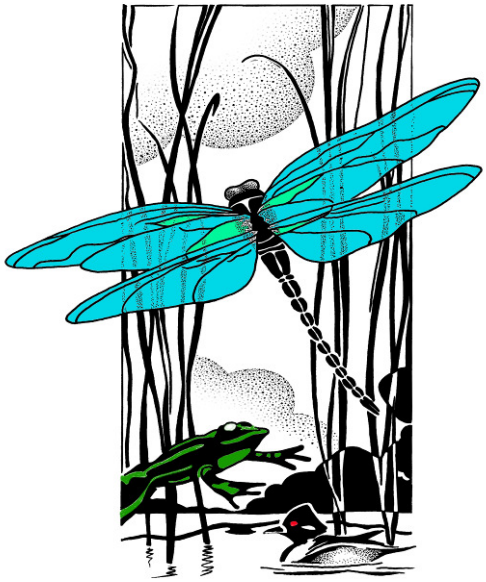
Wetland Health Evaluation Program

2013 Final Report

Dakota County

Dakota COUNTY

2013 Wetland Health Evaluation Program Report
Dakota County, MN



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Report
Prepared by:

FORTIN
CONSULTING, INC.
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the 2013 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
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Mary Kay Lynch

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.***

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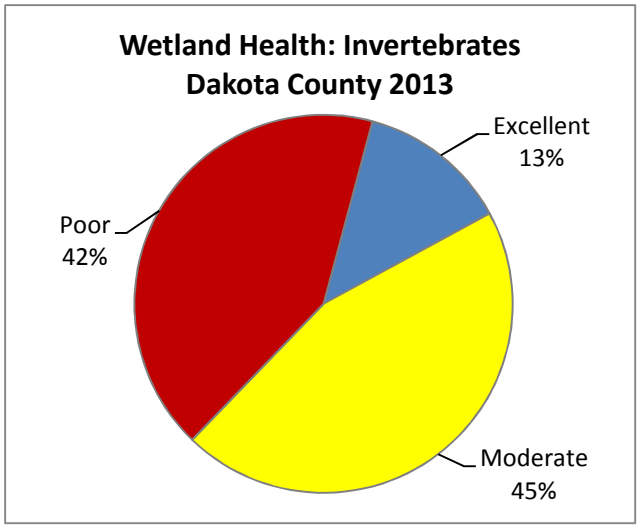
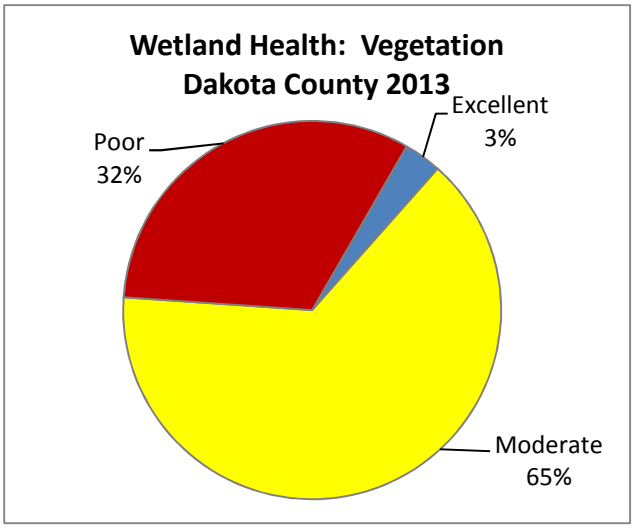
Executive Summary
Dakota County Wetland Health Evaluation Program 2013

Dakota County began sponsoring the Wetland Health Evaluation Program (WHEP) in 1997. Since then, 165 wetlands have been monitored by many volunteers across the County. In 2013, ten cities participated in WHEP, monitoring 31 different wetlands. Five of these wetlands were monitored for the first time in 2013. 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.





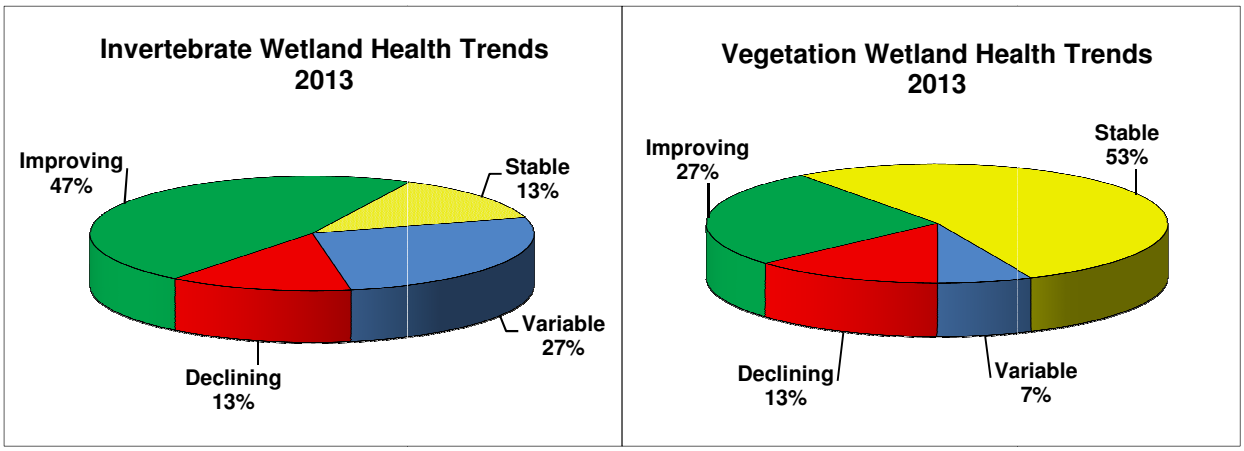
The results of the monitoring for 2013 showed a variety of wetland conditions. The Index of Biotic Integrity was used to determine wetland health ranging from poor to excellent. The majority of wetlands were in the moderate category for both macroinvertebrates (45%) and vegetation (65%). Four wetland sites rated excellent for macroinvertebrates and one wetland site rated excellent for vegetation.

The City of Mendota Height's Copperfield (MH-2) had the highest score for invertebrates (26), and the City of Eagan's Prairie Pond (E-35) had the highest score for vegetation (27). This is the second consecutive year that wetland site MH-2 has had the highest score for invertebrates. This is the first year that site E-35 has been monitored. Wetland sites H-6, l-8, and SSP-3 also scored excellent for invertebrates. Wetland site E-35 was the only site that scored excellent for vegetation in 2013. Kral Pond (F-3) and Autumn Glen (F-7), both Farmington, had the lowest invertebrate scores (8). Vermillion River Wetland (F-6) of Farmington and Erickson Pond (R-26) of Rosemount had the lowest vegetation scores (9).

A trend analysis was conducted for all of the wetlands monitored in 2013 that had enough data to analyze trends. For invertebrates, 47% of wetlands appear to be improving while 13% are declining. For vegetation, 27% of the wetlands showed improved wetland health while 13% are declining. 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.

2013 Dakota County Wetland Health Trends*



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

In 2013, 102 Dakota County WHEP volunteers (fifteen of which volunteered on two teams) donated more than 1,490 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. Developed in 1997, 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) at the MPCA. 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

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.

According to Iowater, Iowa's volunteer monitoring program, there are 17 states in the United States with a functioning volunteer wetland monitoring program. Most of these programs are less than ten years old. Minnesotans can be proud to be one of the leaders in understanding and protecting these often overlooked and undervalued water resources.

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 Dakota County's Wetland Health Evaluation Program for seven years. She says it is rewarding to see volunteers learn about wetlands in their own neighborhoods, collect monitoring data, and become watchful guardians of those wetlands. Congratulations and thank you to the volunteers, cities, Minnesota Pollution Control Agency staff, and Fortin Consulting on another successful WHEP season.

Mary Kay Lynch

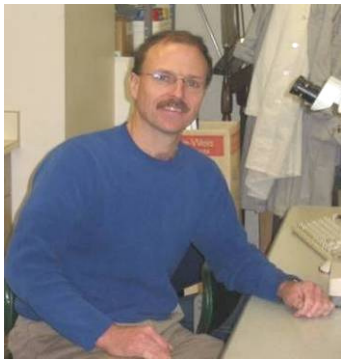
Mary Kay Lynch is the WHEP Field Monitoring Coordinator. She has a master's degree in biology and taught biology for 22 years, 20 of which were in Dakota County. She was a team leader in the pilot program as it was developed by Judy Helgen of the MPCA. She served as the Burnsville team leader for five 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."

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, "The Wetland Health Evaluation Program opens new educational horizons for people interested in wetlands. WHEP serves as an outstanding framework for citizen science (volunteer monitoring). It provides high quality wetland biological data to aid local cities in better protecting and managing the quality of targeted wetlands in their city."

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.

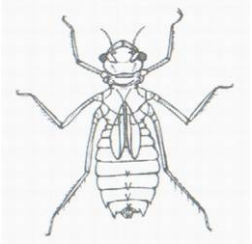
Vegetation Index of Biological Integrity (IBI)

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, 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.

Front: Caitlin Fortin, Katie Farber, Roman Rowan; Middle: Lauren Tjaden, Blake Fortin, Connie Fortin; Back: Meredith Moore, Carolyn Dindorf, Nancy Mulhern

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 2013, Fortin Consulting cross-checked the vegetation plots of three wetlands, one in Hastings (H-6), Rosemount (R-14), and West St. Paul (WSP-1). Fortin Consulting also reviewed the invertebrate samples from sites AV-1, B-1, E-35, F-6, L-8, MH-2, R-21, and WSP-1. 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 2013 Sampling Season Results

During the 2013 sampling season, nine citizen teams monitored 31 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 eight invertebrate samples were checked for accuracy through the Fortin Consulting quality control check.

Figure 3.1.1 Dakota County Wetland Ratings

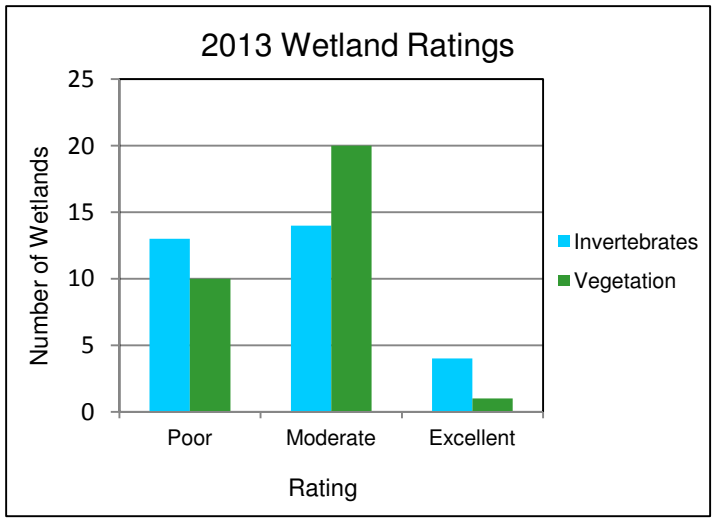


Figure 3.1.1 and Table 3.1.1 show the vegetation and invertebrate ratings for all of the wetlands assessed during the 2013 sampling season. Based on vegetation scores, one of the wetlands rated excellent, twenty of the wetlands were rated moderate, and ten rated poor. Vegetation scores ranged from 9 to 27 out of a maximum of 35 points.

The invertebrate analysis resulted in five wetlands rating excellent, fourteen rating moderate and thirteen poor. Invertebrate scores ranged from 8 to 26 out of a maximum of 30 points.

Several of the sites showed different ratings for vegetation versus invertebrates. More wetlands rated moderate for vegetation than invertebrates and more wetlands rated poor for invertebrates than vegetation; however, more wetlands rated excellent for invertebrate than vegetation. 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)	1/0	2/3	0/0
Burnsville (B)	3/2	1/2	0/0
Eagan (E)	1/0	2/2	0/1
Farmington (F)	3/1	0/2	0/0
Hastings (H)	1/1	2/3	1/0
Lakeville (L)	0/0	1/2	1/0
Mendota Heights (MH)	1/1	0/1	1/0
Rosemount (R)	1/1	3/3	0/0
South Saint Paul (SSP)	1/2	0/0	1/0
West Saint Paul (WSP)	1/2	3/2	0/0
Totals	**13/10**	**14/20**	**4/1**

Figures 3.1.2 and 3.1.3 show the distribution of wetland health ratings for each of the sites monitored in 2013.
Note: For an interpretation of scores, please see page 7.

Figure 3.1.2

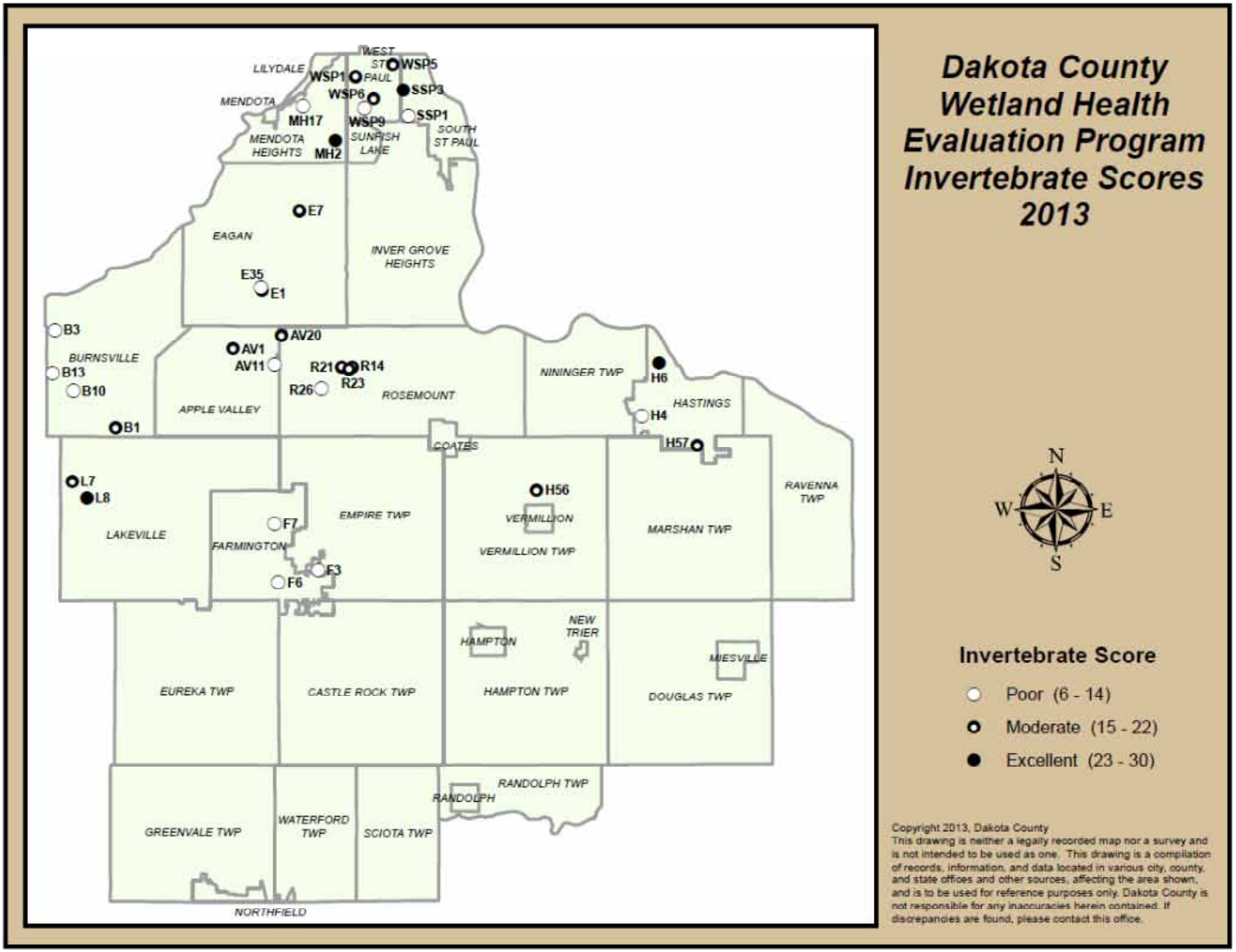

Dakota County
Wetland Health
Evaluation Program
Invertebrate Scores
2013
WEST ST PAUL
LILYDALE
MENDOTA
MENDOTA HEIGHTS
SUNFISH LAKE
SOUTH ST PAUL
EAGAN
INVER GROVE HEIGHTS
BURNSVILLE
APPLE VALLEY
ROSEMOUNT
NININGER TWP
HASTINGS
COATES
RAVENNA TWP
LAKEVILLE
FARMINGTON
EMPIRE TWP
VERMILLION
VERMILLION TWP
MARSHAN TWP
HAMPTON
NEW TRIER
MIESVILLE
EUREKA TWP
CASTLE ROCK TWP
HAMPTON TWP
DOUGLAS TWP
RANDOLPH
RANDOLPH TWP
GREENVALE TWP
WATERFORD TWP
SCIOTA TWP
NORTHFIELD
WSP1
WSP5
WSP6
SSP3
SSP1
WSP9
MH17
MH2
E7
E35
E1
B3
B13
B10
B1
AV1
AV11
AV20
R21
R14
R23
R26
H6
H4
H57
L7
L8
F7
F3
F6
H56
N
W
E
S
Invertebrate Score
Poor (6 - 14)
Moderate (15 - 22)
Excellent (23 - 30)
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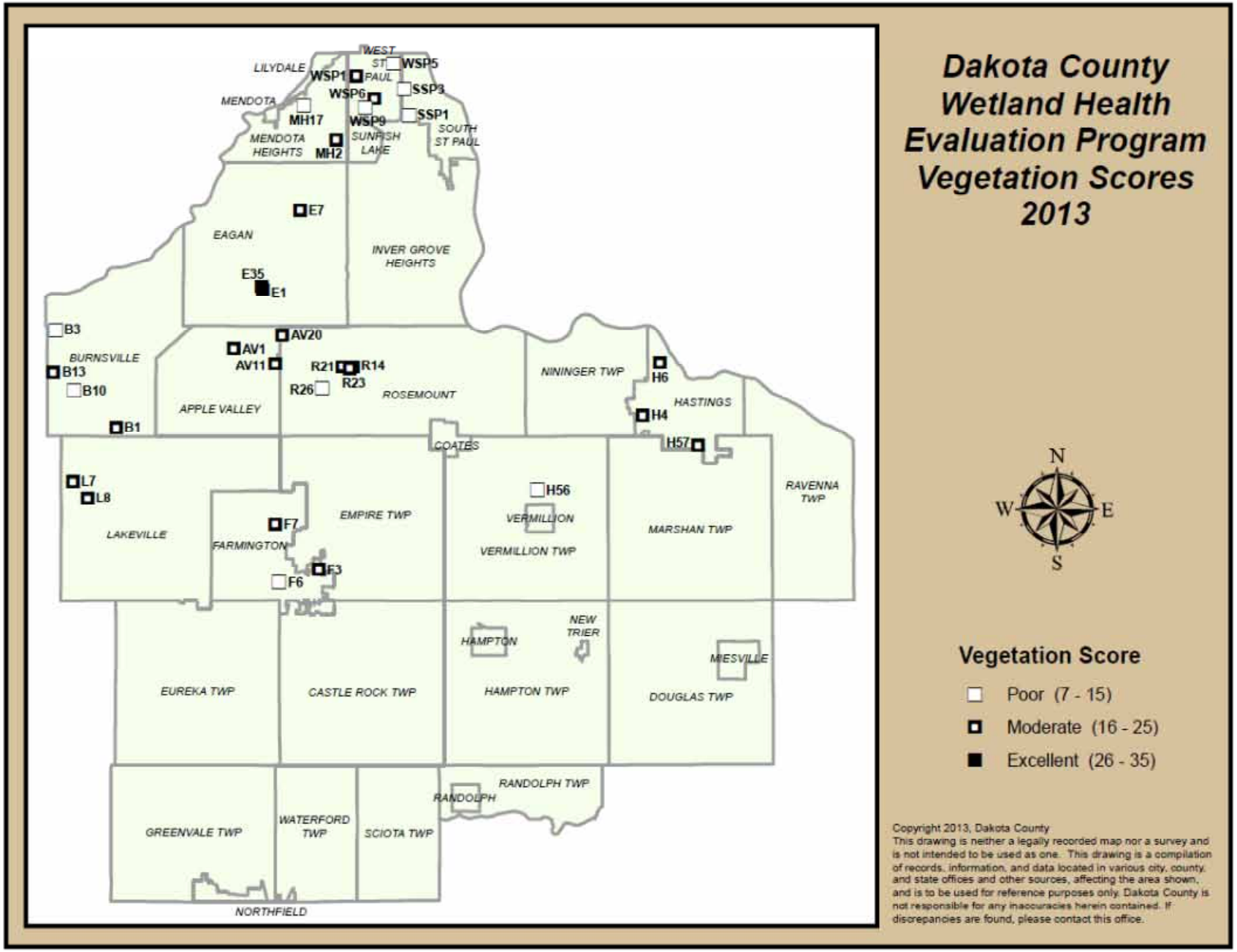
Figure 3.1.3


Dakota County
Wetland Health
Evaluation Program
Vegetation Scores
2013
WEST ST PAUL
LILYDALE
MENDOTA
MENDOTA HEIGHTS
SUNFISH LAKE
SOUTH ST PAUL
WSP1
WSP5
WSP6
SSP3
MH17
WSP9
SSP1
MH2
E7
EAGAN
INVER GROVE HEIGHTS
E35
E1
B3
AV20
AV1
AV11
R21
R14
R23
R26
B13
B10
B1
BURNSVILLE
APPLE VALLEY
ROSEMOUNT
NININGER TWP
H6
HASTINGS
H4
H57
COATES
L7
L8
LAKEVILLE
F7
FARMINGTON
F3
F6
EMPIRE TWP
H56
VERMILLION
VERMILLION TWP
MARSHAN TWP
RAVENNA TWP
HAMPTON
NEW TRIER
MIESVILLE
EUREKA TWP
CASTLE ROCK TWP
HAMPTON TWP
DOUGLAS TWP
RANDOLPH
RANDOLPH TWP
GREENVALE TWP
WATERFORD TWP
SCIOTA TWP
NORTHFIELD
N
W
E
S
Vegetation Score
Poor (7 - 15)
Moderate (16 - 25)
Excellent (26 - 35)
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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 (2008-2013) indicates stormwater wetlands scored higher for vegetation and invertebrates on average, though the average scores differed by four points or less (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.

It is difficult to determine exactly what this means, especially since this has varied from year to year. 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 (2008-2013) of Created, Stormwater and Natural Wetlands

	Invertebrates			Vegetation		
Wetland	Created Wetlands	Stormwater wetlands	Natural Wetlands	Created Wetlands	Stormwater wetlands	Natural Wetlands
AV-1		16			23	
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		24			17	
AV-19			22			15
AV-20			20			17
B-1			18			23
B-1 Alt.			15			23
B-2			12			11
B-3		12			15	
B-6		16			21	

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

	Invertebrates			Vegetation		
Wetland	Created Wetlands	Stormwater Wetlands	Natural Wetlands	Created Wetlands	Stormwater Wetlands	Natural Wetlands
MH-16		24			29	
MH-17	12			15		
R-1		14			23	
R-2		28			17	
R-4		16			15	
R-14			20			23
R-18			26			19
R-20		18			19	
R-21	20			23		
R-22		24			25	
R-23	22			25		
R-25		12			23	
R-26			12			9
SSP-1		14			13	
SSP-3		24			13	
WSP-1			18			23
WSP-2		16			17	
WSP-5			20			15
WSP-6			20			17
WSP-9			12			11
Average	**14**	**18**	**17**	**16**	**19**	**17**

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 19% of the wetlands, and reed canary grass in 74% of the wetlands monitored in 2013. Purple loosestrife will grow in deeper water than reed canary grass, which can grow in both upland and wetland conditions. 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 seven wetlands in 2013.

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 2008-2013

Site ID	Site Name	Wetland size (Acres)	Watershed Size (Acres)	% Imperv	Invert. Score	Veg. Score
AV-1	Hidden Valley	2	21	35	16	23
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	24	17
AV-19	AL-P9.3 Alimagnet Lift Station Chain of Ponds	0.25	28.5	25	22	15
AV-20	Valleywood Golf Course	1.5	12	0	20	17
B-1	Crystal Lake West	0.9	444.5	5	18	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	12	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
B-8	Red Oak	3	115	25	18	13
B-9	Crosstown West	7.2	388	50	18	9
B-10	AP-3 Cedar Pond	3.1	212	22	10	15
B-11	Valley View	1	80	10	16	13
B-13	Sunset Lake	30	436	50	14	19
B-17	Terrace Oaks Buckthorn Pond	2.7	24	5	12	25
E-1	Thomas Lake Park Pond	0.4	4	37	18	21
E-7	Discovery Pond	4.1	16.5	0	20	21
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

Site ID	Site Name	Wetland size (Acres)	Watershed Size (Acres)	% Imperv.	Invert. Score	Veg. Score
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	18	19
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
F-1	Pine Knoll	35	107.5	10.4	NA	13
F-3	Kral Pond	10	41.8	6.6	8	17
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	10	9
F-7	Autumn Glen	2.9	10	NA	8	17
H-4	Stonegate Treated	1	9.5	35	14	19
H-6	Lake Rebecca	19	56	1	24	19
H-30	Sand Coulee	1	107	25	8	13
H-56	180th Street Marsh	20	340	1	20	15
H-57	Cari Park Pond	0.78	29	14	18	17
L-4	Water Treatment Wetland Bank	22.85	99.8	20	14	15
L-7	DNR 387	10	2087	21	16	21
L-8	DNR 393	9.6	4987	17	24	17
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	26	21
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
R-1	Kelly Marsh - Derryglen Ct in 2004	1.3	897	80	14	23
R-2	White Lake	333	998	10	28	17
R-4	Schwartz Pond	10.9	144.5	20	16	15
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	23
R-21	CR-38 Mitigation Site 1	1.7	1530	30	20	23
R-22	Mare Pond, South	8	81	10	24	19
R-23	CR-38 Mitigation Site 2	0.3	81	30	22	25
R-25	WMP #306	1.7	81	30	12	23
R-26	Erickson Pond	1.9	1832	25	12	9
SSP-1	Anderson Pond	2.4	168	15	14	13
SSP-3	LeVander	3.4	37.9	20	24	13
WSP-1	Mud Lake	3.1	34.2	NA	18	23

Site ID	Site Name	Wetland size (Acres)	Watershed Size (Acres)	% Imperv.	Invert. Score	Veg. Score
WSP-2	Thompson Lake 48W	9	73,920	50	16	17
WSP-5	Lilly Lake	6.4	22	NA	20	15
WSP-6	Marthaler Park	4.5	23	NA	20	17
WSP-9	Marie Avenue	4	15	NA	12	11

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 2013 within the vegetation plot sites. The lowest water level measured within the plot in 2013 was zero feet. The highest water level measured within the plot was 6.6 feet. The average water level of the plot in 2013 was approximately one foot. 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 2013 Cross-checks

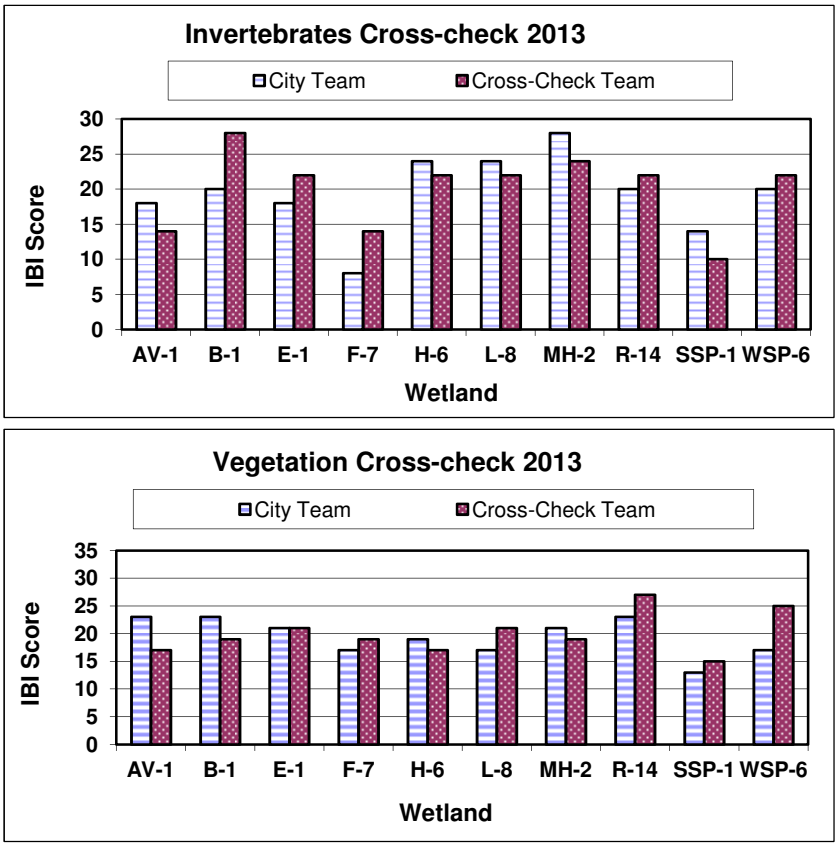
Each city team was responsible for evaluating one wetland in another city (Table 3.2.1). This citizen cross-check provides a second sample for the selected wetland. The purpose of this check is to determine if two different samples provide similar results for the vegetation and invertebrate IBI. Large 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 B-1 was inconsistent. There was an eight point difference in scores. Vegetation scores for site WSP-6 was also inconsistent with an eight point difference 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 E-1 were identical.

- *B-1:* The cross-check team collected a larger diversity of invertebrates than the City team. This included several families of leeches, dragonflies, mayflies, caddisflies. The City team and cross-check team also showed a difference in *Corixidae* proportion.
- *WSP*-6: The cross-check team and City team found nearly the same diversity of vegetation; however, different families were represented. The cross-check team identified more families associated with the Aquatic Guild. In addition, there were differences in the Persistent Litter score.

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	Eagan	AV-1	16	14	23	17
Burnsville	Farmington	B-1	**18**	**28**	23	19
Eagan	Apple Valley	E-1	18	22	21	21
Farmington	Burnsville	F-7	8	14	17	19
Hastings	South St. Paul	H-6	24	22	19	17
Lakeville	Mendota Heights	L-8	24	22	17	21
Mendota Heights	Lakeville	MH-2	26	24	21	19
Rosemount	West St. Paul	R-14	20	22	23	27
South St. Paul	Hastings	SSP-1	14	10	13	15
West St. Paul	Rosemount	WSP-6	20	22	**17**	**25**

Figure 3.2.1 Invertebrate and Vegetation Cross-check Comparisons of IBI Scores

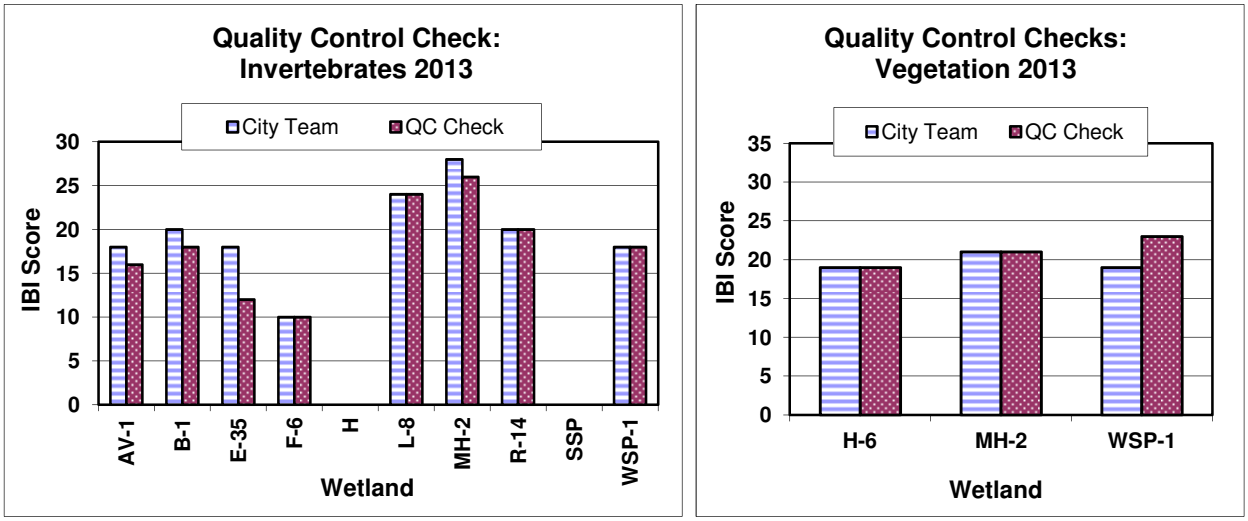


3.2.2 2013 Quality Control Checks

Quality control checks were conducted at three sites for vegetation and eight sites for invertebrates in 2013 (Figure 3.3.2) by Fortin Consulting (FCI), an environmental consulting firm hired to assist with WHEP. 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)



The team scores were found to be consistent with the quality control checks. All sites were within the six point margin expected. The teams 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 the result of misunderstanding the directions associated with computing the Persistent Litter Metric. Several errors were caused by inaccurately transferring data from the data sheets to the scoring sheets. There were 32 data transfer errors and 14 metric errors. Sixteen sites resulted in score changes of one to six 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	23	23	0
	AV-11	10	10	0	17	17	0
	AV-20	20	20	0	17	17	0
	E-1 cc*	22	22	0	21	21	0
Burnsville	B-1	20	20	0	23	23	0
	B-3	12	12	0	12	15	4
	B-10	10	10	1	13	15	4
	B-13	14	14	0	17	19	4
	F-7 cc*	12	14	1	19	19	5
Eagan	E-1	14	18	2	19	21	4
	E-7	18	20	1	21	21	3

		Invertebrate IBI Scores			Vegetation IBI Scores		
Team Name	**Site**	**Team**	**Review**	**Errors**	**Team**	**Review**	**Errors**
	E-35	16	18	1	25	27	3
	AV-1 cc*	14	14	0	17	17	1
Farmington	F-3	8	8	0	17	17	0
	F-6	12	10	1	9	9	0
	F-7	8	8	0	17	17	0
	B-1 cc*	28	28	0	21	19	2
Hastings	H-4	14	14	0	19	19	0
	H-6	23	24	1	19	19	0
	H-56	20	20	0	15	15	0
	H-57	18	18	0	17	17	0
	SSP-1 cc*	10	10	0	15	15	0
Lakeville	L-7	16	16	0	21	21	0
	L-8	24	24	0	17	17	0
	MH-2 cc*	24	24	0	19	19	0
Mendota Heights	MH-2	28	28	0	21	21	0
	MH-17	12	12	0	15	15	0
	L-8 cc*	22	22	0	21	21	0
Rosemount	R-14	20	20	0	23	23	0
	R-21	20	20	0	23	23	0
	R-23	22	22	0	25	25	0
	R-26	12	12	0	9	9	0
	WSP-6 cc*	20	22	1	25	25	0
South St. Paul	SSP-1	14	14	0	13	13	0
	SSP-3	24	24	0	13	13	0
	H-6 cc*	22	22	0	17	17	0
West St. Paul	WSP-1	18	18	0	19	19	0
	WSP-5	22	20	1	21	15	4
	WSP-6	20	20	1	17	17	0
	WSP-9	12	12	0	11	11	0
	R-14 cc*	22	22	0	25	27	1

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

3.3 WHEP Historical Data

Since WHEP began in 1997, 165 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 2013 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, with much fewer excellent ratings compared to moderate and poor.

Figure 3.3.1

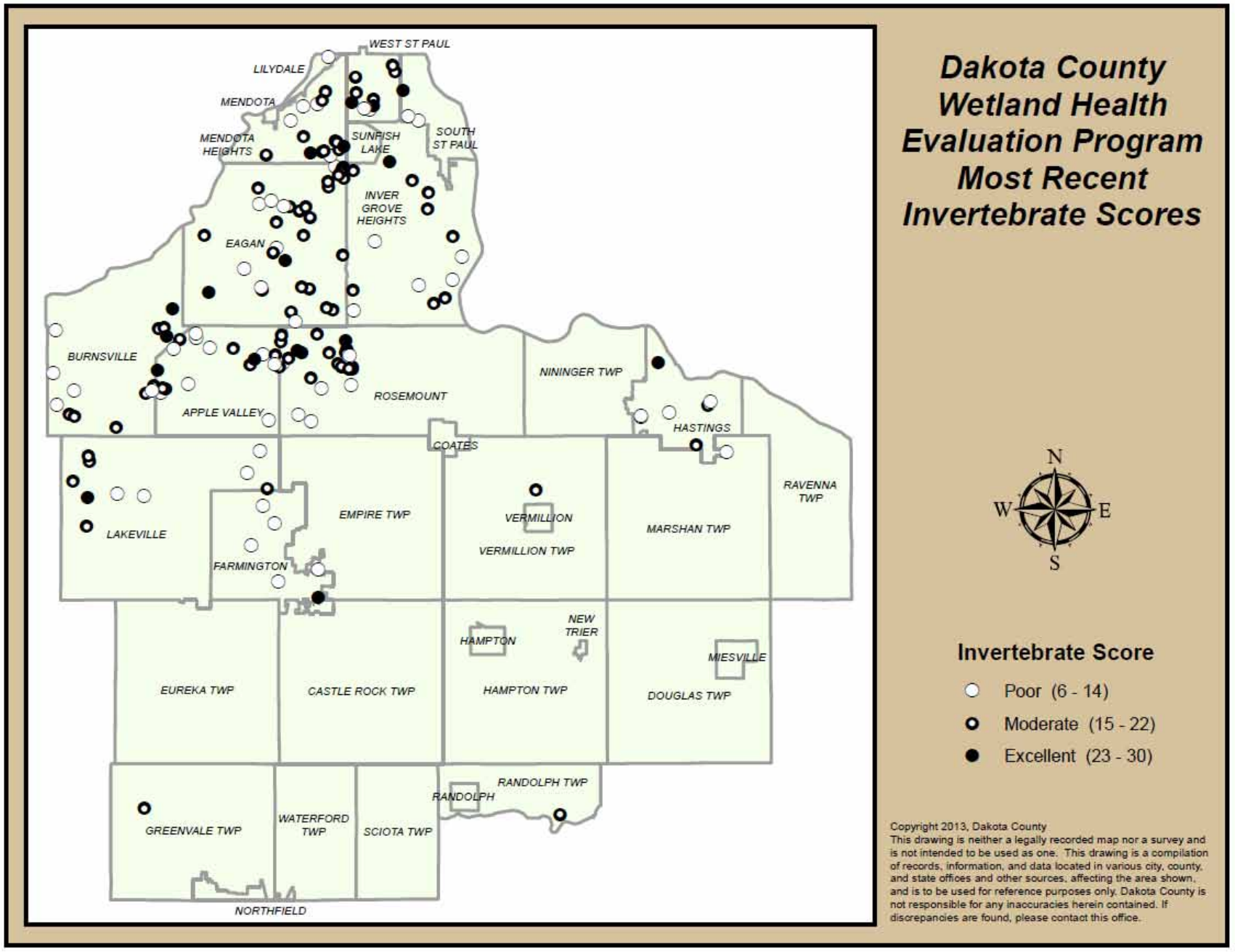

WEST ST PAUL
LILYDALE
MENDOTA
MENDOTA HEIGHTS
SUNFISH LAKE
SOUTH ST PAUL
INVER GROVE HEIGHTS
EAGAN
BURNSVILLE
ROSEMOUNT
NININGER TWP
APPLE VALLEY
HASTINGS
COATES
RAVENNA TWP
LAKEVILLE
EMPIRE TWP
VERMILLION
VERMILLION TWP
MARSHAN TWP
FARMINGTON
NEW TRIER
HAMPTON
MIESVILLE
EUREKA TWP
CASTLE ROCK TWP
HAMPTON TWP
DOUGLAS TWP
RANDOLPH TWP
RANDOLPH
GREENVALE TWP
WATERFORD TWP
SCIOTA TWP
NORTHFIELD
Dakota County Wetland Health Evaluation Program Most Recent Invertebrate Scores
N
W
E
S
Invertebrate Score
Poor (6 - 14)
Moderate (15 - 22)
Excellent (23 - 30)
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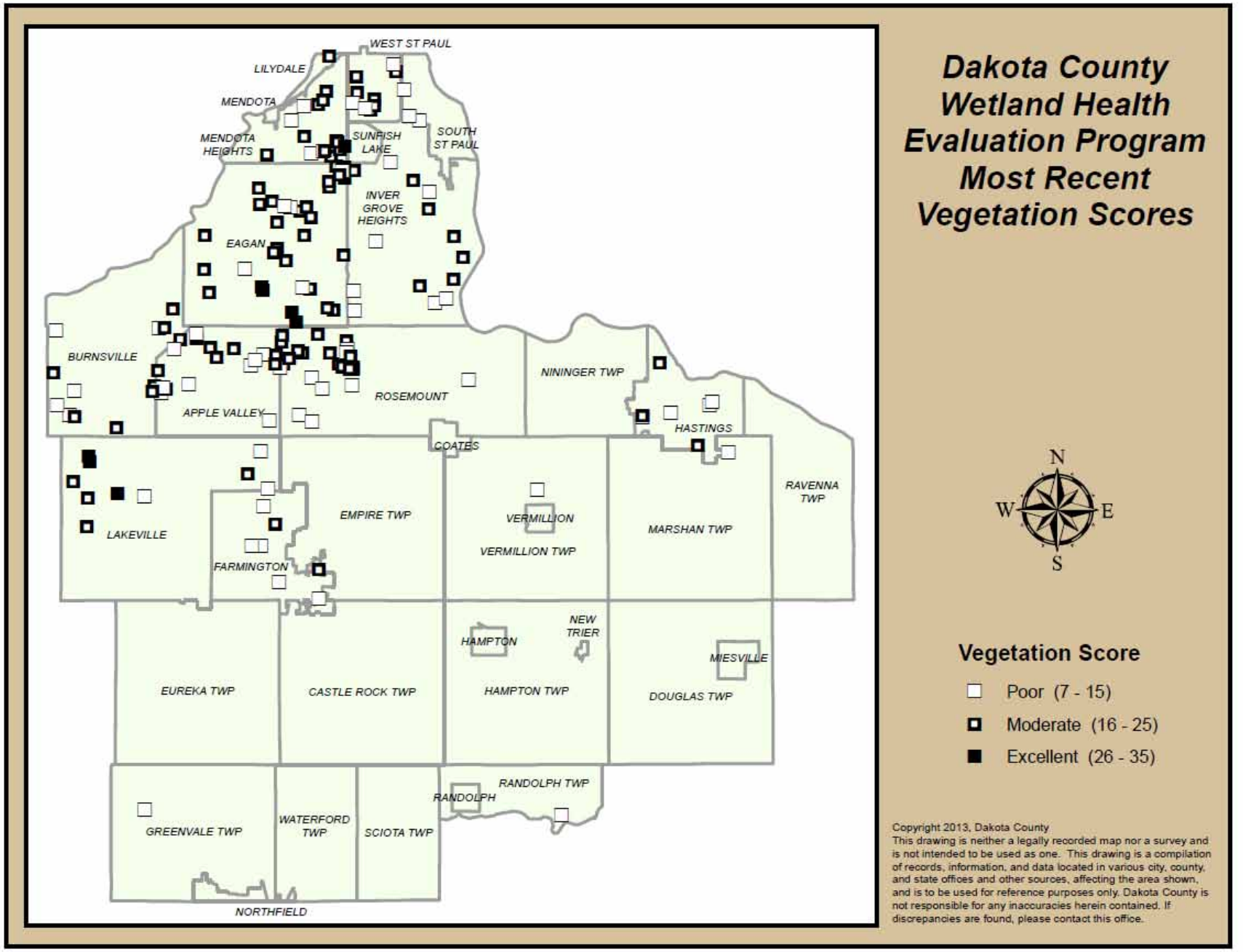
Figure 3.3.2


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 2013, 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.

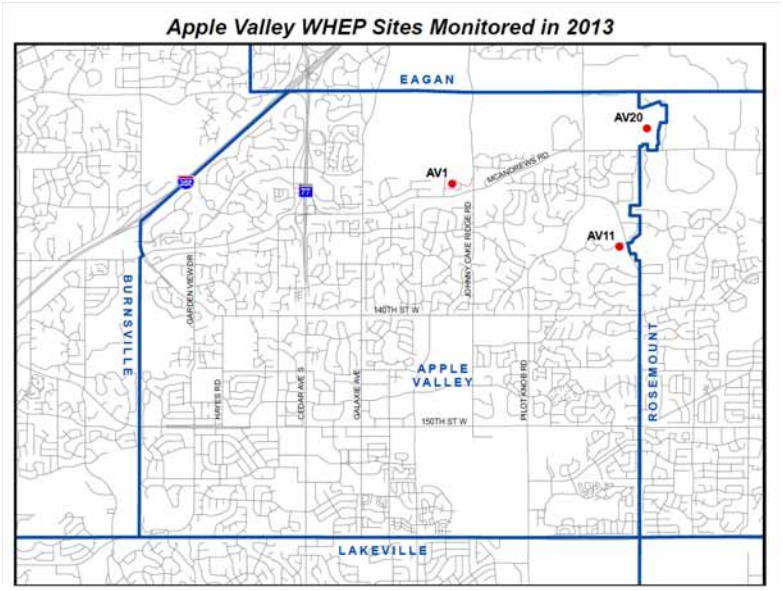
4.0 Wetland Evaluations

4.1 Apple Valley Wetlands

Three wetlands were monitored within the City of Apple Valley in 2013. This is the sixteenth year the City has participated in WHEP, and 20 wetlands have been monitored in that time period.

Team Leader: Jeff Korpik

Team Members: Erin Adams, Madison Adams, Bill Block, Andrea Brownlow, Colin Brownlow, Helen Goeden, Lance Hanson, Marlys Kramersmeier, Mandy Nelson, Jordan Priester, Cindy Taintor, Eric Vavra and Jay Vavra.



Jeff Korpik

Jeff Korpik has a long history with WHEP program, and this is his sixth year as a team leader. Jeff said, "Another successful and fun year for the Apple Valley team. We had our first "dangerous" wetlands this year for various reasons. We sampled a wetland at the Valleywood golf course and had to be mindful of stray golf shots and quiet around the golfers. We also found out that some property owners don't understand city rights of way. The Hidden Valley (AV-1) site shows signs of improvement, which is good news. And, as always, I couldn't have done it without our outstanding new and returning volunteers."

Jeff Kehrer

Jeff Kehrer is the Natural Resources Coordinator at the City of Apple Valley and has been a city contact for WHEP since 2002. He plays a supporting role in the Apple Valley WHEP program to assure program implementation. In previous years he was more directly involved, but that role has since been passed on to Jane Byron. He feels, "WHEP is important to Apple Valley for collection of valuable and reliable wetland data. Without volunteers, WHEP would not exist in its current form; volunteers are the backbone of the program. Apple Valley has been fortunate to have many volunteers participate on the Apple Valley WHEP team; many of whom have returned year after year assuring consistent and high quality data collection, and sharing of experiences with new WHEP volunteers. WHEP has played a significant role in raising wetland awareness and importance in Apple Valley, especially during the plan review process for land development."

Jane Byron

Jane Byron's 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.

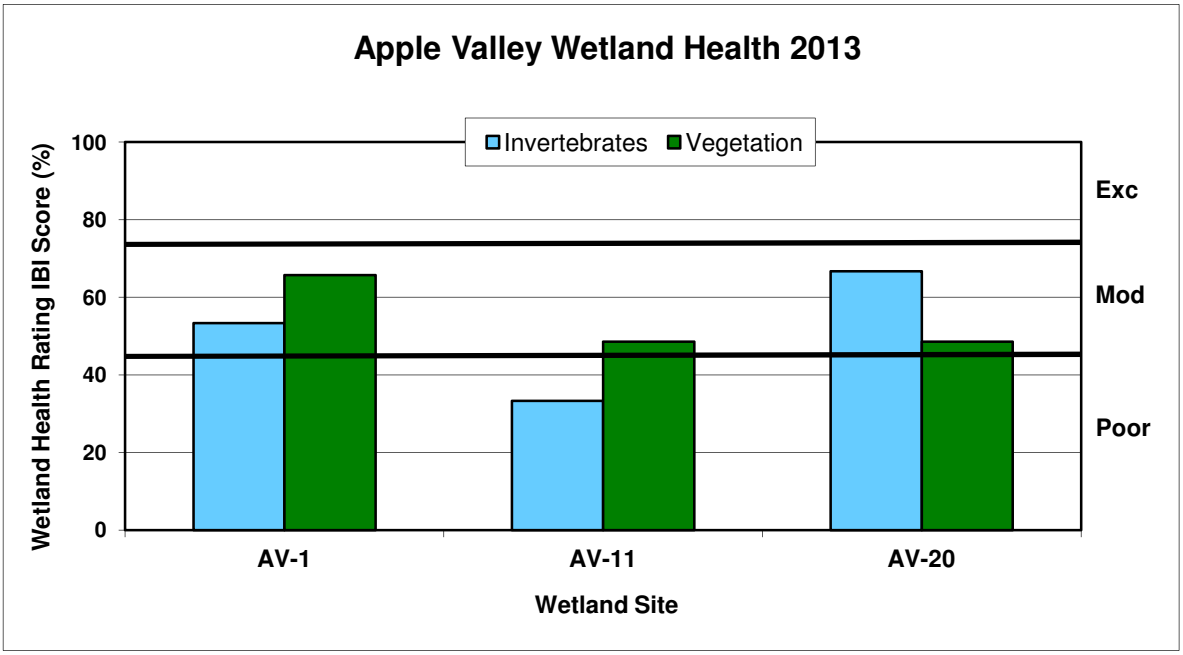
In recent years, the data gathered has allowed us to supplement information from other studies on some of our most impacted wetlands to give a much more detailed picture of the quality of selected wetlands. The baseline picture painted by the information gathered will help us gauge the success of future projects to improve water quality. We cannot thank our volunteers enough for the important service they provide."

Apple Valley General Wetland Health

C. Brownlow, A. Brownlow

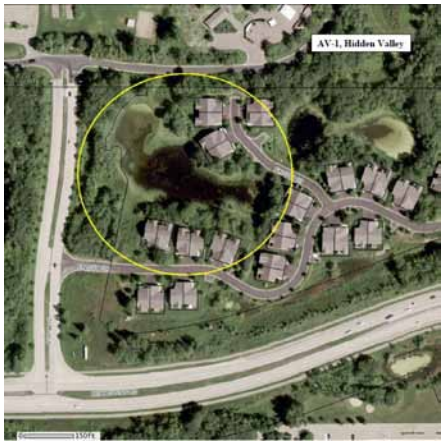
Figure 4.1 presents an overall view of wetland health for all of the 2013 monitoring sites in Apple Valley based on the IBI scores for invertebrates and vegetation presented as a percent. Figure 4.1 also illustrates the consistency between the IBI scores (in percent form) for each wetland sampled. Scores 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. AV-11 scored poorly for invertebrates.

Figure 4.1 Apple Valley site scores (percent) for the 2013 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 county website show an increase in open water/ponding depth. This wetland has two inlets along its southern border, one equalizer pipe along its eastern border, and one outlet along its western border. 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. This is the fifteenth year that this site has been surveyed since 1998.

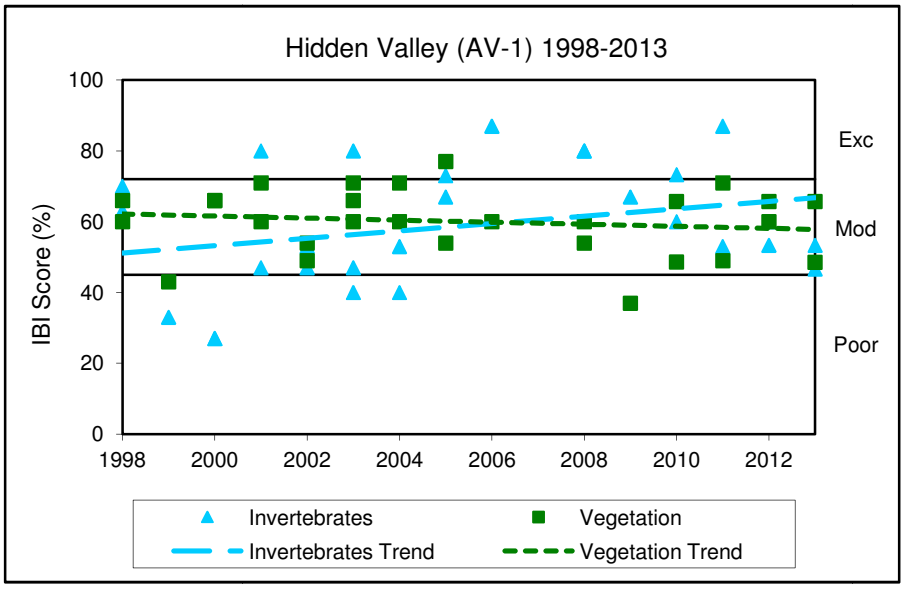
Wetland Health

Site Observations: Reed canary grass, smartweed and cattail around perimeter. A lot of algae and duckweed present. Hooded merganser, wood duck, catbird, cardinal, and goldfinch observed.

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

2013 Data (AV-1)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (16)	Moderate (23)
Cross-check Rating (IBI score)	Poor (14)	Moderate (17)
Trend 1998-2013	Improving	Stable

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



Site Summary: Hidden Valley was found to have moderate health in 2013. The scoring between macroinvertebrate and vegetation categories was inconsistent. Though both categories were given a moderate score, the invertebrate score was more than ten percent lower than the vegetation score. The City team noted that the water level increased by approximately six inches between the invertebrate dipnet placement and collection from June 10th to June 12th. This may have affected the invertebrate sample. The scoring between the City team and cross-check team was consistent; however the cross-check team's vegetation score was lower than the City team due to a higher diversity of plants identified by the City team. The invertebrate scores were lower in 2013 (as in 2012) than in previous years. The invertebrate data has fluctuated between poor to excellent over the years, but overall appears to be improving. The extreme fluctuations may be due to factors such as changes in water level. The vegetation has remained in the moderate category for most of the samples. Based on the fifteen years of monitoring, the data indicates stable to improving wetland health.

4.1.2 Farquar Lift Station (AV-11)

Farquar Lift Station (AV-11), also known as EVR-P352 is a 2.2 acre, type 5 wetland located within EVR-352 subwatershed of the East Vermillion River Watershed, and lies just southeast of Farquar Lake. The wetland watershed has approximately 373 acres with 7 acres of direct drainage, and is 25 percent impervious. There is one inlet at the northwestern corner of the wetland, one inlet in the southern corner, and one outlet at the lift station on the north end of the wetland. It 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 the Farquar and Long Lake Total Maximum Daily Load (TMDL) area. Studies were conducted in this area, resulting in plans to reduce pollutant loading to the lakes. TMDL implementation projects may occur in the wetland in the future. Implementation projects performed in the upper watershed may have an impact on wetland quality. The surrounding area is residential. The shoreline is natural, but the upland buffer is narrow. Home construction and stormwater system maintenance occurred in 2009. There is a dock that leads to a small shed on the island in the wetland.

Wetland Health

Site Observations: The wetland substrate is very mucky. Very little duckweed and many submerged logs were observed. The Chinese mystery snail, cyanobacteria, and milfoil were observed in June during the City team's invertebrate sampling.

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

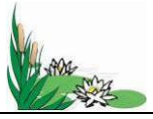
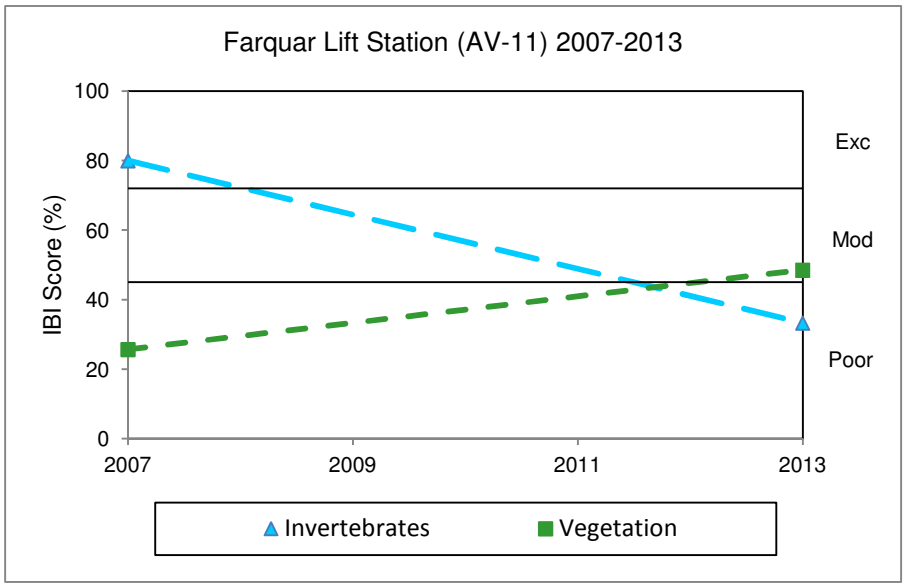
2007-2013 Data (AV-11)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Poor (10)	Moderate (17)
Trend 2007-2013	Not enough data	Not enough data

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



Site summary: This is the second time that AV-11 has been monitored since 2007. IBI scores differ substantially from those found in 2007. 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 twelve 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 slightly mucky. Three-quarters of the wetland perimeter is wooded. Golf course greens border the remaining perimeter of the wetland. Some fallen trees are present. Duckweed and algae were observed by the City team in June.

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

2013 Data (AV-20)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (20)	Moderate (17)
Trend 2013	Not enough data	Not enough data

Site summary: This is the first year that the Valleywood Golf Course wetland has been monitored through the WHEP program. Both invertebrate and vegetation indices indicate moderate health. There is not enough data to determine a health trend.

4.2 Burnsville Wetlands

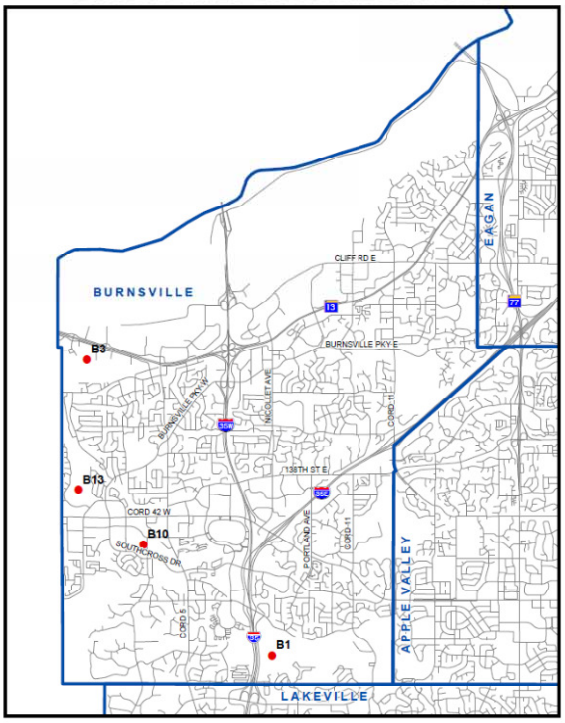
Four wetlands were monitored within the City of Burnsville in 2013. Burnsville has monitored 16 wetlands through WHEP since 1997.

Team Leader: Jeff Zilka

Team Members: Bernie DeMaster, Tom Drogseth, Bob Lorenzen, Lynne Lorenzen, Jessica Oldfather, Kevin Quass, Joan Ramnandon, Benjamin Sailer, Nick Svare, and Thomas Ward.

Jeff Zilka

Burnsville WHEP Sites Monitored in 2013



This is Jeff's third year as a team leader, and eighth year as a WHEP volunteer. He admitted that it was, "another great year for the WHEP program in the Burnsville area. We were fortunate to have dedicated volunteers who were eager to learn and help out in any way they could. What was really interesting and fun was the diversity of our volunteers. We had college students all the way up to retired professionals from all walks of life. It is always great to meet new people that enjoy and have a respect for nature."

Liz Forbes

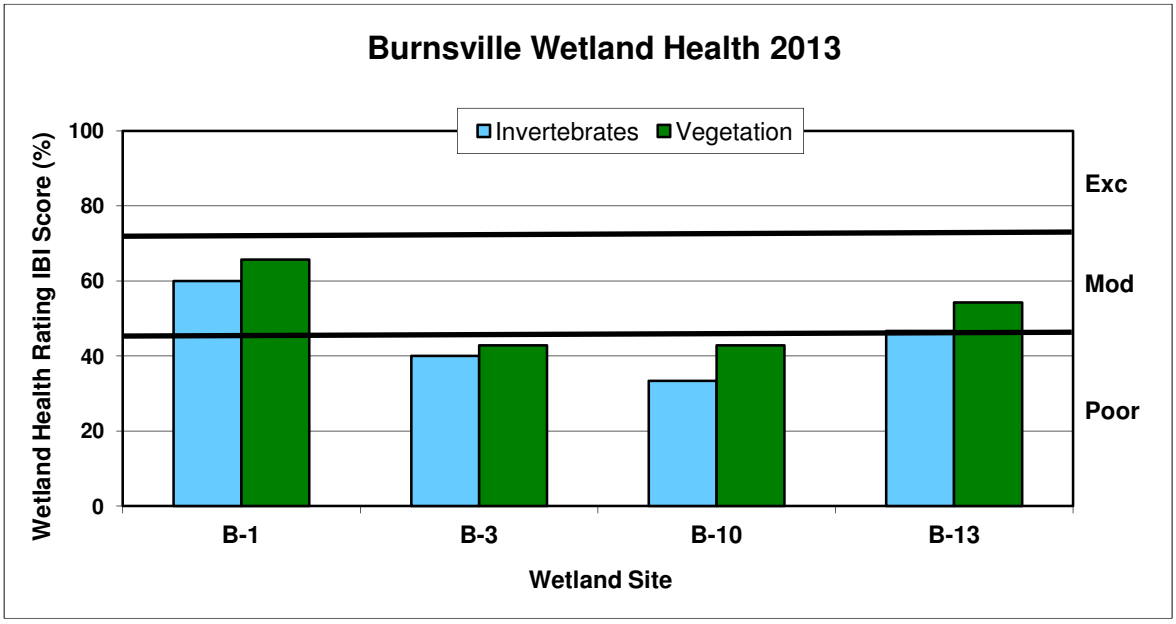
Liz Forbes is a Natural Resources Technician with the City of Burnsville. As the city contact for WHEP, she selects the wetlands, pulls together the site maps and other relevant information, and publicizes the program in Burnsville. Through WHEP, the City monitors four wetlands every year. Two of these (Crystal West and Kraemer) are reference wetlands and the other two are chosen yearly based on several factors. Primarily, the City uses the WHEP data to look at changes in wetlands over time. Without the WHEP team, we would know far less about wetland health in the Burnsville. A big thanks to all of the Burnsville volunteers and team leader Jeff Zilka!

T.Drogseth,K.Quass,J.Zilka,B.Lorenzen, B.DeMaster,and L.Lorenzen

Burnsville General Wetland Health

Figure 4.2 presents an overall view of wetland health for all of the 2013 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 2013, the Burnsville wetlands showed poor to moderate wetland health. B-3 and B-10 scored poor for both invertebrates and vegetation.

Figure 4.2 Burnsville site scores (percent) for the 2013 sampling season



4.2.1 Crystal Lake West (B-1)

Crystal Lake West (B-1) is a 0.9 acre, type 3 wetland located in the CL6 Drainage Area of Crystal Lake subwatershed of the Blackdog watershed. The Crystal Lake West watershed is four 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 wetland has invasive species problems and some recreational vehicle disturbances (mostly in the winter). The wetland is very close to a bay of Crystal Lake and is within a large, naturally vegetated, City-owned 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. Lily pads are abundant. Reed canary grass and bladderwort were observed by the City team in early June.

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

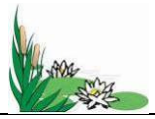
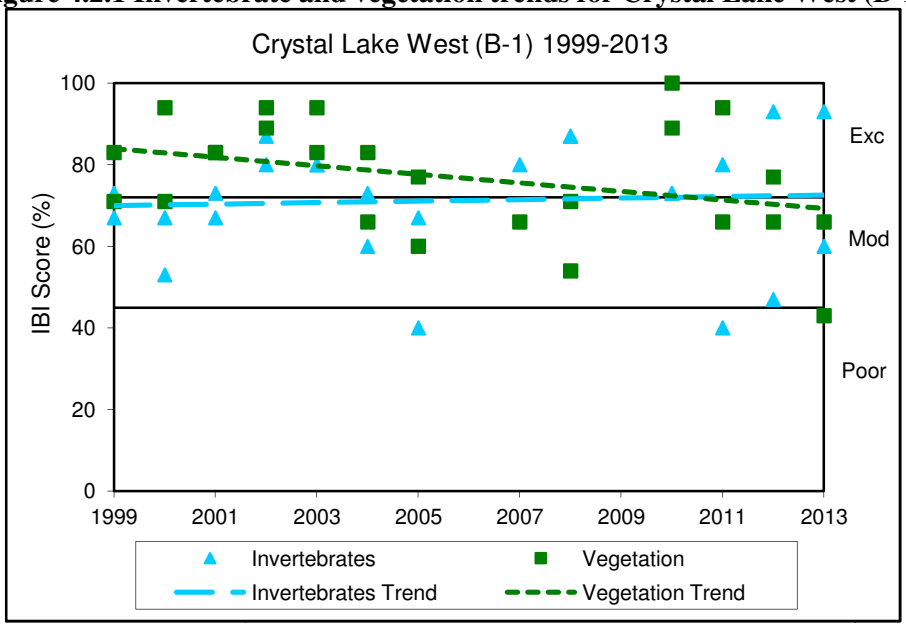
2013 Data (B-1)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (18)	Moderate (23)
Cross-check Rating (IBI score)	Excellent (28)	Moderate (19)
Trend 1999-2013	Variable but stable	Variable but stable

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



Site summary: This is the thirteenth year that B-1 has been surveyed since 1999. The invertebrate and vegetation scores indicate that the wetland has moderate to excellent health. The invertebrate scores between the City team and the cross-check team were not consistent. The cross-check team found the wetland to have excellent invertebrate health while the City team scored the wetland moderate. The cross-check team found a larger diversity of invertebrates which boosted the wetland health scores. The cross-check team noted that summer rains increased the water level so that their vegetation plot was much farther upland than where they placed their invertebrate bottle traps. The trend lines indicate variable but overall stable wetland health.

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 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" 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 vegetaion is actively managed through burning, spraying, and interseeding. There is a gravel path that encircles the wetland.

Wetland Health

Site Observations: The wetland substrate is mucky, but with a firm base three to four inches beneath the muck. A cattail buffer approximately twenty yards deep surround the wetland. Small poplars, willows, and dense bushes are also present.

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

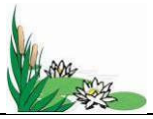
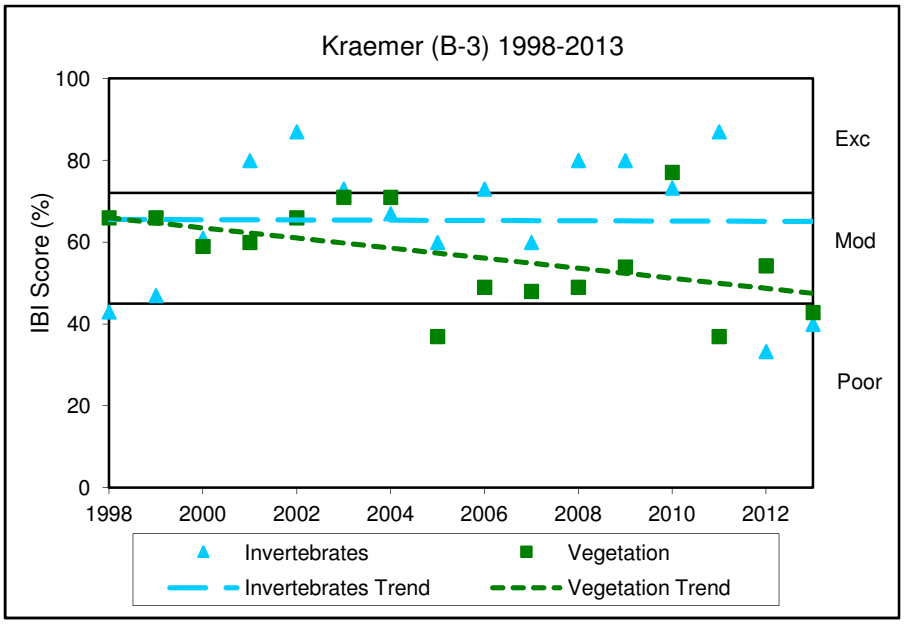
2013 Data (B-3)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Poor (12)	Poor (15)
Trend 1998-2013	Improving through 2011, then declining	Declining but variable

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



Site summary: This is the sixteenth consecutive year of sampling for Kraemer Preserve (B-3). In the past several years, the vegetation and invertebrate scores indicated poor to excellent wetland health; however, in 2012 and 2013, the invertebrates score plunged to poor. There was a similar large drop in IBI scores in 2005 with a gradual increase until 2011 when they dropped again. These extreme fluctuations could be due to water levels. This wetland has maintained overall moderate conditions over most of the years of sampling. Wetland vegetation health is variable but overall declining. For invertebrates, the trend showed improving wetland health through 2012 followed by a decline. Future monitoring will help identify if invertebrates and vegetation health will rebound.

4.2.3 Judicial Pond (B-10)

Judicial Pond (B-10), formerly Rosemount Aerospace, is a seven acre, type 4 wetland located within the Sunset Pond Subwatershed (2,488 acres) of the Black Dog Watershed. The Judicial Pond drainage area is 373 acres and approximately 25 percent impervious. The wetland has one inlet on the northeast corner, one inlet on the southeast corner, and one outlet on the northwest corner. The wetland is part of the City's stormwater management plan and wetland management plan. It is designated as an Improvement Class wetland and is being managed to maintain the wetland without degrading its existing functions, values, and wildlife habitat.

This wetland is owned by UTC Aerospace Systems, and it lies within a business/industrial area. Some residential properties exist to the south of the wetland. The pond receives stormwater and is bordered on the northern and eastern sides by Judicial Road. The western and southern sides have grass/tree buffers which are 300-400 feet wide. In June of 2011 and May of 2012 illicit discharges (mineral spirits, concrete sealer, paint/chemical) into the wetland were detected and immediately cleaned up.

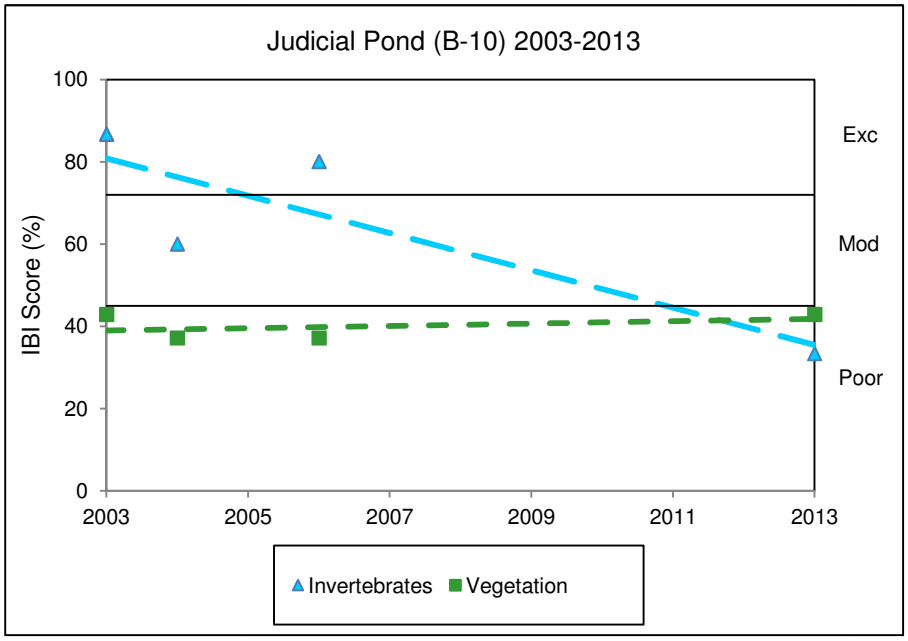
Wetland Health

Site Observations: The fifteen foot wetland slope is fairly steep (this comment varies from 2012 interpretation of the wetland having a "gentle slope"). The wetland is prominently surrounded by cattails. No emergent or submergent vegetation was observed during the invertebrate sampling in June. Small to mid-size trees overhang the north, east, and south sides of the wetland. Mowed landscape exists on the west side.

Table 4.2.3 Judicial Pond (B-10) Wetland Health based on Index of Biotic Integrity

2013 Data (B-10)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Poor (10)	Poor (15)
Trend 2003-2013	Declining	Stable

Figure 4.2.3 Invertebrate and vegetation trends for Judicial Pond (B-10)



Site summary: This is the fourth time that B-10 has been surveyed since 2003. Based on limited data, the invertebrate trend line indicates declining health, and the vegetation health has remained stable over the past decade. This wetland has not been monitored since 2006. Continual monitoring of this wetland will help assess the health trend of this wetland.

B. Lorenzen

4.2.4 Sunset Pond (B-13)

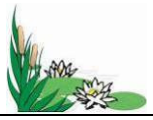
Sunset Pond (B-13) is a 48 acre, type 3 wetland located within the SP1 drainage area of Sunset Pond Subwatershed (2,488 acres) of the Black Dog Watershed (3,700 acres). The SP1 drainage area is 402 acres and approximately 40 percent impervious. The wetland has eight inlets on all sides. There is one outlet on the north end. The wetland is part of the City's stormwater management plan and wetland management plan. It is designated as an Improvement Class wetland and is being managed to maintain the wetland without degrading its existing functions, values, and wildlife habitat. Its functions include flood and stormwater attenuation and water quality protection. Its values include flood protection, sediment control, nutrient removal, open space, and aesthetics.

The entire shoreline is owned by the City and maintained as a natural park. A heavily-used trail circles the wetland. Invasive species (narrow-leaf cattail and reed canary grass), stormwater inflow, sediment pollution, and encroachment of natural areas by neighboring properties into the conservation easement are all disturbance concerns. Herbicide treatment and controlled burns are used as measures of weed control and management in the surrounding upland buffer. A conservation easement exists on the neighboring private properties that restrict structures and requires natural vegetation buffer.

Wetland Health

Site Observations: The wetland has a gentle slope, and its substrate is very mucky. Reed canary grass and purple loosestrife were observed.

Table 4.2.4 Sunset Pond (B-13) Wetland Health based on Index of Biotic Integrity

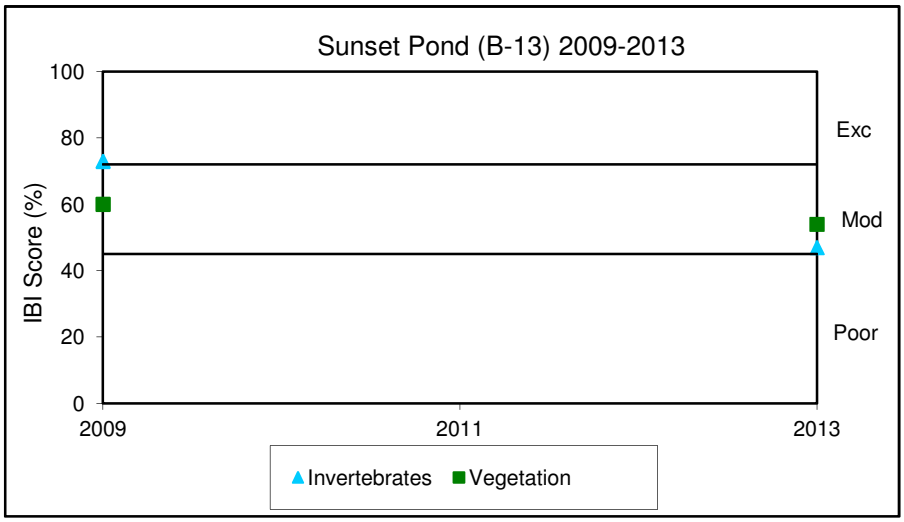
2013 Data (B-13)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Poor (14)	Moderate (19)
Trend 2009-2013	Not enough data	Not enough data

T. Drogseth

K. Quass, J.Ramnandon

J. Zilka, J. Oldfather

Figure 4.2.4 Invertebrate and vegetation trends for Sunset Pond (B-13)



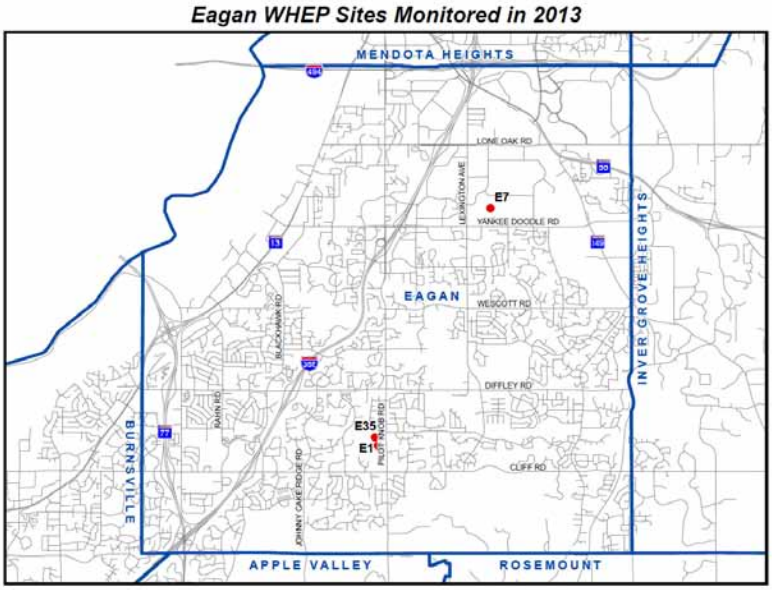
Site summary: This is the second time that B-13 has been surveyed since 2009. The invertebrate scores fell from excellent in 2009 to poor in 2013. The vegetation scores remained constant in the moderate range. Continual monitoring will help assess the health trend of this wetland.

4.3 Eagan Wetlands

The Eagan team monitored three wetlands in 2013. Since WHEP began in 1997, Eagan has monitored 34 wetlands.

Team Leaders: Marianne McKeon

Team Members: Joanne Arenson, Nicole Deziel, Frank Flett, Steve Hart, Kelsey Maher, Cathy Marquardt, Mark Niznik, Rachel Taylor, Gena Tillemans, Ed Turin, Danny Turin, Rachel Turin, Eric Ulrich, and David Von Ruden.




Marianne McKeon

This is Marianne McKeon's third year as Eagan's team leader, though she has been a WHEP volunteer since 2007. She expressed, "I continue to learn each year. Just when I think I start to see some repeating patterns with the diversity of plants and invertebrates, it seems there is always something that ends up surprising me! I have also continued to enjoy meeting many new volunteers of all backgrounds that add their own strengths to our team. I'm looking forward to enjoying another WHEP season in 2014!"

Jessie Koehle is the Water Resources Technician for the City of Eagan. She commented, "WHEP is one of the few programs we have that gives our residents a chance to receive focused training on biological wetland health, specific to their community. Participants in WHEP become informed ambassadors in their neighborhoods and local circles to share what they know and to help support wetland health any way they can. I really appreciate getting to know and interact with individual residents and watch as relationships are built between us all. The data collected in WHEP adds depth to the knowledge we collect over time in our long term water quality database for Eagan; rarely would we have time to scrutinize wetlands in this way through our routine sampling programs. Thanks for all your hard work, Eagan Team!"

Jessie Koehle

Eric Macbeth

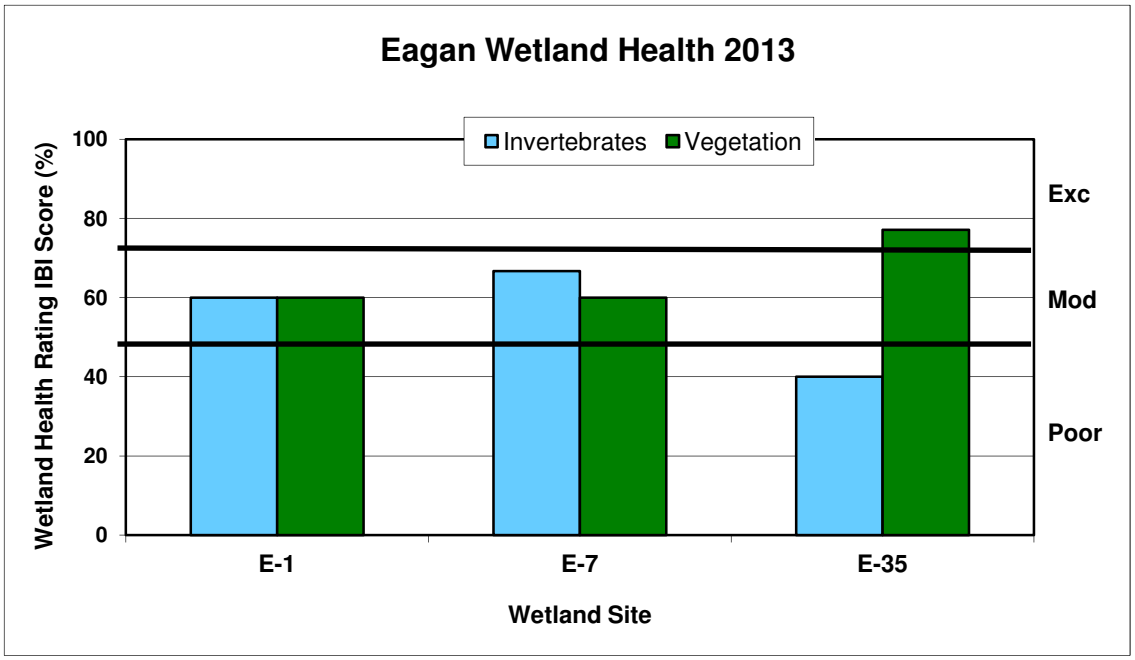
Eric Macbeth has about 25 years experience in management, planning, policy, public education, and research of lakes, ponds, rivers, streams, and wetlands. Since 1999, he has managed Eagan's lakes, stormwater pollution prevention, and wetlands programs. "Since being an 'original city' of the WHEP in 1997, Eagan has annually supported the program because it provides residents another opportunity to be involved and educated," he says. "With about 800 natural waterbodies in our city, most residents live very near a wetland or regularly visit parks with wetlands. With the WHEP, volunteers literally get their hands wet. We believe this helps strengthen the already strong citywide support of our water resources programs."

Eagan General Wetland Health

Figure 4.3 presents an overall view of wetland health for all of the 2013 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 2013. Two of Eagan's wetlands exhibited moderate wetland health based on both invertebrate and vegetation data. E-35 scored inconsistently between vegetation (excellent) and invertebrate (poor) surveys.

E. Turin, R. Turin, D. Turin

Figure 4.3 Eagan site scores (percent form) for the 2013 sampling season



4.3.1 Thomas Lake Park Pond (E-1)

Thomas Lake Park Pond (E-1), also known as City Pond BP-7.1, is a 0.4 acre, type 5 wetland within the Thomas Lake subwatershed of the Gun Club Lake Watershed. The wetland's watershed is approximately four acres including approximately 37 percent impervious surface. There is one inlet on the north side of the wetland, and one outlet on the west side. The wetland is part of the City's stormwater management and wetland management plans. It is officially unclassified, but is used to mediate stormwater impacts on Thomas Lake.The wetland drains water from the parking lot and park shelter at Thomas Lake Park. Water then flows into Thomas Lake.

The wetland is located within the City Park. The surrounding area is a combination of wooded and landscaped areas. Paved walking paths and a fishing pier are nearby. A native shoreland planting took place in 2005 on the northern and western shores. Thistle was removed, and supplemental seedings have occurred occasionally since then. The wetland receives ongoing maintenance.

Wetland Health

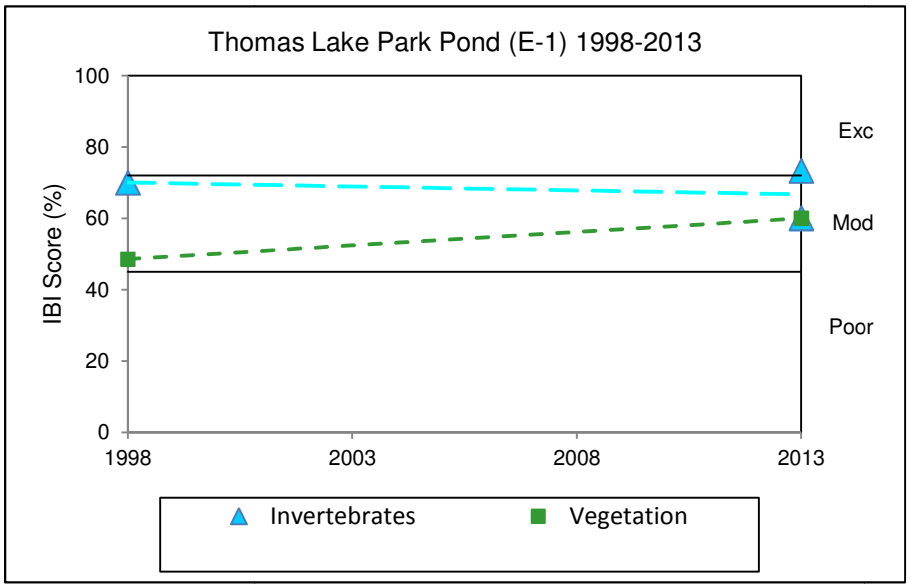
C.Marquardt, J.Arenson

Site Observations: The wetland is surrounded by woods. Trees hang over the water. Reed canary grass exists around the entire perimeter of wetland. The wetland is 90 percent covered by duckweed.

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

2013 Data (E-1)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (18)	Moderate (21)
Cross-check Rating (IBI score)	Moderate (22)	Moderate (21)
Trend 1998-2013	Not enough data	Not enough data

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



Site summary: This is the second year that this wetland has been surveyed. It has not been surveyed since 1998. The vegetation and invertebrate scores indicate moderate wetland health. 2013 scores were very consistent with each other. The vegetation scores between the City team and cross-check team were identical. Continual monitoring of this wetland will help assess the health trend of this wetland.

4.3.2 Discovery Pond (E-7)

Discovery Pond (E-7), also known as City Pond DP-11, is a 4.1 acre, type 4 wetland within the Gun Club Lake Watershed. Local watersheds flow to LeMay Lake prior to the greater Gun Club Lake Watershed. It has one inlet in the southwest corner, and one inlet approximately 600 feet north of the pond in the gully which flows over land to get to the pond. There is one outlet in the southeast corner of the pond.

Discovery Pond is part of the City's stormwater management and wetland management plans. It is designated as a Class VI: Sediment Basin with a management goal to manage sediment loading from surrounding areas. It is a natural wetland; however, other man-made stormwater ponds receiving flow directly from

streets and parking lots flow into Discovery Pond. The surrounding area is partly wooded and partly grassland. The pond is fairly shallow, but desirable vegetation has been identified at this site in the past.

Wetland Health

Site Observations: This wetland is located behind an industrial park. The sample area is dominated by reed canary grass. The wetland substrate is fairly solid, and the slope is gentle. A large amount of *Chara* was observed during the vegetation survey in August.

Table 4.3.2 Discovery Pond (E-7) Wetland Health based on Index of Biotic Integrity

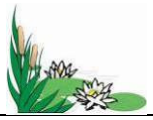
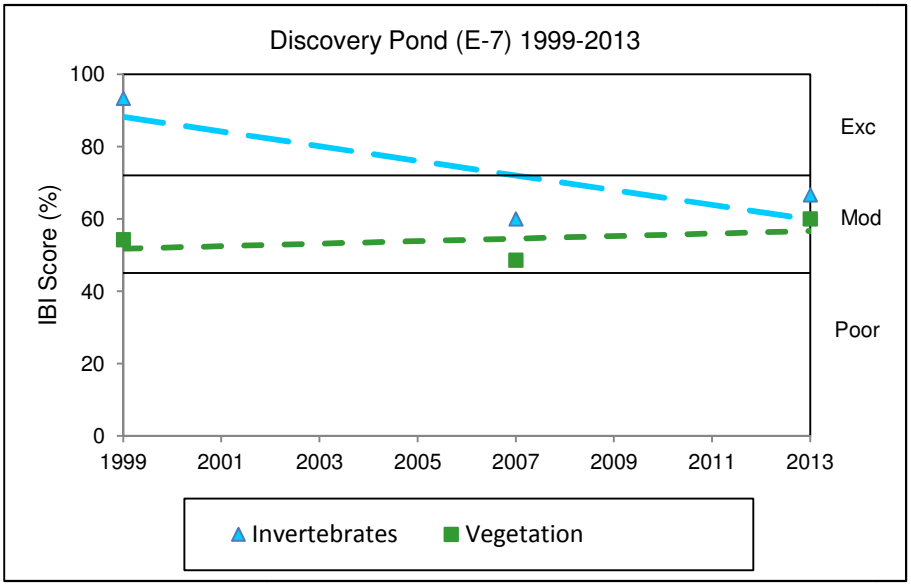
2013 Data (E-7)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (20)	Moderate (21)
Trend 1998-2013	Not enough data	Not enough data

Figure 4.3.2 Invertebrate and vegetation trends for Discovery Pond (E-7)



Site summary: This is the third year that E-7 has been monitored, though it has not been sampled since 2007. Both invertebrates and vegetation scored in the moderate category. There are not enough data to determine wetland health trends for Discovery Pond.

N.Deziel, F.Flett, M.McKeon

4.3.3 Prairie Pond (E-35)

Prairie Pond (E-35), also known as City Pond BP-14, is a 0.8 acre, type 5 wetland located within the Gun Club Lake Watershed. It's local watershed is Thomas Lake, though this pond's watershed is isolated from any others. The watershed is 5.1 acres with no impervious surface. There are no inlets or outlets. This wetland is part of the City's stormwater management plan and wetland management plan. It is designated as a Class III: Scenic Recreation Wetland with the goal to protect for scenic recreation use.

Prairie Pond is located in the center of native prairie in the Thomas Lake Park. Photos from Dakota County dated as early as 1937 show this wetland looking exactly the same as it does now. No stormwater inlets or outlets so water level is dependent on rainfall and infiltration. Surrounding ponds are somewhat ephemeral and water levels fluctuate, but water levels in Prairie Pond seem to persist compared to other prairie wetlands in the area.

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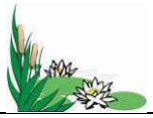
Wetland Health

Site Observations: E-35 is located north of Thomas Lake. It has a gentle slope, and the substrate is somewhat mucky. Many leopard frogs were observed. Aspen, oak, willow, cattail, sensitive fern, and sumac are in the vicinity, but not in the vegetation plot. The wetland water level was quite high during the vegetation survey in July.

Table 4.3.3 Prairie Pond (E-35) Wetland Health based on Index of Biotic Integrity

2013 Data (E-35)	**Invertebrates** 	**Vegetation** 
Wetland Health Rating (IBI score)	Poor (12)	Excellent (27)
Trend 2013	Not enough data	Not enough data

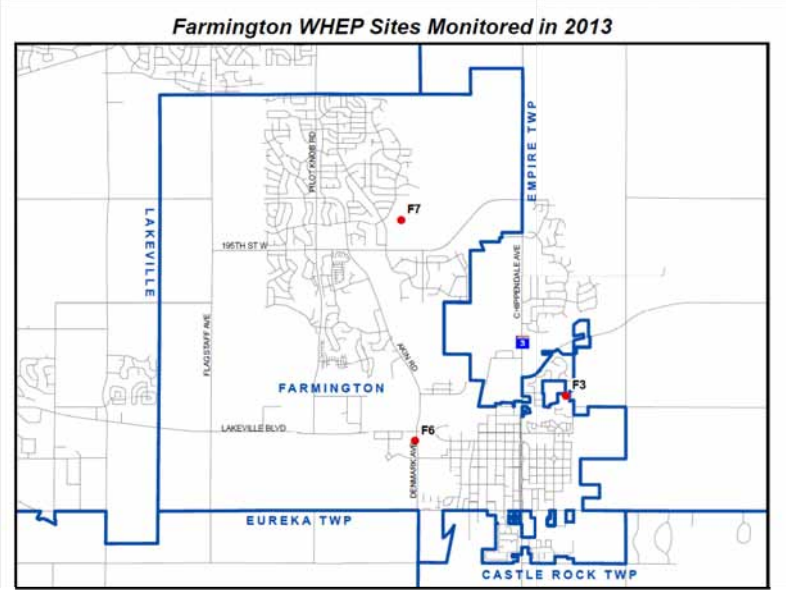
Site summary: This is the first year that E-35 has been monitored. The vegetation and invertebrate scores were not consistent. Vegetation scored excellent while invertebrates scored poor. There are not enough data to determine wetland health trends for Prairie Pond.

4.4 Farmington Wetlands

The Farmington team sampled three wetlands in 2013. 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: Melissa Burton, Rollie Greeno, Danielle Isaacson, Natalie Jorgenson, Riley Lammers, Bob Michels, Marcia Richter, Rachel Schmidt, Mary Schmidt, Ed Scholten, and Richard Schuldt.



Katie Koch-Laveen

Katie Koch-Laveen got involved with WHEP after a long involvement in 4-H. She enjoys interacting with others and has learned to be an effective team leader. She commented that "The Farmington Team had many new members this year, some in high school, some in college. It was wonderful to see the more experienced members take the time to 'teach' the new members what we were doing when collecting and the purpose behind each technique. The new members attended training, as did the more long term members. Our team had good turnout at training and at sampling events. It was great for both the new and experienced folks."

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. With the addition of two new wetlands in 2011, the trends will take time to see, but are important to the City. 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."

Jen Dullum

E. Scholten, N. Jorgenson, M. Richter

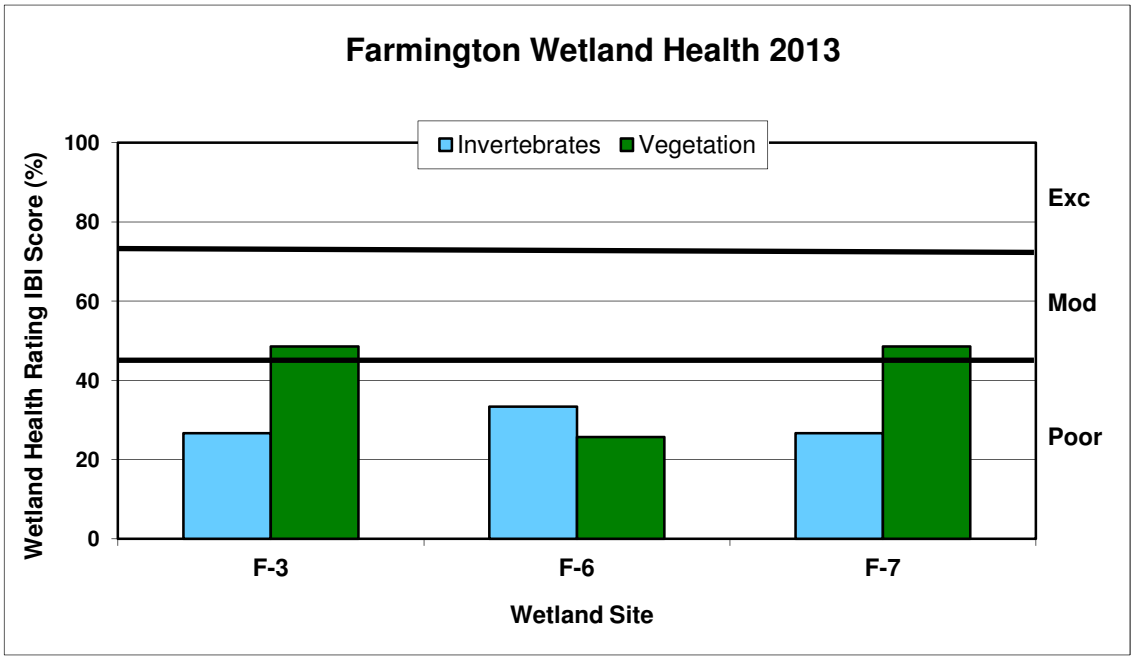
M. Schmidt

R. Lammers , K. Koch-Laveen, E. Scholten, M. Burton

Farmington General Wetland Health

Figure 4.4 presents an overall view of wetland health for all of the 2013 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. The three wetlands were found to be in poor to moderate wetland health. Each of the wetlands scored poorly in invertebrates health. F-3 and F-7 showed inconsistency between invertebrates and vegetation scores.

Figure 4.4 Farmington site scores (percent) for the 2013 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 are inlets in the southwest and northeast corners 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.

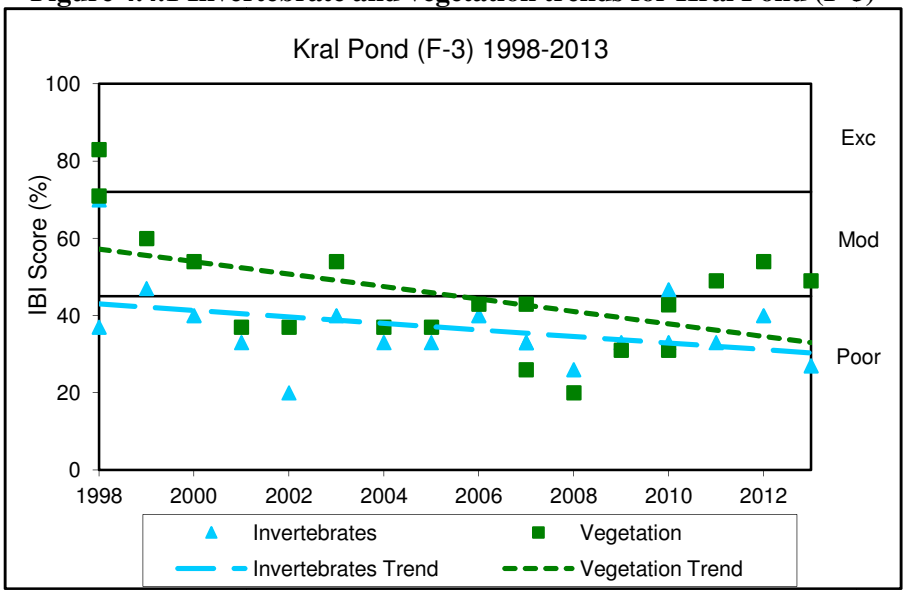
Wetland Health

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. An entire set of housing units was built across from Kral (2005 or 2006). A cemetery, a farm, and farm fields exist around the other sides of Kral.

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

2013 Data (F-3)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Poor (8)	Moderate (17)
Trend 1998-2013	Overall declining, but increasing since 2008	Overall declining, 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 sixteen consecutive years. Recent monitoring indicates poor to moderate wetland health. The long term trend shows a decline in wetland health based on both indices, although since 2009 data show a substantial increase in vegetation scores. The invertebrate trend appears to be stabile, varying from year to year. Changes in the watershed may be impacting the wetland including ongoing development in the surrounding area. The area was historically agricultural. In some cases, conversion from agriculture to residential development can improve water quality since stormwater treatment is added.

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.

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. Water was high into the willows in 2013.

Wetland Health

Site Observations: The Vermillion River wetland is a very small pond at the intersecion of Denmark Avenue and Highway 50. There are ballfields, a parking lot, and an electrical substation across the street. The Vermillion River is to the south of the wetland. The water is shallow and the substrate is muddy. Willows, cattails, and grasses grow along the shore.

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

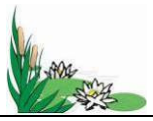
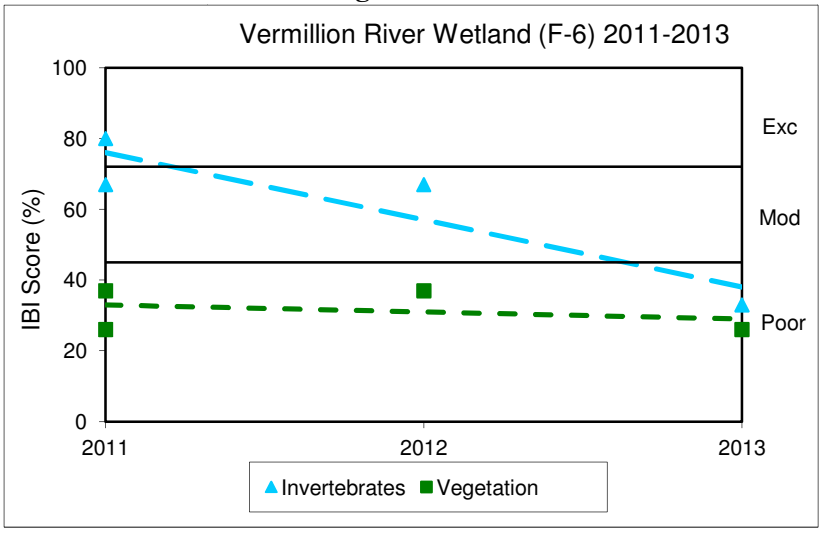
2013 Data (F-6)	**Invertebrates** 	**Vegetation** 
Wetland Health Rating (IBI score)	Poor (10)	Poor (9)
Trend 2011-2013	Not enough data	Not enough data

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



Site Summary: This is the third consecutive year that F-6 has been surveyed. Invertebrates and vegetation both scored poor in 2013. This is the first year that scores have been consistent. Based on limited data, it appears that vegetation health is remaining stable while the invertebrates health has declined in 2013. Continual monitoring is needed to determine a trend in wetland health.

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 with forest surrounding it. The water ultimately flows to North Creek.

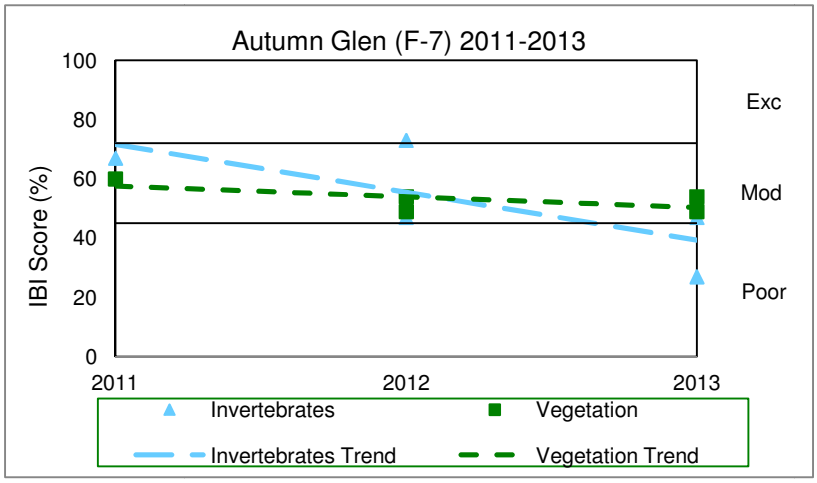
Wetland Health

Site Observations: 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. In 2013, the water was not unusually high. An odor was detected. The wetland has a solid bottom, but becomes muddy.

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

2013 Data (F-7)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Poor (8)	Moderate (17)
Cross-check Rating (IBI score)	Poor (14)	Moderate (19)
Trend 2011-2013	Not enough data	Not enough data

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



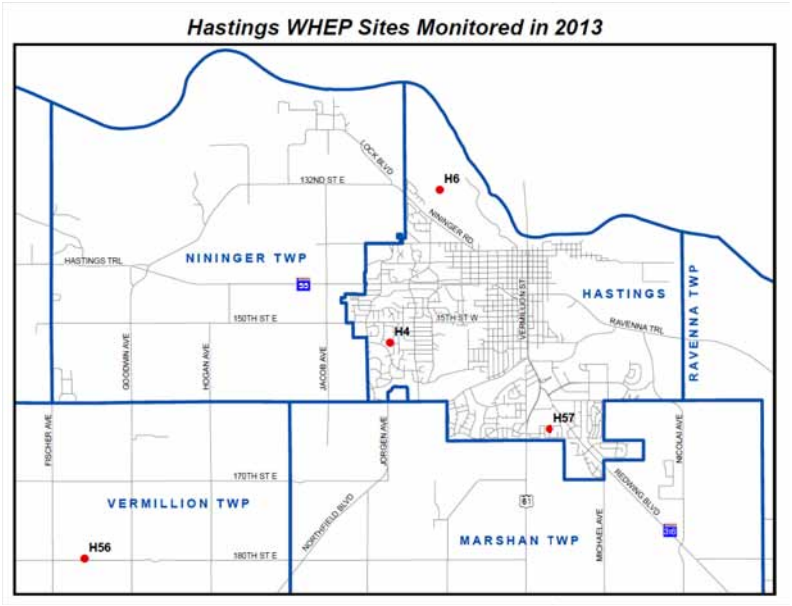
Site Summary: This is the third consecutive year that Autumn Glen has been monitored. The invertebrate scores between the City team and the cross-check team are quite inconsistent just as in 2012. The cross-check team found a larger diversity of invertebrates which increased the overall score. Several factors could have caused this, but most likely sampling location was key. Vegetation scores were very consistent just as in 2012. More years of data are necessary to analyze a data trend.

4.5 Hastings Wetlands

Four wetlands were monitored in Hastings in 2013. Nine wetlands have been sampled in the City of Hastings through the WHEP program since 1999.

Team Leader: Summer Lidtke

Team Members: Brian Huberty, Jim Klassen, Dustin Lidtke, Dane Long, Natalie Lundell, Maggie Lundell, Joshua Lundell, Connie Slaten, Dwight Smith, and Kevin Smith.



Summer Lidtke with nephew Max

This is Summer's first year as team leader for the Hastings team. Summer began volunteering with WHEP in 2006, as an environmental science major at UW-River Falls. She said, "My favorite part was (and still is) getting in the waders and into the wetland, 'getting a hug from the water,' as WHEP teammate Connie Slaten once said. Discovering all the tiny critters and plants was so fascinating and eye-opening. I was hooked on WHEP!

When I was offered the chance to lead the Hastings team, I knew I had some big shoes to fill. Fortunately, I learned from former leader, Joe Beattie, and was supported greatly by him and the dedicated veteran volunteers. My 7th season with WHEP was exciting and vigorous, and I couldn't have done it without our terrific team. Thanks to all for their support!"

John Caven

John Caven administers WHEP for the City of Hastings. This is his fourth year as the City contact for WHEP. His role includes selecting the wetlands to be monitored as well as being a communication link for the City. He says, "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

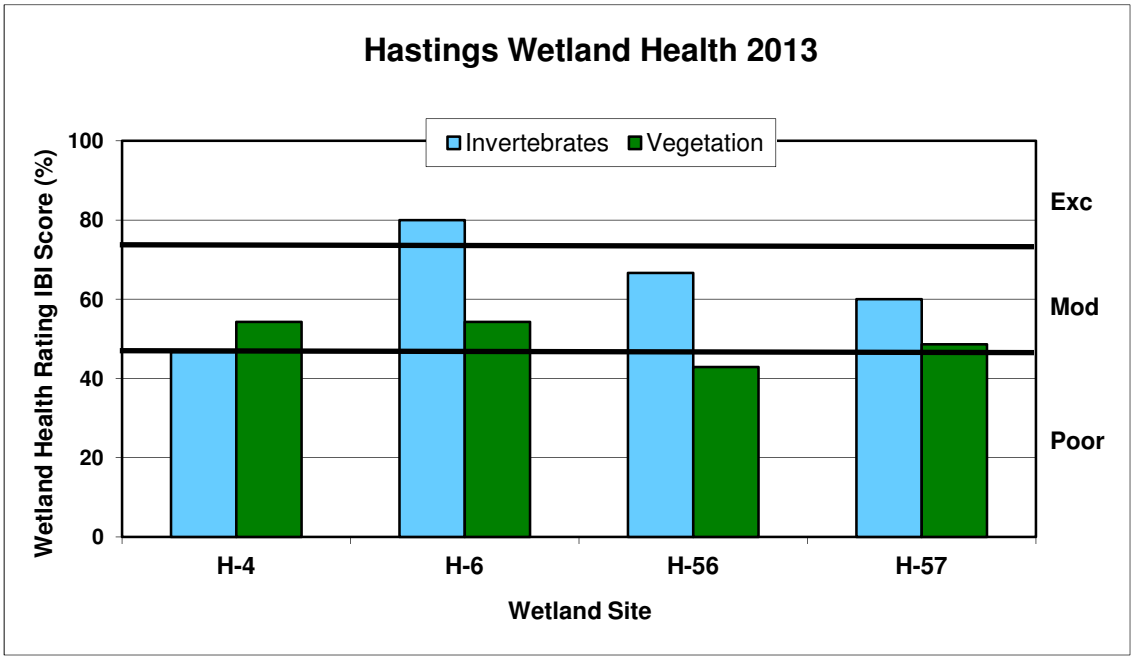
Figure 4.5 presents an overall view of wetland health for all of the 2013 monitoring sites in Hastings based on the IBI scores for invertebrates and vegetation presented as a percent. Figure 4.5 also illustrates the consistency between the IBI scores (in percent form) for each wetland sampled. Scores 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 2013. H-6 scored moderate for vegetation and excellent for invertebrates which is very similar to 2012. The invertebrates and vegetation scores for H-6 and H-56 were inconsistent.

D.Long,D.Smith,M.Lundell,S.Lidtke

B. Huberty

D. Lang, M. Lundell, S.Lidtke, D.Smith, K.Smith

Figure 4.5 Hastings site scores (percent) for the 2013 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.

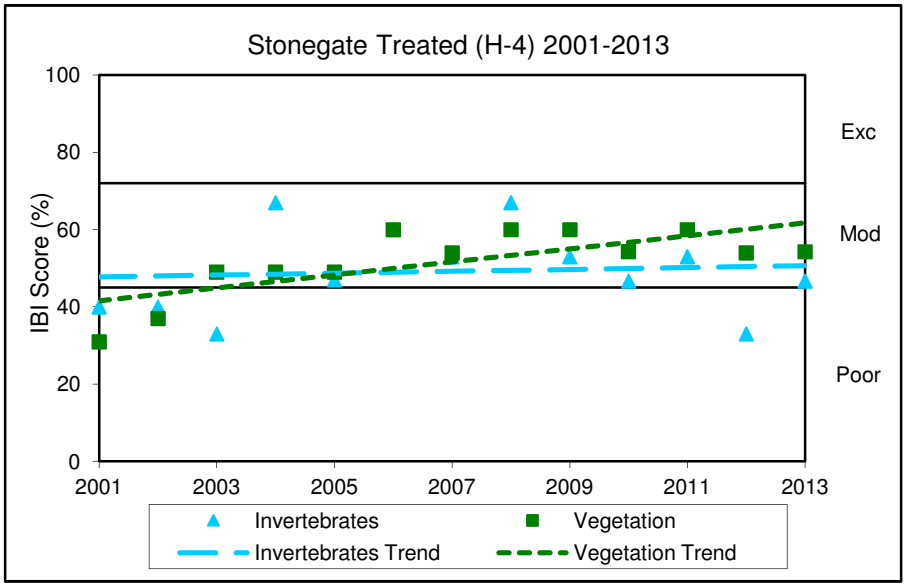
Wetland Health

Site Observations: This is a restoration area with sedges, willows, swamp milkweed, and pondweed. The wetland bottom is mucky with a gentle slope.

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

2013 Data (H-4)	**Invertebrates** 	**Vegetation** 
Wetland Health Rating (IBI score)	Poor (14)	Moderate (19)
Trend 2001-2013	Stable	Stable since 2006

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



Site summary: This is the thirteenth consecutive year that Stonegate Treated has been surveyed. The vegetation trend analysis indicates that wetland health is gradually improving; though it appears to be stabilizing in recent years. The invertebrate data varies from year to year; however, the trend analysis shows stable wetland health for invertebrates and for vegetation in recent years.

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 Mississippi 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 being monitored to better maintain a shoreline buffer along most of the lake, and to manage for wildlife habitat and recreation. 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 were installed and maintained by the City Public Works Department. The City Parks Department operates an aeration system during the winter season to benefit the game fish population in the lake.

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 from development and invasive species, including purple loosestrife, are of growing concern.

Wetland Health

Site Observations: The wetland substrate is very mucky with many fallen logs. A steep slope exists from the bikepath on the levee to the wetland.

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

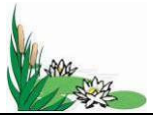
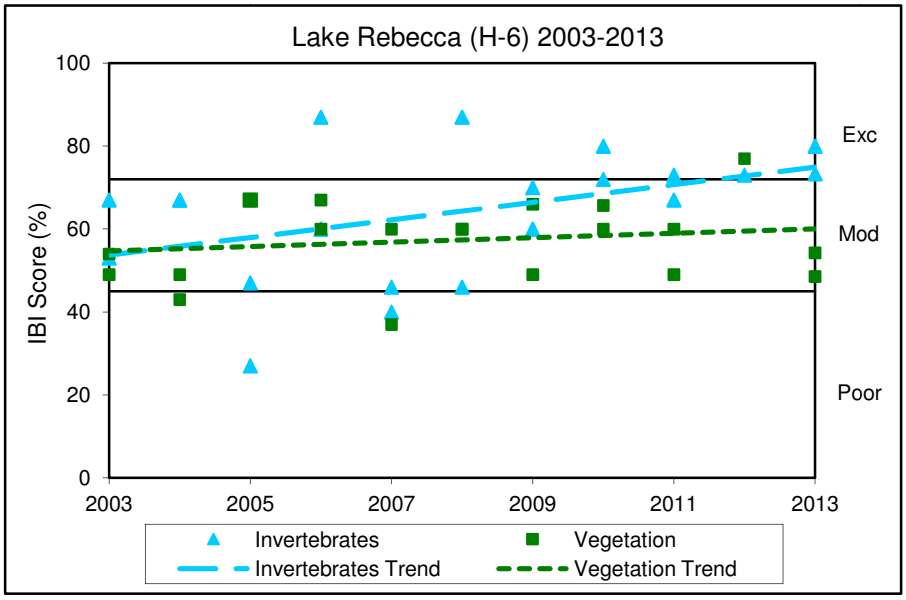
2013 Data (H-6)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Excellent (24)	Moderate (19)
Cross-check Rating (IBI score)	Moderate (22)	Moderate (17)
Trend 2003-2013	Improving	Stable

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



Site summary: This is the eleventh consecutive year of monitoring for Lake Rebecca. Although there is a lot of variation in the data, the long term trend appears to be improving for invertebrates. In 2013, the vegetation health score was much lower than in 2012; however, it appears stable compared to previous years of data. The scores between the City team and cross-check team were very consistent.

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.

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.

Wetland Health

Site Observations: The wetland substrate is mucky, though firm enough to walk easily. The slope entering the wetland is gentle. Cattails, bulrush, and reed canary grass dominate the shoreline. Agricultural land surrounds the natural wetland. The wetland is to the northwest of a farm.

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

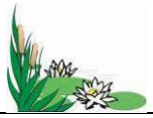
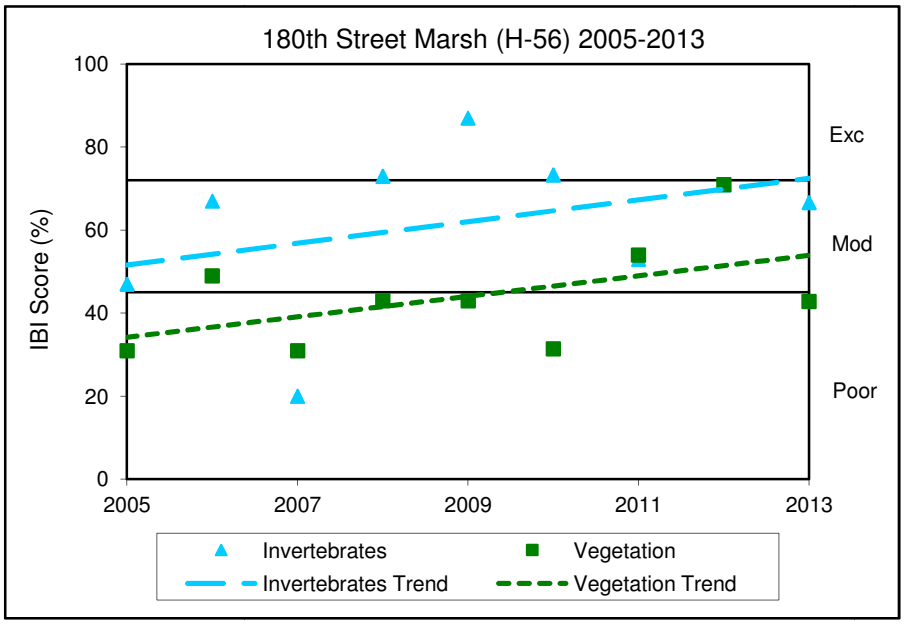
2013 Data (H-56)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (20)	Poor (15)
Trend 2005-2013	Improving	Improving

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



Site summary: This site has been monitored nine consecutive years since 2005. The data are variable between the invertebrates and vegetation for most years, ranging from excellent to poor wetland health, and have been significantly inconsistent, except in 2011 and 2012. Both categories indicate improving trends; however, the vegetation score dropped sharply in 2013 compared to 2012.

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.

Wetland Health

Site Observations: The wetland is surrounded by residential homes, and a children's park is nearby. The wetland substrate is very mucky, and the slope gentle. Cattails line the east end of the wetland. A few scattered willow and cottonwood trees are present. A lot of litter was observed in the pond.

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

2013 Data (H-57)	**Invertebrates** 	**Vegetation** 
Wetland Health Rating (IBI score)	Moderate (18)	Moderate (17)
Trend 2013	Not enough data	Not enough data

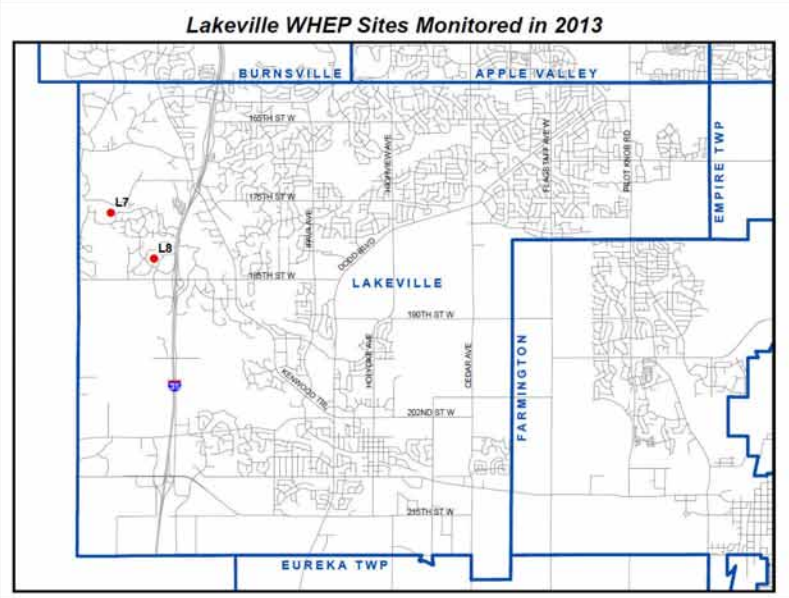
Site summary: This is the first year that Cari Park Pond has been monitored. The vegetation and invertebrate scores are consistent with each other, and both indicate moderate wetland health. Additional years of monitoring will help determine a health trend for Cari Park Pond.

4.6 Lakeville Wetlands

Two wetlands were monitored in 2013 within the City of Lakeville. Ten wetlands have been monitored since WHEP began.

Team Leader: Steve Weston

Team Members: William Barnes, Claire Barnes, Mitchell Hedquist, Erin Kilbride, and David Smith.



Steve Weston with Bill Barnes

Steve Weston describes himself as a naturalist. "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."
Steve said in 2010, "We had an excellent team with a number of youth, mostly high school age, and at least one younger. I find working with the kids most rewarding as I get to share an experience and opportunity that few kids have to learn first-hand the rewards they could find in a biological occupation."

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."

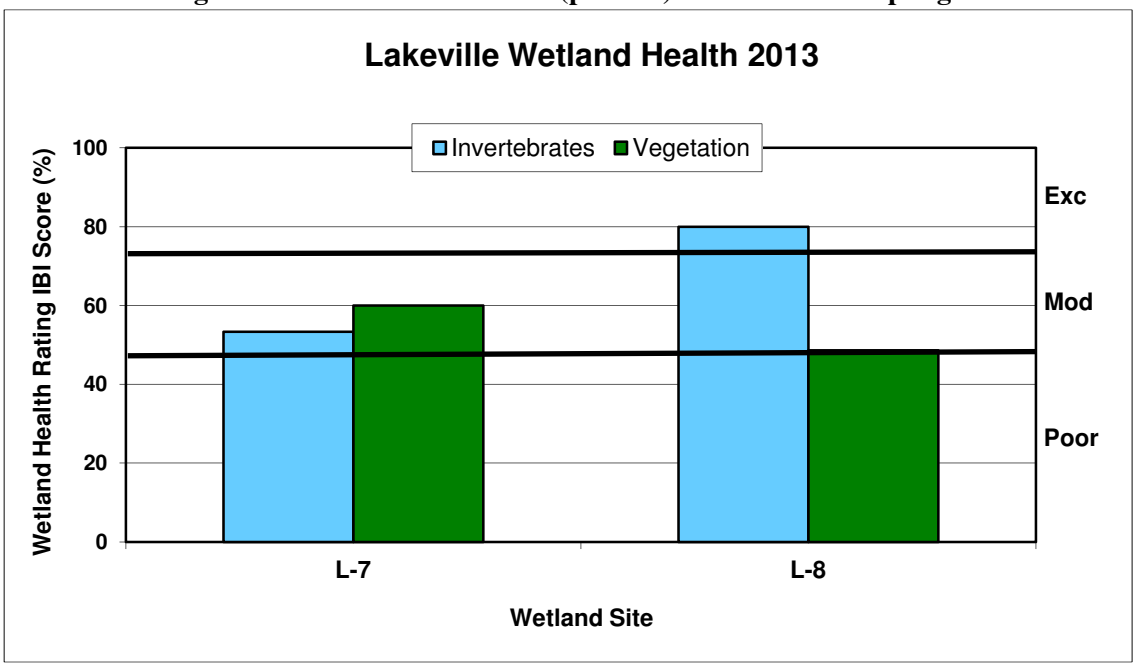
Lakeville General Wetland Health

Figure 4.6 presents an overall view of wetland health for all the 2013 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. The vegetation and invertebrate

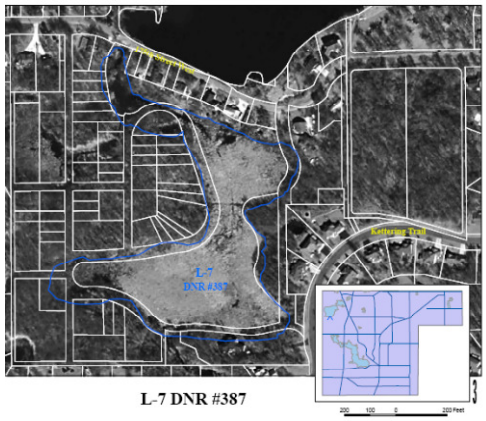
C. Barnes, B. Barnes

scores for L-8 were inconsistent; vegetation scored lower than invertebrates. This has been the trend for this site in the past several years.

Figure 4.6 Lakeville site scores (percent) for the 2013 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 May 1 to September 30 annually.

Wetland Health

Site Observations: The slope is steep and the substrate muddy. The diversity of invertebrates was low in 2013; perhaps heavy rainfall has affected the population.

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

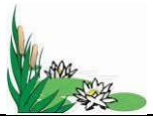
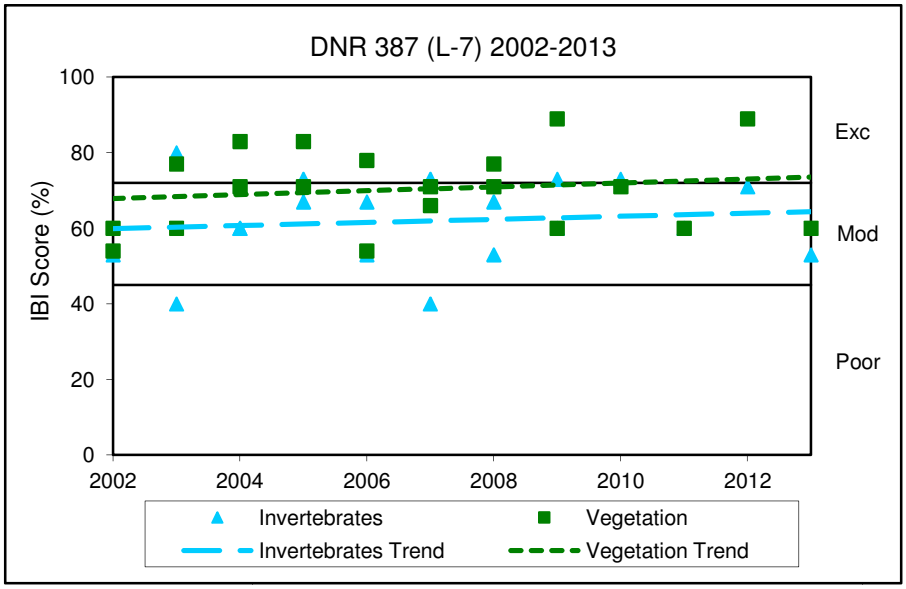
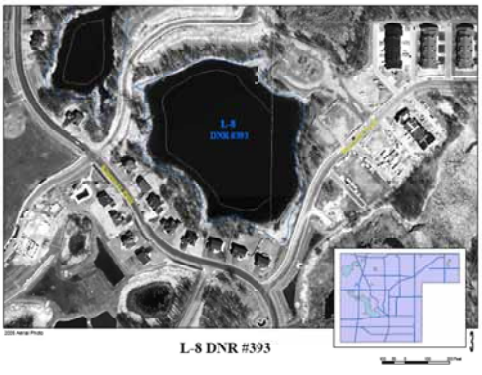
2013 Data (L-7)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (16)	Moderate (21)
Trend 2002-2013	Improving	Improving

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



Site summary: This is the twelfth consecutive year that DNR 387 has been monitored. Scores were lower in 2013 compared to the high scores in 2012. A trend analysis indicates slight improvement in the vegetation and invertebrate community health over time; though data is quite variable over the years.

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. The buffer includes trees and shrubs.

Wetland Health

Site Observations: The wetland is mostly open water with a well-maintained buffer of vegetation with fringe of willows, cattails, and reed canary grass. It is completely surrounded by suburban development. The substrate is solid sand covered in muck. It is fairly easy walking.

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

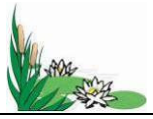
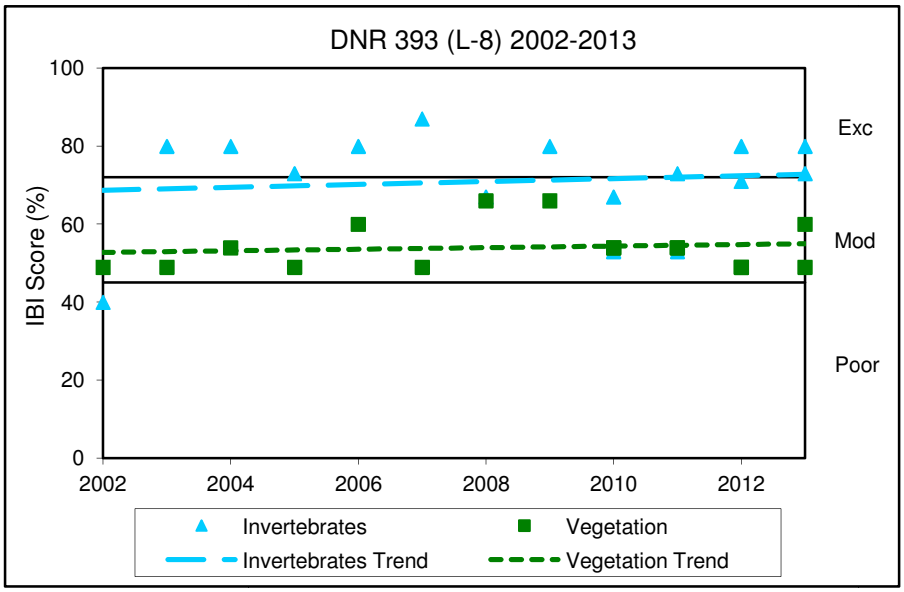
2013 Data (L-8)	**Invertebrates** 	**Vegetation** 
Wetland Health Rating (IBI score)	Excellent (24)	Moderate (17)
Cross-check Rating (IBI score)	Moderate (22)	Moderate (21)
Trend 2002-2013	Stable	Stable

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



Site summary: DNR 393 has been monitored 12 consecutive years. The wetland health appears to remain stable in both the vegetation and invertebrate categories. The invertebrate scores have remained excellent to high moderate for the past decade. The vegetation and invertebrate scores are exactly the same in 2012 and 2013. The City scores and cross-check scores have remained consistent over the past few years. The trend analysis indicates overall stable conditions.

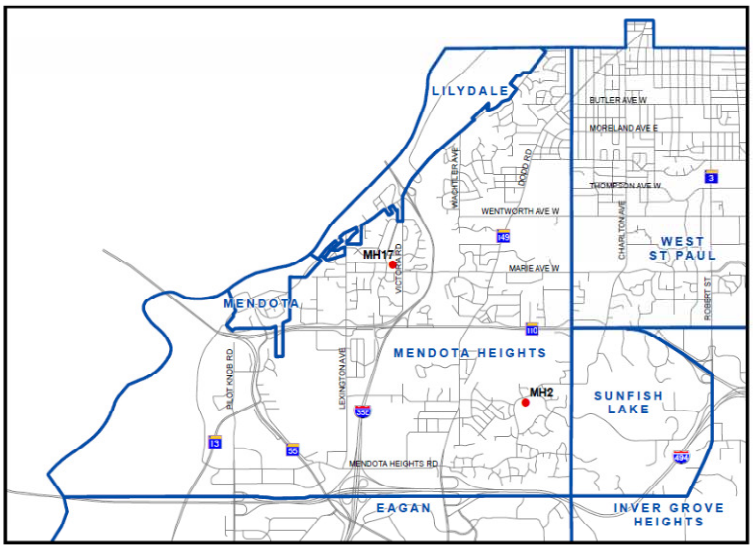
4.7 Mendota Heights Wetlands

In 2013, the Mendota Heights team monitored two wetlands in Mendota Heights. Fourteen wetlands have been monitored in Mendota Heights since the start of the WHEP program.

Team Leader:
Darcy Tatham

Team Members: John Bottomley, James Chastek, Hannah Herzfeld, Noah Herzfeld, Alison Hruby, Jared Pixley, Erica Schwitzer, Jason Skog, Michelle Skog, Mary Stade, Anneliese Tatham, Bob Wright, Jacob Wright, and Micah Zimmerman.

Mendota Heights WHEP Sites Monitored in 2013



Darcy Tatham with Michelle Skog

Mendota Height's team leader, Darcy Tatham, has been part of the program for thirteen plus years. She reflected on the 2013 WHEP season, saying, "Once again this year we were reminded that although we live in urban developed communities, we are intertwined with nature. We went to Copperfield in Mendota Heights in June and found the water level very high, only to come back in two days to very low levels. The reason for this situation was a beaver dam! Beavers had blocked the outlet and then it had been cleared by the city which affected the water levels, all during the time of our monitoring.

I am always thankful for the wonderful volunteers, many of which have participated for several years. I couldn't do this without their help and knowledge. This year we also had several high school students participating. It was great to have their enthusiasm and camaraderie. May this be one of many community involvements for them!

M. Stade

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 City of Mendota Heights places great value on our natural areas and green spaces; especially our wetland habitats. It is a pleasure to be a part of a program that emphasizes wetland health and vitality for the future sustainment of these habitat areas."

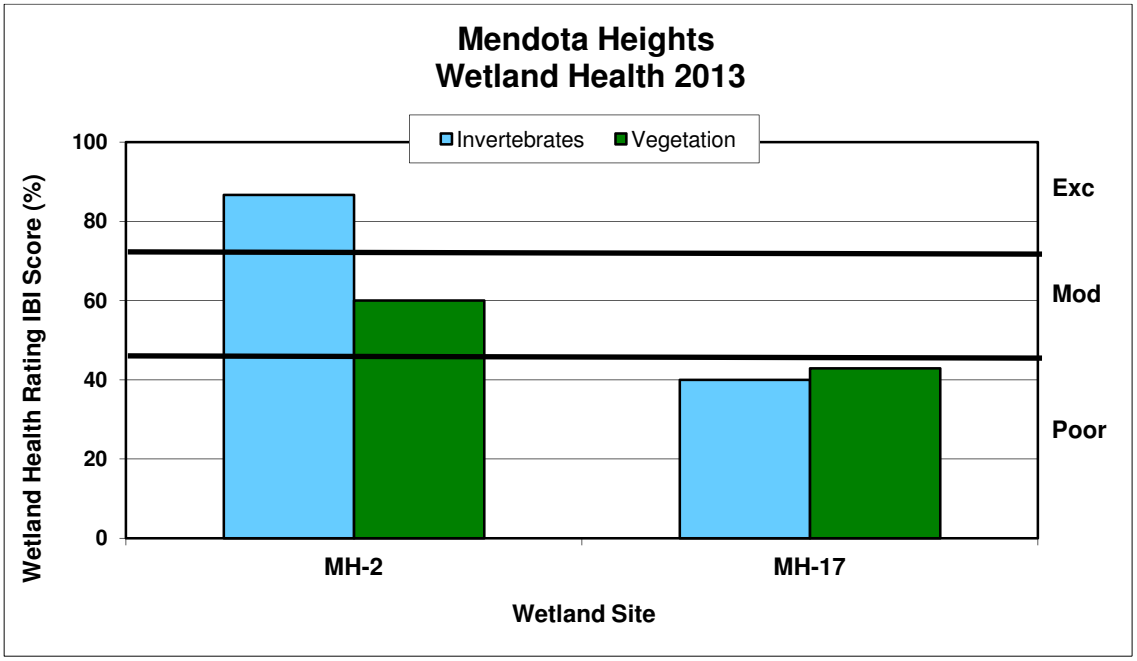
M. Skog, M. Stade, J. Skog, D. Tatham

Ryan Ruzek is the assistant city engineer for the City of Mendota Heights. He has helped coordinate wetlands for monitoring in past seasons. 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 2013 monitoring sites 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 poor to excellent wetland health. MH-2 shows excellent ratings for invertebrate scores for the second year in a row. MH-17 scored poor in both categories. The scores for MH-2 were inconsistent. The invertebrates scored higher than the vegetation.

Figure 4.7 Mendota Heights site scores (percent) for the 2013 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. There is a walking/biking trail around the pond. Water levels were very high during bottle trap setting, but had receded about 20 feet along the bank during bottle trap retrieval two days later (1.5-2.0 foot depth reduction).

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

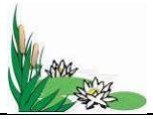
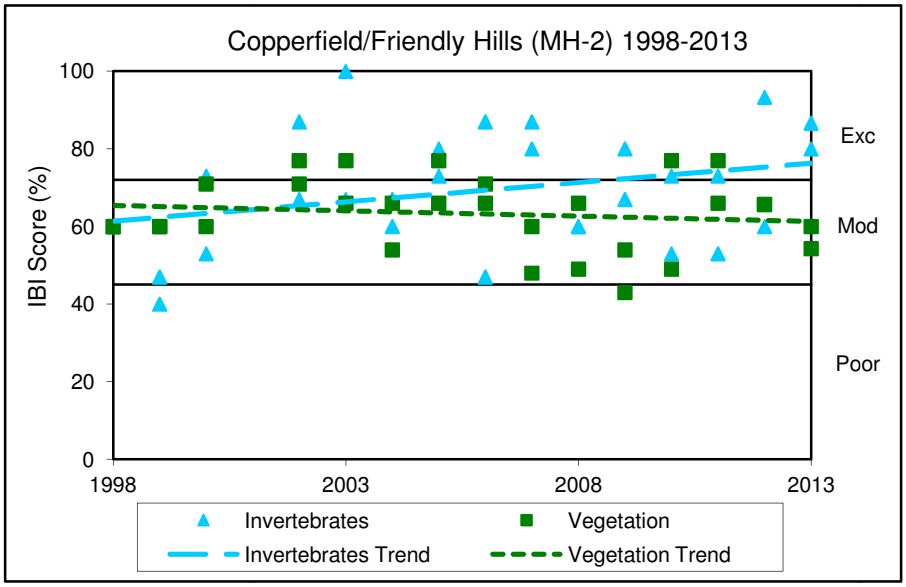
2013 Data (MH-2)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Excellent (26)	Moderate (21)
Cross-check Rating (IBI score)	Excellent (24)	Moderate (19)
Trend 1998-2013	Improving but variable	Stable

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



Site Summary: The long-term trend based on 15 years (12 consecutive years) of data shows improving invertebrate health and relatively stable vegetation health, although there is a lot of variability in the data. The City team calculated a score of excellent for invertebrates in 2013. This is the second year in a row that invertebrates have scored excellent. The cross-check team also scored the invertebrate score as excellent. The City scores were very consistent with the cross-check teams.

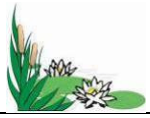
4.7.2 Marie Pond (MH-17)

Marie Pond (MH-17) is a 0.6 acre, type 4 wetland in the Lower Mississippi River watershed. Its watershed is 64.2 acres and 20 percent impervious. The wetland is publicly owned. It is a man-made stormwater retention and treatment pond constructed about 1978-80. It has been unaltered from its original constructed configuration. There are two inlets; one on the south side and one on the northeast corner. There is one outlet in the northeast corner. The wetland is included in the City's storm water management plan and is designated as a PUBF (flooded, unconsolidated bottom) waterbody. It is being monitored for impacts on water quality. The surrounding area is fully developed residential. The wetland is located within a City park which will ideally help educate the public on the advantages of increasing natural buffer width.

Wetland Health

Site Observations: The wetland substrate is extremely mucky with deep mud. The slope is gradual until the cattail edge, and then it sharply drops. Heavy rains occurred on the first morning of the invertebrate sampling dates. The water had a stagnant odor. Many trees surround the pond. Tennis courts, a playground, and a hockey rink are in the nearby area.

Table 4.7.3 Marie Pond (MH-17) Wetland Health based on Index of Biotic Integrity

2013 Data (MH-17)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Poor (12)	Poor (15)
Trend 2013	Not enough data	Not enough data

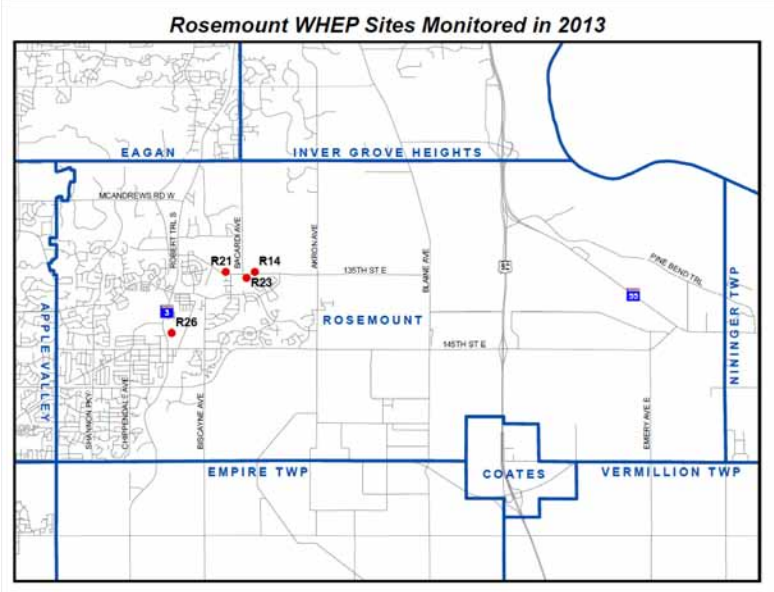
Site summary: This is the first year that MH-17 has been monitored. Both the vegetation and invertebrate scores indicate poor wetland health. Additional years of monitoring Marie Pond will help determine a wetland health trend.

4.8 Rosemount Wetlands

Four wetlands were monitored in the City of Rosemount in 2013. 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, Jane Porterfield, Averie Simon, Andrew Simon, Tom Wilkens, and Denise Wilkens.



Dan Stinnett

Dan Stinnett has been involved in the WHEP program since 2006, and the Rosemount WHEP team leader since 2009. He remarks, "I have enjoyed being a member and lead for the Rosemount WHEP team since 2009. Simply put, the WHEP program offers a new and meaningful outdoor experience to citizens who are interested in their environment. Through the WHEP program, I have an opportunity to share knowledge with others about the importance of wetland resources. My goal as team lead is to help members safely enjoy and appreciate the rigor of science through data collection and analysis. Going about the business of science, while at the same time having fun, is a balance that makes volunteering enjoyable. Speaking of volunteers, the Rosemount WHEP team is fortunate to have a combination of experienced returning members along with enthusiastic new members. Just the right combination of interests in field and laboratory participation help bring a unique strength to the Rosemount WHEP team.

D. Wilkens, B. Berggren

Increased efficiency of services through partnership and volunteerism is a goal of the Rosemount City Council. The Rosemount WHEP team appreciates its role in gathering and disseminating to city officials quality information on wetland resources. Following this past season's early coordination meeting with water resource staff members, the Rosemount WHEP team presented 2012 results at a Rosemount City Council Work Session and then followed-up with a field visit to nearby Erickson Pond. It was great fun to have Mayor Droste, Council members and other city officials join with Rosemount WHEP team members in setting bottle traps and collecting dipnet samples. Thanks go to Mayor Droste, and Council members DeBettignies, Demuth, Shoe-Corrigan, and Weisensel, for their WHEP program support and participation this past year. Water Resource staff members Brotzler and Watson are specially recognized for their positive role in promoting and supporting the Rosemount WHEP program."

The City of Rosemount is very interested in protecting wetlands within the city. Staff uses the WHEP data to assess and monitor the long-term health of these resources. For the past two years, the WHEP program has included ongoing monitoring of Erickson Pond and Wetland following its restoration in 2009. City Staff recently met a group of fifth graders from Rosemount Elementary for a field trip to Erickson Pond and Wetland for their science unit about stormwater. The students were excited about the opportunity to study a wetland up close and learn important information about its function and purpose.

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.

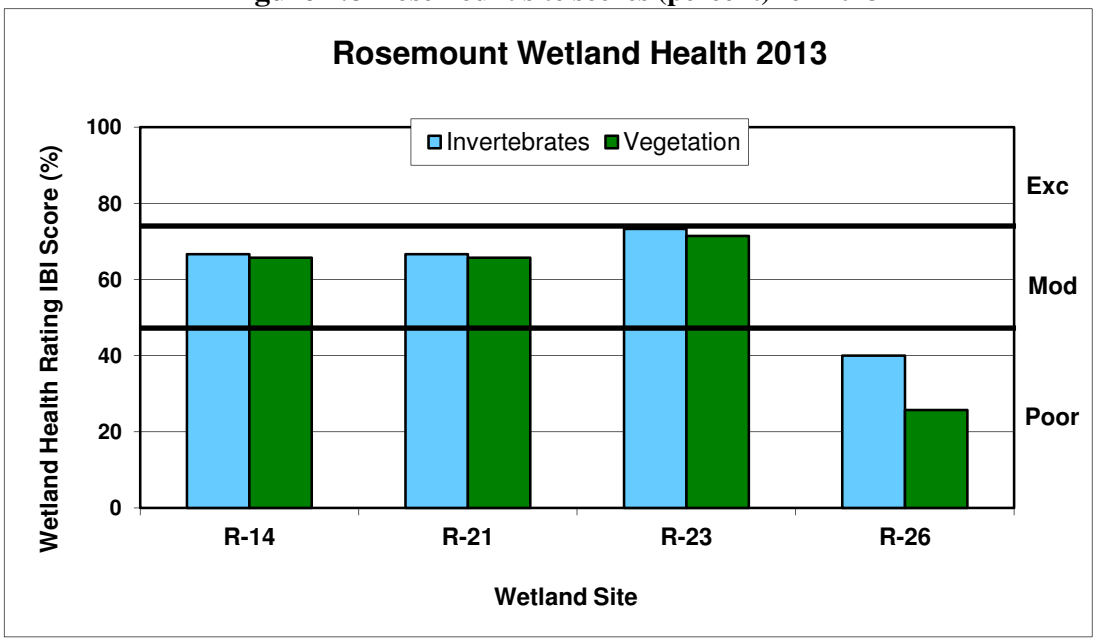
Wetland designation	**Required buffer**
Preserve Wetlands	75 feet
Manage I Wetlands	50 feet
Manage II Wetlands	30 feet
Utilize Wetlands	15 feet in non-agricultural areas only

B. Berggren, B. Carter, D. Stinnett

Rosemount General Wetland Health

Figure 4.8 presents an overall view of wetland health for all the 2013 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 scores for all of the wetlands except R-26 were very consistent between vegetation and invertebrates; however, both categories for R-26 rated the health of the wetland poor.

Figure 4.8 Rosemount site scores (percent) for 2013



4.8.1 WMP #379 (R-14)

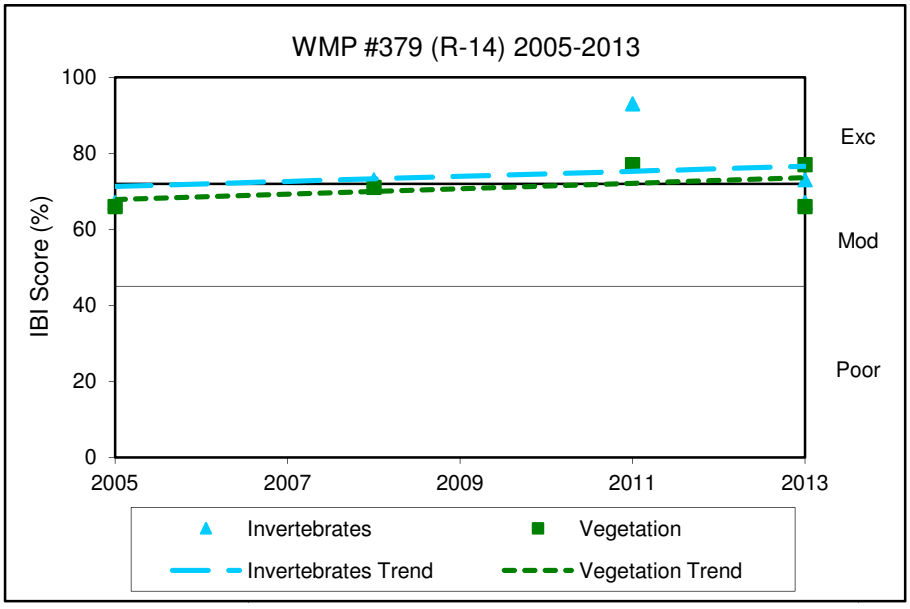
R-14, also known as WMP #379, is a 4.8 acre, type 5 wetland within the White Lake watershed. The watershed is 81 acres with 30 percent impervious surface. R-14 is part of the City's stormwater management plan and is designated to preserve with a management goal to maintain high quality wetland. The surrounding area includes agriculture to the north and residential devopment to the south.

Site Observations: This wetland has a gentle slope, and a solid but muddy bottom. Vegetation is dense. A bird nest was found in the cattails.

Table 4.8.1 WMP #379 (R-14) Wetland Health based on Index of Biotic Integrity

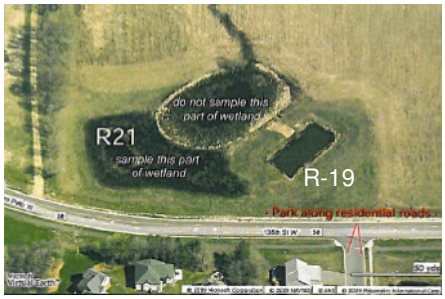
2013 Data (R-1)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (20)	Moderate (23)
Cross-check Rating (IBI score)	Moderate (22)	Excellent (27)
Trend 2005-2013	Stable but variable	Stable

Figure 4.8.1 Invertebrate and vegetation trends for WMP #379 (R-14)



Site summary: This is the fourth time that WMP #379 has been surveyed since 2005. The health scores have remained fairly consistent. The health trends for both the vegetation and invertebrates appear to be stable, with the exception of the high invertebrates score in 2011. More years of monitoring will help better clarify the trends.

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



CR-38 Mitigation Site 1 (R-21) is a 1.7 acre, type 3 wetland in the Keegan Lake watershed. The watershed is 1,530 acres and 30 percent impervious. The wetland has one inlet on the east side which receives stormwater overflow from a storm pond. There are no outlets. R-21 is included in the City's stormwater management plan. It is designated as Manage II, and is managed to maintain the wetland without any loss of its functions or values.

R-21 is a depressional shallow marsh wetland. The southern portion of this wetland complex was constructed as mitigation for impacts to other wetlands as a result of street reconstruction, and is an extension of an existing wetland dominated by reed canary grass. The nutrient loading from adjacent agriculture and reed canary grass impede upon this wetland. This year will mark the fourth in many monitoring seasons to determine the performance of constructed mitigation wetlands in the City of Rosemount.

Site Observations: This wetland has a gentle slope and a solid substrate with sand beneath silt. It has a cattail and reed canary grass perimeter.

Table 4.8.2 CR-38 Mitigation Site 1 (R-21) Wetland Health based on Index of Biotic Integrity

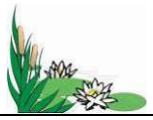
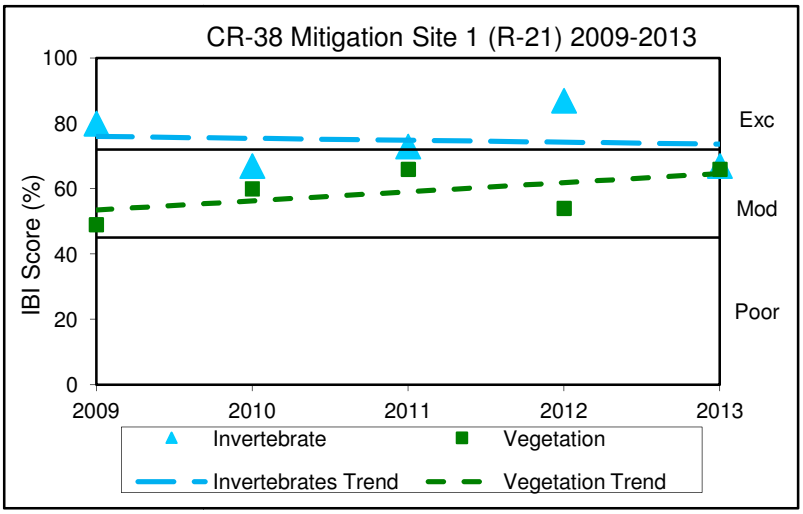
2013 Data (R-21)	**Invertebrates** 	**Vegetation** 
Wetland Health Rating (IBI score)	Moderate (20)	Moderate (23)
Trend 2009-2013	Stable	Improving slightly

Figure 4.8.2 Invertebrate and vegetation trends for CR-38 Mitigation Site 1 (R-21)



Site summary: This is the fifth consecutive year that this site has been monitored. The 2013 scores are very consistent with both scoring moderate. The vegetation trend line indicates a slight improvement in health, and the vegetation score has rebounded from 2012. The invertebrate scores are variable, but the

trend line indicates stable wetland health. Additional monitoring is needed to determine a wetland health trend.

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

CR-38 Mitigation Site 2 (R-23) is 0.3 acre, type 3 wetland in the White Lake Watershed. The watershed is 998 acres of which 30 percent is impervious surface. The subwatershed is 81 acres. There are no inlets or outlets. This wetland is not part of the City's stormwater management plan. It was created in 2008 after the plan was developed. The wetland management goal is to maintain the wetland without any loss of function and value, and to monitor the success of this wetland's creation.

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

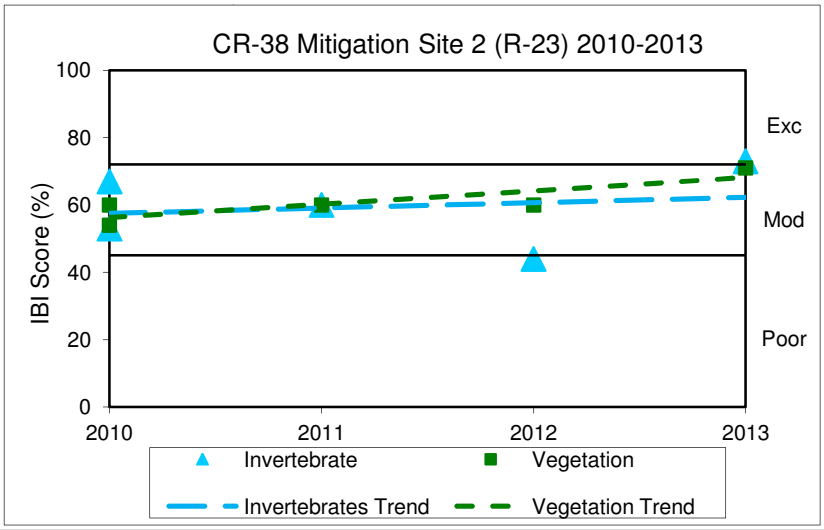
Wetland Health

Site Observations: This wetland has a gentle slope and a firm, sandy substrate. Cattail lines the shoreline. A bike path runs along the west of the wetland. Mare Pond is to the east.

Table 4.8.3 CR-38 Mitigation Site 2 (R-23) Wetland Health based on Index of Biotic Integrity

2013 Data (R-23)	**Invertebrates** 	**Vegetation** 
Wetland Health Rating (IBI score)	Moderate (22)	Moderate (25)
Trend 2010-2013	Not enough data	Not enough data

Figure 4.8.3 Invertebrate and vegetation trends for CR-38 Mitigation Site 2 (R-23)



Site summary: This is the fourth consecutive year that R-23 has been monitored. The vegetation and invertebrate scores were both moderate (nearly excellent) and consistent in 2013. The vegetation score appears quite stable showing a slight incline in health trend. The invertebrate scores are variable throughout the years of monitoring, but with limited data, the trend appears stable. Additional monitoring is needed to determine a wetland health trend.

4.8.4 Erickson Pond (R-26)

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

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

Wetland Health

Site Observations: The wetland has a gentle slope. The substrate is firm but slippery. Bulrush, cattail, smartweed, and reed canary grass are present.

Table 4.8.4 Erickson Pond (R-26) Wetland Health based on Index of Biotic Integrity

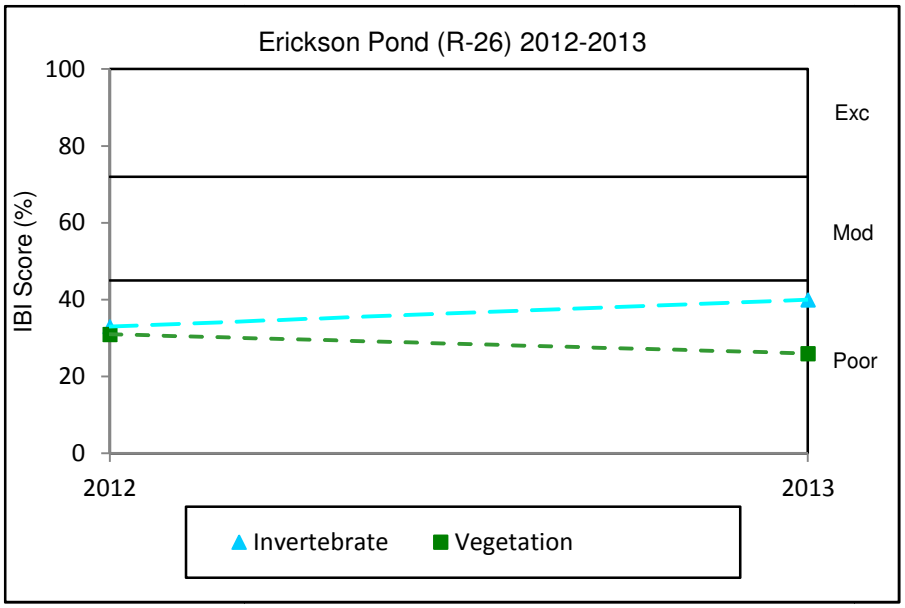
2013 Data (R-26)	**Invertebrates** 	**Vegetation** 
Wetland Health Rating (IBI score)	Poor (12)	Poor (9)
Trend 2012-2013	Not enough data	Not enough data

Jane Porterfield

Back: Andi Moffat (WSB & Associates), Rosemount Council members Mark DeBettignies, and Jeff Weisensel
Front: WHEP team members J. Porterfield, B. Carter, and D. Stinnett

Avery Simon, Andrew Simon, and Rosemount Mavor Bill Droste

Figure 4.8.4 Invertebrate and vegetation trends for Erickson Pond (R-26)



Site summary: This is the second consecutive year that R-26 has been monitored. The wetland scores are consistent. Both invertebrates and vegetation scored poorly, like in 2012. More data is necessary to determine health trends. It will be interesting to continue monitoring this wetland to determine if the invasive species control, prairie buffer and stormwater treatment efforts improve the wetland health.

4.9 South St. Paul Wetlands

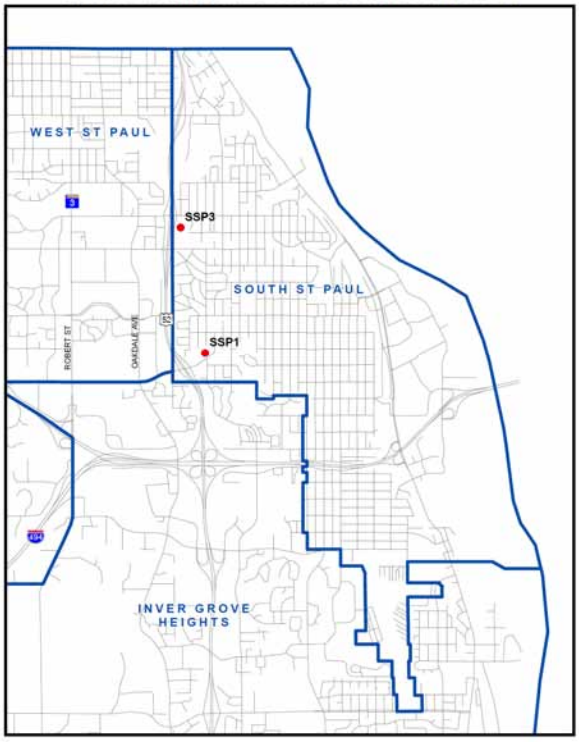
Two wetlands were monitored in South St. Paul in 2013 by the South St. Paul team. Three wetlands have been monitored in South St. Paul since the start of the WHEP program. This is the second year that South St. Paul has had a City team of its own to monitor it, though the Mendota Heights team leader led the monitoring in 2013.

Team Leader:
Darcy Tatham

Team Members: John Bottomley, James Chastek, Hannah Herzfeld, Noah Herzfeld, Alison Hruby, Jared Pixley, Erica Schwitzer, Jason Skog, Michelle Skog, Mary Stade, Anneliese Tatham, Bob Wright, Jacob Wright, and Micah Zimmerman.

M. Skog

South St Paul WHEP Sites Monitored in 2013



John Sachi

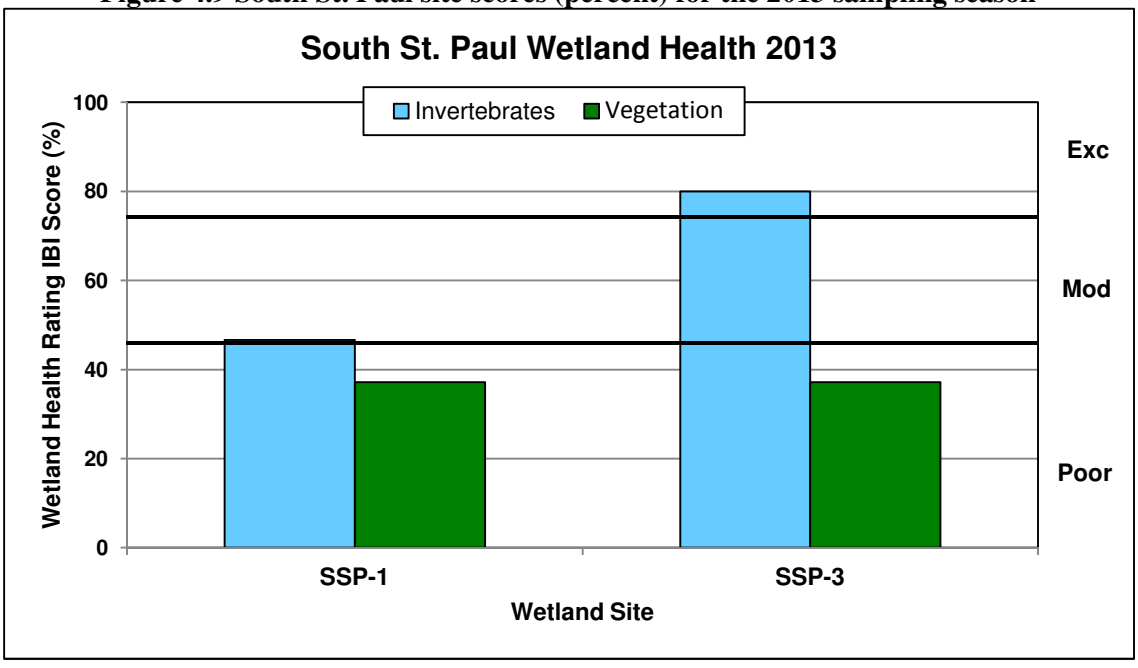
John Sachi is the City of South St. Paul contact for WHEP. He is the City Engineer for South St. Paul, as well as, the Secretary/Treasurer for the Lower Mississippi River Watershed Management Organization (LMRWMO). South St. Paul has been involved in WHEP since 2003. John has worked with the City Council 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

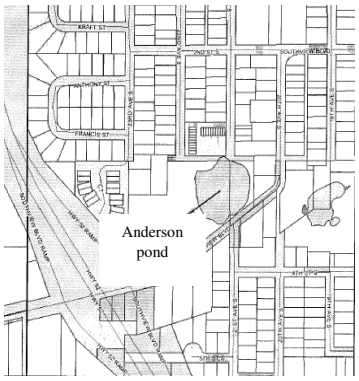
Figure 4.9 presents an overall view of wetland health for all of the 2013 monitoring sites in South St. Paul based on the IBI scores for invertebrates and vegetation presented as a percent. Figure 4.9 also illustrates the consistency between the IBI scores (in percent form) for each wetland sampled. 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 wetland ratings ranged from poor to excellent wetland health. The invertebrates and vegetation scores for SSP-3 were very inconsistent with the invertebrates scoring excellent and the vegetation scoring poor. SSP-1 scored poor in both categories.

D. Tatham, J. Skog

Figure 4.9 South St. Paul site scores (percent) for the 2013 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 cell was created near the northwest inlet in order to facilitate future dredging and other maintenance activities. 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 mucky. A lot of cattail and jewelweed is present. Litter is also present.

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

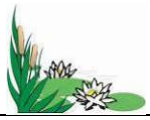
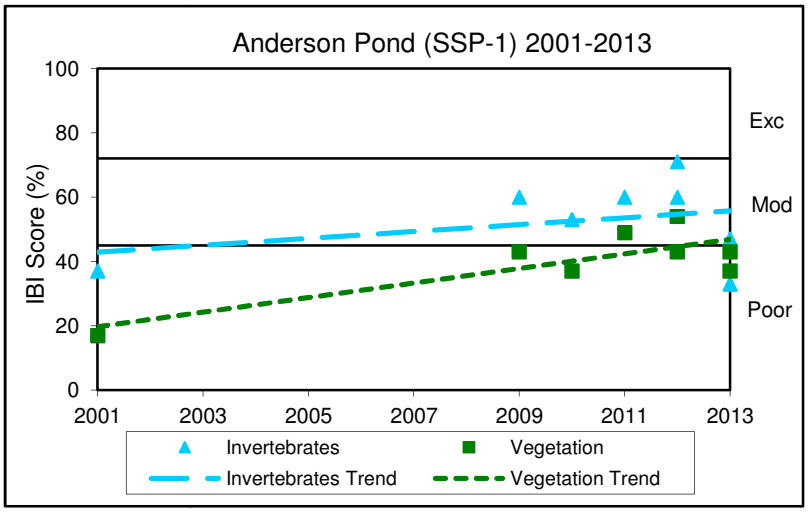
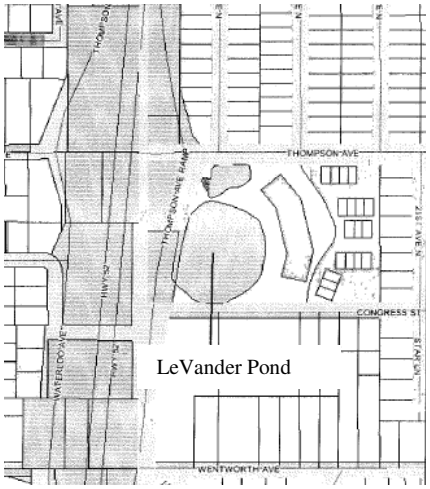
2013 Data (SSP-1)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Poor (14)	Poor (13)
Cross-check Rating (IBI score)	Excellent (24)	Poor (13)
Trend 2001-2013	Improving	Improving

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



Site Summary: This is the fifth consecutive year that SSP-1 has been monitored, and the sixth time monitored overall since 2001. For most years, the scores have remained much higher than in 2001; however, in 2013 the invertebrate score dropped down to 2001 level. Additional data is needed to confirm a health trend. The vegetation scores between the City team and cross check team were very consistent. The cross-check team had a higher invertebrates score than the City team. The cross-check team collected a larger diversity of invertebrates. Trends show an overall improvement for both vegetation and invertebrates since 2001; however, scores have been fairly stable since 2009.

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.

LeVander Pond vegetation plot area

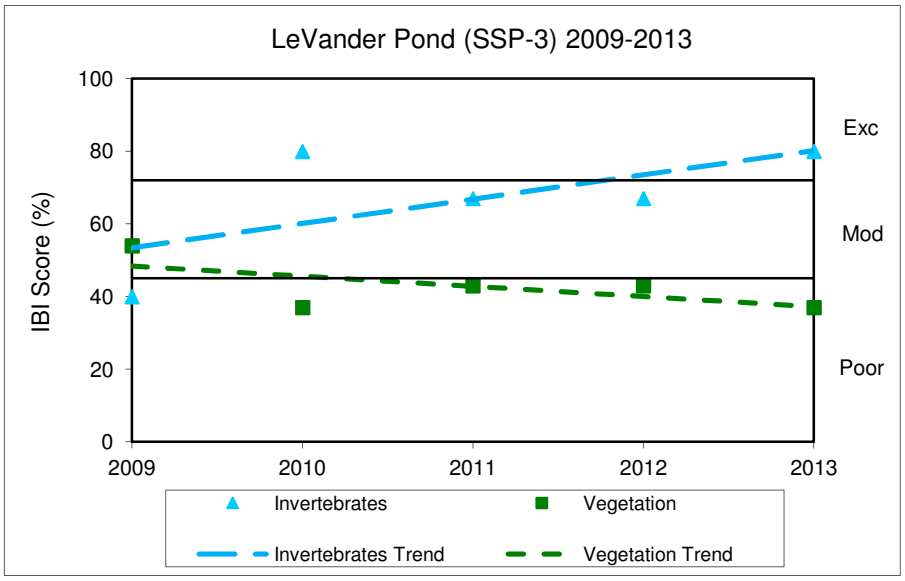
Wetland Health

Site Observations: The wetland slope is gradual and easy to enter. The substrate is sandy with a little muck, but firm and easy to walk. The water level was much lower than in the past. There were several fallen trees. Cattails and reed canary grass were present, and duckweed and *Wolfia* covered the entire surface of the pond. Heavy tree cover (willow, cottonwood, buckthorn) exists on the north and south side of the wetland, and condominiums and a large retaining wall on the east side. A frontage road runs along the west.

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

2013 Data (SSP-3)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Excellent (24)	Poor (13)
Trend 2009-2013	Improving	Stable

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



Site summary: This is the fifth consecutive year of monitoring LeVander Pond (SSP-3). The initial data indicates opposite trends for vegetation and invertebrate scores. The vegetation and invertebrates scores have been inconsistent over the course of monitoring and, especially in 2013. The invertebrates scored excellent while the vegetation scored poor. With limited data, the vegetation scores appear to be stable the past few years. Additional monitoring is recommended to determine the health of this wetland and identify solid trends.

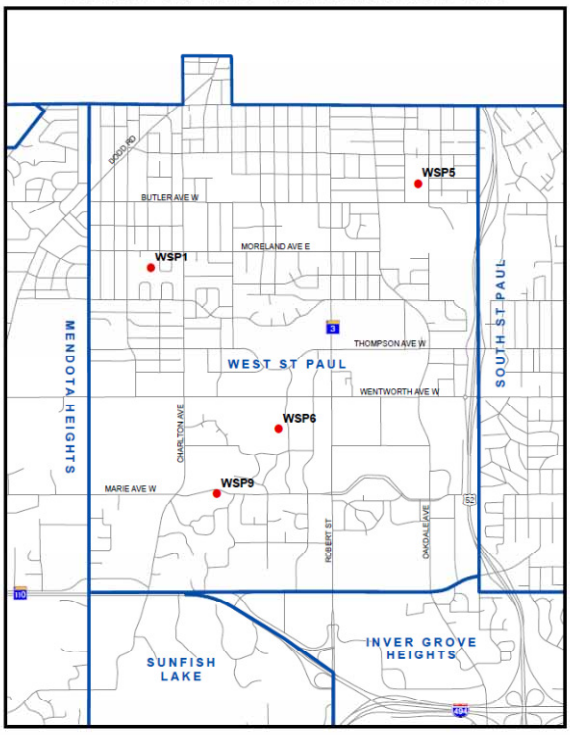
4.10 West St. Paul Wetlands

Four wetlands were monitored in West St. Paul in 2013 by the West St. Paul team. Nine wetlands have been monitored in West St. Paul since the start of the WHEP program; however this is the first 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 Erik Schilling

Team Members: Mara Brettner, Jeanette Fordyce, Jeannette Henrikssen, Michael Kuchera, Tim Martin, and Annette Sherer.

West St Paul WHEP Sites Monitored in 2013



Maggie Karschnia

This is Maggie's first year as team leader of West St. Paul; though she has been involved in WHEP for a total of seven years (including three years in Hennepin County). She recalls several entertaining stories/learning experiences for the year. One event stands out. On a visit to Marthaler Park, she and her team members were carefully collecting macroinvertebrate bottletraps. To be sure that they wouldn't spill their samples, they worked over their collection tray while in the water. However, this particular day, they found themselves in a predicament…while retrieving the bottletraps, their collection tray floated away…twenty feet or more into the deeper water. Luckily, they could safely retrieve the tray and complete the collection for the day. Maggie expressed, "the West St. Paul volunteers were great. They were dedicated and showed up to all of the sites. I couldn't have asked for a better group."

Erik Schilling

This was Erik Schilling's first year as team leader of West St. Paul and also his first year being involved with the WHEP program. Erik is a recent graduate of the Environmental Sciences, Policy, and Management program at the University of Minnesota. Although, most of his background and field experience is in Forest Ecology he thoroughly enjoyed learning about the ecology of wetlands. More specifically, he enjoyed the challenge of identifying microinvertebrates and field assessment with the West St. Paul volunteers. A highlight was interacting with property owners adjacent to the wetlands surveyed and getting a glimpse into how much these citizens care for the health of their wetland.

Matt Saam

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 leader.

West St. Paul General Wetland Health

Figure 4.10 presents an overall view of wetland health for all of the 2013 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.

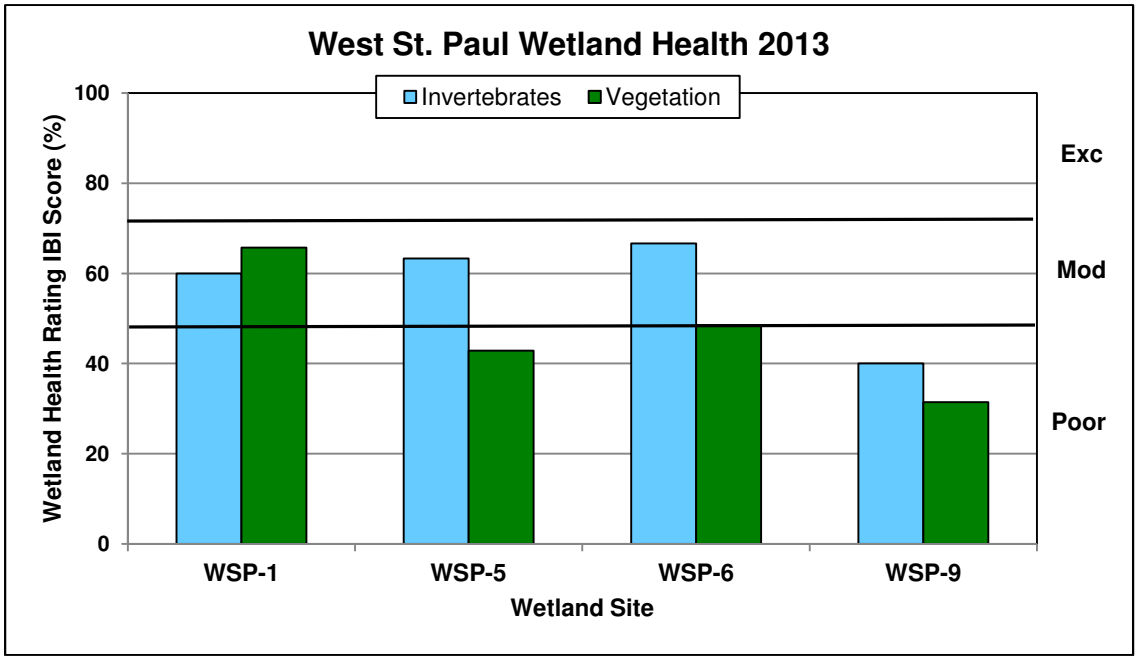
Erik Schilling with T. Martin

Based on the IBI scores, a wetland health rating is assigned as excellent, moderate or poor. The West St. Paul wetland ratings ranged from poor to moderate wetland health. The invertebrates and vegetation scores for WSP-5 and WSP-6 were inconsistent. Both wetlands scored moderate for invertebrates and poor for vegetation.

M.Karschnia. J.Henrikssen, E.Schilling, M.Kuchera, T.Martin

E.Schilling, T.Martin, J.Henrikssen, M.Brettner

Figure 4.10 West St. Paul site scores (percent) for the 2013 sampling season



4.10.1 Mud Lake (WSP-1)

Mud Lake (WSP-1) 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 and is designated as a RW7P wetland.

Wetland Health

Site Observations: The wetland slope is gentle, and the substrate is mucky with rocks. The wetland is very vegetated, and cattails, duckweed, and water lilies are present. Mud Lake is located within a residential

neighborhood. The vegetation plot was set on the side of the wetland near a small park which had been recently mowed.

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

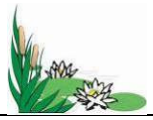
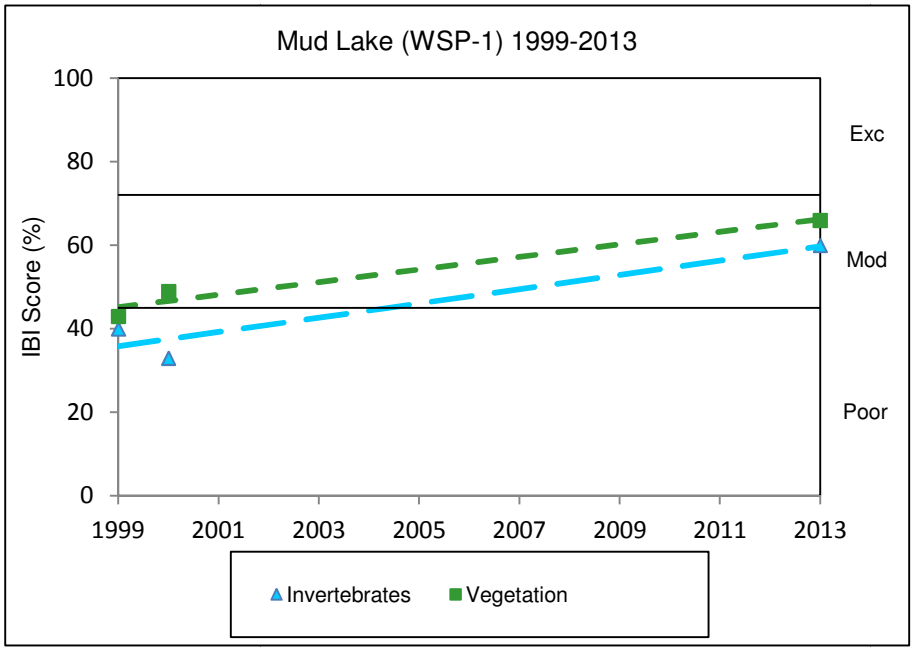
2013 Data (WSP-1)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Poor (18)	Poor (23)
Trend 1999-2013	Not enough data	Not enough data

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



Site Summary: This is the third year that WSP-1 has been monitored; however, it has not been monitored since 2000. In 2013, the vegetation and invertebrate data was consistent. It appears to be improving, but additional data is needed to determine a health trend.

4.10.2 Lilly Lake (WSP-5)

Lilly Lake (WSP-5), 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 and is designated as a RW-24P wetland.

Wetland Health

Site Observations: The wetland has a gentle slope, and the substrate is mucky with a lot of course, woody debris. It is 20 percent covered in algae. A lot of litter is present.

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

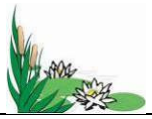
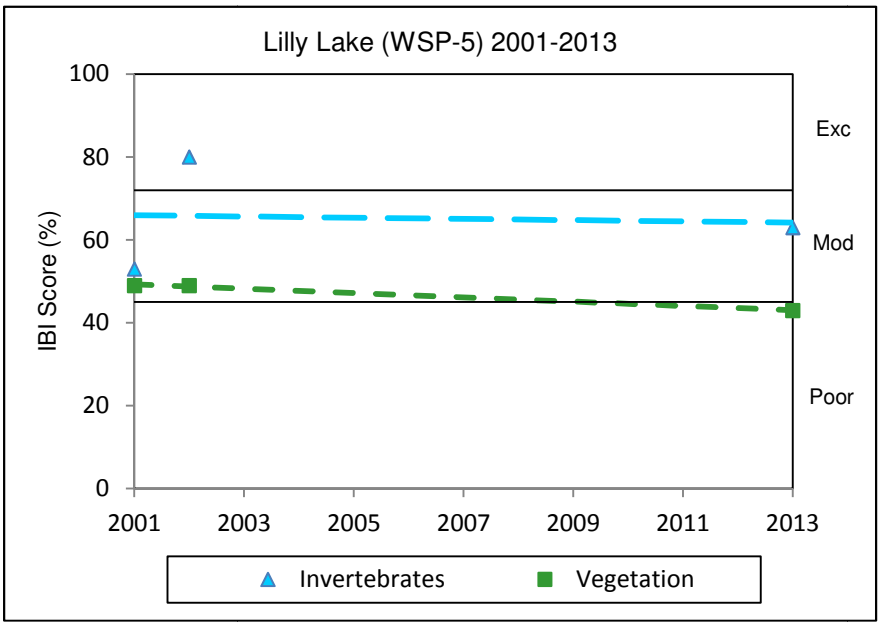
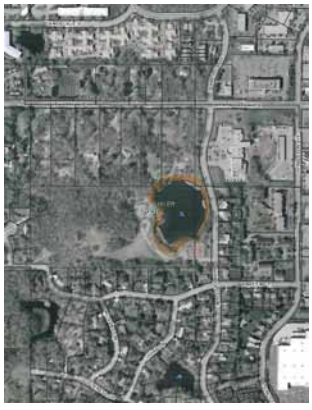
2013 Data (WSP-5)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (20)	Poor (15)
Trend 2009-2013	Not enough data	Not enough data

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



Site summary: This is the third year of monitoring Lilly Lake; however, it has not been monitored since 2002. In 2013, the vegetation and invertebrate data was inconsistent. With limited data, the invertebrate scores are variable while the vegetation scores seem rather stable since initial monitoring. Additional data is needed to determine a health trend.



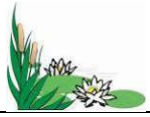
4.10.3 Marthaler Park (WSP-6)

Marthaler Park (WSP-6) is a 4.5 acre, type 2 wetland within the Simons Ravine District. The drainage area is 23 acres. It is publicly owned. It has an inlet on the west side, an inlet on the east side, but does not have an outlet. It is part of the City's stormwater management plan. It is designated as a SR4P wetland.

Wetland Health

Site Observations: The wetland slope is gentle, and has a firm, sandy bottom. It is surrounded by a City Park. Buckthorn is in the area.

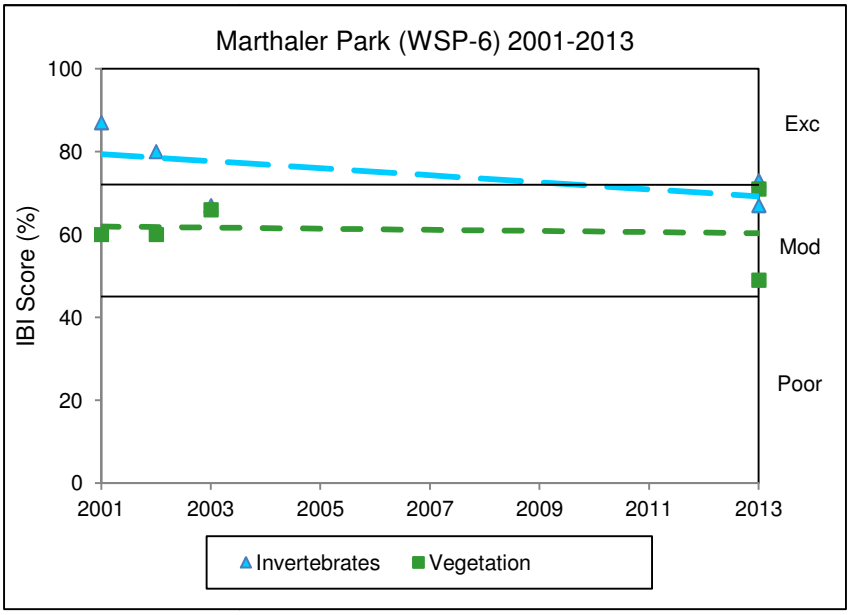
Table 4.10.3 Marthaler Park (WSP-6) Wetland Health based on Index of Biotic Integrity

2013 Data (WSP-6)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (20)	Moderate (17)
Cross-check Rating (IBI score)	Moderate (22)	Moderate (25)
Trend 2001-2013	Not enough data	Not enough data

T. Martin

M.Brettner. J.Henrikssen, E.Schilling

Figure 4.10.3 Invertebrate and vegetation trends for Marthaler Park (WSP-6)



Site Summary: This is the fourth year that WSP-6 has been monitored; however, it has not been monitored since 2003. In 2013, both categories scored moderate for both the City team and cross-check team. Vegetation scores between the City team and cross-check team were inconsistent. The cross-check team identified a larger diversity of vegetation in their plot. Additional data is needed to determine a health trend.

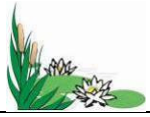
4.10.4 Marie Avenue (WSP-9)

Marie Avenue (WSP-9), is a four acre, type 3 wetland within the Highway 110/Interstate 494 drainage area. Its watershed is 15 acres. It is privately owned. There is one inlet on the north side and one outlet on the east side of the wetland. It is part of the City's stormwater management plan. It is designated as an A2P wetland.

Wetland Health

Site Observations: The wetland has a steep slope, and a mucky bottom. The entire wetland is taken over by cattail.

Table 4.10.4 Marie Avenue (WSP-9) Wetland Health based on Index of Biotic Integrity

2013 Data (WSP-9)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Poor (12)	Poor (11)
Trend 2013	Not enough data	Not enough data

Site summary: This is the first year of monitoring Marie Avenue. The vegetation and invertebrate scores were consistent. The scores for both categories indicate poor wetland health. Additional data is needed to determine a health trend.