identified by the teams and completed the lab and metric sheets. The quality control review was done independently of the citizen team. The following sites were checked as a measure of quality control by FCI.

Figure 3.2.2 Quality Control Checks (IBI Score Comparison)



All team invertebrate scores were found to be consistent with the quality control checks. Wetland B3 scored inconsistently for vegetation with the quality control checks. There was a six point difference. However, the Burnsville Team Leader assisted Fortin Consulting during their vegetation survey and the identification differences were realized and understood between both parties. 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.

WHEP also provides review of the data sheets for scoring and data transfer errors. This review is conducted by Fortin Consulting. Table 3.2.2 shows the data sheet review results. Most of the errors found were in data transfer which compounded to errors in metric calculations. 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. Several errors were also caused by miscalculating metric scores, and one

math error. There were 23 errors of which 14 affected the metric scores. Corrections affected the scores by two to four points. Many of these errors could be prevented by double-checking the transfer and math work on the data sheets. The quality control checks are working well. Errors are identified and corrections are made as needed.

Table 3.2.2 Data Sheet Review

		Invertebrate IBI Scores			Vegetation IBI Scores		
Team Name	**Site**	**Team**	**Review**	**Errors**	**Team**	**Review**	**Errors**
Apple Valley	AV-1	18	18	0	15	15	0
	AV-19	18	18	0	19	17	1
	AV-20	14	14	0	15	15	1
	F-7 cc*	14	14	0	27	27	0
Burnsville	B-1	20	20	1	23	23	0
	B-3	20	20	0	23	23	0
	B-4	16	16	0	15	15	0
	B-12	16	14	2	15	15	0
	H-6 cc*	22	24	1	21	21	0
Eagan	E-10	14	14	0	17	17	0
	E-32	14	14	0	15	15	0
	E-36	14	18	1	19	17	1
	MH-2 cc*	14	18	1	17	17	0
Farmington	F-3	16	16	2	19	19	1
	F-6	12	12	1	11	9	1
	F-7	12	16	2	25	23	1
	AV-1 cc*	14	14	0	21	17	1
Hastings	H-4	18	18	0	21	17	1
	H-6	22	22	0	29	27	1
	H-56	20	20	0	19	19	0
	H-57	16	16	0	23	21	1
	B-1 cc*	24	24	0	23	23	1
Lakeville	L-7	16	16	0	27	27	0
	L-8	26	26	0	29	29	0
	WSP-6 cc*	14	14	0	23	23	0
Mendota Heights	MH-2	22	22	0	23	23	0
	MH-9	22	22	0	27	27	0
	E-36 cc*	24	24	0	21	21	0
Rosemount	R-2	18	18	0	23	23	0
	R-4	14	14	0	13	13	0
	R-6	20	18	1	19	19	0
	R-20	16	16	0	15	15	0
	SSP-1 cc*	8	8	0	11	11	0
South St. Paul	SSP-1	14	14	0	11	11	0
	SSP-3	22	22	0	15	15	0
	R-20 cc*	14	14	0	19	19	0
West St. Paul	WSP-1	22	22	0	NA	17	NA
	WSP-5	20	20	0	19	19	0

		Invertebrate IBI Scores	Vegetation IBI Scores				
Team Name	Site	Team	Review	Errors	Team	Review	Errors
	WSP-6	24	24	0	23	23	0
	WSP-12	12	12	0	15	15	0
	L8 cc*	22	22	0	21	21	0

cc*- indicates cross-check of another team's wetland

3.3 WHEP Historical Data

Since WHEP began in 1997, 173 wetlands have been sampled, but not all are sampled every year. Figures 3.3.1 and 3.3.2 provide an overall picture of wetland health in Dakota County based on the most recent sample collected for each wetland. The historical data can be found for each site since the start of the program at www.mnwhep.org. Section 4.0 includes the sites sampled in 2015 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

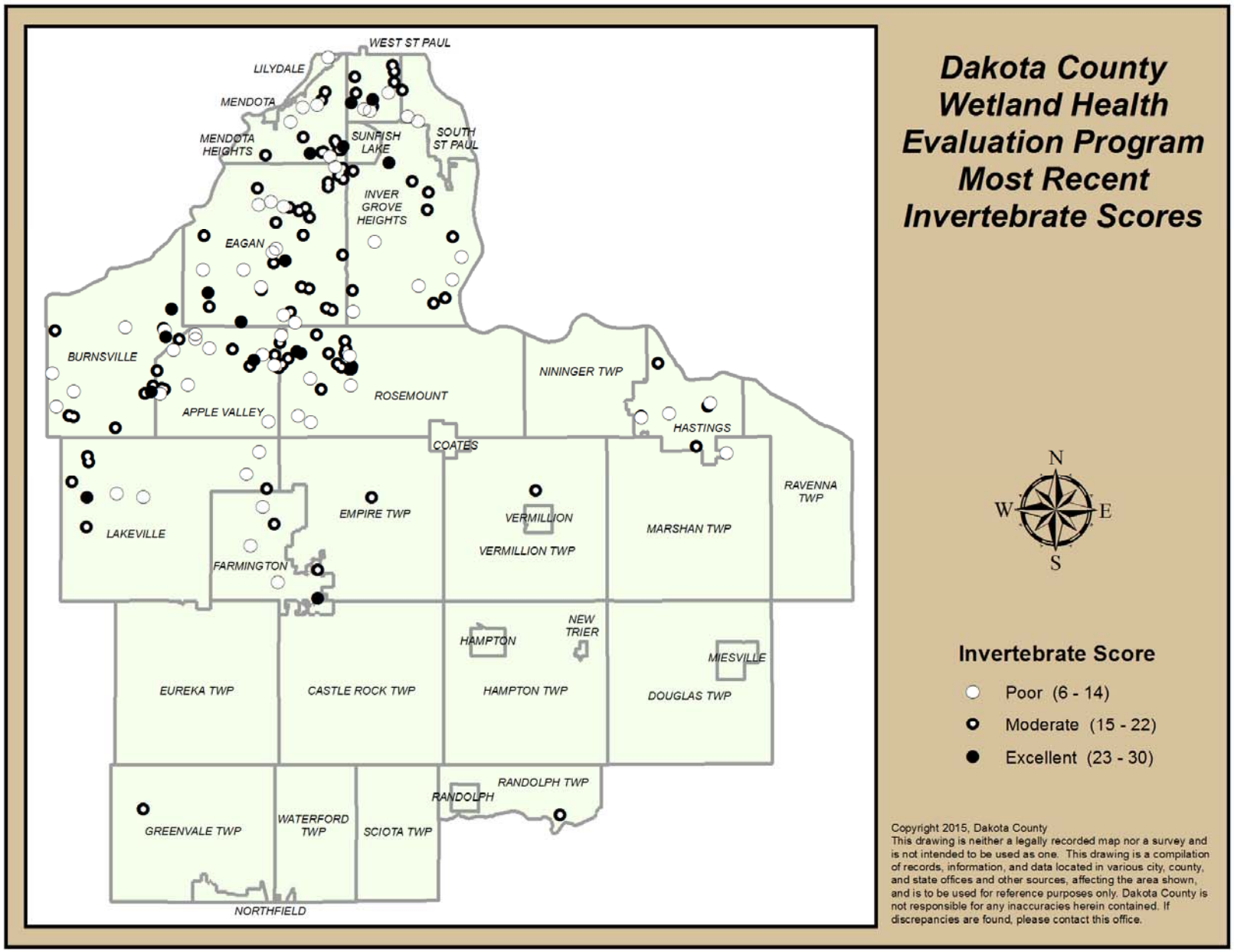
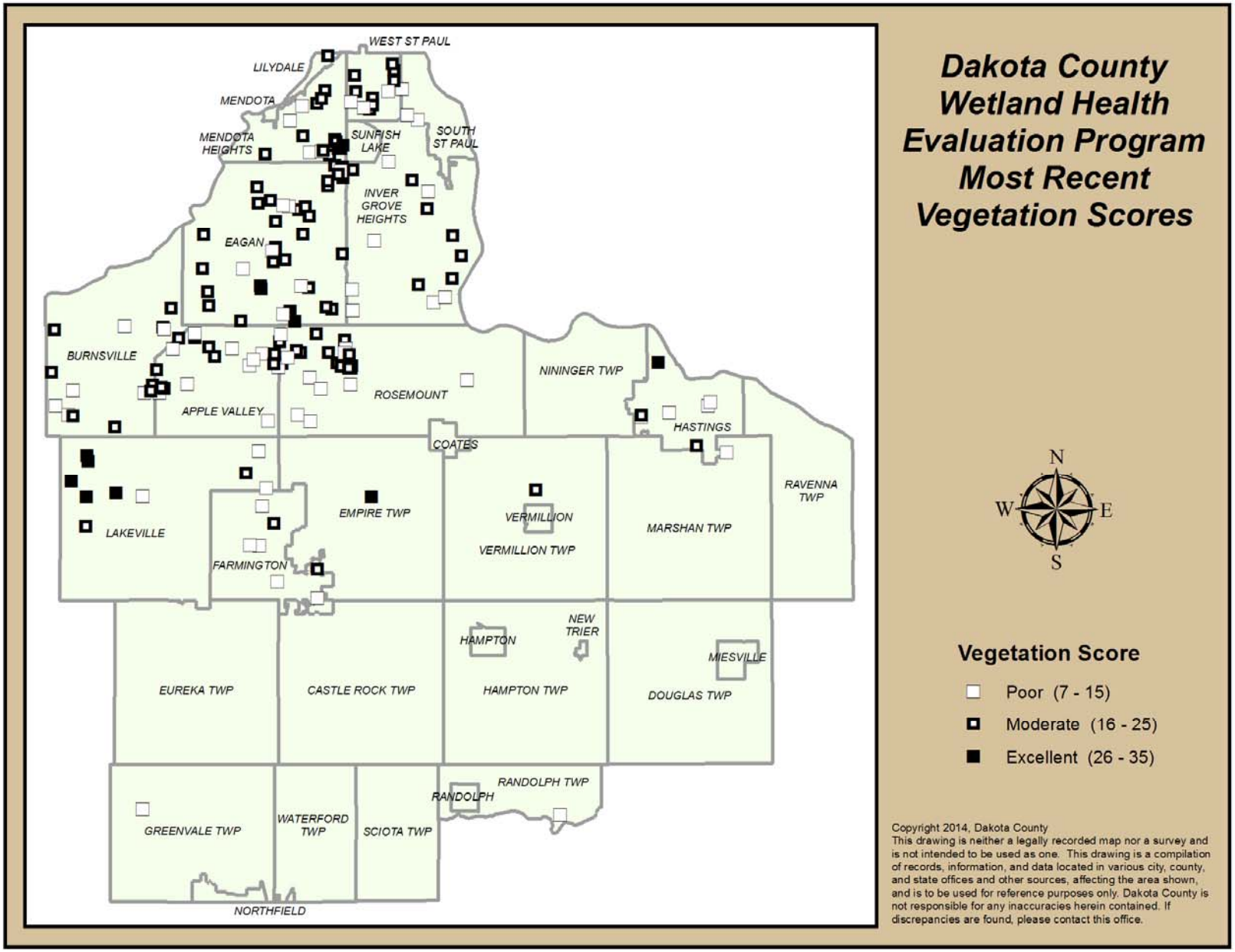

Dakota County
Wetland Health
Evaluation Program
Most Recent
Invertebrate Scores
WEST ST PAUL
LILYDALE
MENDOTA
MENDOTA HEIGHTS
SUNFISH LAKE
SOUTH ST PAUL
INVER GROVE HEIGHTS
EAGAN
BURNSVILLE
APPLE VALLEY
ROSEMOUNT
NININGER TWP
HASTINGS
COATES
RAVENNA TWP
LAKEVILLE
FARMINGTON
EMPIRE TWP
VERMILLION
VERMILLION TWP
MARSHAN TWP
NEW TRIER
HAMPTON
MIESVILLE
EUREKA TWP
CASTLE ROCK TWP
HAMPTON TWP
DOUGLAS TWP
RANDOLPH TWP
RANDOLPH
GREENVALE TWP
WATERFORD TWP
SCIOTA TWP
NORTHFIELD
N
W
E
S
Invertebrate Score
Poor (6 - 14)
Moderate (15 - 22)
Excellent (23 - 30)
Copyright 2015, Dakota County
This drawing is neither a legally recorded map nor a survey and is not intended to be used as one. This drawing is a compilation of records, information, and data located in various city, county, and state offices and other sources, affecting the area shown, and is to be used for reference purposes only. Dakota County is not responsible for any inaccuracies herein contained. If discrepancies are found, please contact this office.

Figure 3.3.2


WEST ST PAUL
LILYDALE
MENDOTA
MENDOTA HEIGHTS
SUNFISH LAKE
SOUTH ST PAUL
INVER GROVE HEIGHTS
EAGAN
BURNSVILLE
APPLE VALLEY
ROSEMOUNT
NININGER TWP
HASTINGS
COATES
RAVENNA TWP
EMPIRE TWP
VERMILLION
VERMILLION TWP
MARSHAN TWP
LAKEVILLE
FARMINGTON
NEW TRIER
HAMPTON
MIESVILLE
EUREKA TWP
CASTLE ROCK TWP
HAMPTON TWP
DOUGLAS TWP
RANDOLPH TWP
RANDOLPH
GREENVALE TWP
WATERFORD TWP
SCIOTA TWP
NORTHFIELD
Dakota County Wetland Health Evaluation Program Most Recent Vegetation Scores
N
W
E
S
Vegetation Score
Poor (7 - 15)
Moderate (16 - 25)
Excellent (26 - 35)
Copyright 2014, Dakota County
This drawing is neither a legally recorded map nor a survey and is not intended to be used as one. This drawing is a compilation of records, information, and data located in various city, county, and state offices and other sources, affecting the area shown, and is to be used for reference purposes only. Dakota County is not responsible for any inaccuracies herein contained. If discrepancies are found, please contact this office.

4.0 Wetland Evaluations

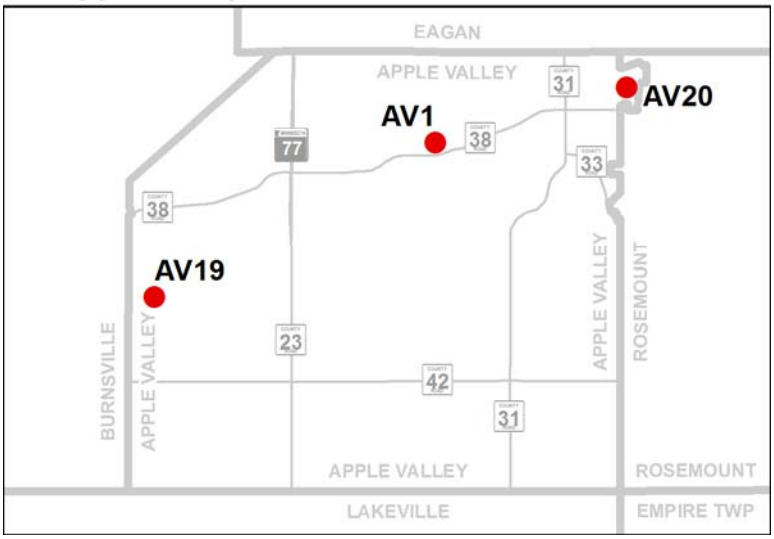
4.1 Apple Valley Wetlands

Three wetlands were monitored within the City of Apple Valley in 2015. This is the eighteenth year the City has participated in WHEP, and 20 wetlands have been monitored in that time period.

Team Leader: Jeff Korpik

Team Members: Colin Brownlow, Helen Goeden, Kevin O'Connor, Maya Ricard, Noah Ricard, Rachel Ricard, Andy Riesgraf, Rachel Riesgraf, Ryan Russen, Cindy Taintor, and Bill Turner

Apple Valley WHEP Sites Monitored in 2015

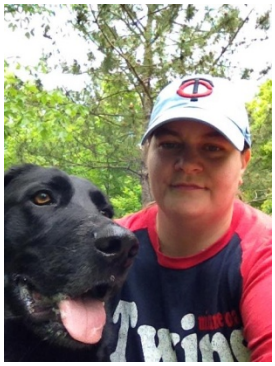


Jeff Korpik

Jeff Korpik has been involved with WHEP since 2006 and team leader since 2007. Jeff remarked, "It is always great being a part of the WHEP program. Meeting new volunteers and catching up with returning ones. I enjoy getting out and seeing different parts of the City and County as well, and seeing the good and the bad wetlands of the area. As usual, the most interesting wetlands are often the cross-checks. Not sure why that is. New territory, I guess. I want to thank all of the volunteers and hope they still don't mind getting a bit dirty and smelling like wetland occasionally."

Jessica Schaum

Jessica Schaum started with Apple Valley as their Natural Resources Coordinator a year ago, and serves as a City contact for WHEP. She remarked, "I was immediately impressed with the ongoing water quality programs and volunteer base Apple Valley is fortunate enough to have. WHEP is truly an instrumental program that allows us to track local trends and impacts over time. We utilize this data when evaluating conditions for a new road project, when a nearby site might be redeveloped, or in determining the best stormwater feature we could use upstream. Sometimes unexpected projects come up – like the future North Creek Greenway trail near our reference wetland. It will be interesting to see potential benefits of the overall project somewhere we already have compiled data. We have come to rely and depend on our volunteers for this service, and without them I'm not sure we could accomplish even half of the work on our own! I look forward to another successful year in establishing and tracking our wetland trends."



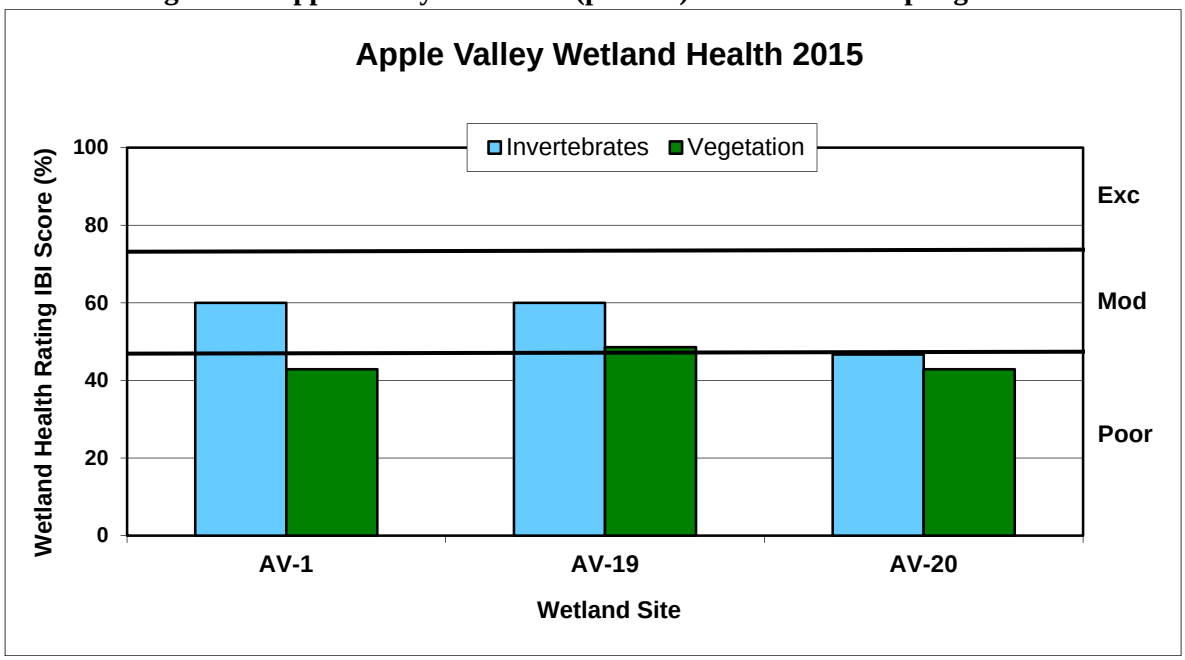
Jane Byron

Jane Byron is the Water Quality Technician for the City of Apple Valley. Her primary role in WHEP is to assist in wetland selections and provide some of the administrative assistance needed from the City of Apple Valley. She says, "The City finds the information gathered by WHEP volunteers invaluable. In recent years, the data gathered has allowed us to supplement information from other studies on some of our most impacted wetlands to give a much more detailed picture of the quality of selected wetlands. The baseline picture painted by the information gathered will help us gauge the success of future projects to improve water quality. We cannot thank our volunteers enough for the important service they provide."

Apple Valley General Wetland Health

Figure 4.1 presents an overall view of wetland health for all of the 2015 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. Scores that differ by less than ten percent 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 moderate wetland health based on both invertebrate and vegetation data. AV1 and AV19 both were inconsistent in scores between invertebrates and vegetation. The invertebrates and vegetation scores for AV19 differed by 11 percent.

Figure 4.1 Apple Valley site scores (percent) for the 2015 sampling season



4.1.1 Hidden Valley (AV-1)

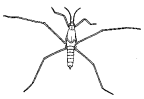
Hidden Valley (AV-1), also known as EVR-P53, is a 2.0 acre, type 4 wetland within the Vermillion River Watershed. It drains locally to a wetland known as EVR-53, and then through a series of wetlands and lakes. The wetland watershed is 21 acres with 15 acres of direct drainage, and is 35 percent impervious.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

The wetland is located within a privately-owned residential development and is surrounded by homes and dense lines of deciduous trees such as oak, box elder, and ash. A steep slope extends down to the wetland. Dense stands of cattails, reed canary grass, and willows line much of the wetland edge. Historic aerial photos taken from the Dakota County website show an increase in open water/ponding depth. This wetland is included in the City's stormwater management plan as a Manage 2 wetland with a goal to monitor the wetland over time. Wetlands in this classification have medium floral diversity and direct stormwater inputs. They are characterized by high or exceptional restoration potential but are not located in public or open space. A planned trail project is scheduled to start in February of 2016 and continue into late spring. This will likely impact the wetland. Impacts will be observed and recorded over the next few years. This is the seventeenth year that this site has been surveyed since 1998.

Wetland Health

Site Observations: The wetland substrate was mucky and water levels in the vegetation plot were less than one meter deep. Pygmy backswimmers dominated the bottletrap collection.

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

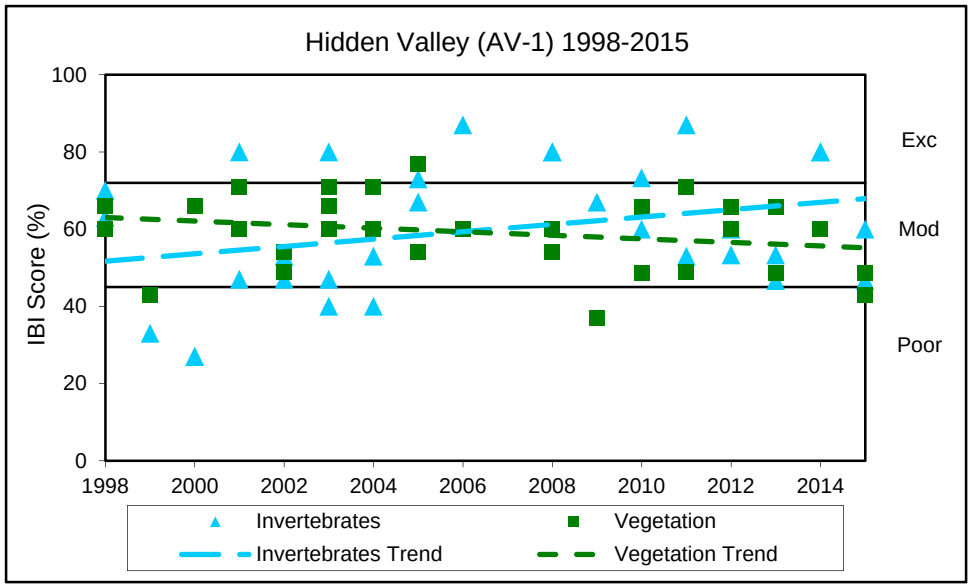
2015 Data (AV-1)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (18)	Poor (15)
Cross-check Rating (IBI score)	Poor (14)	Moderate (17)
Trend 1998-2015	Improving	Slightly declining

Jeff Korpik instructing WHEP volunteers at training

Bill Turner

Jeff Korpik, Noah Ricard, and Rachel Ricard

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



Site Summary: Hidden Valley was found to have moderate health for invertebrates and poor health for vegetation in 2015. This was a decrease from 2014; however, scores have fluctuated over the many years of sampling. The extreme fluctuations may be due to factors such as changes in water level. The invertebrates trend appears to be improving, in general, while the vegetation trend stays fairly stable. The scoring between invertebrate and vegetation categories was consistent. The scoring between the City team and cross-check team was consistent. Based on the 17 years of monitoring, the data indicates stable to improving wetland health.

4.1.2 Alimagnet Lift Station Chain of Lakes (AV-19)

Alimagnet Lift Station Chain of Lakes (AV-19), also known as AL-P9.3, is a 0.25 acre, type 3 wetland located within the AL-P9.3 City Subwatershed of Alimagnet Lake which is in the Vermillion River Watershed. The wetland watershed has approximately 28.5 acres, and is 25 percent impervious. There is one inlet near the southeast corner of the wetland and one outlet near the southwest corner. This wetland is part of the City's stormwater management plan, and is designated as a Manage 2 wetland with a goal to continue monitoring over time. Wetlands assigned to this category are characterized by high or exceptional restoration potential but are not located in public or open space. The wetland is within a wooded area densely grown with trees, shrubs, and grasses.

The wetland is within a City Park and drains to larger Alimagnet Lake to the west. A system of asphalt walking trails pass along the northwest and southwest sides of the wetland, extending from nearby residential areas to Alimagnet Lake.

Wetland Health

Site Observations: The wetland is bordered by many overhanging trees. Submerged logs are present.

Table 4.1.2 Alimagnet Lift Station Chain of Lakes (AV-19) Wetland Health based on IBI

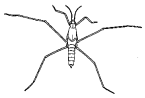
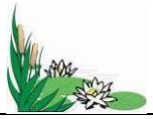
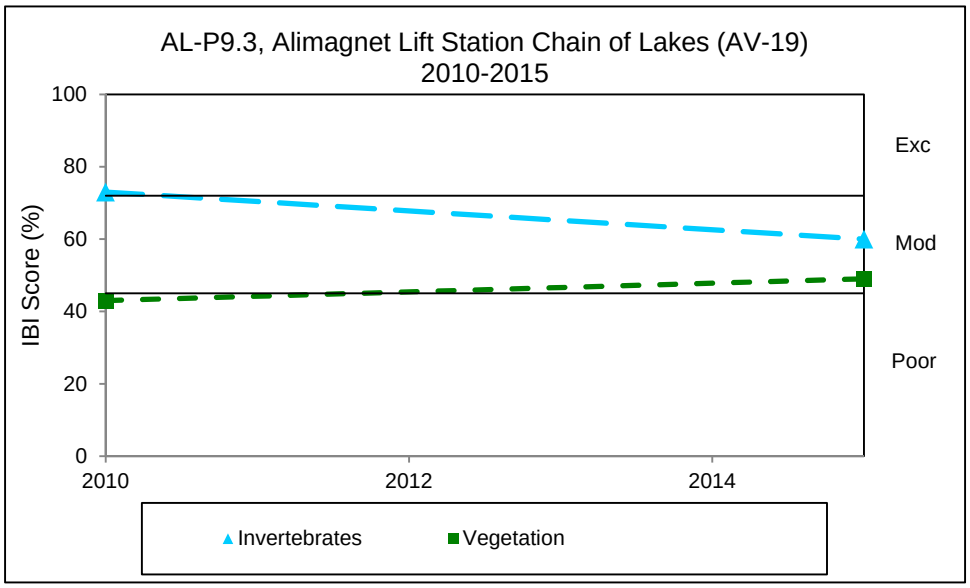
2015 Data (AV-19)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (18)	Moderate (17)
Trend 2010-2015	Not enough data	Not enough data

Figure 4.1.2 Invertebrate and vegetation trends for Alimagnet Lift Station Chain of Lakes (AV-19)



Site summary: This is the second time that AV-19 has been monitored since 2010. The invertebrate scores are inconsistent. They are lower in 2015 than in 2010. The vegetation score is similar to scores in 2010. However, there is not enough data to determine the health trend.

4.1.3 Valleywood Golf Course (AV-20)

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

characterized by high or exceptional restoration potential but are not located in public or open space.

Valleywood Golf Course wetland is located within the boundaries of the golf course. Management of the wetland is consistent with the golf course's practices.

Wetland Health

Site Observations: The wetland substrate is very mucky, and the slope is fairly steep. In mid-June there were no cattails present, but duckweed covers much of the water and land where water has receded. Ducks were observed.

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

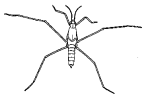
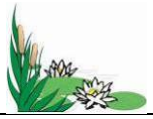
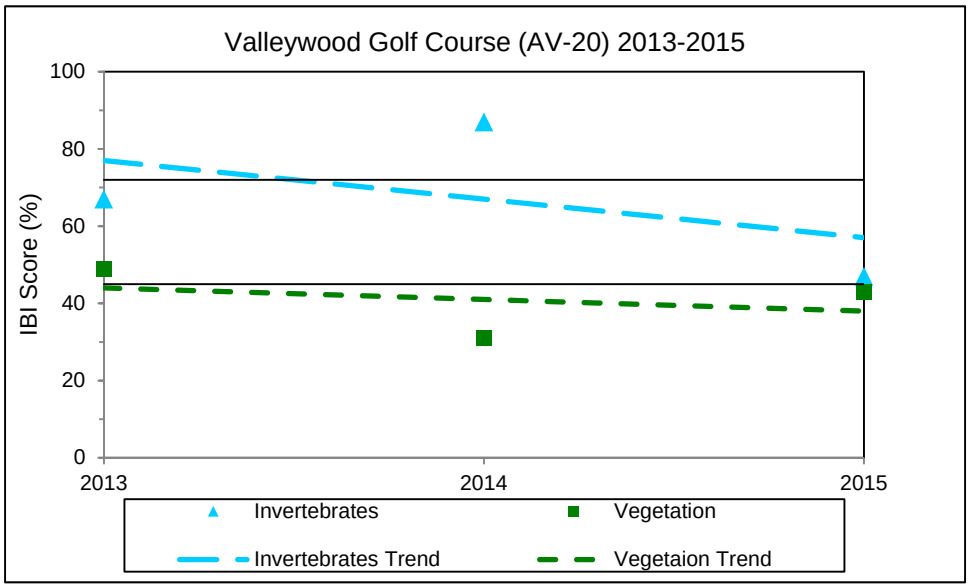
2015 Data (AV-20)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Poor (14)	Poor (15)
Trend 2013-2015	Not enough data	Not enough data

Figure 4.1.3 Invertebrate and vegetation trends for Valleywood Golf Course (AV-20)



Site summary: This is the third consecutive year that AV-20 has been monitored through WHEP. Invertebrate and vegetation scores are very consistent in 2015. Invertebrates and vegetation scores were poor. The vegetation scores remain stable; however, the invertebrates score decreased from excellent in 2014. The timing of invertebrate emergence may have influenced this change. There is not enough data for a reliable health trend.

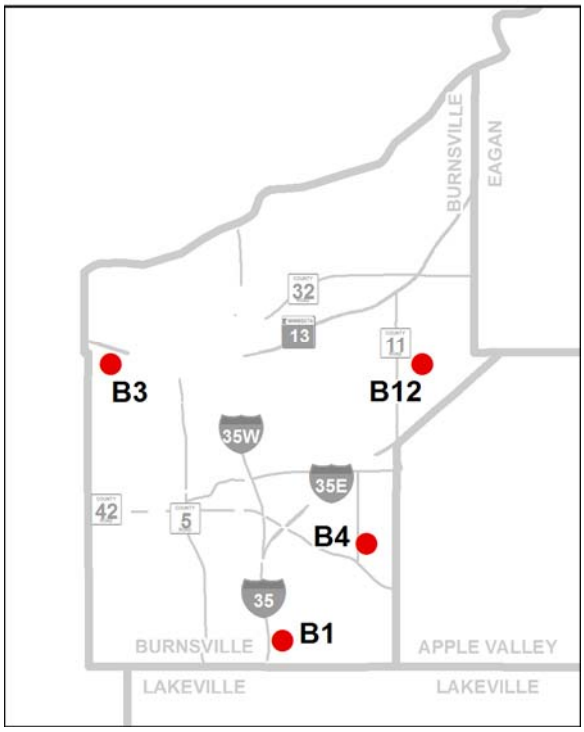
4.2 Burnsville Wetlands

Four wetlands were monitored within the City of Burnsville in 2015. Burnsville has monitored 16 wetlands through WHEP since 1997.

Team Leader: Bernie DeMaster

Team Members: Frank Beery, Thomas Drogseth, Travis Finlayson, Syndey Gram, Joey Haas, Jack Jenkins, Marilyn Jenkins, Kelly Kays, and Megan Ullery

Burnsville WHEP Sites Monitored in 2015



Bernie DeMaster

This is Bernie's second year as a Burnsville team leader; though he has been an active volunteer with the program since 2010. He has a college degree in Physics and Computer Science, but he says, "I have always had an interest in the outdoors and conservation. I believe I saw the initial notice for WHEP in the local paper," and everything else is history. He described his team as a "very dedicated group of volunteers."

Liz Forbes is the city contact for the Burnsville WHEP team. Her role is to select wetlands for evaluation, provide team support, and recruit volunteers.

Liz Forbes

She commented, "WHEP provides good information on wetlands that City staff doesn't have the time to study. Since Burnsville has participated in WHEP since it began, we have almost 20 years of data to reference when looking at health trends of our water bodies and to guide our surface water management decisions.

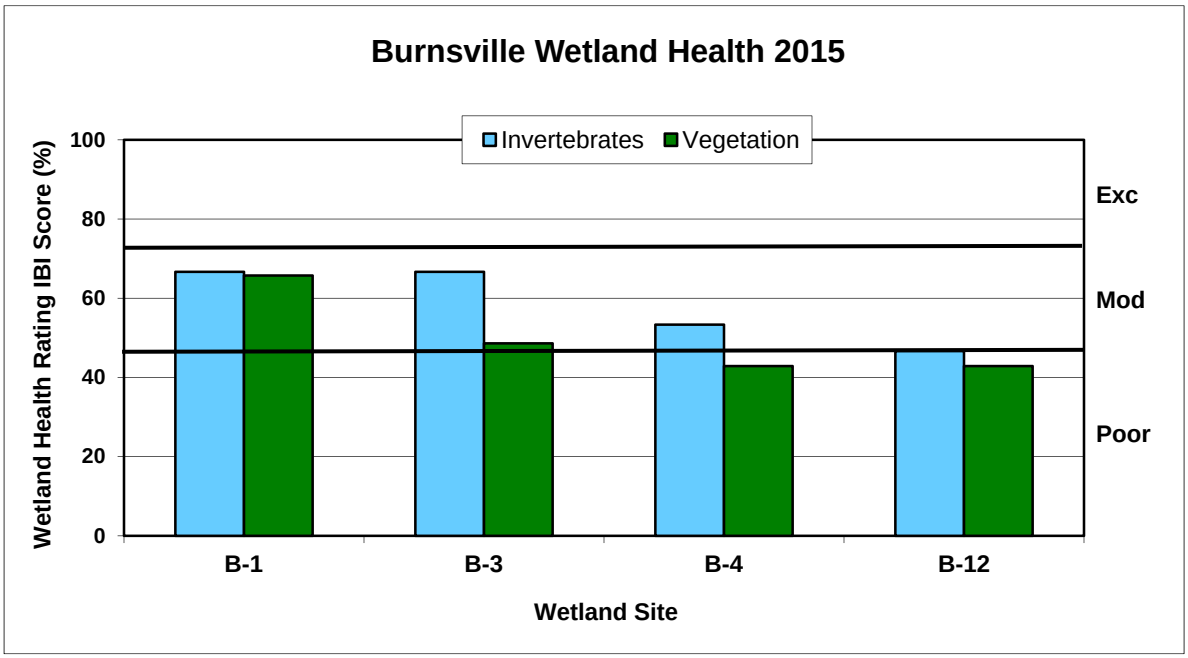
Burnsville has two reference wetlands (Kraemer and Crystal West) that are included in WHEP every year. Two other wetlands are selected based on a number of factors, including how long since it was last studied and proximity to projects that disturb the landscape. For example, a Terrace Oaks Park wetland was selected in 2015 because of a nearby habitat restoration project.

City staff really appreciate the efforts of the Burnsville WHEP team – especially its dedicated team leader, Bernie. WHEP is such a great way to gain valuable information, but it also offers the opportunity for residents to become engaged with their local natural resources."

Burnsville General Wetland Health

Figure 4.2 presents an overall view of wetland health for all of the 2015 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. Scores that differ by less than ten percent are considered consistent. Based on the IBI scores, a wetland health rating is assigned as excellent, moderate or poor. For 2015, the Burnsville wetlands showed poor to moderate wetland health. B12 scored poor for both invertebrates and vegetation. Invertebrate and vegetation scores for sites B3 were inconsistent.

Figure 4.2 Burnsville site scores (percent) for the 2015 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 Blackdog watershed. The CL6 Drainage area is 444.5 acres, and 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 Aesthetic/Recreation/Education & Science wetland. The goal for the wetland is to improve its quality. The wetland has invasive species problems and 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-owned park called Crystal Lake West Park.

Wetland Health

Site Observations: This wetland is located off of a hiking trail system within a densely wooded natural area. Many trees hang over the water's edge. Tall, dense clumps of grass are present. Water levels were low and emergent vegetation grew 5 to 30 meters from the water's edge. Lily pads are abundant. The wetland is mucky. Tadpoles, minnows, and crayfish were observed.

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

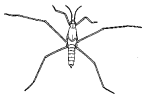
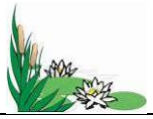
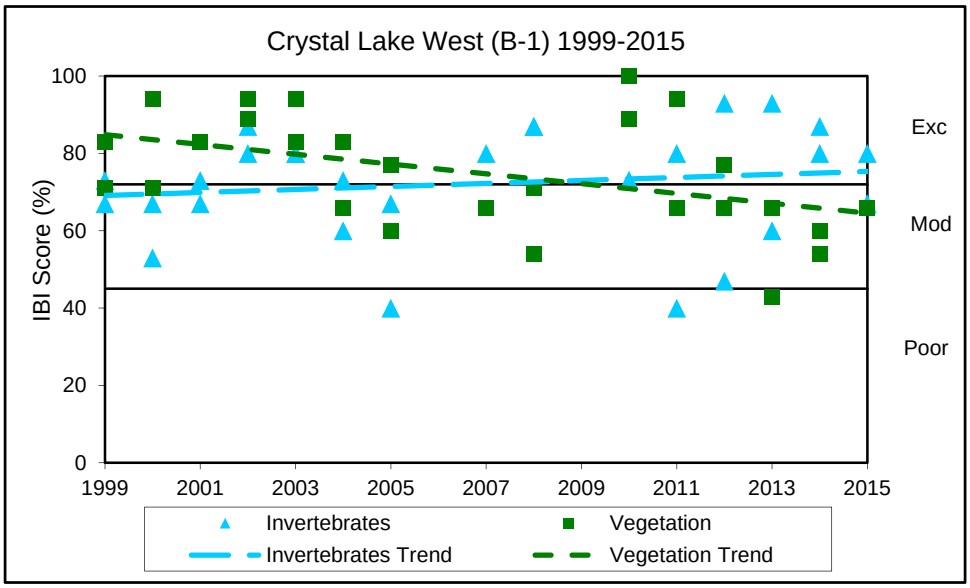
2015 Data (B-1)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (20)	Moderate (23)
Cross-check Rating (IBI score)	Excellent (24)	Moderate (23)
Trend 1999-2015	Variable but stable	Variable but declining

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



Site summary: This is the fifteenth year that B-1 has been surveyed since 1999. The invertebrate and vegetation scores indicate that the wetland has excellent and moderate health, respectively. This is similar to the past several years. Scores between the City team and the cross-check team were consistent, and the two teams calculated the same vegetation score. The trend lines indicate variable but overall stable wetland health. The cross-check team noted that due to low water levels, the releve was positioned toward the middle of the wetland, and so cattails and other tall emergent vegetation could not be included in the releve. The vegetation scores appear to show two cycles of high to low scores first between 2000 to 2009 and then between 2010 and 2015, with an overall declining trend.

4.2.2 Kraemer Preserve (B-3)

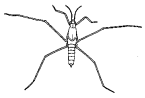
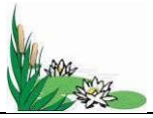
B-3, also known as Kraemer Preserve, is a restored public water wetland in the City of Burnsville. It is a 29.7 acre, type 3 wetland located within the NW21 drainage area of Northwest Subwatershed (1,404 acres) of the Lower Minnesota Watershed (40,960 acres). The NW21 drainage area is 93 acres and approximately 30 percent impervious. The wetland is part of the City's stormwater management plan. It has one inlet on the south side and one inlet on the east side. It also has one outlet in the northwest corner and one outlet on the north side. The wetland was originally a type 1 or 2 wetland which was mined for peat within the last 30 years. Two 18-inch stormwater pipes were added in 1995 and the area was converted into a wetland mitigation site in 1997.

Land use in the watershed is mainly residential and industrial. The upland buffer has been restored to prairie and some stormwater ponds are in place to protect the wetland. It is a protected wetland and provides migratory bird habitat. Invasive species are cause for concern. The wetland management goal is to protect the wetland, maintain flood protection, control sediment, and remove nutrients. Upland vegetation is managed through burning, spraying, and interseeding. A gravel path encircles the wetland.

Wetland Health

Site Observations: This is a large wetland surrounded by a walking trail. Dense cattail surround the wetland, encroaching 20 or more meters from the shore to the open water. The wetland bottom is slightly solid with an overlay of organic matter. The water is more clear than Crystal Lake West wetland.

Table 4.2.2 Kraemer Preserve (B-3) Wetland Health based on Index of Biotic Integrity

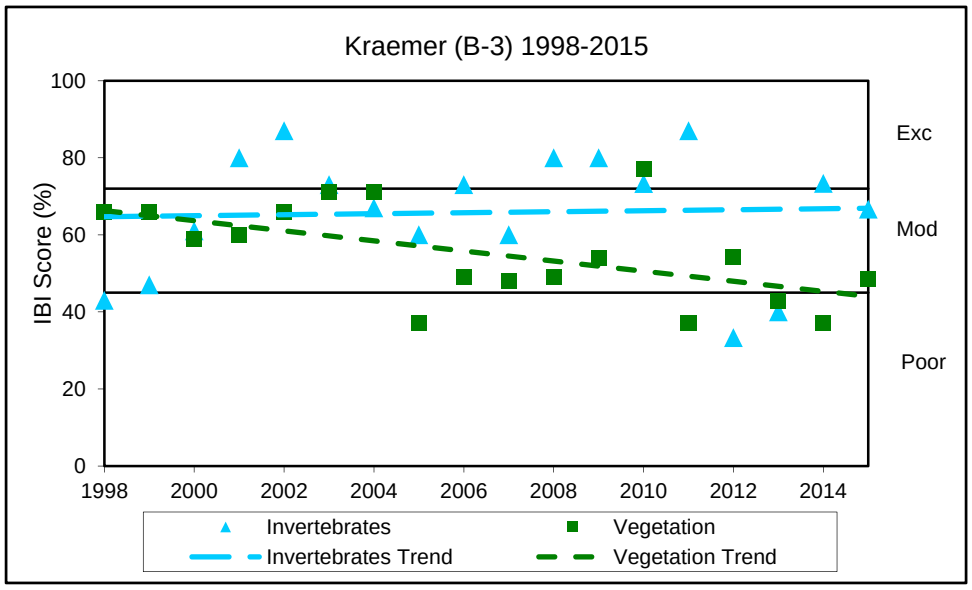
2015 Data (B-3)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (20)	Moderate (17)
Trend 1998-2015	Variable but stable	Variable but declining

Thomas Drogseth, Jack Jenkins, and Frank Beery

Frank Beery, Thomas Drogseth, Kelly Kays, Marilyn Jenkins, and Jack Jenkins

Frank Beery, Bernie DeMaster, Kelly Kays, and Tom Drogseth

Figure 4.2.2 Invertebrate and vegetation trends for Kraemer Preserve (B-3)



Site summary: This is the eighteenth consecutive year of sampling for Kraemer Preserve (B-3). Invertebrate and vegetation scores were inconsistent again in 2015 with invertebrates scoring higher than vegetation. Despite a couple of years scoring poor, in 2012 and 2013, the invertebrates trend appears to be stable. The vegetation trend implies decreasing health.

4.2.3 Alimagnet (B-4)

Alimagnet (B-4) is a 0.9 acre, type 3 wetland located within the LA4 drainage area of Lake Alimagnet, which is in the Vermillion River Watershed. It is one of two shallow marsh areas within a 4.9 acre wet meadow wetland. The LA4 drainage area is 701 acres of which approximately 20 percent is impervious. The wetland has no inlets or outlets. It is a protected wetland, part of the City's wetland management plan, and is considered a natural wetland adjacent to natural communities. It is being managed to maintain or improve the existing habitat.

Alimagnet wetland is bordered by a prairie and woodland (both managed as natural habitats by the City). The park road borders the northern end of the wetland. Invasive species including reed canary grass are present. Management of the surrounding land includes tree removal (woodland), prescribed burns (woodland and prairie), and herbicide control of invasive species.

Wetland Health

Site Observations: The wetland substrate is very mucky and the slope is gentle. Water levels in the sampling areas were at most two feet deep.

Table 4.2.3 Alimagnet (B-4) Wetland Health based on Index of Biotic Integrity

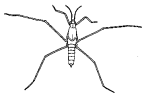
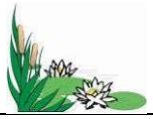
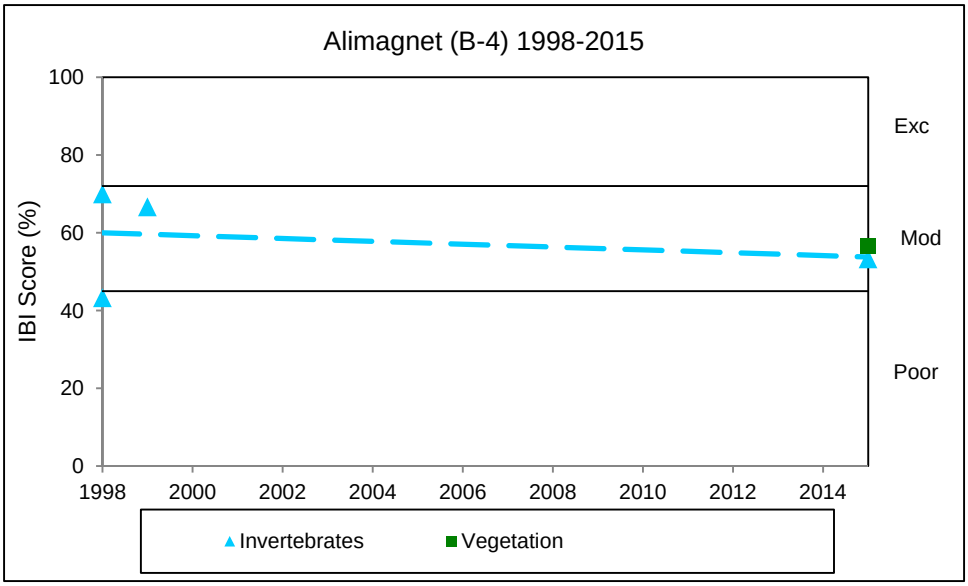
2015 Data (B-4)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (16)	Poor (15)
Trend 1998-2015	Not enough data	Not enough data

Figure 4.2.3 Invertebrate and vegetation trends for Alimagnet (B-4)



Site summary: This is the third time that Alimagnet (B-4) has been surveyed. It was previously surveyed for WHEP in 1998 and 1999. This is the first year that vegetation data was collected. Invertebrate and vegetation scores were consistent with each other, even though the invertebrate score was moderate while the vegetation score was poor. More data is needed to assess the health trend of this wetland.

4.2.4 Terrace Oaks BV Parkway (B-12)

Terrace Oaks BV Parkway (B-12) is a 1.7 acre, type 3 wetland located within the E23 Drainage of the East subwatershed (2,170 acres) of the Black Dog Watershed (3,700 acres). The E23 Drainage area is 68 acres and approximately five percent impervious. The wetland is part of the City's stormwater management plan. It has no inlets and one outlet on the north side near Burnsville Parkway. It is designated as an Improvement Class wetland and is being managed to improve existing habitat.

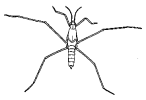
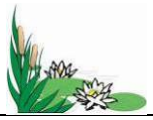
The wetland is surrounded by woodland in Terrace Oaks Park, and is bordered to the north by Burnsville Parkway. Beginning in

winter of 2014-15, an oak savanna restoration project began in a 19 acre area within the northwest corner of Terrace Oaks Park. Part of the restoration area lies within the drainage area of the wetland. The restoration project included tree removal. Additional activities will include herbicide sprays to control invasive plant species, brush cutting, native plant seeding, and prescribed burns. Invasive species including reed canary grass are present.

Wetland Health

Site Observations: The wetland has a gentle slope and a very muddy substrate. A lot of reed canary grass is present. Birds and ducks were observed.

Table 4.2.4 Terrace Oaks BV Parkway (B-12) Wetland Health based on Index of Biotic Integrity

2015Data (B-12)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Poor (14)	Poor (15)
Trend 2015	Not enough data	Not enough data

Site summary: This is the first time that B-12 has been surveyed for WHEP. The invertebrate and vegetation scores were consistent with each other. Both scored poor. More data is necessary to determine a health trend.

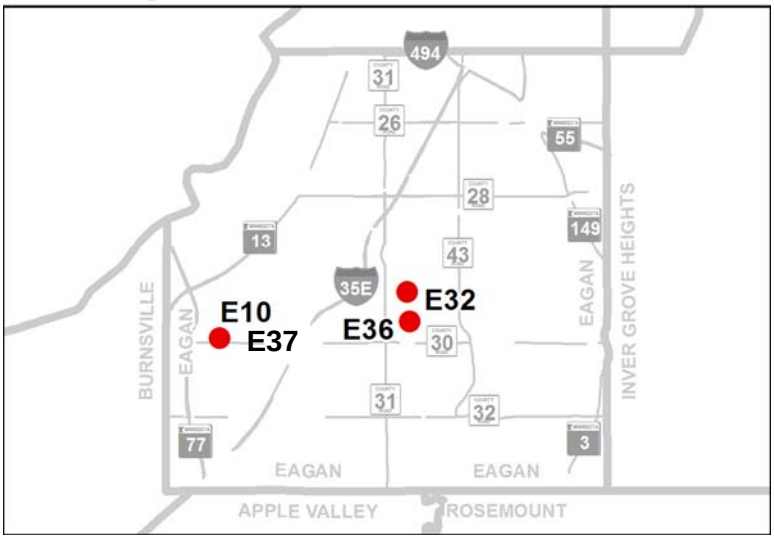
4.3 Eagan Wetlands

The Eagan team monitored three wetlands in 2015. Since WHEP began in 1997, Eagan has monitored 37 wetlands.

Team Leaders: Marianne McKeon

Team Members: Robert Giefer, Craig Harnagel, Paul Hassett, Jessie Koehle, Bill Larson, Carl Larson, Mark Niznik, Joe Schmitz, John Tessmer, Danny Turin, Edward Turin, and Rachel Turin

Eagan WHEP Sites Monitored in 2015



Marianne McKeon has been involved in WHEP since 2007, and has been Eagan's team leader for the past 5 years. She commented, "I was lucky to enjoy the company of returning volunteers again this year, as well as some new faces. They were all very dedicated. There are a couple of families that I've had the pleasure of working with for several years, and witnessed the kids grow and mature. They are like

Marianne McKeon

extended family really! It's so fun to see them year after year, and I appreciate them so. It is a great feeling to know that I had a little part in influencing these kids to go out into the world with the mindset that they are citizen scientists, and they are as important as the professionals in protecting and being aware of our natural resources (in our case, specifically, water). We were excited to learn that the County received a grant to rehabilitate Buck Pond (which appears to have once been a cattle watering hole) in Lebanon Hills starting in 2016! We collected baseline data, and it will be really interesting to watch the restoration take shape and hopefully become a thriving wetland. This is something we don't get to witness very often! It had a mere six different plants, and interestingly, one of them was *Carex*."

Jessie Koehle

Jessie Koehle is the Water Resources Technician for the City of Eagan. She explained, "I have been involved with selection of Eagan's WHEP testing sites since I joined the City of Eagan in 2007. Throughout the year, I communicate frequently with Marianne to help plan and strategize the WHEP sampling season. Whenever I am able to meet volunteers in the field, I enjoy getting to know them and practicing my plant and invertebrate identification. I especially enjoyed the informal WHEP picnic we shared at Jensen Lake this year. We are building a group of wetland ambassadors that are an invaluable resource to our program and the Eagan community.

At the City of Eagan, WHEP data is used as a qualitative, informative source of support for protection or improvement as needed for development projects, as well as historical recordkeeping for future changes. We have a unique challenge which is how to track the health of our 820-some natural waterbodies! It can be difficult to choose just a few to sample, but we feel it's a good problem to have. Thanks to all the WHEP staff and volunteers for your dedication and time spent on this excellent program."

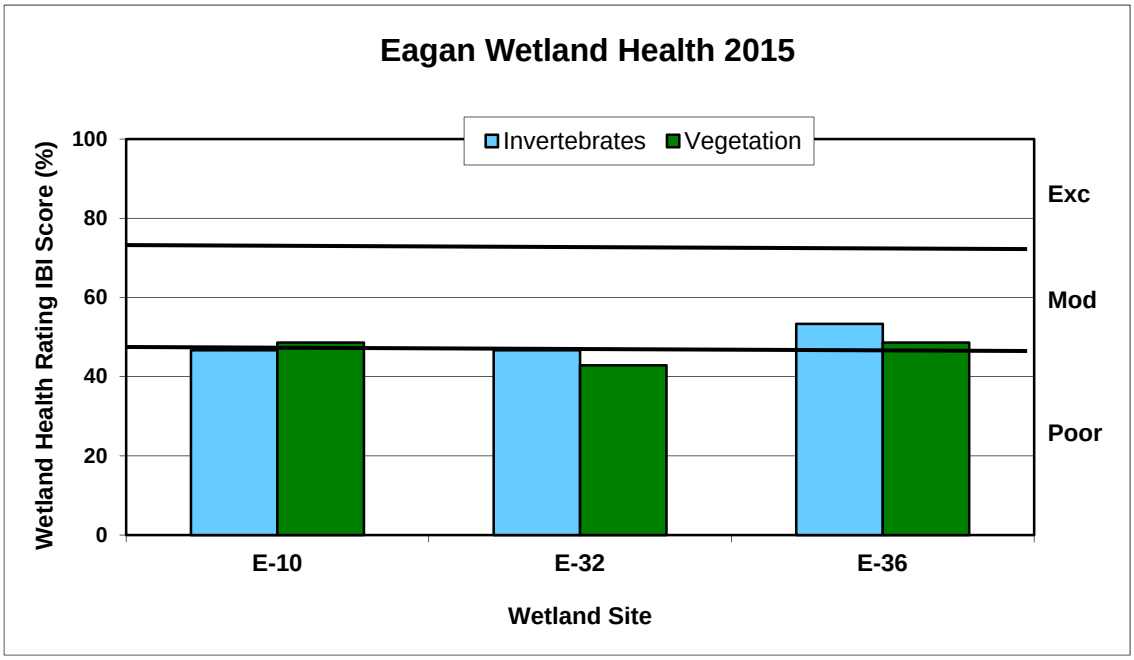
Since 1999, Eric Macbeth has managed Eagan's water resources programs that focus on protecting and improving lakes, conserving wetlands, and preventing stormwater pollution. "Eagan has annually supported WHEP since being an 'original city' in 1997. We believe the program provides residents a wonderful opportunity to be involved and educated," he says. "We have over 800 lakes and wetlands, and most residents live very near a wetland or regularly visit parks with wetlands. With WHEP, volunteers literally get their hands wet. We believe this helps strengthen the already strong citywide support of our water resources programs."

Eric Macbeth

Eagan General Wetland Health

Figure 4.3 presents an overall view of wetland health for all of the 2015 monitoring sites in Eagan based on the IBI scores for invertebrates and vegetation presented as a percent. Figure 4.3 also illustrates the consistency between the IBI scores (in percent form) for each wetland sampled. Scores that differ by less than ten percent 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 2015. The invertebrates and vegetation scores for each of the sites were consistent; even though E-10 scored poor for invertebrates and moderate for vegetation. E-36 scored moderate for both invertebrates and vegetation, and E-32 scored poor for both invertebrates and vegetation.

Figure 4.3 Eagan site scores (percent form) for the 2015 sampling season



4.3.1 Cedar Pond, AP-3 (E-10)

Cedar Pond (E-10), is Public Water #19-0150 and also known locally as AP-3. A 3.1-acre, type 4 wetland, it is entirely within Eagan's Cedar Pond Park and the City's "A" stormwater district that eventually drains to the Minnesota River. The wetland's watershed is 1,150 acres. There is one inlet in the northeast, two inlets in the southeast, and one outlet on the western side of the wetland. Cedar Pond Park is surrounded by single family homes and neighborhoods. In 2001, the City implemented a project with funding support from the Minnesota Environment and Natural Resources Trust Fund and the Minnesota Department of Natural Resources. While addressing flooding issues, the City increased the pond's volume, naturalized the shoreline, and established rainwater gardens to intercept some of the adjacent street runoff before it enters the pond. The City removed the sand delta from the southeast in 2013. The pond still receives a large volume of stormwater runoff; however, the City plans to continue to educate the public about the importance of keeping stormwater clean, and to keep up maintenance of the wetland buffer and raingarden sediment traps.

Wetland Health

Site Observations: The wetland is slightly mucky with a steep slope. Cattails, bulrushes and sedges grow near the shore. Tadpoles, fish, and crayfish were observed.

Table 4.3.1 Cedar Pond (E-10) Wetland Health based on Index of Biotic Integrity

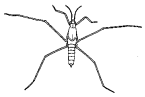
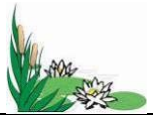
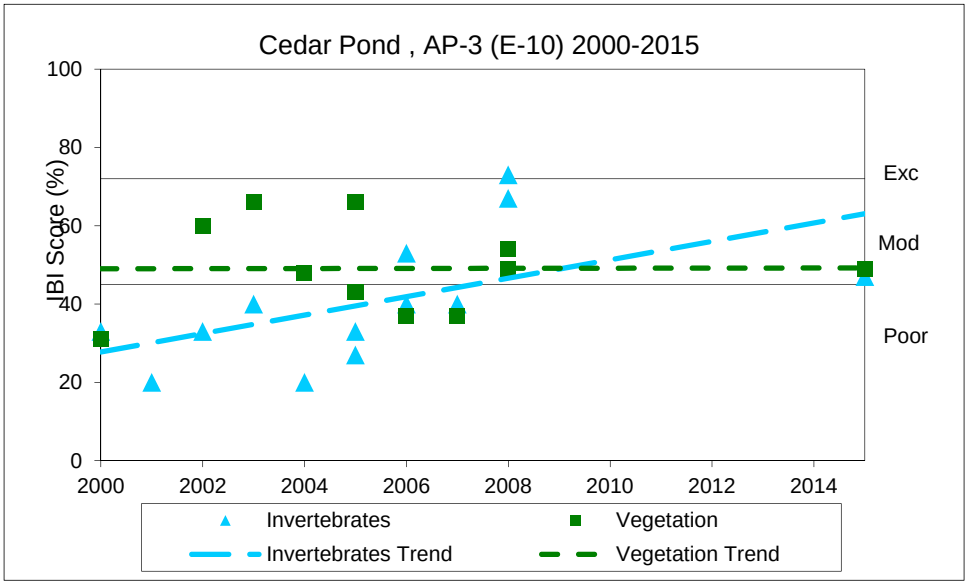
2015 Data (E-10)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Poor (14)	Moderate (17)
Trend 2000-2015	Improving	Stable

Figure 4.4.1 Invertebrate and vegetation trends for Cedar Pond (E-10)



Site summary: This is the tenth year that Cedar Pond has been surveyed; however, it has not been surveyed since 2008. The invertebrate and vegetation scores were consistent and both scored moderate. Even though the invertebrates score is lower than the last survey in 2008, the data indicates an increasing health trend. The vegetation scores, though slightly variable, are showing a steady health trend. Continued surveys will help determine a more recent health trend.

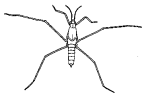
4.3.2 City Hall Pond, JP-6 (E-32)

City Hall Pond (E-32), is Public Water #19-0144 and also known locally as JP-6. A 6.6-acre, type 4 wetland, it is primarily within Eagan's Windcrest Park and entirely within the City's "J" stormwater district that eventually drains to Fish Lake. The wetland's watershed is 123 acres. There are two inlets in the northwest "finger" of the wetland, two inlets along the southern shore, and one outlet on the northern shore near the northeast corner. Eagan designates JP-6 a Class L3 lake, with management goals to support wildlife habitat, educational opportunities, and aesthetics. The area surrounding City Hall Pond outside of the park is mostly residential; however, the Eagan Sanitary Sewer lift station is along the northern shore. Wooded and natural areas buffer the wetland. City Hall Pond gets street runoff and indirect runoff from parking lots at City Hall, Civic Center, and Cascade Bay. A storm pond upstream of this pond intercepts water from the parking lots before it flows into this wetland.

Wetland Health

Site Observations: It is a slightly hilly area, but the wetland slope is gentle. The shore contains numerous grasses and small trees, and the substrate is very mucky.

Table 4.3.2 City Hall Pond (E-32) Wetland Health based on Index of Biotic Integrity

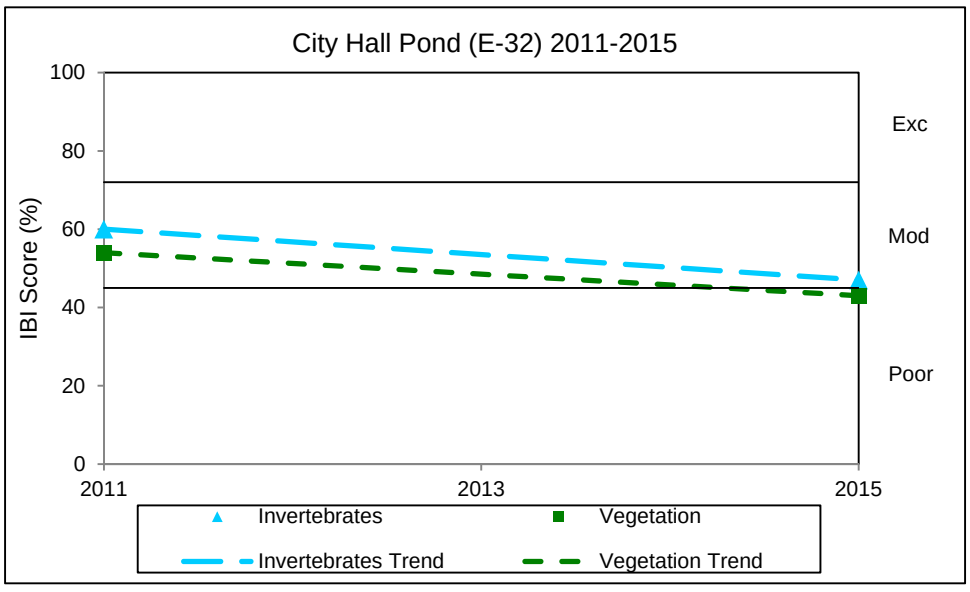
2015 Data (E-32)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Poor (14)	Poor (15)
Trend 2011-2015	Not enough data	Not enough data

Mark Niznik, Bob Geifer, Danny Turin, Rachel Turin, Craig Harnagel, Marianne McKeon, Paul Hassett, and Joe Schmitz

Rachel Turin, Danny Turin, Bob Geifer, Mark Niznik, Paul Hassett, Joe Schmitz, Marianne McKeon, Jessie Koehle, and Craig Harnagel

Danny and Ed Turin

Figure 4.3.2 Invertebrate and vegetation trends for City Hall Pond (E-32)



Site summary: This is the second time that City Hall Pond has been surveyed. It was first surveyed in 2011. Invertebrate and vegetation scores were consistent in 2015. Both scores were poor. Both scores have declined since 2011. Continual monitoring of this wetland will help assess the health trend.

4.3.3 Mooney Pond, JP-7 (E-36)

Mooney Pond (E-36), is Public Water #19-0148 and also known locally as JP-7. This 7-acre, type 5 wetland, is primarily within Eagan's Berry Patch Park and entirely within the City's "J" stormwater district that eventually drains to Fish Lake. Eagan designates Mooney as a Class L3 lake, with management goals to support wildlife habitat, educational opportunities, and aesthetics. The wetland's watershed is 112 acres. There is one inlet in the southwest, one inlet in the southeast, and one outlet on the eastern shore.

Mooney Pond is a pretty little hidden spot with historically nice pondweeds and occasional populations of goldfish. It 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. The City has not fully evaluated through modeling the effects of stormwater. There are no BMPs in place to benefit specifically the water quality. Public education and outreach on best practices for stormwater are ongoing throughout the City.

Wetland Health

Site Observations: The wetland substrate was firm with a layer of muck on top. The slope was gentle. The water levels were high and immersing the tree trunks along the shoreline. Many trees have fallen down and laying in the wetland. Trees, grasses and irises grow along the shoreline. Very few submerged vegetation were present in 2015.

There have been elevated water levels for the past few years due to mechanical issues of one of the pumps servicing the outlet for Mooney Pond. The City Utilities Department is working to correct the problem. Parks and Forestry Departments will work on fallen tree removal this winter.

Table 4.3.3 Mooney Pond (E-36) Wetland Health based on Index of Biotic Integrity

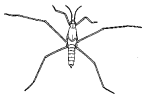
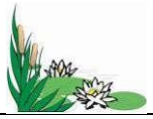
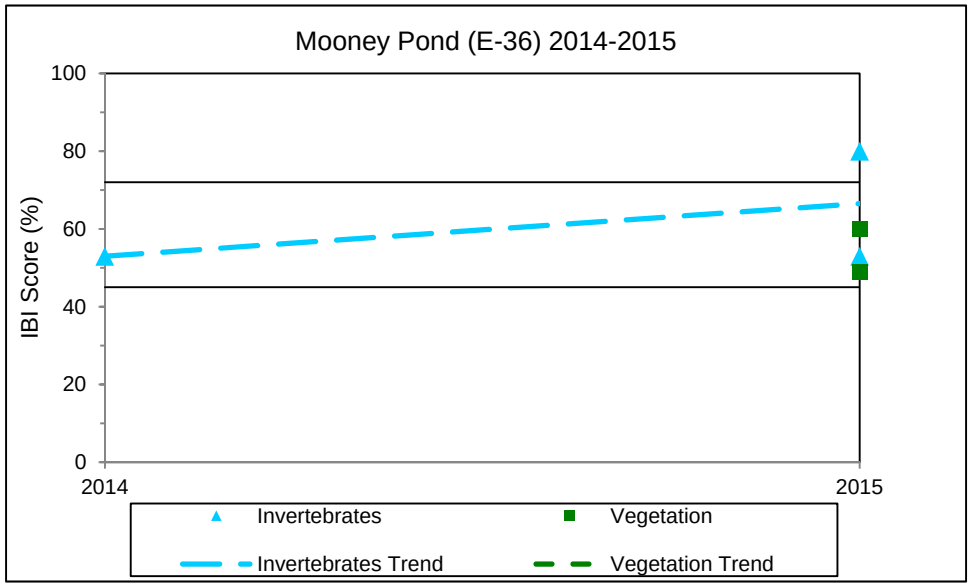
2015 Data (E-36)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (16)	Moderate (17)
Cross-check Rating (IBI score)	Excellent (24)	Moderate (21)
Trend 2014-2015	Not enough data	Not enough data

Figure 4.3.3 Invertebrate and vegetation trends for Mooney Pond (E-36)



Site summary: This is the first year that Mooney Pond has been surveyed. The water was too high to complete a vegetation survey. However, the invertebrates scored moderate. The scores from the City team and cross-check team were consistent; though the City score was lower than the cross-check score. The cross-check team collected a larger diversity of invertebrates. Continual monitoring of this wetland will help assess the health trend.

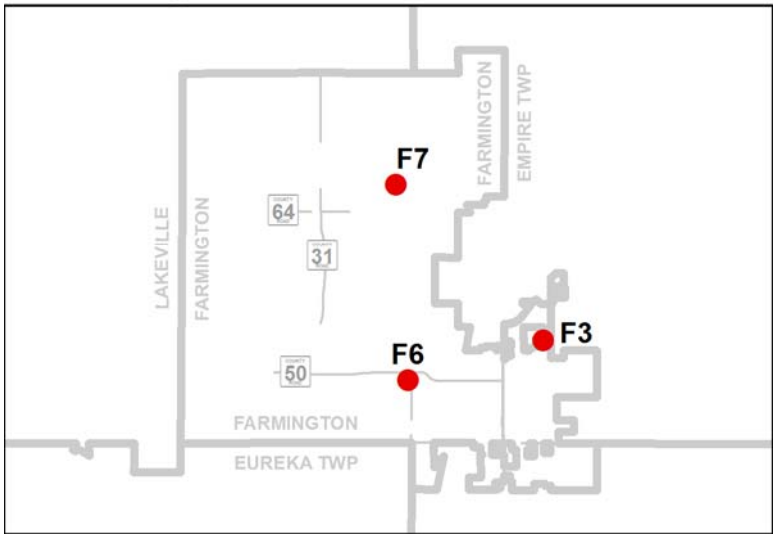
4.4 Farmington Wetlands

The Farmington team sampled three wetlands in 2015. The City has been monitoring wetlands through the WHEP program since 1997, and has many years of data.

Team Leader:
Katie Koch-Laveen

Team Members: Heather Evans, Rollie Greeno, Josiah Hakala, Paige Letourneau, Cindy O'Connor, Marcia Richter and Richard Schuldt.

Farmington WHEP Sites Monitored in 2015



Katie Koch-Laveen began working with WHEP in 2000 as the Farmington Team leader. Over the years she has been fortunate to have a core group of long time team members. She stated, "Each team member brings a unique skill set to WHEP and we learn from each other. We all enjoy each others' company and expertise. This year we had a sophomore student from Farmington High School join the team. She

Katie Koch-Laveen

learned easily and was very willing to venture into the wetlands. Our team often discusses the great changes that have taken place in the Farmington wetlands. Perhaps Farmington has endured the most development in the past 15 years and we think we see some of those results in the wetlands. We plan to test some of those ideas next year as we collect more data."

Jen Dullum

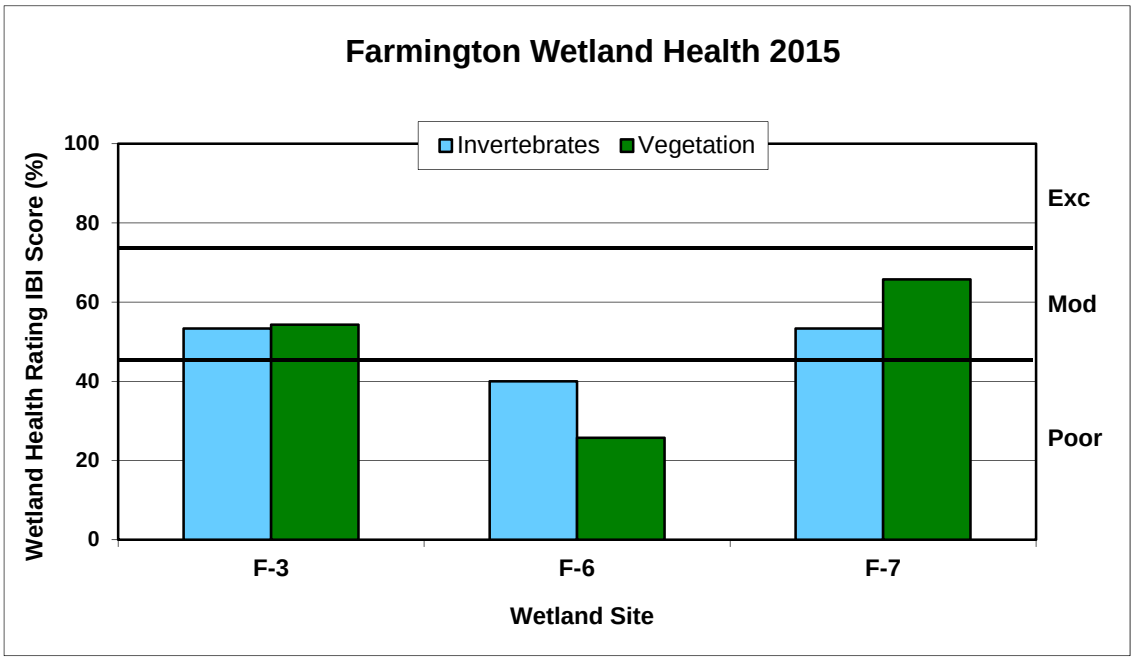
Jennifer Dullum administers the WHEP program for the City of Farmington. Her role is to publicize the program in local publications, determine which wetlands should be monitored, provide site maps and any directional needs, and review the collected data.

She says, "The WHEP program is important to the City in comparing past data to see changes occurring within the wetland system as development increases in Farmington. The dedication from the WHEP volunteers is extremely appreciated and a value to the City. I hope that the information gained by the volunteers is shared with their family, friends and neighbors so that connectivity between natural and man-made systems can be made."

Farmington General Wetland Health

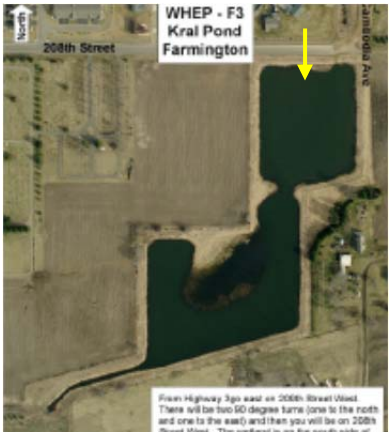
Figure 4.4 presents an overall view of wetland health for all of the 2015 monitoring sites in Farmington based on the IBI scores for invertebrates and vegetation presented as a percent. Figure 4.4 also illustrates the consistency between the IBI scores (in percent form) for each wetland sampled. Scores that differ by less than ten percent are considered consistent. Based on the IBI scores, a wetland health rating is assigned as excellent, moderate or poor. Scores for the three wetlands indicate poor to moderate wetland health; however, only the vegetation score for F-6 was found to be poor. This is similar to 2014 data. F-6 and F-7 showed inconsistency between invertebrates and vegetation scores, also similar to 2014 data.

Figure 4.4 Farmington site scores (percent) for the 2015 sampling season



4.4.1 Kral Pond (F-3)

F-3, also known as Kral Pond, is a ten acre wetland with a drainage area of 41.8 acres which is 6.6 percent impervious. It is a type 4 wetland located within the Vermillion River Watershed. 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 designated as a Manage 2 wetland in the City wetland management plan. Manage 2 wetlands have usually been altered by human activities. These wetlands have low to medium floral diversity and wildlife habitat components, and are slightly susceptible to impacts from stormwater. There is development to the north, south, and west, and agriculture to the east. Wetland buffers are in place. The wetland management goal is to document how housing and agriculture impact the man-made wetlands.



Wetland Health

Site Observations: This is a large wetland with extensive stands of cattail. The slope to the wetland is steep, but gentle into the water. The substrate is solid. Reed canary grass is present.

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

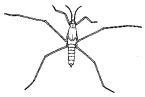
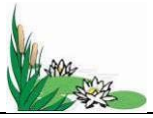
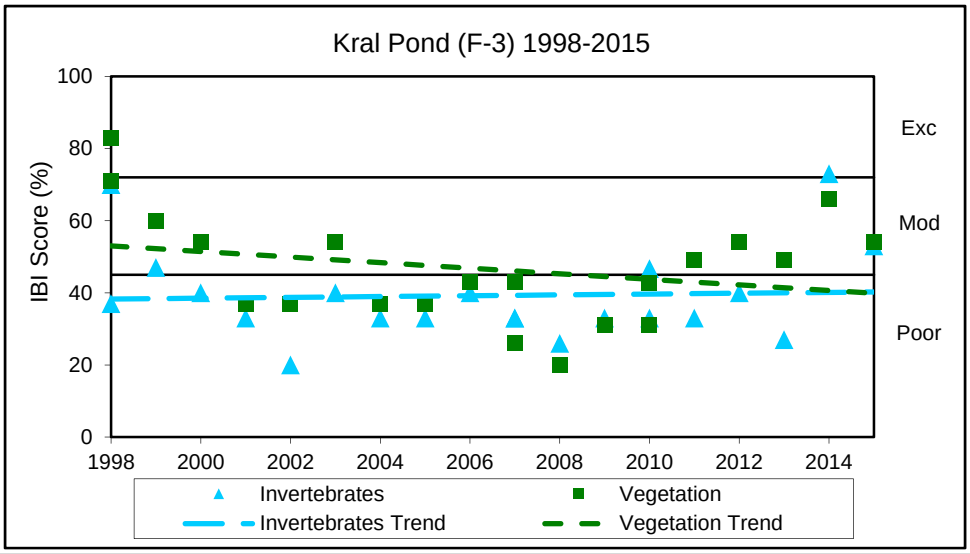
2015 Data (F-3)	**Invertebrates** 	**Vegetation** 
Wetland Health Rating (IBI score)	Moderate (16)	Moderate (19)
Trend 1998-2015	Overall stable, but increasing since 2008	Overall decline, but increasing since 2008

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



Site summary: Kral Pond has been monitored for 18 consecutive years. Recent monitoring indicates moderate wetland health. Although the overall trend shows a decline in vegetation scores and stable invertebrate scores since the monitoring began in 1998, both invertebrate and vegetation scores appear to be on the rise since a low in 2008. The area was historically agricultural. Development surrounding the wetland may have impacted the wetland. In some cases, conversion from agriculture to residential development can improve water quality since stormwater treatment is added. The improved health scores may be proof of this.

4.4.2 Vermillion River (F-6)

Vermillion River (F-6) is a 6.3 acre wetland within the Vermillion River Watershed. The wetland drainage area is 16 acres and is approximately 30 percent impervious. There is one inlet on the west side of the wetland past the infiltration areas. There is one outlet in the southeast corner. The wetland is included in the City's stormwater management plan and wetland management plan. It is a protected wetland with a management plan to monitor wetlands near the Vermillion River where potential exists for new development.

The Vermillion River wetland is a very small pond at the intersection of Denmark Avenue and Highway 50. There are ballfields, a parking lot, and an electrical substation across the street, and the Vermillion River is to the south of the wetland. There is commercial development to the north and west. Agricultural land lies to the south, and major roadways run to the north and west. There is potential for new development to the west. Infiltration areas are in place to the west of the wetland which is in the floodplain of the Vermillion River.

Wetland Health

Site Observations: The wetland substrate is very mucky. There are many young willow trees, cattails and reed canary grass along the shore.

Table 4.4.2 Vermillion River (F-6) Wetland Health based on Index of Biotic Integrity

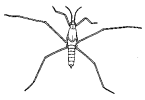
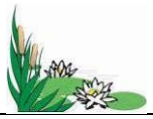
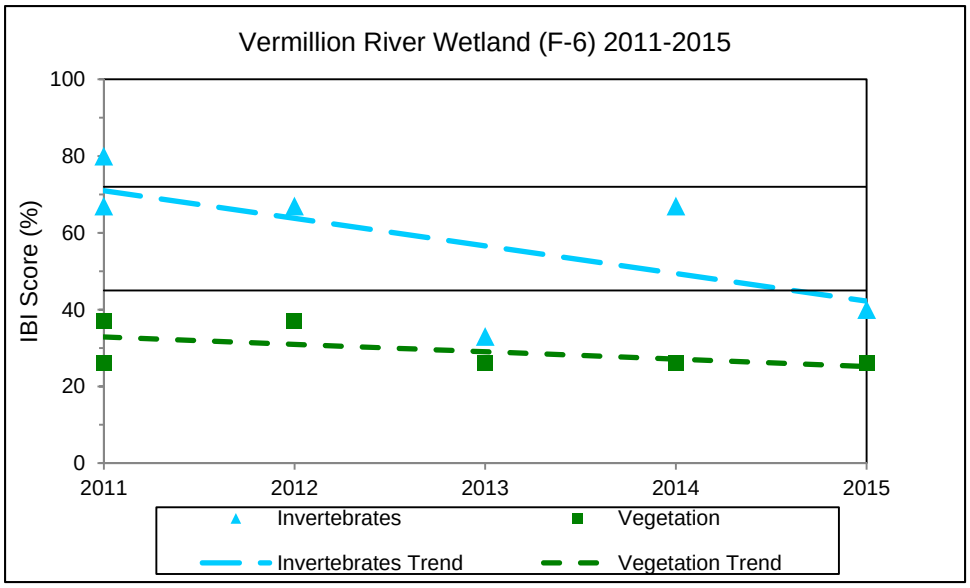
2015 Data (F-6)	**Invertebrates** 	**Vegetation** 
Wetland Health Rating (IBI score)	Poor (12)	Poor (9)
Trend 2011-2015	Declining	Stable

Figure 4.4.2 Invertebrate and vegetation trends for Vermillion River (F-6)



Site Summary: This is the fifth consecutive year that F-6 has been surveyed. In 2015, both the invertebrates and vegetation scored poor; however, these scores were inconsistent with each other. The vegetation trend is fairly stable. The invertebrates trend is variable. More years of data will help assess the health trends.

4.4.3 Autumn Glen (F-7)

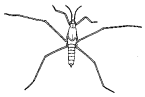
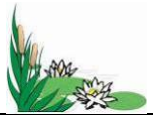
Autumn Glen (F-7) is a 2.9 acre wetland within the Vermillion River Watershed. The watershed is ten acres and four percent impervious. There is one inlet in the northwest corner of the wetland along Dunbury Avenue and one outlet in the northeast corner. The wetland is included in the City's stormwater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

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

Wetland Health

Site Observations: The wetland slope is very gentle. The wetland substrate is firm, but becomes mucky. There was low water at the time of invertebrate sampling in June. Many frogs and dragonflies are present in this wetland.

Table 4.4.3 Autumn Glen (F-7) Wetland Health based on Index of Biotic Integrity

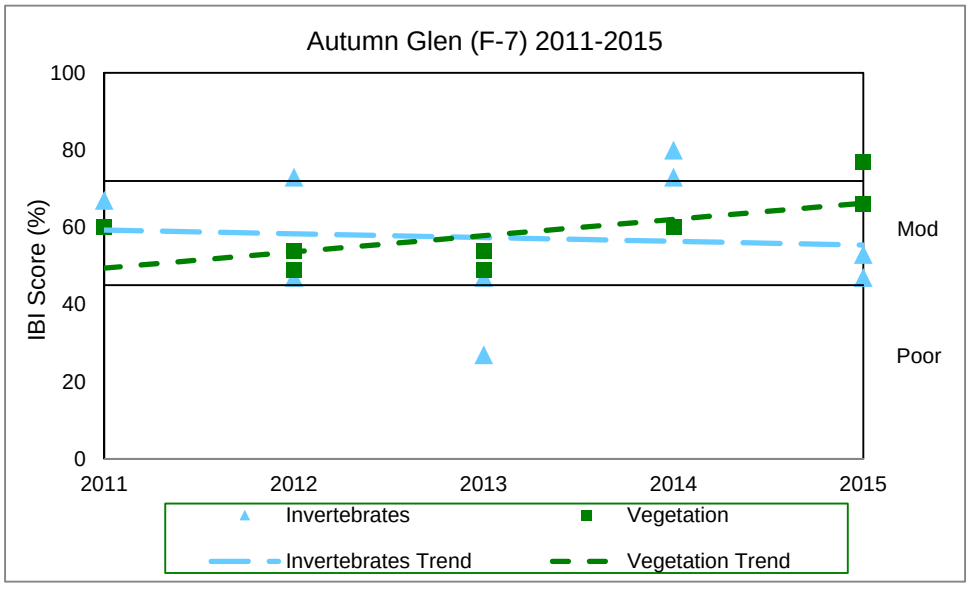
2015 Data (F-7)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (16)	Moderate (23)
Cross-check Rating (IBI score)	Excellent (14)	Moderate (27)
Trend 2011-2015	Variable, but stable	Improving

Richard Schuldt and Paige Letourneau

Josiah Hakala, Marcia Richter, Richard Schuldt, Rollie Greeno, and Katie Koch-Laveen

Josiah Hakala and Richard Schuldt

Figure 4.4.3 Invertebrate and vegetation trends for Autumn Glen (F-7)



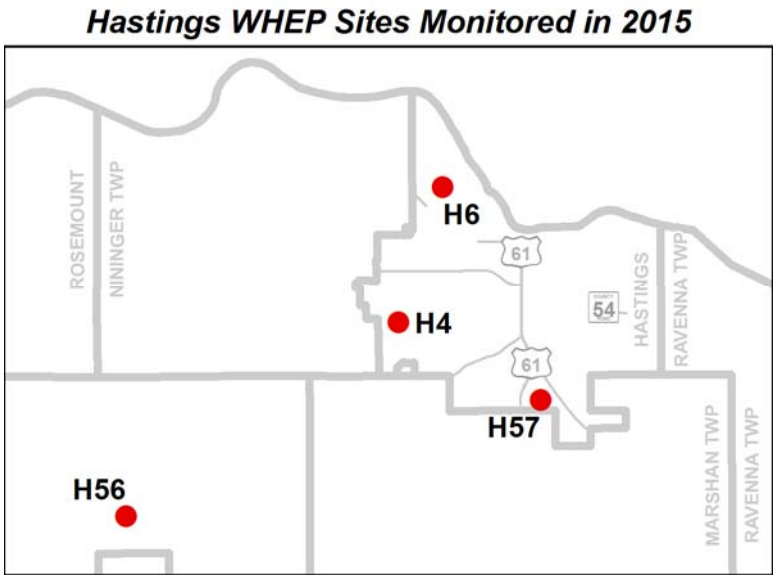
Site Summary: This is the fifth consecutive year that Autumn Glen has been monitored. The invertebrate scores between the City team and the cross-check team are consistent, but the vegetation scores are not. The invertebrate and vegetation scores were not consistent with each other for each of the teams. Vegetation scores are the highest on record in 2015. The vegetation trend appears to be improving. The invertebrate scores are variable, though the trend appears stable. Both teams commented that water levels were low in 2015. Fluctuating water levels may affect the health scores.

4.5 Hastings Wetlands

Four wetlands were monitored in Hastings in 2015. Nine wetlands have been sampled in the City of Hastings through the WHEP program since 1999.

Team Leader: Jessie Eckroad

Team Members: Rong Cao, Suzie Gehrz, Cal Gergen, Brian Huberty, Derek Huebsch, Mike Nelson, Michael Ruhs, Mike Shelhamer, Dwight Smith, Kevin Smith, Alexander Theisen, and Yan Wang.



Jessie Eckroad

This was Jessie Eckroad's first year as a WHEP team leader. She wrote, "My involvement with WHEP began with a happy accident in the Spring of 2015. Through my position as Outreach Program Coordinator at Carpenter Nature Center, I have developed connections with many environmental leaders in Dakota County, including members of the Hastings WHEP team. I had been encouraged to join by several people, but I was apprehensive because, at the time, there was no team leader for Hastings. During a discussion with veteran Hastings WHEP member, Kevin Smith, he proclaimed, 'Hey! *You* should be our leader! You would be great!' With his support, I timidly contacted Paula Liepold, and as they say, the rest is history! I became a brand new WHEP member *and* the team leader. I was so intimidated by all the new things I was learning, and very apprehensive about the season. However, I drew on my past leadership and water quality monitoring experiences, and with the support of my very experienced and dedicated team, I learned the ropes quickly. I joined WHEP with the intent to gain additional experience as a leader and scientist, but I will be staying because of the wonderful relationships I formed this past season. The field sessions and lab ID work are incredibly fascinating and informative, but my favorite part is spending time with the amazing group of people I am privileged to call my team *and* my friends. I look forward to being a part of the Hastings WHEP team for many years to come."

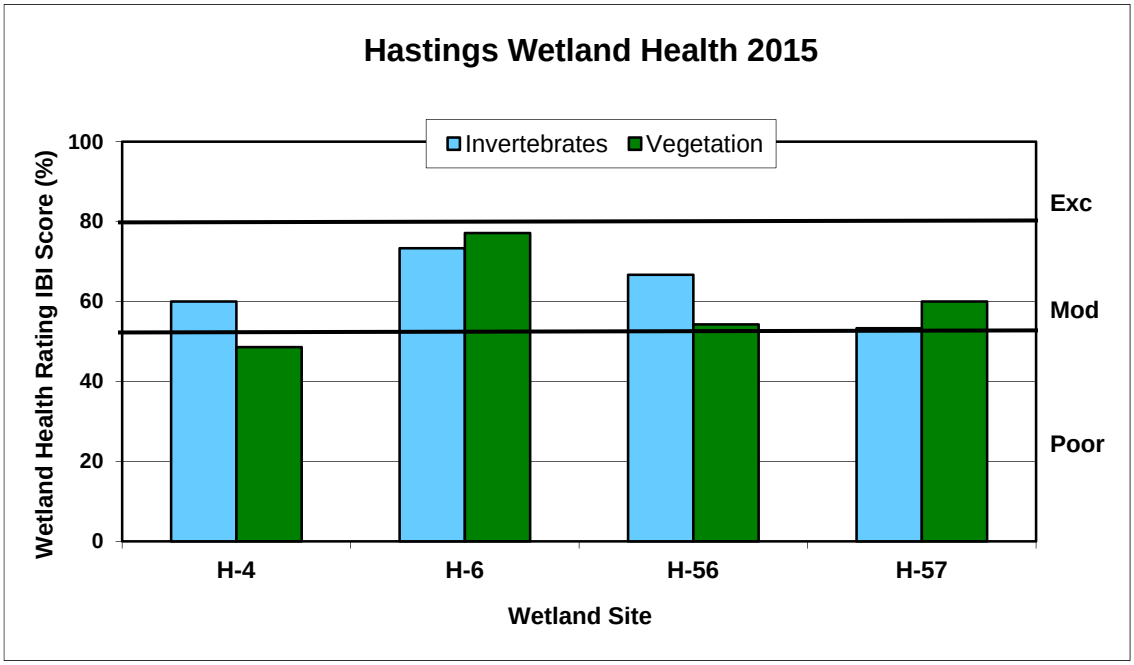
John Caven

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 program is a tremendous asset to the community as the program provides tangible trend lines of the general health of area ponds. Over time, we'll be able to see the progress already made and help determine in the future how much further we'll need to go in the area of stormwater management. The hard work of many dedicated volunteers is the backbone to providing the vital data required to make this valuable program a success."

Hastings General Wetland Health

Figure 4.5 presents an overall view of wetland health for all of the 2015 monitoring sites in Hastings based on the IBI scores for invertebrates and vegetation presented as a percent. Figure 4.5 also illustrates the consistency between the IBI scores (in percent form) for each wetland sampled. Scores that differ by less than ten percent are considered consistent. Based on the IBI scores, a wetland health rating is assigned as excellent, moderate or poor. The wetlands showed poor to excellent wetland health in 2015. H-6 and H-57 showed consistency in scores between invertebrates and vegetation. H-6 scored excellent for vegetation. Sites H-4, H-56, and H-57 each scored moderate for invertebrates and vegetation.

Figure 4.5 Hastings site scores (percent) for the 2015 sampling season



4.5.1 Stonegate Treated Wetland (H-4)

H-4, also known as Stonegate Treated, is the second cell of a two-celled stormwater management system created to treat runoff from surrounding residential development. It is a 1.2 acre, type 4 stormwater detention pond 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 with a goal to improve water quality of the stormwater runoff before it adversely affects the Vermillion River.

The watershed is primarily residential with private property on three sides and a public trail along the south side of the wetland. Private landowners within the Wyndham Hills Neighborhood Association manage their own frontages of the pond with rip-rap, mowing, and chemical use. Several property owners demonstrate good management practices by maintaining shoreland buffers to protect water quality and provide wildlife habitat. In 2004, the Wyndham Hills Neighborhood Association partnered with the City of Hastings and the DNR to provide native plantings around the pond.

A private trail access divides Stonegate pond from another pond just south of the site. Some concerns compromising the health of the pond include invasive species, mowing too close to the water's edge, and the use of chemicals on adjacent shoreline turf.

Wetland Health

Site Observations: The wetland substrate is mucky and it has a steep slope. Most of the wetland is lined with cattails, other emergent vegetation, and deciduous trees and shrubs including willows. The northeastern side of the wetland is mowed up to the water's edge.

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

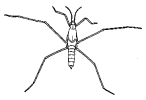
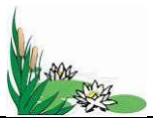
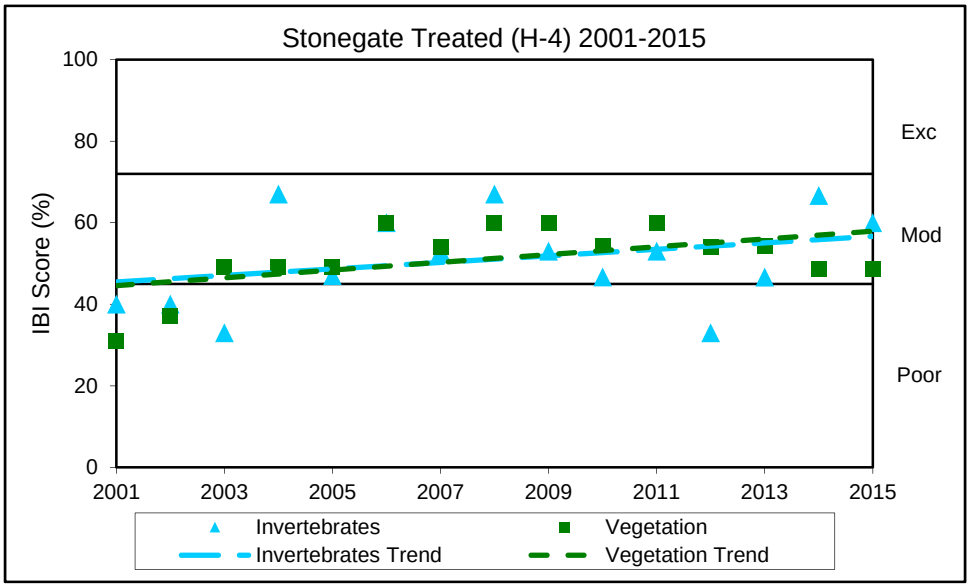
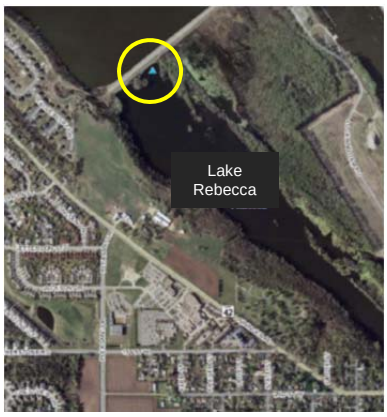
2015 Data (H-4)	**Invertebrates** 	**Vegetation** 
Wetland Health Rating (IBI score)	Moderate (18)	Moderate (17)
Trend 2001-2015	Improving overall, but stabilizing	Improving, but variable

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



Site summary: This is the fifteenth consecutive year that Stonegate Treated has been surveyed. The vegetation trend analysis indicates that wetland health is gradually improving; although it has been fairly stable remaining in the moderate category since the poor scores found in 2001 and 2002. Vegetation scores were identical in 2014 and 2015 and the lowest since 2005. The invertebrate data varies from year to year; however, the trend analysis indicates improving scores due to the low scores from 2001 to 2003.

4.5.2 Lake Rebecca Wetland (H-6)



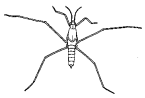
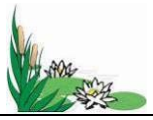
H-6, also known as Rebecca EM 1&2, is a public water wetland in the City of Hastings. It is a 19 acre, type 5 open water wetland located in the Vermillion River Watershed. The wetland drainage area is 56 acres, and is 1 percent impervious. The wetland has two stormwater inlets along the southwest shoreline and one controlled outlet on the southeast end. The wetland is part of the City's stormwater management plan, and is designated as a High Quality Wetland. It is being managed as a wildlife habitat area and for recreational use. A natural shoreline buffer zone exists along much of the lake's perimeter. The Mississippi River Flats Natural Resource Management and Restoration Plan was adopted in December 2002. One of the inflow areas to the lake is fitted with a series of sediment control structures. These are maintained by the City Public Works Department. The City Parks Department operates an aeration system during the winter season to benefit the game fish.

The wetland is an emergent marsh and shoreline/floodplain forest. Spring fed water from the bluffs helps maintain water levels. Jaycee Park provides access for recreation on the lake, including a boat launch. Diversion of stormwater into the lake and an impervious parking lot/boat launch adjacent to the eastern edge of the lake are of growing concern. A temporary staging area for the Highway 61 bridge is located on the nearby river flats but does not contribute to runoff directly into Lake Rebecca. Purple loosestrife and zebra mussels are present, and compromise the health of the lake.

Wetland Health

Site Observations: A steep slope exists from the bikepath on the levee to the wetland; however, the wetland itself has a gentle slope. It is mucky, but with a solid bottom. It contains many submerged logs.

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

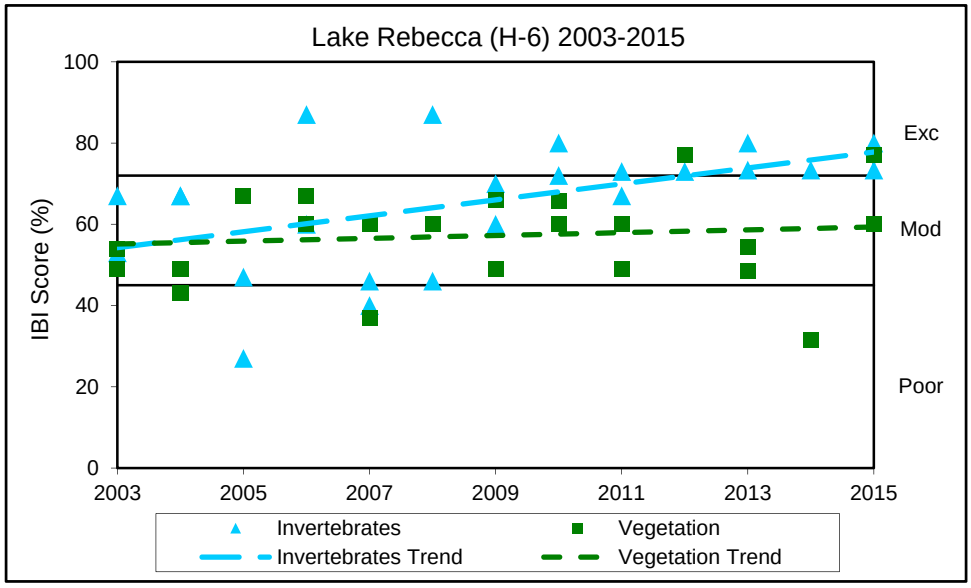
2015 Data (H-6)	**Invertebrates** 	**Vegetation** 
Wetland Health Rating (IBI score)	Moderate (22)	Excellent (27)
Cross-check Rating (IBI score)	Excellent (24)	Moderate (21)
Trend 2003-2015	Improving	Stable

Mike Nelson, Brian Huberty, Yan Wang, Rong Cao, Mike Shelhammer, and Dwight Smith

Back Cal Gergen, Suzie Gehrz, Michael Ruhs, Jessie Eckroad, Rong Cao, Yan Wang, Brian Huberty *Front* Mike Nelson, Dwight Smith, Alex Theisen

Yan Wang, Dwight Smith, Mike Shelhammer, Michael Ruhs, and Rong Cao

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



Site summary: This is the thirteenth consecutive year of monitoring for Lake Rebecca. There was a lot of variability in the invertebrate data prior to 2009; however since then, the invertebrate health has remained stable and the long term trend appears to be improving for invertebrates. The vegetation data is still variable; however, the long term trend appears stable. The invertebrate and vegetation scores were consistent for the City team; however, the scores collected by the cross-check team were inconsistent, and the vegetation score was much lower than either invertebrate score. The vegetation scores were also inconsistent between the City team and the cross-check team. Differences in vegetation scores may be caused by plot positioning within the wetland and/or water level differences on the days of survey.

4.5.3 180th Street Marsh (H-56)

H-56, also known as 180th Street Marsh, is a 20 acre type 5 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 180th 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 landowner has not communicated any plans on management of the wetland. There is a concern that when the ponds are dry, the landowners may put the land into production. Farming practices to the south restrict any 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 on the surrounding land, and wildlife habitat management to be practiced in the wetland areas. Reed canary grass is a dominant vegetative cover.

Wetland Health

Site Observations: The wetland substrate is sandy and firm near the shore but gets muckier as the water depth increases (though still firm enough to walk). The slope entering the wetland is moderate. Water levels were low in 2015 and emergent vegetation was 5-20 meters inland from open water. A large amount of reed canary grass exists.

Table 4.5.3 180th Street Marsh (H-56) Wetland Health based on Index of Biotic Integrity

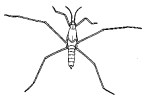
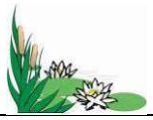
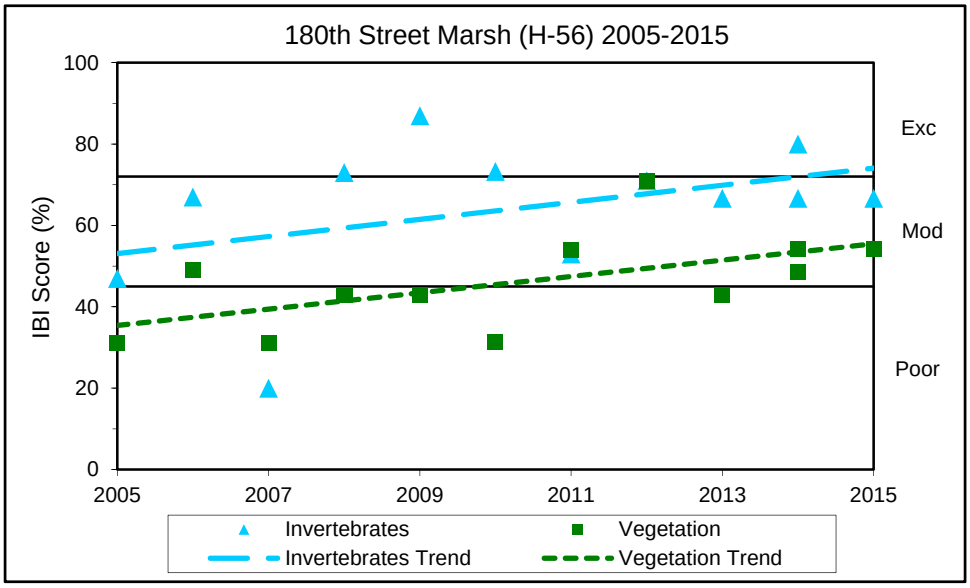
2015 Data (H-56)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (20)	Moderate (19)
Trend 2005-2015	Improving	Improving

Figure 4.5.3 Invertebrate and vegetation trends for 180th Street Marsh (H-56)



Site summary: This site has been monitored eleven consecutive years since 2005. Both the invertebrate and vegetation data is variable from year to year; however, both trends appear to be increasing slightly. Invertebrate and vegetation data were inconsistent again in 2015. The wetland water level was low in 2015, so the emergent vegetation was not fairly represented in the plot.

4.5.4 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 is designated as a Medium Quality Wetland. It serves as a stormwater detention pond within a developed neighborhood. The goal for the wetland is to

improve water quality of the stormwater runoff before it adversely affects the Vermillion River. The City has erosion control regulations in place to minimize the impacts of development within the watershed.

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

Wetland Health

Site Observations: The wetland is surrounded by residential homes, and a park is nearby. The wetland substrate is very mucky, and the slope gentle. Mallard ducklings and painted turtle were observed.

Table 4.5.4 Cari Park Pond (H-57) Wetland Health based on Index of Biotic Integrity

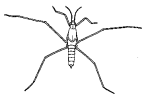
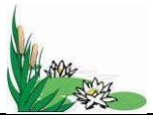
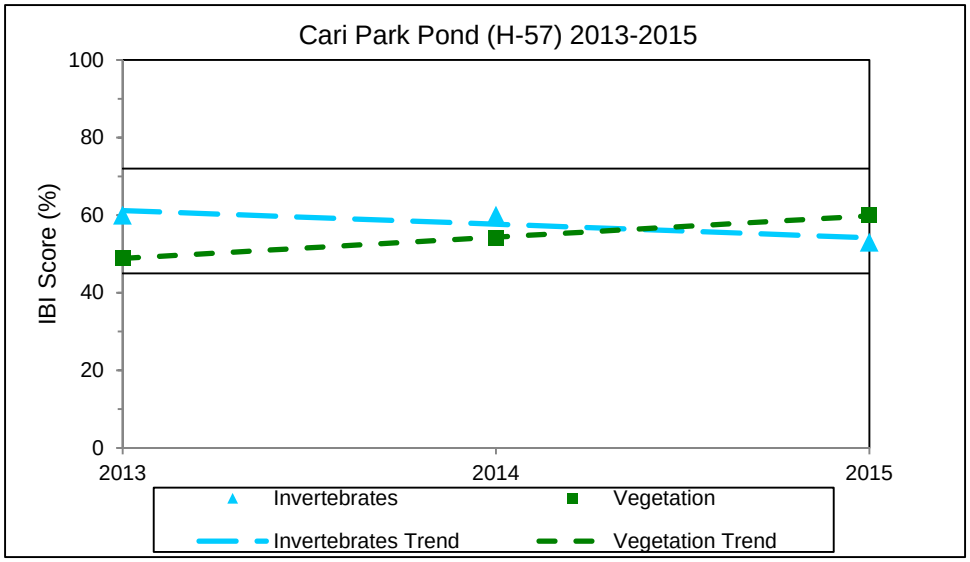
2015 Data (H-57)	**Invertebrates** 	**Vegetation** 
Wetland Health Rating (IBI score)	Moderate (16)	Moderate (21)
Trend 2013-2015	Not enough data	Not enough data

Figure 4.5.4 Invertebrate and vegetation trends for Cari Park Pond (H-57)



Site summary: This is the third consecutive year that Cari Park Pond has been monitored. The vegetation and invertebrate scores are consistent with each other, and both indicate moderate wetland health. The limited data show stable trends for both categories, but more years of monitoring will help determine a health trend for Cari Park Pond.

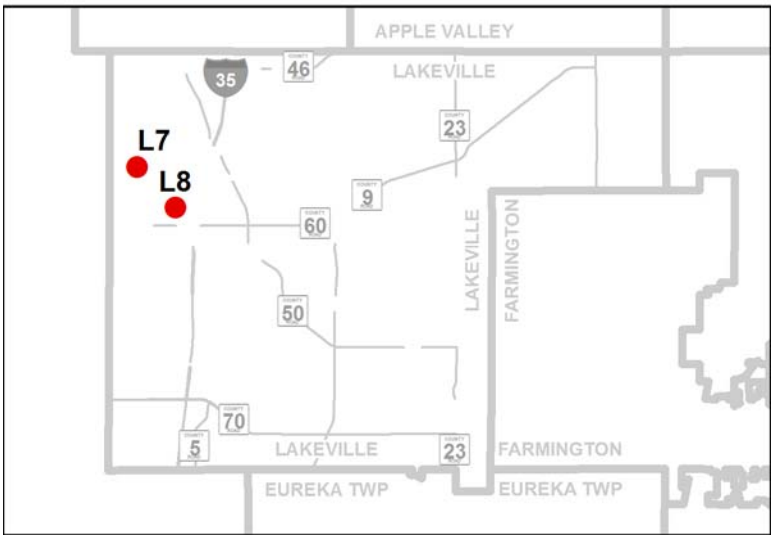
4.6 Lakeville Wetlands

Two wetlands were monitored in 2015 within the City of Lakeville. Ten wetlands have been monitored since WHEP began.

Team Leader: Steve Weston

Team Members: Tatjana Gleixner, Tom Goodwin, David Leard, Kim Menard, Ella Renner, Kristi Renner, Nora Renner, and Thomas Renner.

Lakeville WHEP Sites Monitored in 2015



Steve Weston

Steve Weston has participated in WHEP for over 14 years. He describes himself as a naturalist, and says, “I am best known for my bird observations, but people who join me on field trips realize that I am really interested in all components of the environment. I have little formal biological training.”

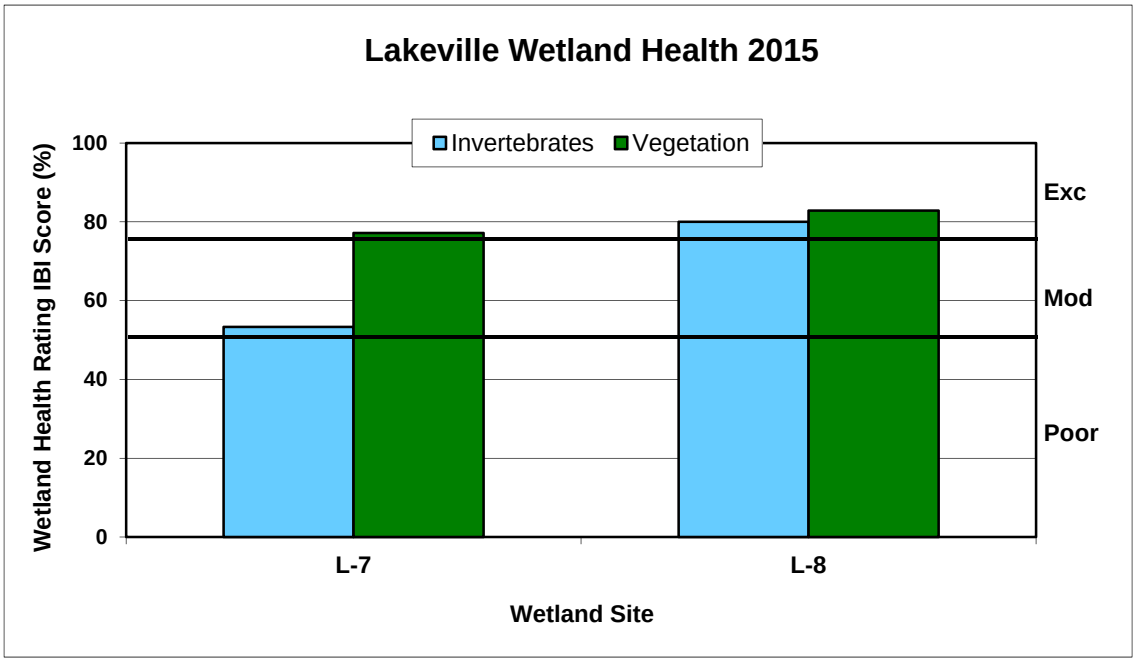
Ann Messerschmidt

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

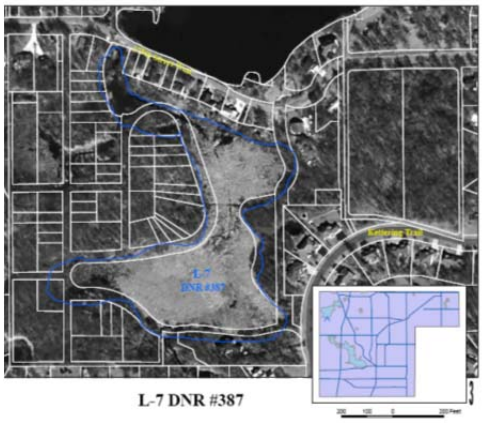
Lakeville General Wetland Health

Figure 4.6 presents an overall view of wetland health for all the 2015 monitoring sites in Lakeville based on the IBI scores for invertebrates and vegetation presented as a percent. Figure 4.6 also illustrates the consistency between the IBI scores (in percent form) for each wetland sampled. Scores that differ by less than ten percent are considered consistent. Based on the IBI scores, a wetland health rating is assigned as excellent, moderate or poor. The vegetation and invertebrate data for the two wetlands sampled ranged from moderate to excellent. Site L-8 scored excellent in both invertebrates and vegetation. Site L-7 scored excellent for vegetation and moderate for invertebrates.

Figure 4.6 Lakeville site scores (percent) for the 2015 sampling season



4.6.1 DNR Wetland #387 (L-7)


L-7 DNR #387

L-7, also known as DNR #387, is a ten acre, type 4 wetland located in the Orchard Lake subwatershed within the Black Dog Watershed. The Orchard Lake subwatershed is 506.6 acres with 105.5 acres of direct drainage. It is 29 percent impervious, and both publicly and privately owned. It has one inlet in the southeast corner of the wetland off of Kettering Trail and two outlets along the north side near Orchard Lake. The wetland is part of the City's stormwater management plan. The wetland designation is to preserve. The management goal is to actively protect and preserve the functions and values of the wetland. A woodland buffer surrounds most of the west side of the wetland, with woodland buffers between the few properties along the north and southeast wetland boundary. In an effort to improve water quality of Orchard Lake, an aeration system was installed in L-7 in 2010. There are four diffuser heads installed near the north outlet into Orchard Lake. The goal is to precipitate phosphorous out of the water column and drop it out into the sediments in L-7 so that less phosphorous will enter into Orchard Lake. The aeration system is scheduled to run from April to October annually.

Wetland Health

Site Observations: The slope is steep and the substrate muddy. The wetland is dominated by cattails, although the area around the site is quite diverse in vegetation. Some blooming of purple loosestrife is evident for the first time in several years. However, damage to the purple loosestrife leaves from purple loosestrife beetles is obvious. Steve Weston believes, "Damage to purple loosestrife leaves from loosestrife beetles shows that they are thriving, and with an abundance of loosestrife to consume, we expect they will drive loosestrife back into eclipse."

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

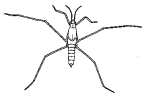
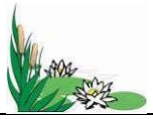
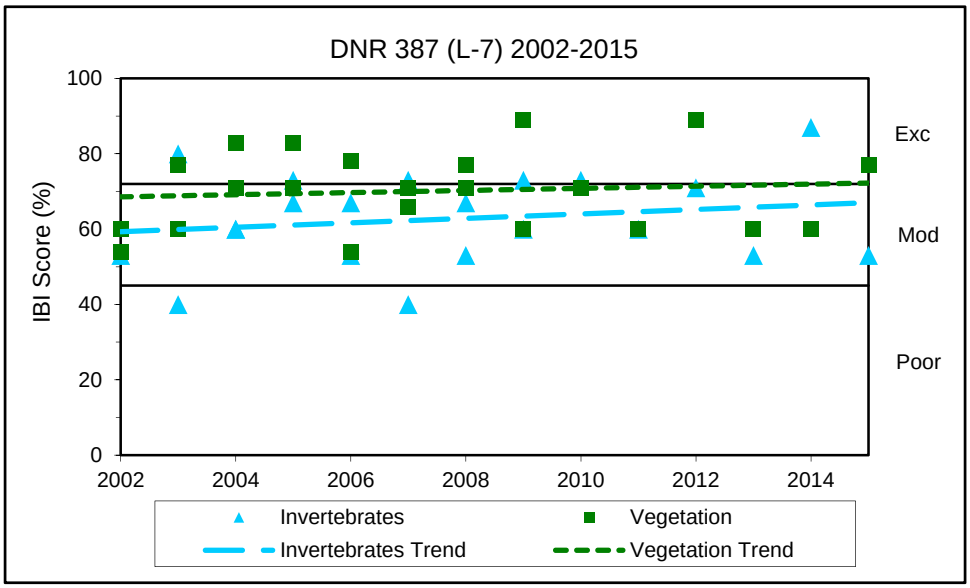
2015 Data (L-7)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (16)	Excellent (27)
Trend 2002-2015	Improving	Variable but stable

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



Site summary: This is the fourteenth consecutive year that DNR 387 has been monitored. The invertebrate and vegetation scores are both variable throughout the years, and in 2015 they are inconsistent with each other. The health trend of the invertebrates appears to be improving slightly while the vegetation trend remains stable.

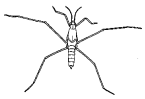
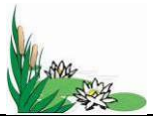
4.6.2 DNR #393 (L-8)

L-8, also known as DNR #393, 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 as much as possible. 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 substrate is muddy. Arrowhead, which in previous years appeared to be suffering from overgrazing by deer, are doing better. Steve Weston commented, "The high score for invertebrates is interesting because the quantity of the sample is consistently quite low, but the diversity is surprisingly high. I believe this indicates a high quality wetland including a healthy predator population."

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

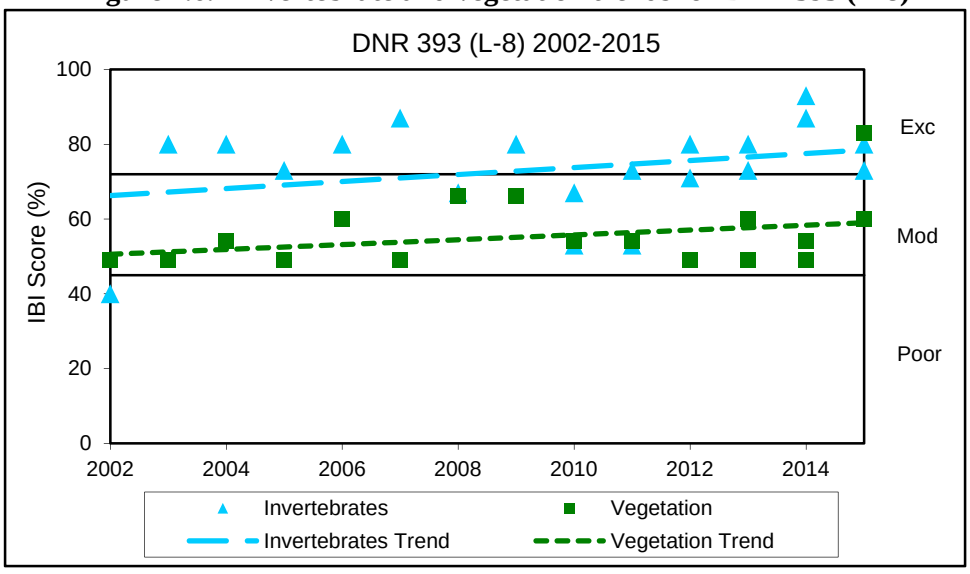
2015 Data (L-8)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Excellent (24)	Excellent (29)
Cross-check Rating (IBI score)	Moderate (22)	Moderate (21)
Trend 2002-2015	Improving	Improving

Tom Renner and Steve Weston

Steve Weston, Tatjana Gleixner, Kristi Renner and Tom Renner

Lakeville team at training

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



Site summary: DNR 393 has been monitored 14 consecutive years. The invertebrate and vegetation scores appear to be stable, especially since 2010; however, both trends are showing slight improvement. The invertebrate scores have remained excellent to high moderate for the past decade. The vegetation score increased sharply in 2015. The City scores and cross-check scores are consistent with each other; for invertebrates but not for vegetation. The cross-check team's vegetation score more resembled historical data. Steve Weston noted, "the surrounding area, once fallow agricultural land, has become developed during the time it has been monitored, yet the conditions of the wetland have remained high."

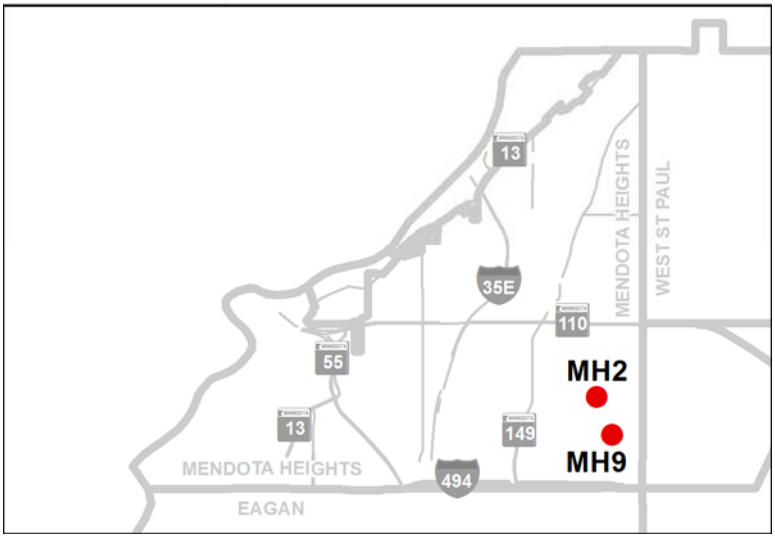
4.7 Mendota Heights Wetlands

In 2015, the Mendota Heights team monitored two wetlands in Mendota Heights. Sixteen wetlands have been monitored in Mendota Heights since the start of the WHEP program.

Team Leader:
Darcy Tatham

Team Members: John Bottomley, James Chastek, Michelle Janson, Brian Koster, Mary Stade, and Anneliese Tatham

Mendota Heights WHEP Sites Monitored in 2015



Darcy Tatham

Mendota Heights' team leader, Darcy Tatham, has been part of the program for 15 plus years. She reflected on the 2015 season, "Every pond is different and every year is different. This year the team was somewhat disappointed in the Copperfield results. We typically expect it to be the best, and this year didn't bring the same stellar results that we've seen other years. They were still good, but we have come to expect more. Instead, we were impressed by the results at the Hagstrom-King pond. Both ponds are close in proximity to each other but even that doesn't mean you can forecast the results. We had a small team this year, but it was a very good dedicated team. The experienced members guided the newer members, and the new members added a fresh vitality. I couldn't have done it without them. Thank you!"

John Mazzitello

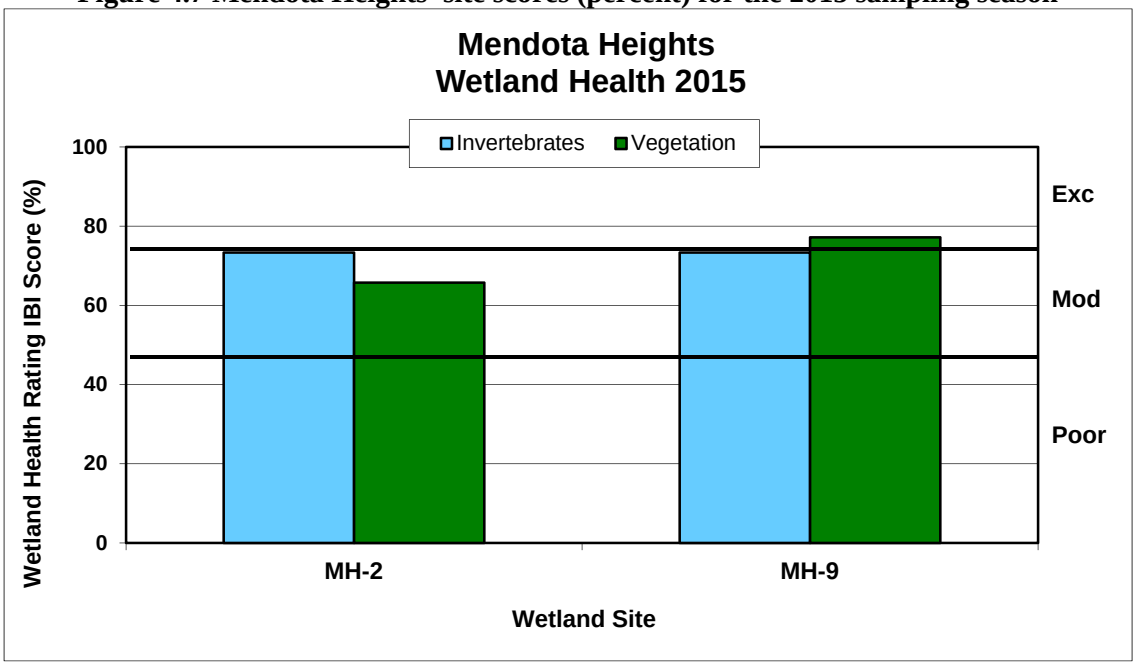
John Mazzitello has been the city WHEP contact since 2008. He is the City of Mendota Heights Public Works Director/City Engineer. He says, "The wetlands in Mendota Heights provide essential functions to the City. Not only are they part of our overall surface water management, but the unique habitats they provide help to sustain a balance of wildlife in the area. This is relatively unique to a first-tier metropolitan suburb, and it helps make Mendota Heights the unique community that it is. We are grateful to be part of a program that emphasizes the health and vitality of these wetland areas."

Ryan Ruzek is the Assistant City Engineer for the City of Mendota Heights. He helps coordinate wetlands for monitoring. Ryan's WHEP volunteer experience provided him with valuable knowledge helping him analyze the data.

Mendota Heights General Wetland Health

Figure 4.7 presents an overall view of wetland health for all of the 2015 monitoring sites in Mendota Heights based on the IBI scores for invertebrates and vegetation presented as a percent. Figure 4.7 also illustrates the consistency between the IBI scores (in percent form) for each wetland sampled. Scores that differ by less than ten percent are considered consistent. Based on the IBI scores, a wetland health rating is assigned as excellent, moderate or poor. Two sites were monitored in Mendota Heights. The wetland ratings ranged from moderate to excellent wetland health. Both sites scored consistently between invertebrates and vegetation. MH-2 scored high moderate for both categories. MH-9 scored high moderate for invertebrates and excellent for vegetation.

Figure 4.7 Mendota Heights' site scores (percent) for the 2015 sampling season



4.7.1 Copperfield (MH-2)

Copperfield (MH-2) is a 9.4-acre, type 4 wetland within the IV-18 subwatershed of the Lower Mississippi River watershed. The subwatershed is 865.3 acres and is 20 percent impervious. The basin is surrounded by grasslands and trees within a residential neighborhood in Mendota Heights. Many of these ponds receive surface runoff from residential and road development. The wetland has several inlets on the south side and one outlet on the northwest side at Huber Drive. The two wetlands are connected when water levels are high. The wetland is part of the City's stormwater management plan and is

designated PUBG (intermittently exposed, unconsolidated bottom). It is monitored for invasive species and vegetative growth trends that impact water quality. It is a natural park area surrounded completely by development. Copperfield is designated as a reference site.

Wetland Health

Site Observations: The wetland is very mucky with a gentle slope. This is part of a chain of ponds. It is a residential neighborhood, but no houses on the pond. There is a walking/biking trail around the pond. Cattails, water lilies, grasses, and a lot of submerged vegetation present in 2015.

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

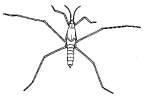
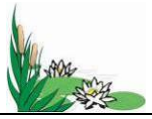
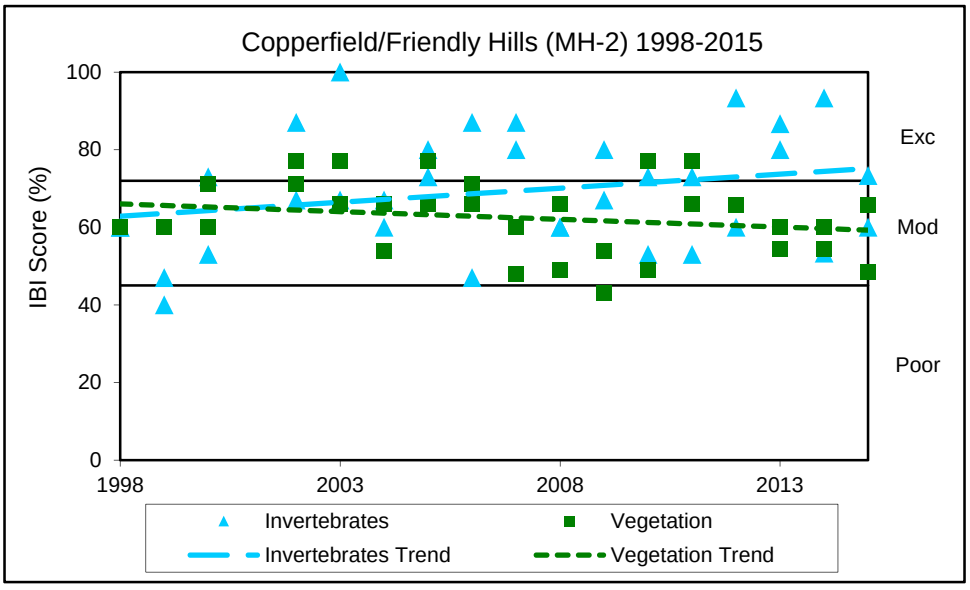
2015 Data (MH-2)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (22)	Moderate (23)
Cross-check Rating (IBI score)	Moderate (18)	Moderate (17)
Trend 1998-2015	Improving but variable	Stable

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



Site Summary: This is the seventeenth year that MH-2 has been monitored since 1998. There is a lot of variability in the data throughout the years of monitoring. Despite a decrease in invertebrates scores in 2015, the invertebrate trend still shows signs of improvement. The vegetation trend appears stable; though perhaps declining slightly. The vegetation scores between the City team and cross-check team were inconsistent. The teams found very similar vegetation species in their separate surveys; however, the City team found *Utricularia* which improves the vegetation scores.

4.7.2 Hagstom-King (MH-9)

King Pond (MH-9) is a three acre type 4 wetland located within the Lower Mississippi Watershed. The watershed is 20 acres and 25 percent impervious. There is one inlet on the north side, one inlet on the south side, and one outlet on the east side of the pond. Hagstrom-King Pond is part of the City's stormwater management plan and is managed for aesthetics.

Hagstrom-King (MH-9) is a wetland located in Hagstrom-King Park just north of Interstate-494 and west of Delaware Avenue. The pond lies to the west of a baseball field. There is a playground, trails, and other ponds in the area. The surrounding area is mostly residential but the pond is buffered by natural areas.

Wetland Health

Site Observations: The wetland slope is gentle and the substrate somewhat firm. Cattails, some submerged plants, and a lot of duckweed are near the wetland shore.

Table 4.7.3 Hagstom King (MH-9) Wetland Health based on Index of Biotic Integrity

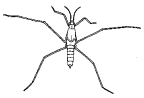
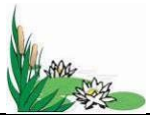
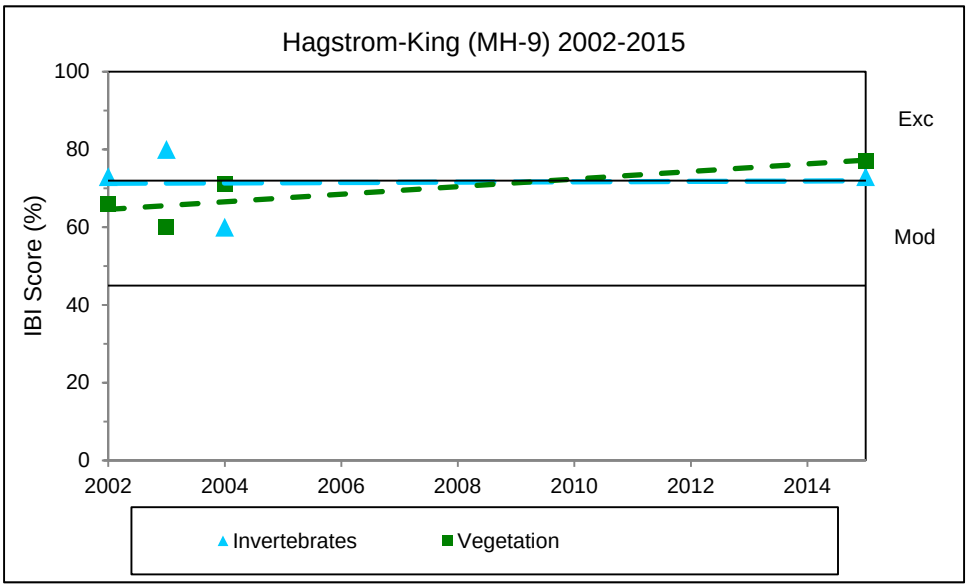
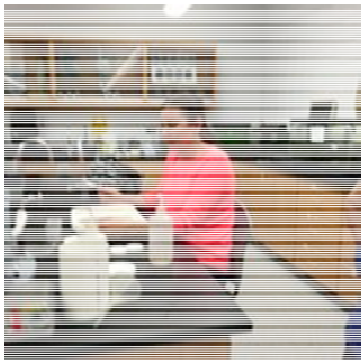
2015 Data (MH-9)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (22)	Excellent (27)
Trend 2002-2015	Not enough data	Not enough data

Figure 4.7.2 Invertebrate and vegetation trends for Hagstrom-King (MH-9)



Site summary: This is the first since 2004 that Hagstrom-King wetland has been monitored. It has been monitored four times since 2002. Invertebrate and vegetation scores are similar to early data; however, more data is necessary to determine a reliable health trend.



Michelle Janson

Brian Koster, Darcy Tatham, Michelle Janson

Brian Koster and James Chastek

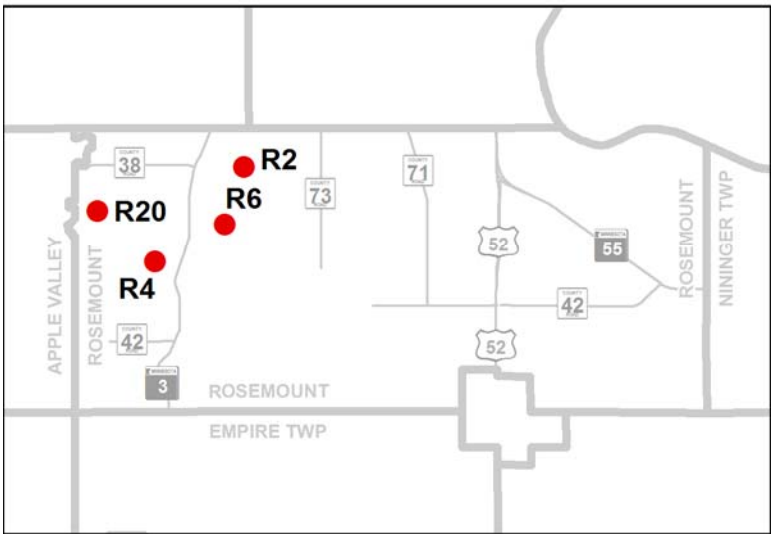
4.8 Rosemount Wetlands

Four wetlands were monitored in the City of Rosemount in 2015. Twenty-four wetlands have been monitored in Rosemount since the start of WHEP.

Team Leaders: Dan Stinnett

Team Members: Barbara Berggren, Brian Berggren, Bertha Carter, Jennifer Kanz, Jane Porterfield, Marianne Sciamanda, Andrew Simon, Avery Simon, Peyton Simon, and Denise and Tom Wilkens

Rosemount WHEP Sites Monitored in 2015



Dan Stinnett

Dan Stinnett has been involved in the WHEP program since 2006, and the Rosemount WHEP team leader since 2009. He is an educator and a retired biologist. He has always enjoyed collecting field data and sharing knowledge and experiences with his other team members, the City, and other interested citizens. He stated that 2015, "seemed to go without a hitch." He proudly announced that "former team leader, Jane Porterfield, received her Master's Degree with research centered on the discovery of a species of fairy shrimp collected in a Rosemount WHEP site a few years ago. Through the WHEP program, a range extension for the species has now been documented."

He observed that the 2015 sites were different from other years. He commented, "with exception of R-20 we found this year's monitored sites to more closely meet deep-water (lacustrine) rather than wetland

(palustrine) criteria. Based on water depth and basin size, along with sampling results, it would appear that three of the four sites are capable of supporting year-round fish communities." The team also learned that some of the WHEP sites in Rosemount are actively treated for mosquito larvae, which he questioned how this would affect the invertebrate populations at those wetlands.

ROSEMOUNT MINNESOTA

The City of Rosemount considers its wetlands a critical part of its Natural Resources. The City commented, "We have participated in the WHEP program since it began because it provides essential information that allows the city to better manage and restore its wetland biodiversity both now and in the future. Over the years, the WHEP volunteers have provided the city with high-quality quantitative data for numerous wetlands, which would otherwise be very difficult to obtain with our limited staff time and resources. The volunteer efforts are greatly appreciated!"

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.

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

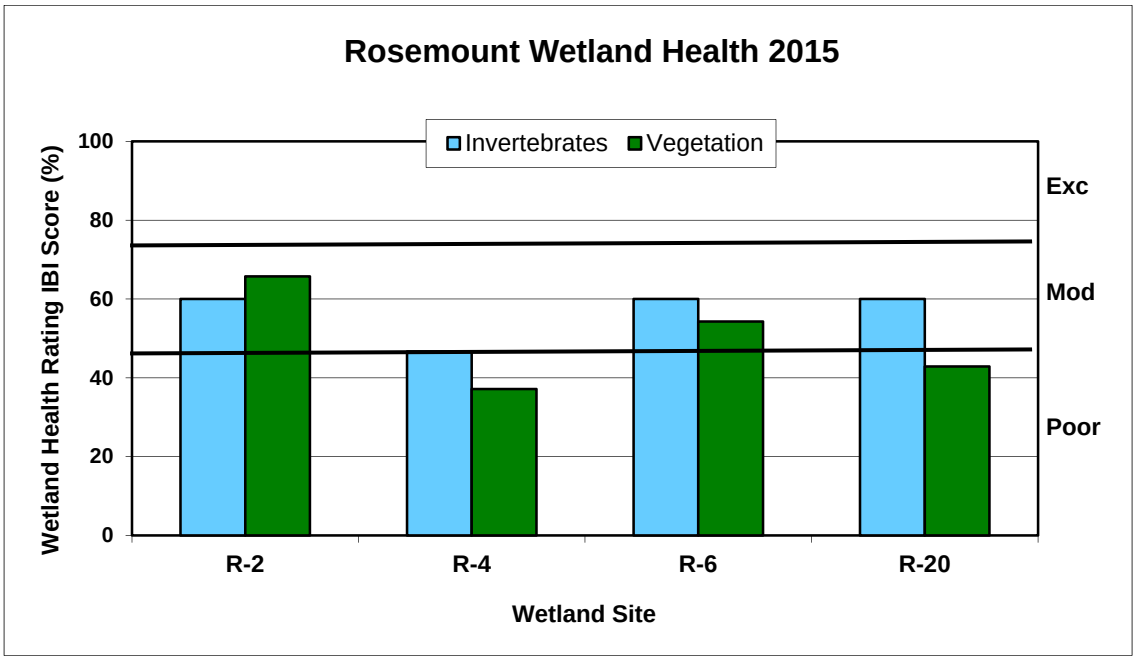
Figure 4.8 presents an overall view of wetland health for all the 2015 monitoring sites in Rosemount based on the scores for invertebrates and vegetation presented as a percent. Figure 4. 8 also illustrates the consistency between the IBI scores (in percent form) for each wetland sampled. Scores that differ by less than ten percent are considered consistent. Based on the IBI scores, a wetland health rating is assigned as excellent, moderate or poor. The four wetlands scored poor to moderate. R-4 scored poor for both invertebrates and vegetation, and R-20 scored poor for vegetation. The scores for R-4 were inconsistent between invertebrates and vegetation.

Rosemount team at training

Dan Stinnett, Bertha Carter, Averie Simon, Andrew Simon, and Peyton Simon

Dan Stinnett

Figure 4.8 Rosemount site scores (percent) for 2015



4.8.1 White Lake (R-2)

White Lake (R-2), also known as WMP #152, is a 22 acre, type 5 openwater wetland within the White Lake watershed. The watershed is 998 acres with 30 percent impervious surface. There is one outlet on the south side of the wetland, but no inlets. White Lake is part of the City's stormwater management plan and is designated to preserve with a management goal to maintain wetland and its existing functions, values, and wildlife habitat.

A large buffer surrounds the wetland providing water quality treatment. The surrounding area includes an active agricultural field to the north, and road sides. Excess nutrient loading may occur from the crop fields and runoff from the roads.

Site Observations: A thin layer of organic material lays over firm substrate. The wetland has a gentle slope. Duckweed, coontail, iris, smartweed, reed canary grass and willow shrubs are near the shore. Dead cattails sit in approximately three feet deep water. This site looks more like a lake. Predatory fish are present. Stickleback and Cyprinid were collected in the bottle traps.

Table 4.8.1 White Lake (R-2) Wetland Health based on Index of Biotic Integrity

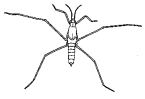
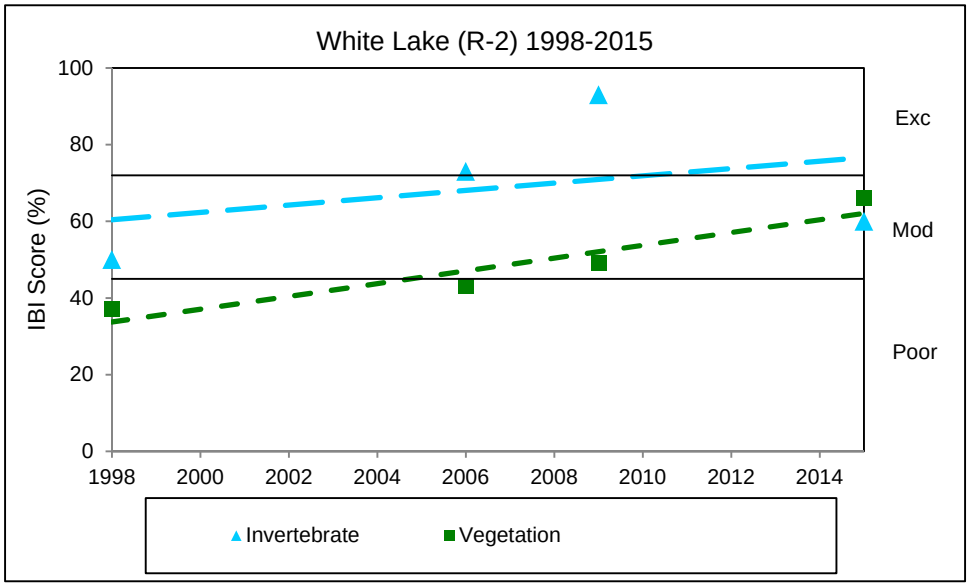
2015 Data (R-2)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (18)	Moderate (23)
Trend 1998-2015	Improving	Improving

Figure 4.8.1 Invertebrate and vegetation trends for White Lake (R-2)



Site summary: This is the fourth time that White Lake has been monitored since 1998, and the first time since 2009. The invertebrate and vegetation health scores are consistent. Both health trends appear to be improving. More years of data will help determine a more reliable health trend.

4.8.2 Schwartz Pond (R- 4)

Schwartz Pond (R-4), also known as WMP #431, is an 11 acre, type 5 wetland in the Erickson Pond watershed. The watershed is 1,832 acres with 25 percent impervious surface. The wetland has no inlets or outlets. It is included in the City's stormwater management plan and is designated to preserve with a management goal to maintain wetland and its existing functions, values, and wildlife habitat.

Schwartz Pond sits in a depressional area surrounded by wooded areas to the north and west. There are baseball fields to the east and Rosemount High School to the south. There are no dedicated buffers, and excess nutrient runoff may occur from turf maintenance of the baseball fields.

Site Observations: Schwartz Pond has a gentle slope and a silty substrate. Tadpoles were caught in the bottle traps. This pond is used for recreational fishing.

Table 4.8.2 Schwartz Pond (R-4) Wetland Health based on Index of Biotic Integrity

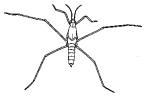
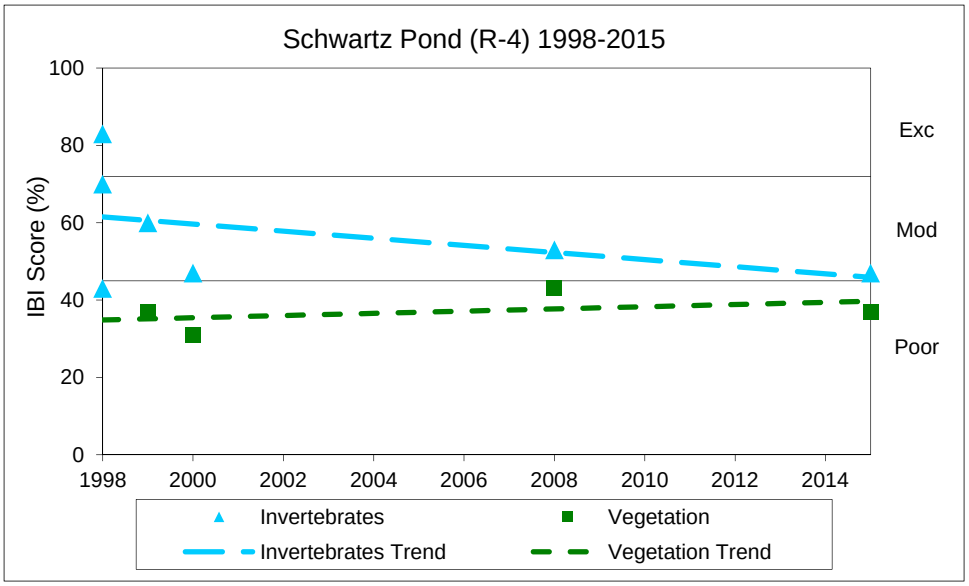
2015 Data (R-4)	**Invertebrates** 	**Vegetation** 
Wetland Health Rating (IBI score)	Poor (14)	Poor (13)
Trend 1998-2015	Declining	Stable

Figure 4.8.2 Invertebrate and vegetation trends for Schwartz Pond (R-4)



Site summary: This is the fifth year that Schwartz Pond has been monitored for WHEP since 1998, and the first year since 2008. The invertebrates and vegetation scores were consistent with each other. The vegetation health trend appears stable, while the invertebrates trend is declining. However, more years of data will help determine a more reliable health trend.

4.8.3 Keegan Lake (R-6)

Keegan Lake (R-6), also known as WMP #310, is a 35 acre, type 5 open water wetland in the Keegan Lake watershed. The watershed is 1,530 acres of which 30 percent is impervious surface. There are no inlets or outlets. This wetland is included in the City's stormwater management plan and is designated to preserve with a management goal to maintain wetland and its existing functions, values, and wildlife habitat.

An undedicated buffer surrounds Keegan Lake. There are roads adjacent to the wetland boundary to the east and south, and wooded area on the west and north sides of the lake. Storm water runoff from the existing roads may bring in contaminants typically found on roads.

Wetland Health

Site Observations: This is a deep water lake with a gradual slope. The bottom of the wetland has logs, rock, rubble, and vegetation. A lot of coontail and reeds are present near the shoreline, as well as crowded young cottonwoods and willows in the water and along the shore. Reed canary grass is present. Fish were collected in every bottletrap in 2015.

Table 4.8.3 Keegan Lake (R-6) Wetland Health based on Index of Biotic Integrity

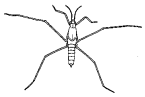
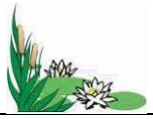
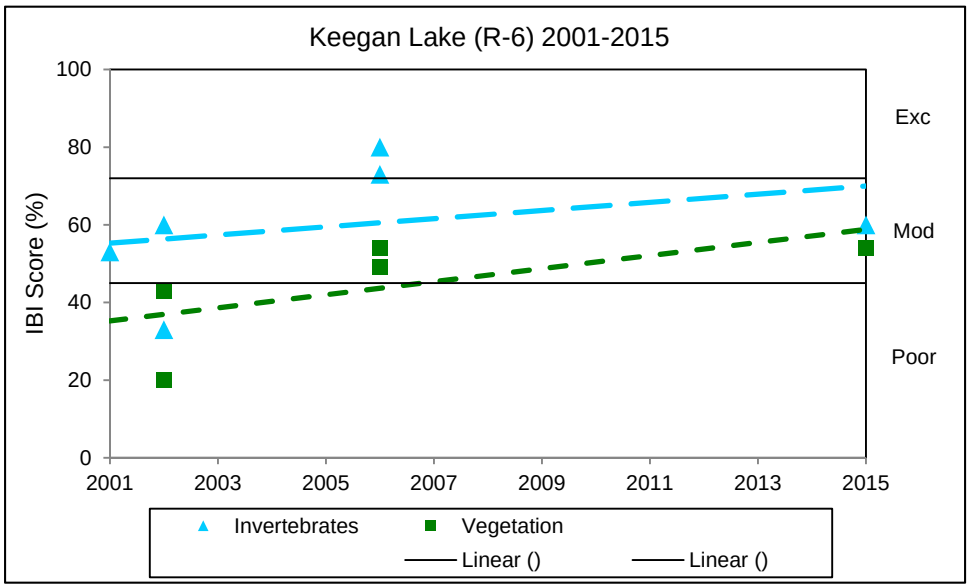
2015 Data (R-6)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (18)	Moderate (19)
Trend 2010-2015	Stable but variable	Improving slightly

Figure 4.8.3 Invertebrate and vegetation trends for Keegan Lake (R-6)



Site summary: This is the fourth year that R-6 has been monitored since 2001, and the first time since 2006. The scores are variable. Additional monitoring is needed to determine a wetland health trend.

4.8.4 WMP #332 (R-20)

WMP #332 (R-20) is a one acre, type 5 open water wetland in the Birger Pond watershed. The watershed is 897 acres of which 80 percent is impervious surface. There are no inlets or outlets. This wetland is included in the City's stormwater management plan and is designated to preserve with a management goal to maintain wetland and its existing functions, values, and wildlife habitat.

R-20 is surrounded by residential areas with several roads adjacent to the wetland. There is a 75 foot buffer around the wetland. Stormwater runoff from the roads and nutrient loading from turfgrass maintenance of residential lawns may impact the wetland health.

Wetland Health

Site Observations: The wetland slope is gradual. The water is murky, and the substrate is muddy. Scattered young willows grow along the south side of the wetland. Smartweed and reed canary grass surround the shore. This wetland is controlled upstream by a pond release and downstream through a drain that is gated and set at fixed elevation.

Table 4.8.4 WMP #332 (R-20) Wetland Health based on Index of Biotic Integrity

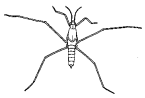
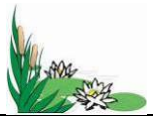
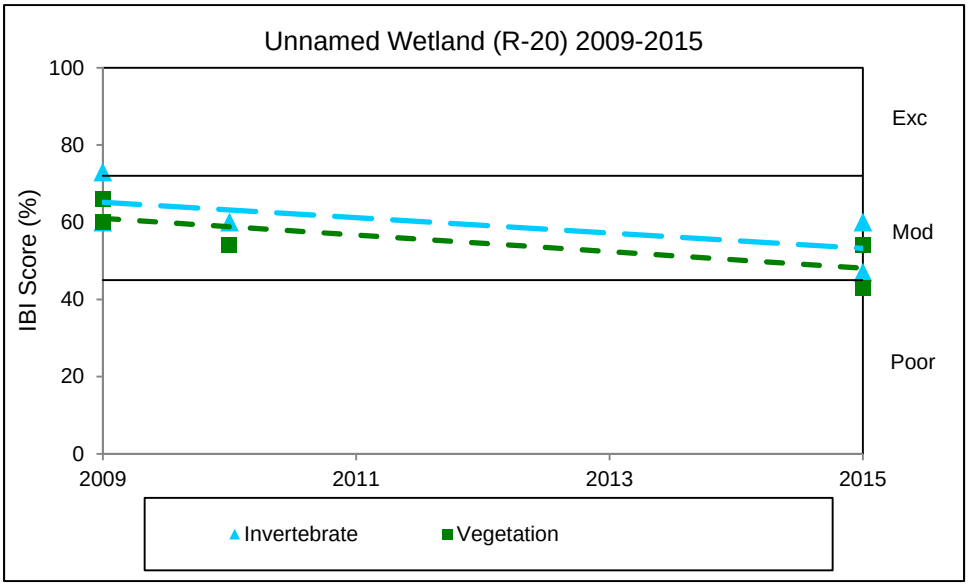
2015 Data (R-20)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (18)	Poor (15)
Cross-check Rating (IBI score)	Poor (14)	Moderate (19)
Trend 2009-2015	Not enough data	Not enough data

Figure 4.8.4 Invertebrate and vegetation trends for WMP #332 (R-20)

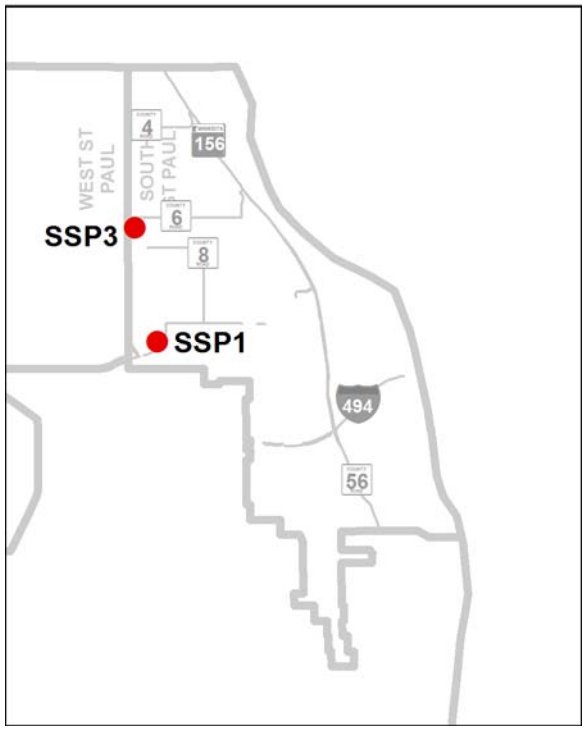


Site summary: This is the third time R-20 has been monitored since 2009. It has not been monitored since 2010. The invertebrates and vegetation scores for the City team are inconsistent. The invertebrates score was moderate, while the vegetation score was poor. The invertebrates scores between the City team and the cross-check team are inconsistent, and the vegetation scores between the two teams are also inconsistent. Both health trends appear to be declining; however, more years of data are necessary to determine reliable health trends.

4.9 South St. Paul Wetlands

Two wetlands were monitored in South St. Paul in 2015 by the South St. Paul team. Three wetlands have been monitored in South St. Paul since the start of the WHEP program. This is the fourth year that South St. Paul has had a City team of its own to monitor the City wetlands.

South St. Paul WHEP Sites Monitored in 2015



Team Leader: Michelle Skog

Team Members: Leah Anderson, John Bottomley, David Dahle, Kim Fackler, Sabrina Greene, Alison Hruby, Serena Kucera, and Fangfang Zhao

Michelle Skog

Michelle Skog is the team leader for South St. Paul. She has participated in WHEP for nine years, and has been South St. Paul's team leader for three years. She commented, "I graduated from the University of Minnesota with a Conservation Biology degree in 2001, and have always enjoyed spending time outdoors. During the day, I work indoors for a biotech company in their GMP antibody production department. So, getting to spend my afternoons out in the ponds volunteering with WHEP has always been a welcome activity. I also became a new mom in March, which actually made this WHEP season a little more challenging than previous years.

The weather made for some interesting samples this year. In June, when sampling the invertebrates, water levels were quite low. In our Rosemount cross-check pond we set bottle traps in the middle of the pond. By July, when we returned to sample the vegetation, water levels had risen so dramatically that we had difficultly identifying plants since our plot included many upland forbs. I was thankful Mary Kay was there to help out!! As always, I cannot thank my volunteers enough! Even though there were only a few of us, we managed to get all the work done, and have fun at the same time!"

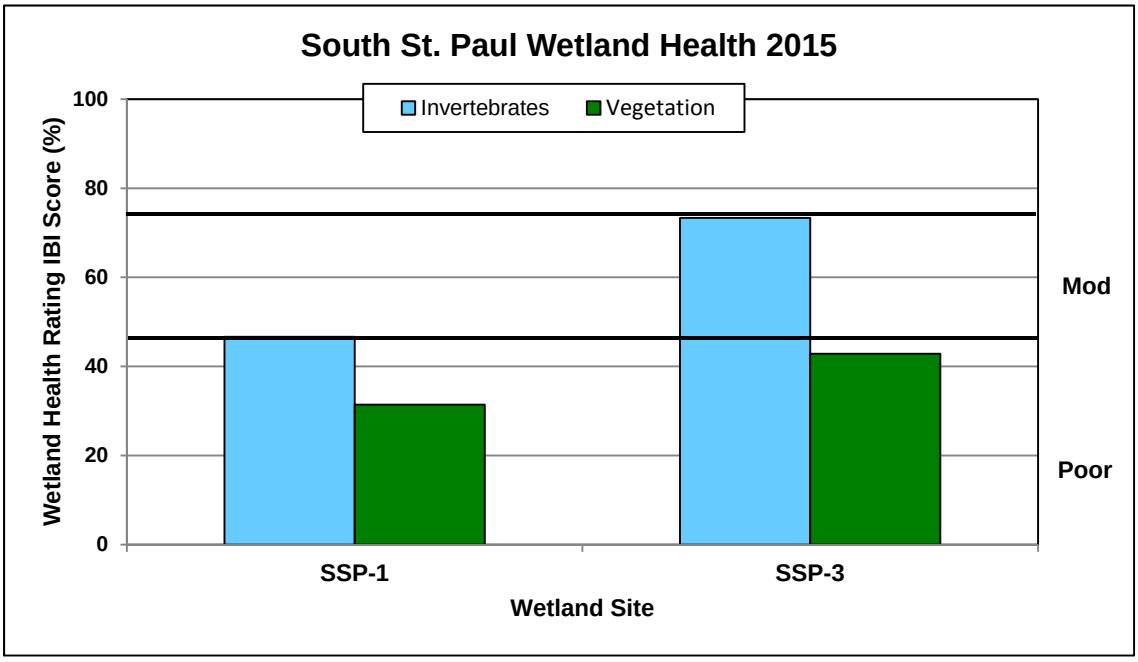
John Sachi

John Sachi is the City of South St. Paul contact for WHEP. He is the City Engineer for South St. Paul, and has been a board member of the Lower Mississippi River Watershed Management Organization (LMRWMO) for more than 23 years. South St. Paul has been involved in WHEP since 2003. John has worked with the City Council to secure funding for South St. Paul's participation in the program. Each year John identifies the ponds to be monitored by WHEP. John recognizes that, "the City benefits from this program by helping the City and LMRWMO to establish a baseline of information for potential wetland/pond improvements. Since the City has very few wetlands, maintaining and sustaining them to be viable is critical to the City and LMRWMO. The WHEP volunteers are essential to making this program a success. Given the City's limited staff resources, it is unlikely the City would participate without the help of these dedicated volunteers."

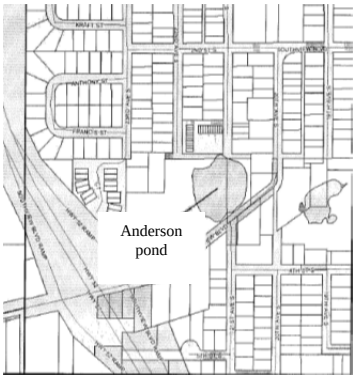
South St. Paul General Wetland Health

Figure 4.9 presents an overall view of wetland health for all of the 2015 monitoring sites in South St. Paul based on the IBI 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. Scores that differ by less than ten percent are considered consistent. Based on the IBI scores, a wetland health rating is assigned as excellent, moderate or poor. The South St. Paul wetland ratings scored poor to moderate in 2015. The invertebrates and vegetation scores for SSP-3 were inconsistent just as in 2014. The invertebrates score was high moderate, while the vegetation score was poor.; though both scores were poor.

Figure 4.9 South St. Paul site scores (percent) for the 2015 sampling season



4.9.1 Anderson Pond (SSP-1)



Anderson Pond (SSP-1) is a 2.4 acre, type 4 wetland within the Lower Mississippi River watershed. The drainage area is 168 acres, and is approximately 15 percent impervious. It is publicly owned. It has an inlet on the northwest corner, an inlet on the west side, and an outlet on the south side of the wetland. It is part of the City's stormwater management plan. The City does not have a wetland 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 already returning on the east and west sides of the pond. A separate maintenance cell was created near the northwest inlet in order to facilitate future dredging and other maintenance activities. Additional dredging was done in late 2011 and 2012. In 2009, Southview Pond was constructed as a pre-treatment measure for the runoff from Highway 52 and West St. Paul, prior to conveyance into Anderson Pond. Highway 52 is a major contributor to Anderson Pond as is the City of West St. Paul (over 90% of the pond's watershed is in West St. Paul). The pond is in an older established residential area surrounded by roads, apartment blocks, and houses.

Wetland Health

Site Observations: The wetland slope is gradual to the edge of the water, but then the water gets deep quickly. The substrate is very mucky. Dense populations of cattail, coontail and Canada waterweed are present. The invasive oriental mystery snails were collected in both the bottle traps and the dipnets. Many small fish were also caught.

Table 4.9.1 Anderson Pond (SSP-1) Wetland Health based on Index of Biotic Integrity

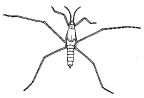
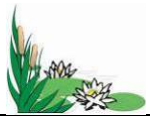
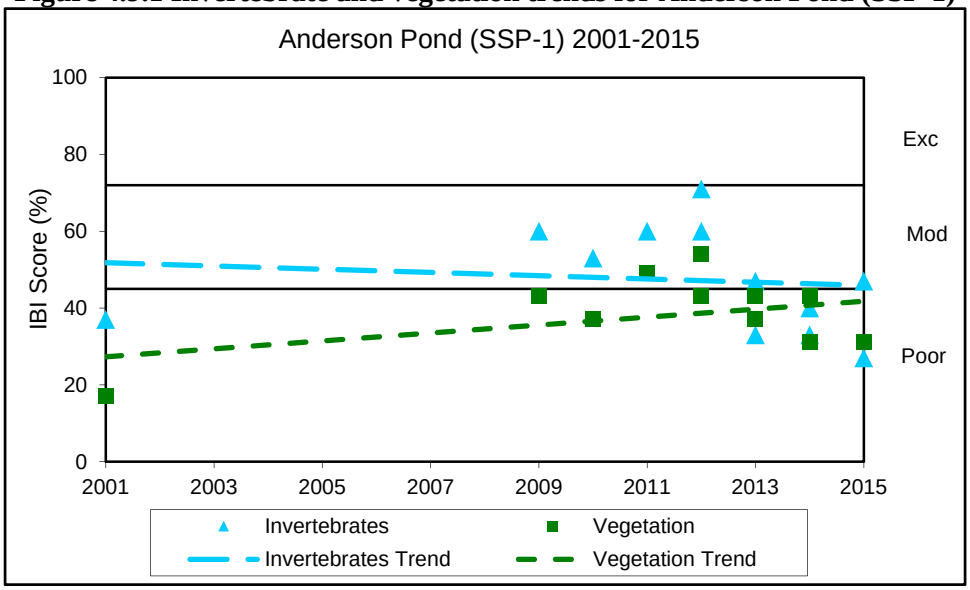
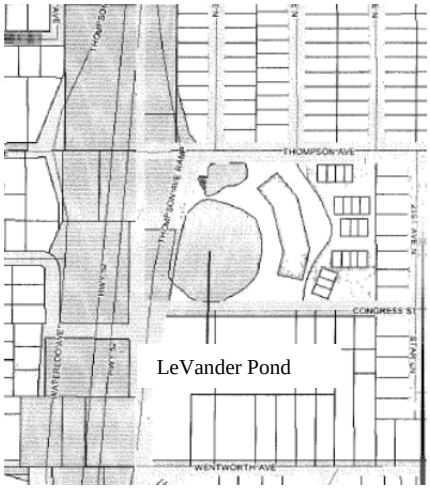
2015 Data (SSP-1)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Poor (14)	Poor (11)
Cross-check Rating (IBI score)	Poor (8)	Poor (11)
Trend 2001-2015	Stable but decreasing since 2009	Stable but decreasing since 2009

Figure 4.9.1 Invertebrate and vegetation trends for Anderson Pond (SSP-1)



Site Summary: This is the seventh consecutive year that SSP-1 has been monitored since 2009, and the eighth time monitored overall since 2001. Initial low scores in 2001 make the vegetation health trend appear to be increasing; however, since 2009, the vegetation scores seem to be decreasing. Invertebrates scores were moderate from 2009-2012; however, for the past three years, they have dropped to poor. This wetland is described as a poor site, and the scores are reflecting its physical image. Highway 52 contributes stormwater input to the wetland. Though the scores remain stable, they are poor.

4.9.2 LeVander Pond (SSP-3)



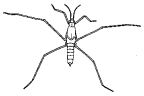
LeVander Pond, also known as SSP-3, is a 3.4 acre, type 4 wetland within the Lower Mississippi River Watershed. Its watershed is 37.9 acres which is approximately 20 percent impervious. It is part of a City of South St. Paul easement. There is one inlet on the west side and one outlet on the north side 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. Mn/DOT recently completed an upgrade of Wentworth/Thompson interchanges and in doing so enhanced some of the drainage in LeVander Pond by installing a pretreatment basin south of the pond. TH52 is a major contributor to LeVander Pond as is the City of West St. Paul.

Wetland Health

Site Observations: The wetland slope is gradual and easy to enter. The substrate is slightly mucky, but easy to walk. The water surface is one hundred percent covered in duckweed. This site is always poor for vegetation, and it has a slight odor.

Table 4.9.2 LeVander Pond (SSP-3) Wetland Health based on Index of Biotic Integrity

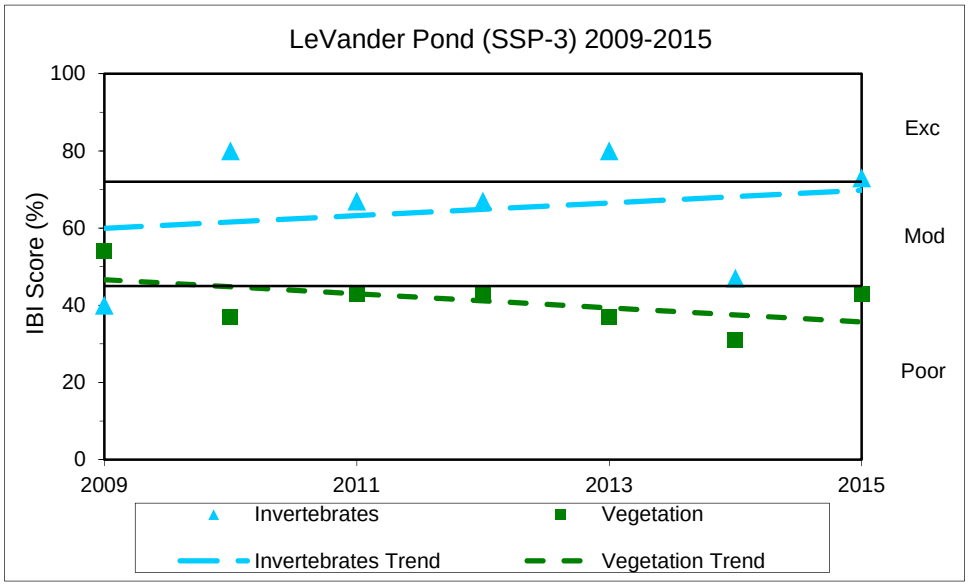
2015 Data (SSP-3)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (22)	Poor (15)
Trend 2009-2015	Stable but variable	Stable

Serena Kucera

Michelle Skog, John Bottomley, and Alison Hruby

Michelle Skog, Sabrina Greene, Brian Koster, and James Chastek

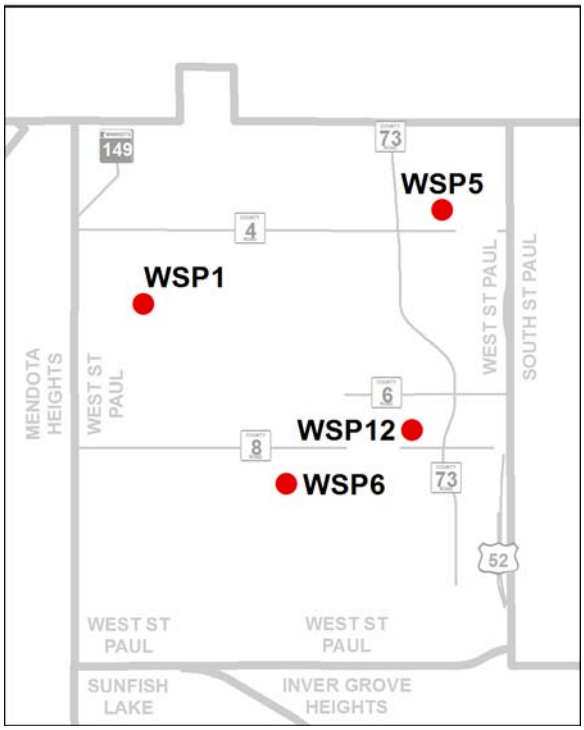
Figure 4.9.2 Invertebrate and vegetation trends for LeVander Pond (SSP-3)



Site summary: This is the seventh consecutive year of monitoring LeVander Pond (SSP-3). The data indicates opposite trends for vegetation and invertebrate scores. The vegetation and invertebrates scores have been inconsistent over the course of monitoring. The invertebrates scores have regularly been moderate to excellent, while the vegetation scores remain poor.

4.10 West St. Paul Wetlands

West St. Paul WHEP Sites Monitored in 2015



Four wetlands were monitored in West St. Paul in 2015 by the West St. Paul team. Eleven wetlands have been monitored in West St. Paul since the start of the WHEP program, and one wetland was monitored for the first time in 2015. This is the third year since 2003 that the City of West St. Paul has had a City team of its own to monitor their wetlands.

Team Leaders:
Maggie Karschnia and Tim Martin

Team Members: Phillip Alford, Hannah Blanke, Robert Henley, Sharon Jerzyk, Delaney Karschnia, Rick Karschnia, Sarah Pronschinske, and Sarah Russell

Maggie became a WHEP volunteer in 2007, and was eventually enlisted as a team leader for West St. Paul ahead of the 2013 season. This is her third year as team leader. She expressed, "We had another great monitoring season this year with one of the best volunteer teams I've ever worked with. I couldn't

imagine a more fun, capable, and supportive team. This year, we also had the opportunity to represent WHEP at a booth at the Take a Kid Fishing event held at Thompson Park in West St Paul. It was a great opportunity to highlight what we're doing to the residents in the local community."

Maggie Karschnia

Tim Martin

This was Tim Martin's second year as team leader of West St. Paul. He admitted, "I developed a passion for field biology during my undergraduate studies in environmental science and WHEP has given me an outlet to expand my knowledge of wetland ecosystems. Partly inspired by my work with WHEP, I began a Master's degree in Water Resource Science at the University of Minnesota this last Fall. In addition to the educational benefits, this program also gives me a chance to spend time outdoors, which I greatly appreciate after a long day of working at a desk. It also helps to have a great team helping us. The volunteers we had this year were all eager to learn and chip in. Such a dedicated group makes all of the work much easier"

Matt Saam is the WHEP coordinator for the City of West St. Paul. He was successful in bringing West St. Paul into the WHEP program. His role includes selecting wetlands to be monitored, submitting the proper information and paperwork, and communication with Dakota County and the City team leaders.

Matt Saam

Dave Schletty

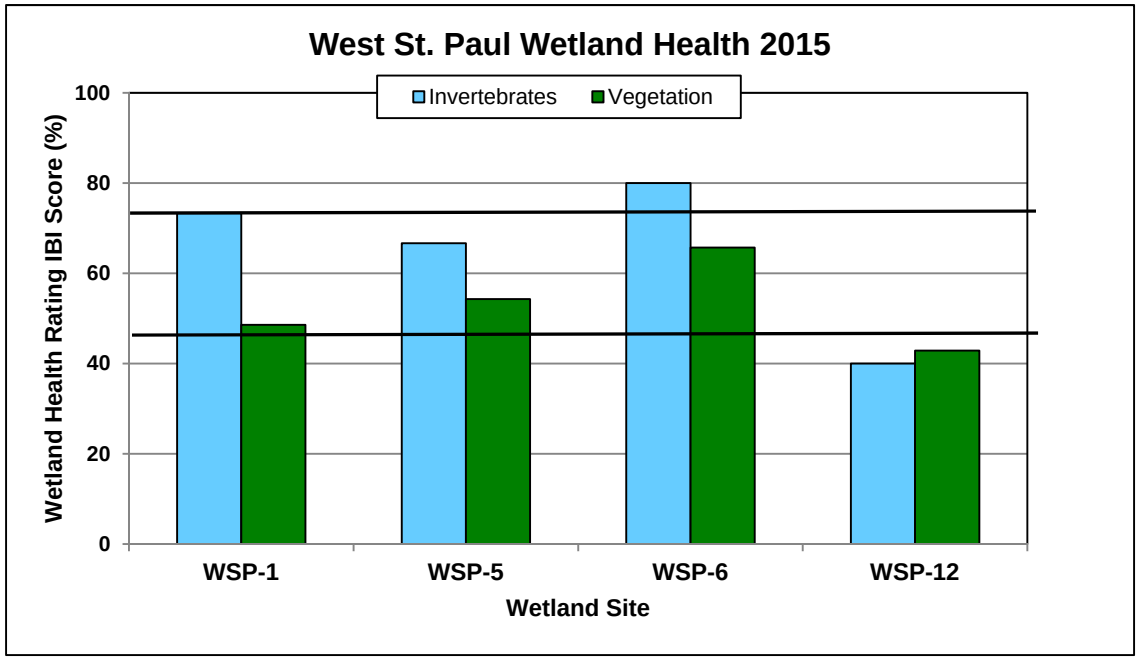
Dave Schletty is new to the WHEP program. As the Assistant Parks & Recreation Director for the City of West St Paul he assists Matt Saam with coordination of the program. Since many of the wetlands are within parkland, Dave has a vested interest in the quality of the wetlands in the City. In his first year with the program he has said, "It is interesting learning about the condition of the City's wetlands and seeing the trend data for each location." He looks forward to learning more and working with the community to improve water quality.

West St. Paul General Wetland Health

Figure 4.10 presents an overall view of wetland health for all of the 2015 monitoring sites in West St. Paul based on the IBI scores for invertebrates and vegetation presented as a percent. Figure 4.10 also illustrates the consistency between the IBI scores (in percent form) for each wetland sampled. Scores that differ by less than ten percent 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 excellent wetland health. The invertebrates and vegetation scores were inconsistent for each of the wetlands monitored in 2015, except WSP-12. WSP-12 scored poor for both invertebrates and vegetation, and was the only wetland where vegetation scored higher than invertebrates.

Figure 4.10 West St. Paul site scores (percent) for the 2014 sampling season



4.10.1 Mud Lake (WSP-1)

Mud Lake (WSP-1), also known as RW7, is a 3.1 acre, type 3 wetland within the Riverview Tunnel Drainage District. The drainage area is 34.2 acres. It is publicly owned, and has an inlet on the east side and an outlet on the west side of the wetland. It is part of the City's stormwater management plan.

Wetland Health

Site Observations: This wetland is located in a mostly residential area. The wetland slope is gentle, and the substrate is mucky but with some firm areas. A lot of duckweed and water-meal float on the water. Trees and forbs buffer the shoreline. There is a public park on the east side which is frequently used by neighborhood residents.

Table 4.10.1 Mud Lake (WSP-1) Wetland Health based on Index of Biotic Integrity

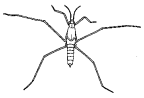
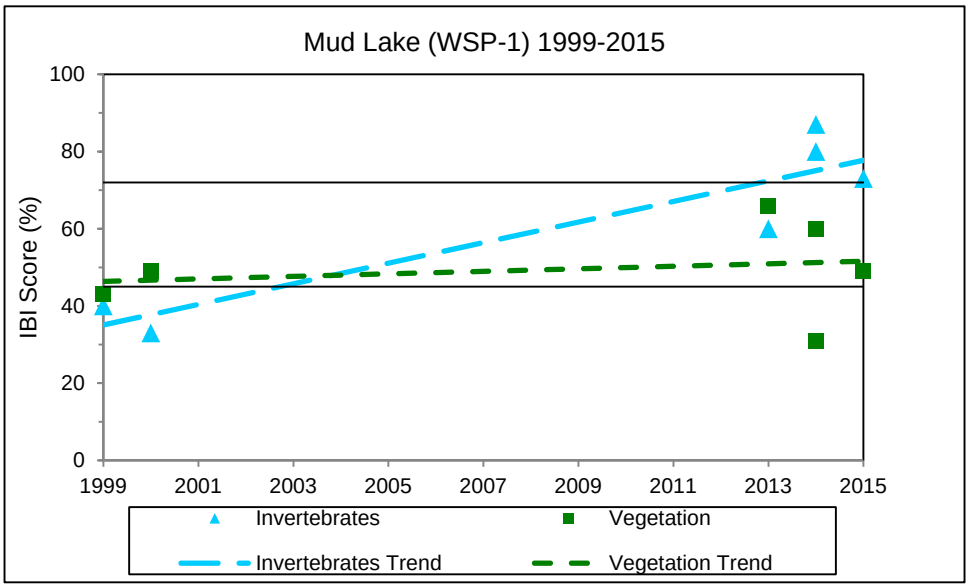
2015 Data (WSP-1)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Excellent (22)	Moderate (17)
Trend 1999-2015	Improving	Stable, but variable

Figure 4.10.1 Invertebrate and vegetation trends for Mud Lake (WSP-1)



Site Summary: This is the third consecutive year that WSP-1 has been monitored, and the fifth time it has been monitored since 1999. In 2015, the vegetation and invertebrate data was inconsistent. Just as in 2014, the invertebrates scored much higher than the vegetation. Early trends show invertebrates scores improved from initial surveys in 1999 and 2000, the vegetation scores remain stable, though variable. Additional data is needed to determine a reliable health trend.

4.10.2 Lilly Lake (WSP-5)

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

Wetland Health

Site Observations: The surrounding area is densely residential. Patches of trees and shrubs provide buffer between the homes and the lake. The wetland slope is fairly steep, and the substrate is very mucky.

Table 4.10.2 Lilly Lake (WSP-5) Wetland Health based on Index of Biotic Integrity

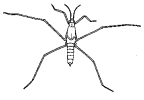
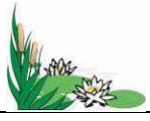
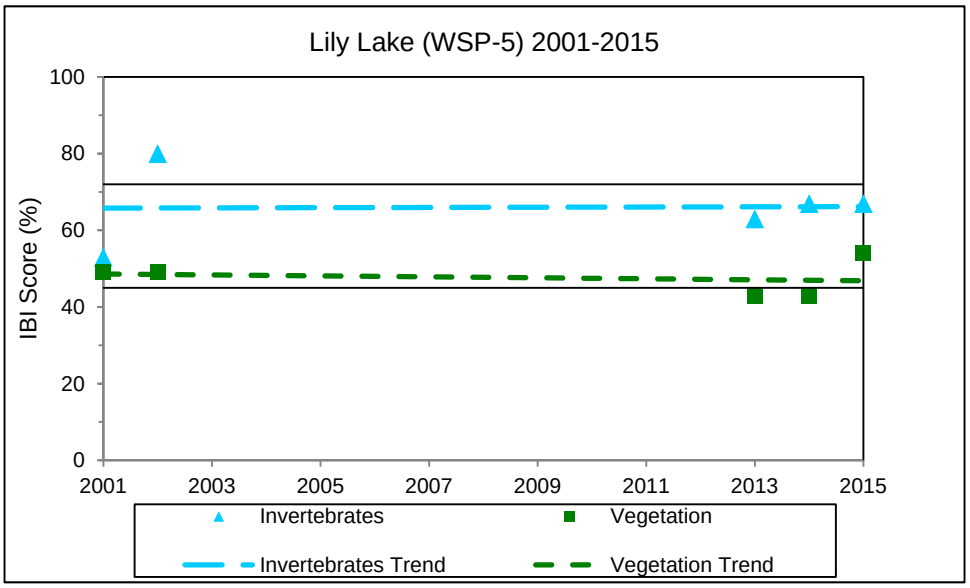
2015 Data (WSP-5)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (20)	Poor (19)
Trend 2001-2015	Stable	Stable

Figure 4.10.2 Invertebrate and vegetation trends for Lilly Lake (WSP-5)



Site summary: This is the third consecutive year that WSP-5 has been monitored, and the fifth time it has been monitored since 2001. The vegetation and invertebrate data was inconsistent again in 2015. Invertebrate scores remain higher than vegetation scores. Scores have been very similar the last three years. Early trends appear to be stable for both invertebrates and vegetation. Additional data would help determine a more reliable health trend.

4.10.3 Marthaler Park (WSP-6)

Marthaler Park (WSP-6) is a 4.5 acre, type 3 wetland within the Simons Ravine District. The drainage area is 23 acres. It is publicly owned. It has one inlet on the east side, one inlet on the west side, but does not have an outlet. It is part of the City's stormwater management plan.

This wetland is located within Marthaler Park. Most of the surrounding area is undisturbed with trees and other vegetation. Private residences line the nearby streets adjacent to Marthaler Park. The wetland is on the west side of Humboldt Avenue, and the West St. Paul Sports Center is northeast of the wetland.

Wetland Health

Site Observations: The wetland has a gentle slope and a solid, sandy substrate. Cattails, bulrush, and pondweed dominate the wetland vegetation. Fish were caught in the bottle traps.

Table 4.10.3 Marthaler Park (WSP-6) Wetland Health based on Index of Biotic Integrity

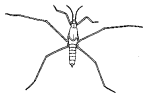
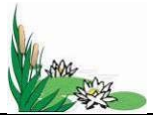
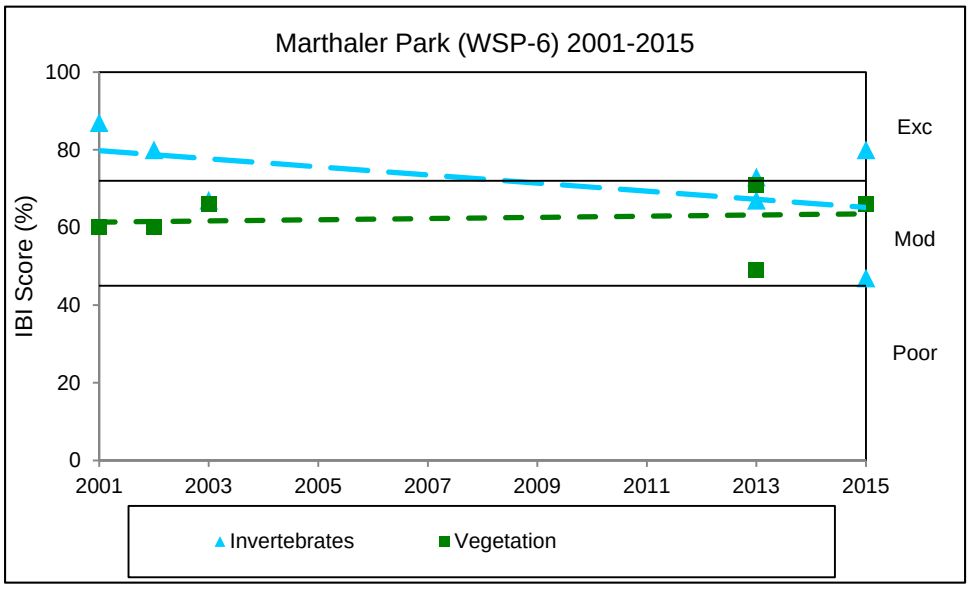
2015 Data (WSP-6)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Excellent (24)	Moderate (23)
Cross-check Rating (IBI score)	Poor (14)	Moderate (23)
Trend 2001-2015	Stable	Stable

Figure 4.10.2 Invertebrate and vegetation trends for Marthaler Park (WSP-6)



Site Summary: This is the fifth time that WSP-6 has been monitored since 2001. Invertebrate and vegetation scores were inconsistent with each other for both the City team and the cross-check team. The invertebrate scores were inconsistent between the two teams; however, the teams calculated the same score for vegetation despite positioning the vegetation plots in different areas. The City team collected a slightly higher diversity of invertebrates including leeches, dragonflies, and snails that warranted a higher invertebrates score. The invertebrate trend was affected by the lower score. Without the cross-check score, the trend is stable. Additional data will help determine a more reliable health trend.

4.10.4 Wentworth Pond (WSP-12)

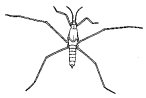
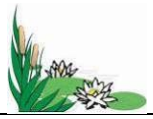
Wentworth Pond (WSP-12) is a six acre, type 5 wetland within the Simons Ravine District drainage area. Its watershed is 71.2 acres. It is publicly owned. There is one inlet on the west side, one inlet on the south side and one outlet on the east side of the wetland. It is part of the City's stormwater management plan.

A tree lined buffer surrounds Wentworth Pond. It is surrounded by Thompson Oaks Golf Course to the north and east. The Wentworth Library is adjacent to the southwest side of the wetland. Private residences line the nearby streets.

Wetland Health

Site Observations: The wetland slope is steep and the substrate is mucky. Vegetation is present along the shoreline, but little aquatic vegetation exists.

Table 4.10.4 Wentworth Pond (WSP-12) Wetland Health based on Index of Biotic Integrity

2015 Data (WSP-12)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Poor (12)	Poor (15)
Trend 2015	Not enough data	Not enough data

Site summary: This is the first year of monitoring Wentworth Pond. In 2015, scores for vegetation and invertebrate were very consistent, and both categories scored poor. Additional data is needed to determine a health trend.

Hannah Blanke and SarahRussell

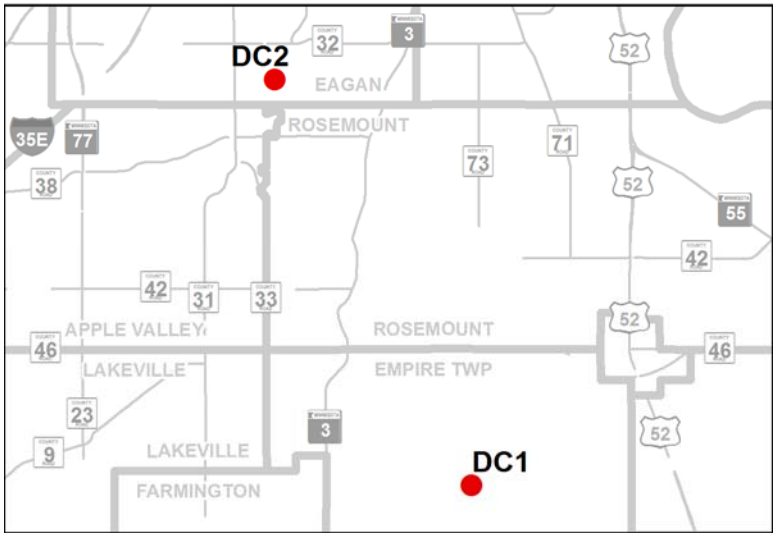
Tim Martin, Alana Karschnia, Maggie Karschnia, Sharon Jerzyk, Robert (Jan) Henley, and Hannah Blanke

Phillip Alford and Robert (Jan) Henley

4.11 Dakota County Wetlands

Two wetlands were monitored for Dakota County in 2015. Empire Lake was monitored by volunteers from the Lakeville WHEP team and Buck Pond was monitored by volunteers from the Eagan WHEP team. This is the first year that Dakota County has monitored wetlands with WHEP. Two wetlands have been monitored for Dakota County

Dakota County WHEP Sites Monitored in 2015



4.11.1 Empire Lake (DC-1)

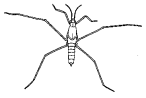
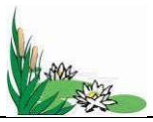
Empire Lake (DC-1) is a 21 acre, type 5 wetland located in the Vermillion River watershed. The watershed is 1.8 square miles. Water enters the lake on the west side via a stream channel and exits at the dyke on the east.

Empire Lake is the man-made result of impounding an unnamed tributary stream to the Vermillion River. It is located within Whitetail Woods Regional Park. The surrounding area includes agricultural fields, natural areas, and commercial industry. Dakota County will be implementing major ecological restoration of the adjacent uplands over the course of the next four years, beginning in the fall of 2015. Data collected before, during, and after the restoration will monitor the affects of the project on the wetland.

Wetland Health

Site Observations: The wetland substrate is muddy. A large diversity of submergent and emergent forbs were recorded in and around this wetland.

Table 4.11.1 Empire Lake (DC-1) Health based on Index of Biotic Integrity

2015 Data (DC-1)	**Invertebrates** 	**Vegetation** 
Wetland Health Rating (IBI score)	Moderate (22)	Excellent (27)
Trend 2015	Not enough data	Not enough data

Site summary: This is the first year that Empire Lake has been monitored by WHEP. The invertebrate and vegetation scores were consistent with each other, even though the invertebrates scored moderate and the vegetation scored excellent. More years of monitoring will help assess the wetland health trends.

4.11.2 Buck Pond (DC-2)

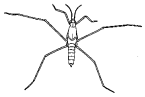
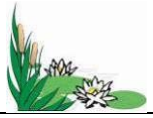
Buck Pond (DC-2) is a 1.6 acre, type 4 wetland located in the Lower Minnesota River watershed. The pond's watershed is approximately 25 acres. It is a small, round pond/wetland located roughly in the center of Lebanon Hills Regional Park. It's an isolate terrene basin, within 700-1200 feet of larger lakes to the east and south. It is classified as "shallow marsh" and a "freshwater emergent wetland". It is surrounded by smooth brome-dominated uplands and overgrown savanna/woodland. It was likely grazed historically. There is very low plant diversity within the basin and very little native emergent vegetation. The soils are fine sands.

Dakota County will be implementing major ecological restoration of this wetland over the next three years. The management goal is to improve the wetland and surrounding area for wildlife habitat value. Data collected before, during, and after the restoration will monitor the affects of the project on the wetland.

Wetland Health

Site Observations: The pond is east and slightly north of Jensen Lake. It has a gentle slope and a mucky substrate. The western side is sloped to the pond and covered in trees. The south, east and north is mostly grasses. Reed canary grass dominate the shoreline.

Table 4.11.2 Buck Pond (DC-2) Health based on Index of Biotic Integrity

2015 Data (DC-2)	**Invertebrates** 	**Vegetation** 
Wetland Health Rating (IBI score)	Poor (10)	Poor (13)
Trend 2015	Not enough data	Not enough data

Site summary: This is the first year that Buck Pond has been monitored by WHEP. The invertebrate and vegetation scores were consistent with each other, and both scored poor. More years of monitoring will help assess the wetland health trends.