Wetland Health Evaluation Program

Dakota County

2012 Final Report

2012 Wetland Health Evaluation Program Report
Dakota County, MN

Coordinated By:

Dakota County

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Report
Prepared by:

FORTIN CONSULTING, INC.
serving the environment

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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
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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 Water Resources Department or visit ***www.mnwhep.org.***

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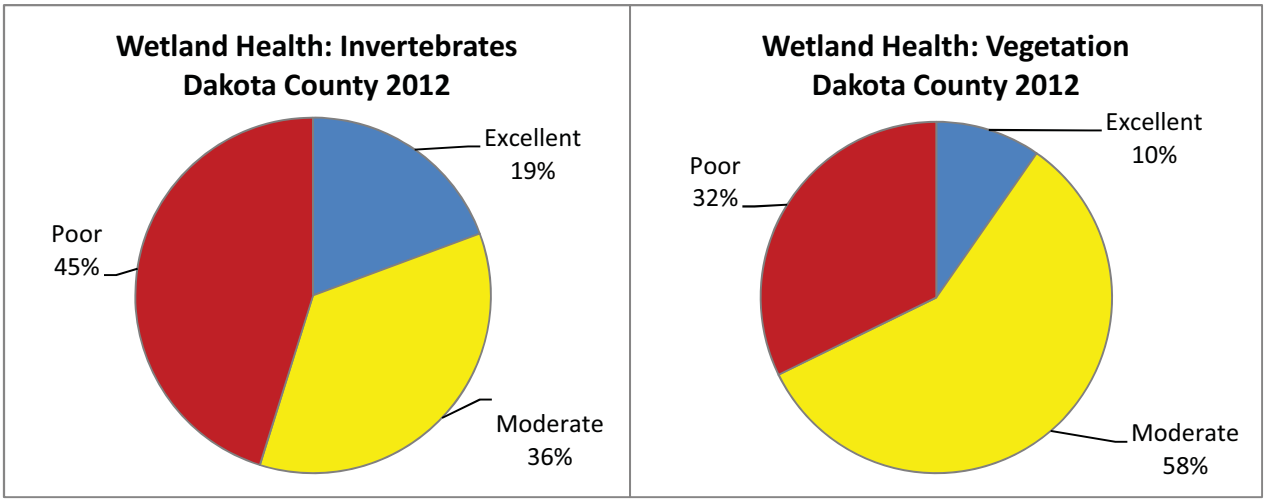
Executive Summary
Dakota County Wetland Health Evaluation Program 2012

Dakota County began sponsoring the Wetland Health Evaluation Program (WHEP) in 1997. Since then, 160 wetlands have been monitored by many volunteers across the County. In 2012, nine cities participated in WHEP, monitoring 31 different wetlands. Five of these wetlands were monitored for the first time in 2012. 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.



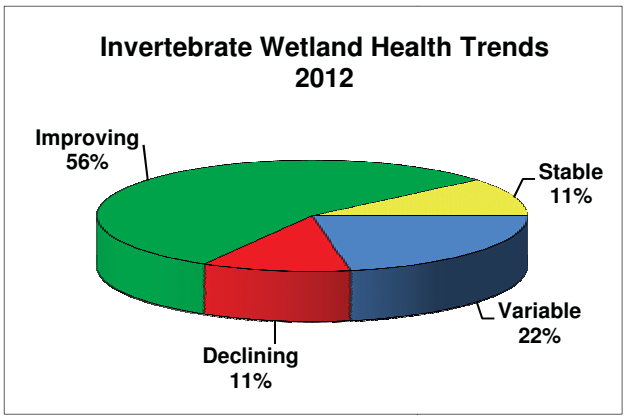
The results of the monitoring for 2012 showed a variety of wetland conditions. The Index of Biotic Integrity was used to determine wetland health ranging from poor to excellent. The majority of wetlands were in the poor category for macroinvertebrates (45%) and the moderate category for vegetation (58%); though more wetlands were in the excellent category for invertebrates (19%) than for vegetation (10%). Six wetland sites rated excellent for macroinvertebrates and three wetland sites rated excellent for vegetation. This has increased since 2011.

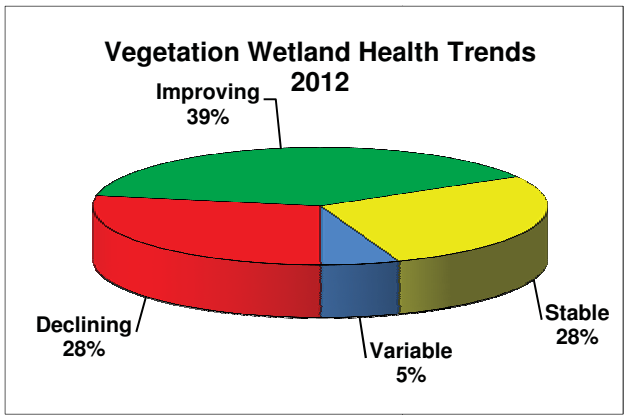
The City of Mendota Height's Copperfield (MH-2) had the highest score for invertebrates (28), and the City of Lakeville's DNR 387 (L-7) had the highest score for vegetation (31). AV-13, E-34, L-8, MH-16, and R-21 also scored excellent for invertebrates; while H-6 and MH-16 also scored excellent for vegetation. Sand Coulee (H-30) in Hastings had the lowest invertebrate score (8). Alimagnet (AV-10) in Apple Valley had the lowest vegetation score (9).

A trend analysis was conducted for all of the wetlands monitored in 2012 that had enough data to analyze trends. For invertebrates, 56% of wetlands appear to be improving while 11% are declining. For vegetation, 39% of the wetlands showed improved wetland health while 28% 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.

2012 Dakota County Wetland Health Trends*





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

In 2012, 110 Dakota County WHEP volunteers (five of which volunteered on two teams) donated 1,917 hours in training, sample collection and sample identification in completion of this valuable monitoring. It gives citizens an opportunity to study the wetlands in their communities and see the impacts of human disturbance on our wetlands, and it provides valuable data to the cities and County. The data collected by the WHEP volunteers can be used for many purposes such as, to help track changes in wetlands over time and relate to changes in the watershed, help identify high quality wetlands that may need protection, track changes in wetland health with restoration projects, evaluate the success of wetland creation or impacts of new stormwater input, and to help find invasive species that threaten the wetlands. WHEP is a great example of a successful cooperative program between citizens, cities, counties and state government.

1.0 Background

1.1 The Wetland Health Evaluation Program (WHEP)

The Wetland Health Evaluation Program (WHEP) is a volunteer monitoring program for wetlands. 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 that WHEP is an ideal example of civic engagement. People spend their summers learning about their neighborhood wetlands, identifying plants and macroinvertebrates, monitoring the wetlands and reporting the data, and telling others - from city staff to their friends and neighbors - about the value and health of those wetlands. They recruit their family members and friends to volunteer, too. In turn, cities combine WHEP data with other study results and form conclusions about how land use changes impact water resources.

Mary Kay Lynch

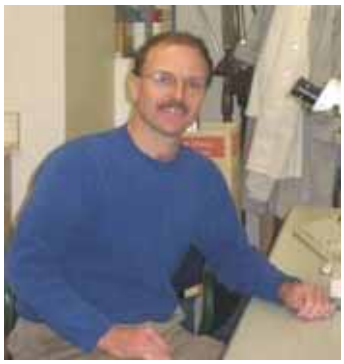
Mary Kay Lynch is the WHEP Field Monitoring Coordinator. She has a master's degree in biology and taught biology for 22 years, 20 of which were in Dakota County. She was a team leader in the pilot program as it was developed by Judy Helgen of the MPCA. She served as the Burnsville team leader for five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

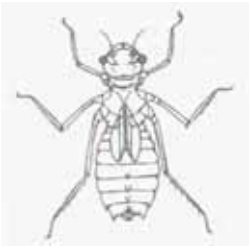
Vegetation Index of Biological Integrity (IBI)

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 provided Quality Control (QC) review of the completed data sheets in 2012. This review identifies and corrects errors in scoring, transfer

Back: Roman Rowan, Nancy Mulhern. Blake Fortin, Connie Fortin; Front: Carolyn Dindorf, Caitlin Fortin, Katie Farber

of data, and data analysis.

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 2012, Fortin Consulting cross-checked the vegetation plots of three wetlands, one in Apple Valley (AV-1), Burnsville (B-1), and South St. Paul (SSP-1). Fortin Consulting also reviewed the invertebrate samples from sites AV-1, B-1, E-33, F-7, H-6, L-8, MH-2, R-26, and SSP-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 dissolved oxygen 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 2012 Sampling Season Results

During the 2012 sampling season, nine citizen teams monitored 31 wetlands in eleven cities in Dakota County (Apple Valley, Burnsville, Eagan, Farmington, Hastings, Lakeville, Lilydale, Mendota Heights, Rosemount, South St. Paul, and West St. Paul). Nine of these wetlands were sampled twice through citizen cross-checks. Three wetland vegetation samples and nine invertebrate samples were checked for accuracy through the Fortin Consulting quality control check.

Figure 3.1.1 Dakota County Wetland Ratings

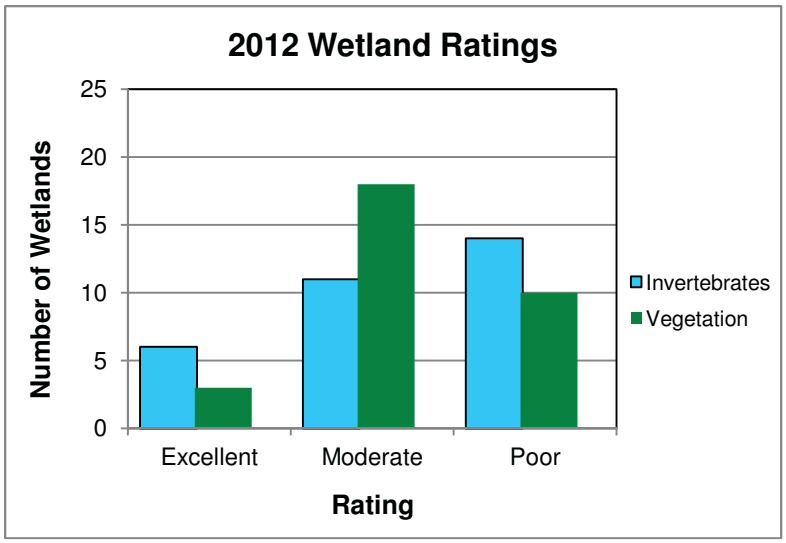


Figure 3.1.1 and Table 3.1.1 show the vegetation and invertebrate ratings for all of the wetlands assessed during the 2012 sampling season. Based on vegetation scores, three of the wetlands rated excellent, 18 of the wetlands were rated moderate, and ten rated poor. Vegetation scores ranged from nine to 31 out of a maximum of 35 points.

The invertebrate analysis resulted in six wetlands rating excellent, eleven rating moderate and 14 poor. Invertebrate scores ranged from 8 to 28 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.

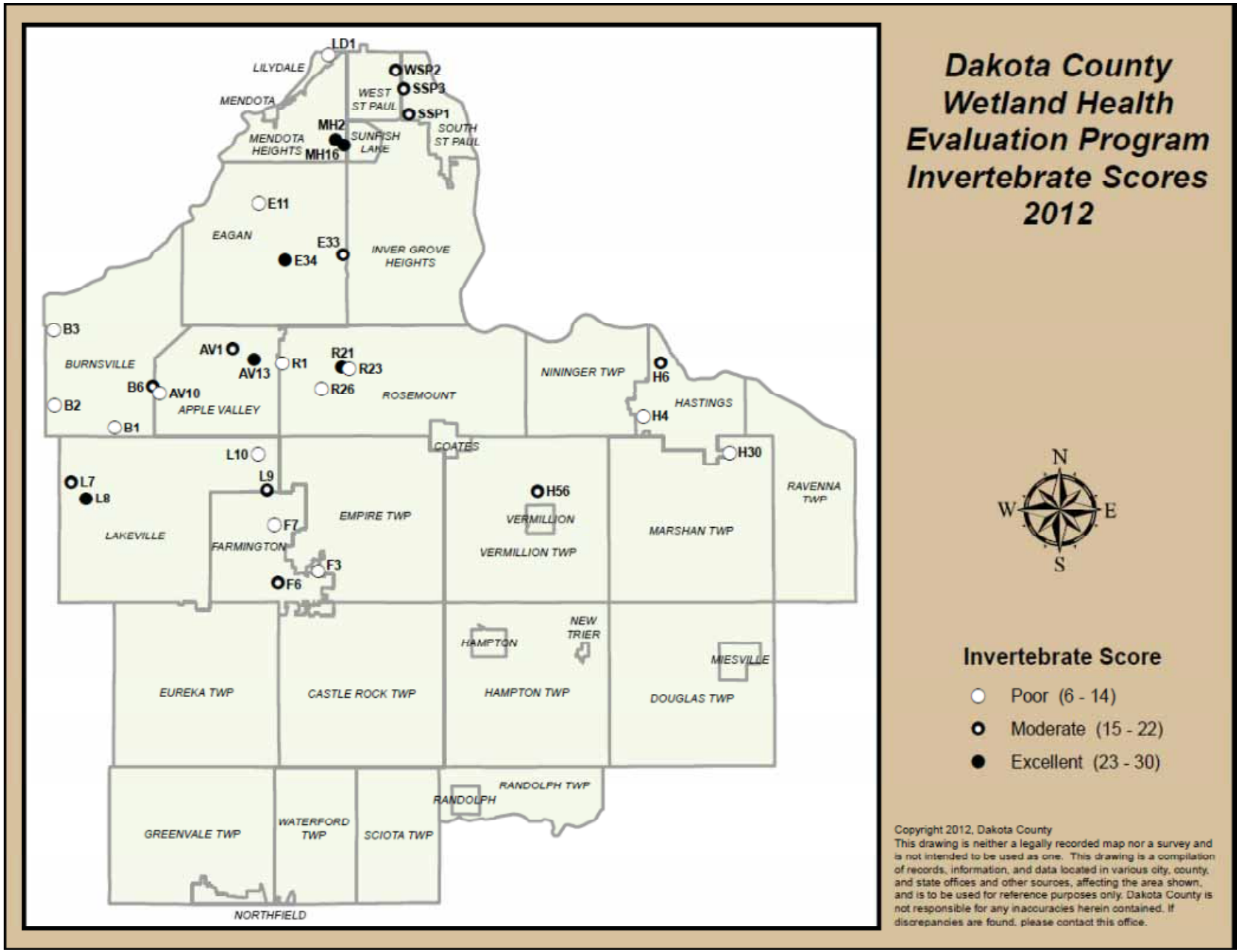
Table 3.1.1 Wetland Ratings by City Based on IBI Scores
Values are listed as number of wetlands rated in each category for Invertebrates/Vegetation

City	Poor	Moderate	Excellent
Apple Valley (AV)	1/2	1/1	1/0
Burnsville (B)	3/1	1/3	0/0
Eagan (E)	1/0	1/3	1/0
Farmington (F)	2/1	1/2	0/0
Hastings (H)	2/1	2/2	0/1
Lakeville (L)	1/2	2/1	1/1
Lilydale (MH)	1/0	0/1	0/0
Mendota Heights (MH)	0/0	0/1	2/1
Rosemount (R)	3/1	0/3	1/0
South Saint Paul (SSP)	0/2	2/0	0/0
West Saint Paul (MH)	0/0	1/1	0/0
Totals	**14/10**	**11/18**	**6/3**

Figures 3.1.2 and 3.1.3 show the distribution of wetland health ratings for each of the sites monitored in 2012.

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

Figure 3.1.2


Dakota County
Wetland Health
Evaluation Program
Invertebrate Scores
2012
LD1
LILYDALE
WSP2
SSP3
WEST ST PAUL
MENDOTA
SSP1
SOUTH ST PAUL
MH2
MENDOTA HEIGHTS
MH16
SUNFISH LAKE
E11
EAGAN
E33
E34
INVER GROVE HEIGHTS
B3
AV1
AV13
R1
R21
R23
R26
BURNSVILLE
B6
AV10
APPLE VALLEY
B2
B1
ROSEMOUNT
NININGER TWP
H6
HASTINGS
H4
COATES
H30
L10
L9
L7
L8
H56
RAVENNA TWP
F7
EMPIRE TWP
VERMILLION
LAKEVILLE
FARMINGTON
F3
F6
VERMILLION TWP
MARSHAN TWP
NEW TRIER
HAMPTON
MIESVILLE
EUREKA TWP
CASTLE ROCK TWP
HAMPTON TWP
DOUGLAS TWP
RANDOLPH TWP
RANDOLPH
GREENVALE TWP
WATERFORD TWP
SCIOTA TWP
NORTHFIELD
N
W
E
S
Invertebrate Score
Poor (6 - 14)
Moderate (15 - 22)
Excellent (23 - 30)
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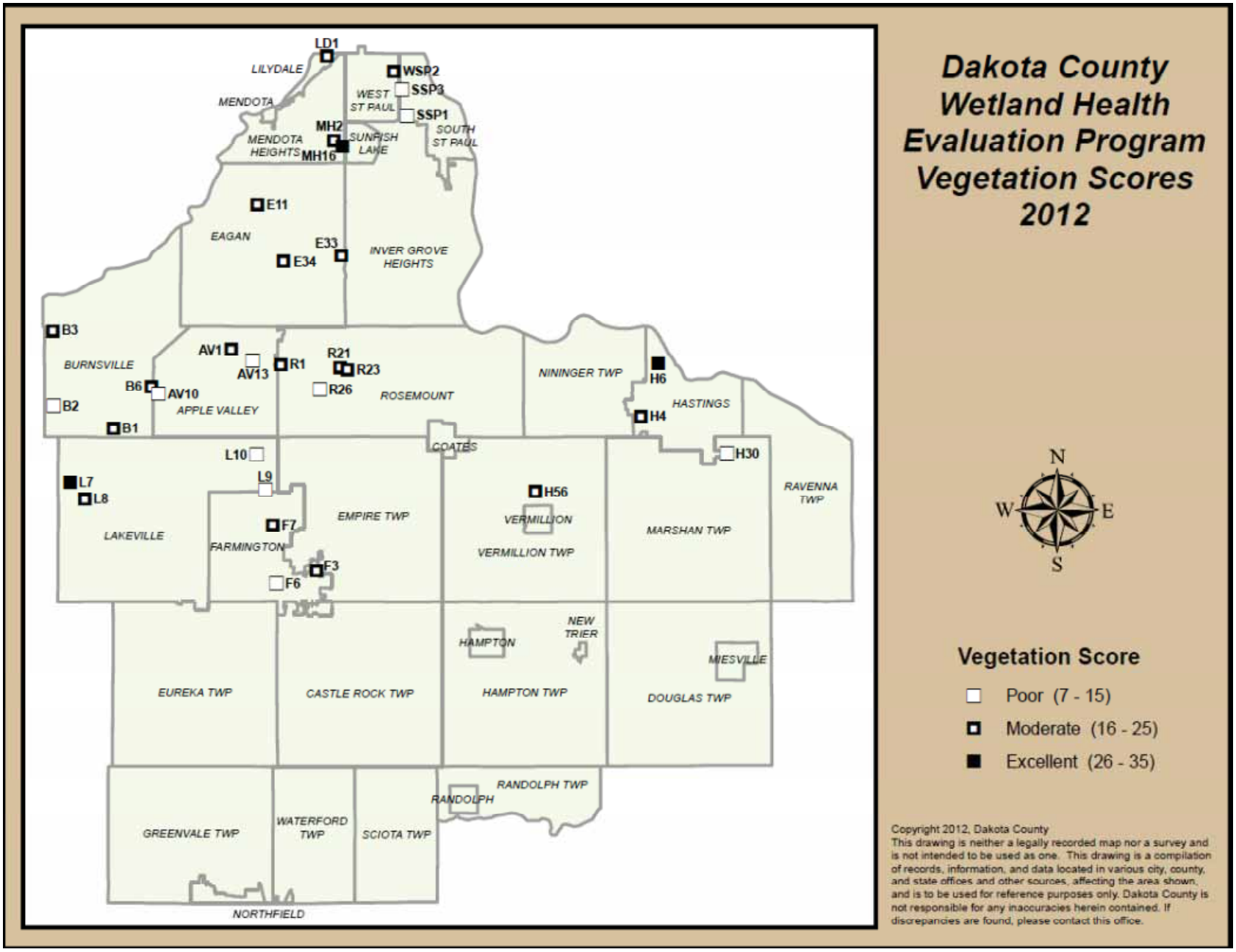
This drawing is neither a legally recorded map nor a survey and is not intended to be used as one. This drawing is a compilation of records, information, and data located in various city, county, and state offices and other sources, affecting the area shown, and is to be used for reference purposes only. Dakota County is not responsible for any inaccuracies herein contained. If discrepancies are found, please contact this office.

Figure 3.1.3


Dakota County
Wetland Health
Evaluation Program
Vegetation Scores
2012
LD1
LILYDALE
WSP2
SSP3
WEST ST PAUL
SSP1
MENDOTA
MH2
SUNFISH LAKE
SOUTH ST PAUL
MENDOTA HEIGHTS
MH16
E11
EAGAN
E33
E34
INVER GROVE HEIGHTS
B3
AV1
AV13
R1
R21
R23
R26
BURNSVILLE
B6
AV10
APPLE VALLEY
B2
B1
ROSEMOUNT
NININGER TWP
H6
HASTINGS
H4
COATES
H30
L10
L9
L7
L8
H56
RAVENNA TWP
EMPIRE TWP
VERMILLION
LAKEVILLE
F7
FARMINGTON
F3
F6
VERMILLION TWP
MARSHAN TWP
NEW TRIER
HAMPTON
MIESVILLE
EUREKA TWP
CASTLE ROCK TWP
HAMPTON TWP
DOUGLAS TWP
RANDOLPH TWP
RANDOLPH
GREENVALE TWP
WATERFORD TWP
SCIOTA TWP
NORTHFIELD
N
W
E
S
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 (2008-2012) indicates natural wetlands scored higher for vegetation on average and stormwater wetlands scored higher for invertebrates on average (Table 3.1.2). An analysis of variance (ANOVA) was completed to determine if the differences were statistically significant. Differences in IBI scores for natural and created 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 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 (2008-2012) of Created, Stormwater and Natural Wetlands

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

Wetland	Invertebrates			Vegetation		
	Created Wetlands	Stormwater wetlands	Natural Wetlands	Created Wetlands	Stormwater wetlands	Natural Wetlands
B-9		18			9	
B-11		16			13	
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	
F-1		NA			13	
F-3		12			19	
F-4	8			11		
F-5		NA			NA	
F-6		20			13	
F-7		14			19	
H-4	10			19		
H-6		22			27	
H-30	8			13		
H-56		22			25	
L-4	14			15		
L-7		22			31	
L-8			24			17
L-9	20			11		
L-10			12			11
LD-1			14			17
MH-2		28			23	
MH-13		20			21	
MH-14		22			25	
MH-15		16			21	
MH-16		24			29	
R-1		14			23	
R-2		28			17	
R-4		16			15	
R-14			28			27
R-18			26			19
R-20		18			19	
R-21	26			19		

	Invertebrates			Vegetation		
Wetland	**Created Wetlands**	**Stormwater Wetlands**	**Natural Wetlands**	**Created Wetlands**	**Stormwater Wetlands**	**Natural Wetlands**
R-22		24			25	
R-23	14			21		
R-25		12			23	
R-26			10			11
SSP-1		18			15	
SSP-3		20			15	
WSP-2		16			17	
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 87% of the wetlands monitored in 2012. 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. In 2011, a new invasive species, Water lettuce (*Pistia stratiotes*), was identified in at one of the Eagan sites (E-18). Literature indicates that this plant cannot survive a hard freeze. Eagan WHEP volunteers will have to keep an eye on this to make sure it does not become a problem. Water lettuce is sold through the aquarium and pond supply industry.

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, such as roads, parking lot, rooftops and driveways, likely receive more runoff and pollutants. Impervious areas ranged from zero 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 2008-2012

Site ID	Site Name	Wetland size (Acres)	Watershed Size (Acres)	% Imperv	Invert. Score	Veg. Score
AV-1	Hidden Valley	2	21	35	18	21
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-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
B-1	Crystal Lake West	0.9	444.5	5	14	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	10	19
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	20	19
B-11	Valley View	1	80	10	16	13
B-13	Sunset Lake	30	436	50	22	21
B-17	Terrace Oaks Buckthorn Pond	2.7	24	5	12	25
E-11	Central Park Pond	1.8	130	20	14	21
E-18	Moonshine Park Pond	2.5	34	25	22	19
E-20	Shanahan Lake	10.9	56.4	1	20	27
E-21	FP-11.5	0.26	1.6	0	20	19
E-22	FP-11.6	0.58	2.7	0	20	17
E-25	FP 4.5	1	35	55	16	19
E-26	DP-6.2, Northwoods Business Park	3.2	25	44	14	15
E-27	LP-26.54, Thomas Woods Site	0.2	5.3	29	18	21
E-28	HDP-1, Kennerick Addition Site	0.8	39	18	16	21
E-29	LP-15, Lily Pond in Lebanon 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

Site ID	Site Name	Wetland size (Acres)	Watershed Size (Acres)	% Imperv.	Invert. Score	Veg. Score
F-1	Pine Knoll	35	107.5	10.4	NA	13
F-3	Kral Pond	10	41.8	6.6	12	19
F-4	Lake Julia	10	233	21.2	8	11
F-5	Autumn Glen	2.9	10	NA	20	21
F-6	Vermillion River	6.3	16	NA	20	13
F-7	Autumn Glen	2.9	10	NA	14	19
H-4	Stonegate Treated	1	9.5	35	10	19
H-6	Lake Rebecca	19	56	1	22	27
H-30	Sand Coulee	1	107	25	8	13
H-56	180th Street Marsh	20	340	1	22	25
L-4	Water Treatment Wetland Bank	22.85	99.8	20	14	15
L-7	DNR 387	10	2087	21	22	31
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	0.4	28	23
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
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	28	27
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	26	19
R-22	Mare Pond, South	8	81	10	24	19
R-23	CR-38 Mitigation Site 2	0.3	81	30	14	21
R-25	WMP #306	1.7	81	30	12	23
R-26	Erickson Pond	1.9	1832	25	10	11
SSP-1	Anderson Pond	2.4	168	15	18	15
SSP-3	LeVander	3.4	37.9	20	20	15
WSP-2	Thompson Lake 48W	9	73,920	50	16	17

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 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 2012 Cross-checks

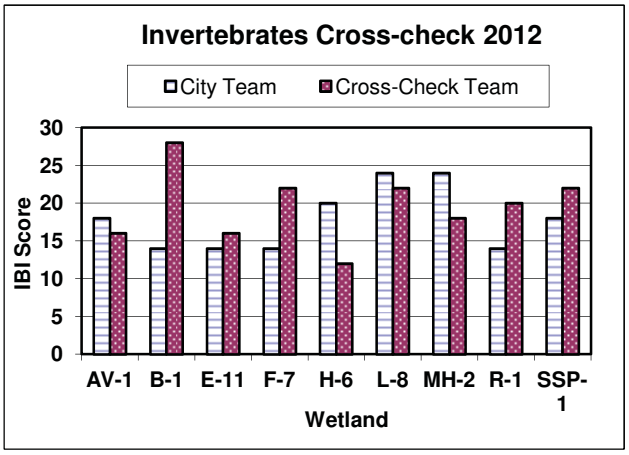
Each city team was responsible for evaluating one wetland in another city (Table 3.2.1). This citizen cross-check provides a second sample for the selected wetland. The purpose of this check is to determine if two different samples provide similar results for the vegetation and invertebrate IBI. Large 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 point 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 sites B-1, F-7, and H-6 were inconsistent. There was a fourteen point, eight point, and eight point difference in scores, respectively. Vegetation scores for sites AV-1, B-1, and H-6 were also inconsistent with an eight point, eight point, and ten point difference in scores, respectively. The varied scores may indicate a difference in sampling technique, a change in conditions between sample dates, differences in identification accuracy, or some other cause. Below lists the obvious differences in scoring for those wetlands that were inconsistent. Data collected by the original 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 sites L-8 and MH-2 were identical.

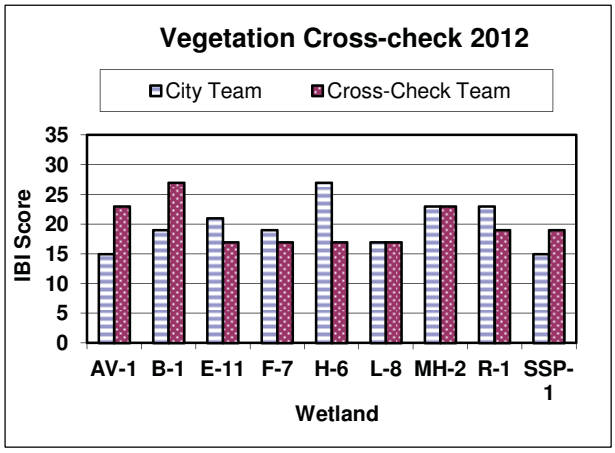
- *AV-1:* The City team and cross-check team set their vegetation plots in different locations at wetland site AV-1. The cross-check team found a higher diversity of vegetation in their plot than the City team which included more emergent forbs.
- *B-1:* Both the invertebrate scores and the vegetation scores between the City team and the cross-check team for site B-1 were inconsistent. The City team and cross-check team actually had very similar findings in their vegetation plots. The cross-check team found one more grass and two more forbs than the City team, and this drastically affected the vegetation scores. The cross-check team collected a much larger diversity of invertebrates than the City team.
- *F-*7: The cross-check team collected a higher diversity of invertebrates than the City team including several families of leeches, damselflies, and dragonflies.
- *H-*6: Both the invertebrate scores and the vegetation scores between the City team and the cross-check team for site H-6 were inconsistent. The teams realized after the sampling season was completed that they actually sampled different wetlands which were adjacent to one another.

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	Hastings	AV-1	18	16	**15**	**23**
Burnsville	Mendota Heights	B-1	**14**	**28**	**19**	**27**
Eagan	South St. Paul	E-11	14	16	21	17
Farmington	Rosemount	F-7	**14**	**22**	19	17
Hastings	Apple Valley	H-6	**20**	**12**	**27**	**17**
Lakeville	Eagan	L-8	24	22	17	17
Mendota Heights	Burnsville	MH-2	24	18	23	23
Rosemount	Farmington	R-1	14	20	23	19
South St. Paul	Lakeville	SSP-1	18	22	15	19

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

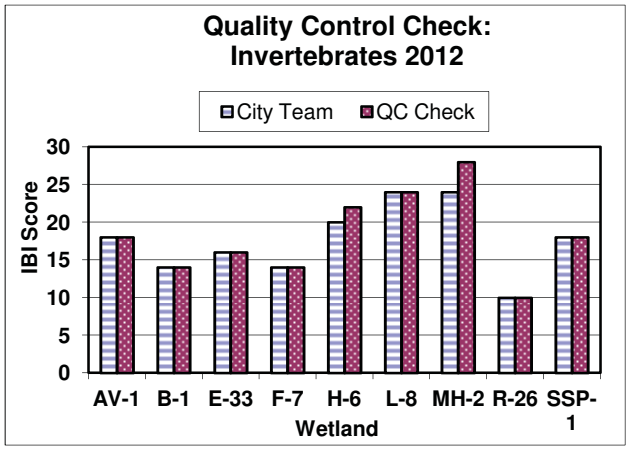


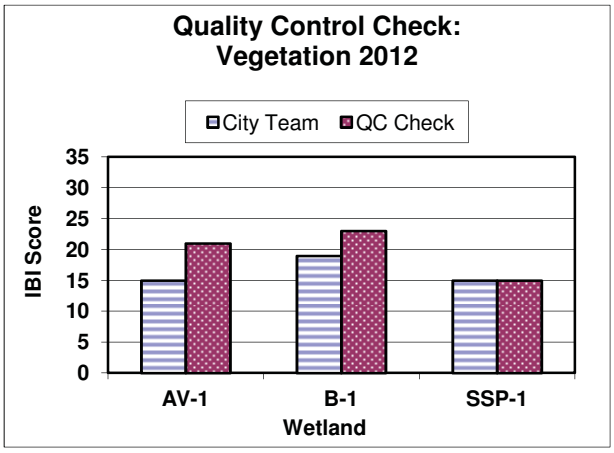


3.2.2 2012 Quality Control Checks

Quality control checks were conducted at three sites for vegetation and nine sites for invertebrates in 2012 (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 21 data transfer errors and 6 metric errors, and two math errors. Nine sites resulted in score changes of two to 10 points. Many of

these errors could be prevented by double-checking the transfer and math work on the data sheets. The quality control checks are working well. Errors are identified and corrections are made as needed.

Table 3.2.2 Data Sheet Review

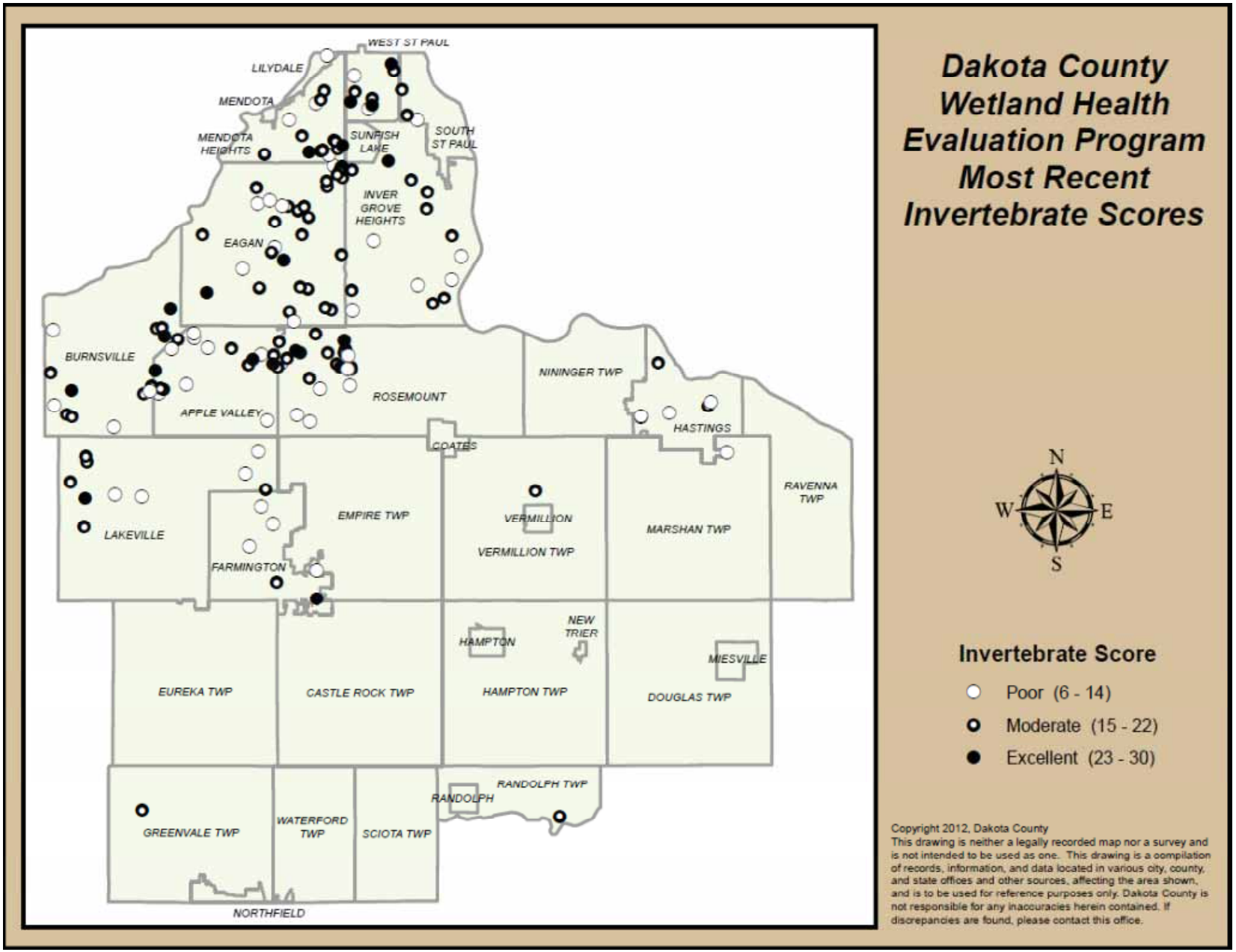
		Invertebrate IBI Scores			Vegetation IBI Scores		
Team Name	**Site**	**Team**	**Review**	**Errors**	**Team**	**Review**	**Errors**
Apple Valley	AV-1	18	18	0	15	15	0
	AV-10	12	12	0	9	9	0
	AV-13	24	24	0	13	15	2
	H-6 cc*	12	12	0	17	17	0
Burnsville	B-1	24	14	2	19	19	0
	B-2	18	12	2	11	11	0
	B-3	14	10	3	19	19	3
	B-6	26	16	1	21	21	2
	MH-2 cc*	26	18	3	23	23	1
Eagan	E-11	16	14	2	21	21	0
	E-33	16	16	0	21	21	0
	E-34	19	24	2	23	23	0
	L-8 cc*	20	22	2	23	23	0
Farmington	F-3	12	12	0	19	19	0
	F-6	20	20	0	13	13	0
	F-7	14	14	0	19	19	0
	R-1 cc*	20	20	0	19	19	0
Hastings	H-4	10	10	0	19	19	0
	H-6	20	20	0	27	27	0
	H-30	8	8	0	13	13	0
	H-56	22	22	0	25	25	0
	AV-1 cc*	16	16	0	23	23	0
Lakeville	L-7	22	22	0	31	31	0
	L-8	24	24	0	17	17	0
	L-9	20	20	0	11	11	0
	L-10	12	12	0	11	11	0
	SSP-1 cc*	22	22	0	19	19	0
Mendota Heights	LD-1	14	14	0	17	17	0
	MH-2	24	24	0	23	23	0
	MH-16	24	24	0	29	29	0
	WSP-2	16	16	0	17	17	0
	B-1 cc*	28	28	0	27	27	0
Rosemount	R-1	14	14	0	23	23	0
	R-21	26	26	0	19	19	0
	R-23	14	14	0	21	21	0
	R-26	10	10	0	11	11	0
	F-7 cc*	22	22	0	17	17	0
South St. Paul	SSP-1	18	18	0	15	15	0
	SSP-3	20	20	0	15	15	0
	E-11 cc*	16	16	0	17	17	0

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

3.3 WHEP Historical Data

Since WHEP began in 1997, 160 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 2012 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


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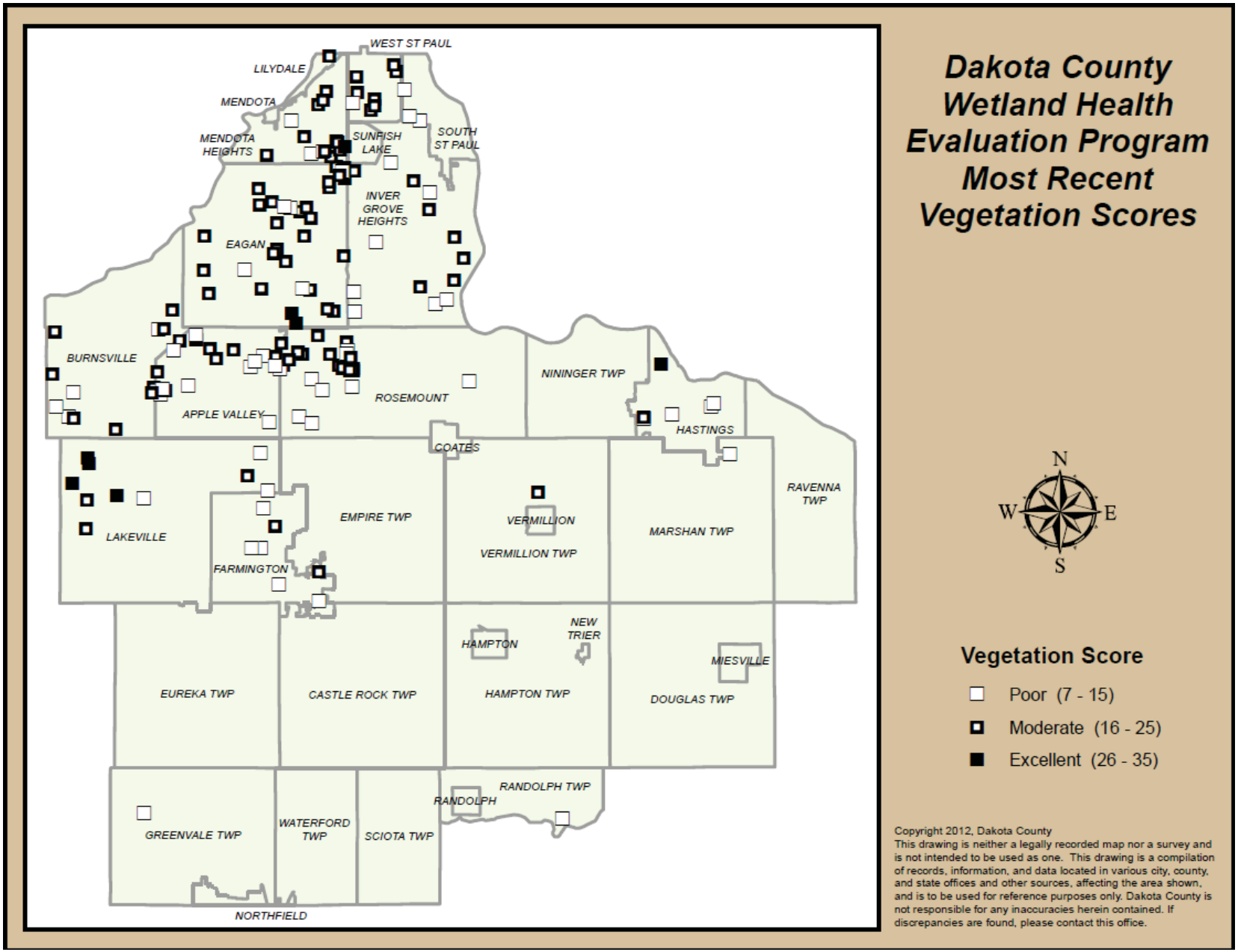
Figure 3.3.2


WEST ST PAUL
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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 2012, 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.

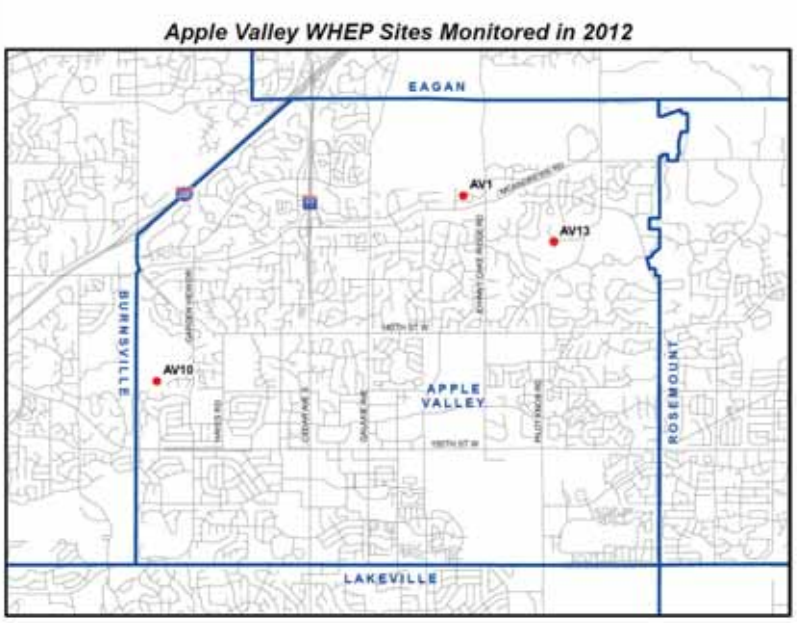
4.0 Wetland Evaluations

4.1 Apple Valley Wetlands

Three wetlands were monitored within the City of Apple Valley in 2012. This is the fifteenth year the City has participated in WHEP, and 19 wetlands have been monitored in that time period.

Team Leader: Jeff Korpik

Team Members: Erin Adams, Andrea Brownlow, Colin Brownlow, Duncan Brownlow, Bonnie Crissman, Helen Goeden, Mandy Nelson, Jordan Priester, Rachel Ricard, and Scott Rivenburg.



Colin Brownlow, Scott Rivenburg, Helen Goeden, Jordan Priester, Mandy Nelson, Jeff Korpik

Jeff Korpik

Jeff Korpik, the team leader, has been part of the WHEP program for many seasons, and this is his fitth year as a team leader. Jeff said, “This year's sampling was interesting as always. We had a wetland that didn't look good, but scored fairly high in Apple Valley, and one that looked beautiful, but scored fairly low in Hastings. I also realized that even with very detailed instructions and a satellite picture of the site from Joe Beattie, it is still possible to go the wrong area. I truly value the great volunteers we have on the team and I am excited about this season!”

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."

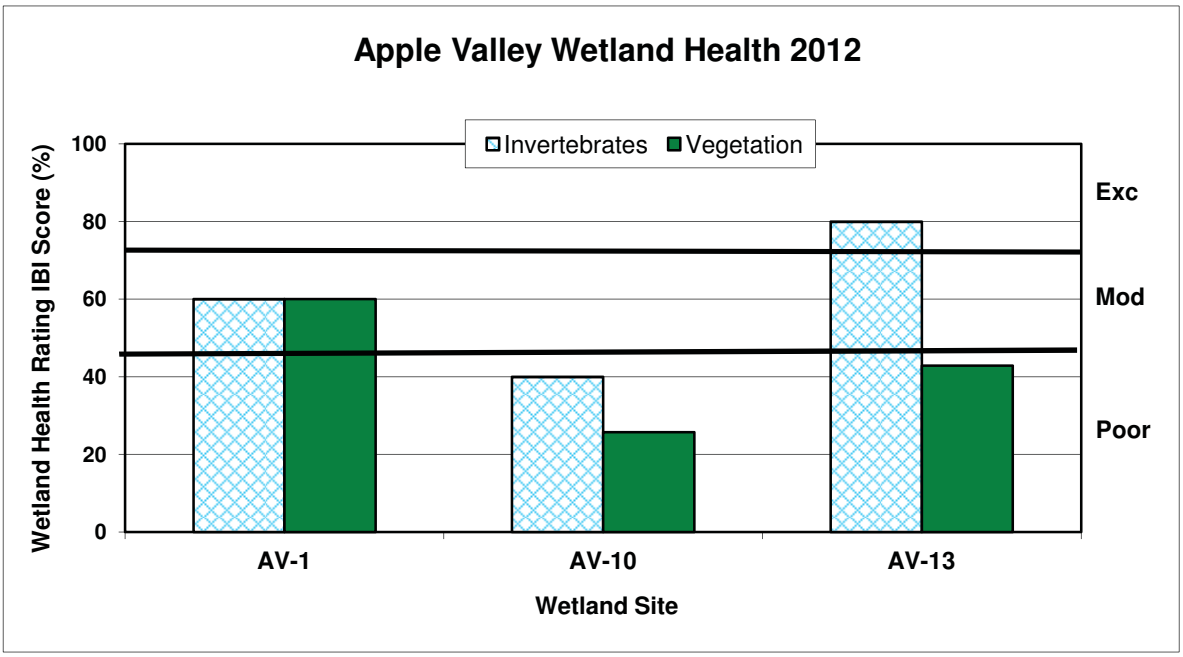
Helen Goeden, Jordan Priester, Colin Brownlow

Helen Goeden Mandy Nelson

Apple Valley General Wetland Health

Figure 4.1 presents an overall view of wetland health for all of the 2012 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 excellent wetland health based on both invertebrate and vegetation data. AV-10 scored poorly for both invertebrates and vegetation. AV-1 and AV-13 scored excellent for invertebrates but poor in vegetation.

Figure 4.1 Apple Valley site scores (percent) for the 2012 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 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 fourteenth year that this site has been surveyed since 1998.

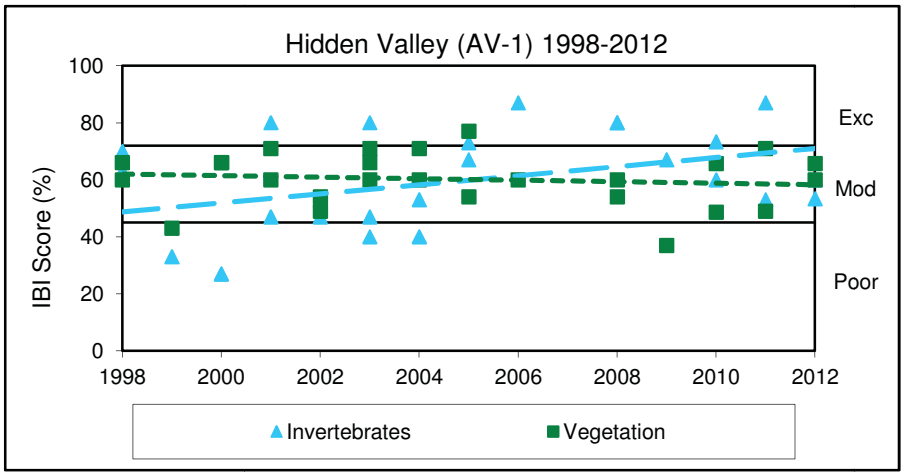
Wetland Health

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)

2012 Data (AV-1)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (18)	Moderate (21)
Cross-check Rating (IBI score)	Moderate (16)	Moderate (23)
Trend 1998-2012	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 2012. The scoring between categories was consistent. The scoring between the City team and cross-check team was also consistent. 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 fourteen years of monitoring, the data indicates stable to improving wetland health.

4.1.2 Alimagnet Park (AV-10)

Alimagnet Park (AV-10) is a 0.5 acre, type 5 wetland located within Alimagnet Lake subwatershed of the Vermillion River Watershed, and lies just southeast of Alimagnet Lake. The wetland watershed has approximately 25 acres with five acres of direct drainage, and is 20 percent impervious. There is one inlet at the southeastern corner of the wetland and one outlet along the western border which pipes beneath a trail. It is not part of the City's stormwater management plan; however, it is designated as a Manage 2 wetland with a goal to continue monitoring over time. Wetlands assigned to this category are characterized by high or exceptional restoration potential but are not located in public or open space.

The wetland is located within an active park that features a frisbee golf course. Some minor disturbances to the understory have occurred within the parkland from installation of the frisbee golf course; however, disturbances within this watershed are limited. A partially functional raingarden which drains in four days, was installed near the entrance to the park in 2008. It will treat some of the stormwater that flows to this wetland. Other disturbances should be those normal to parkland and residential areas.

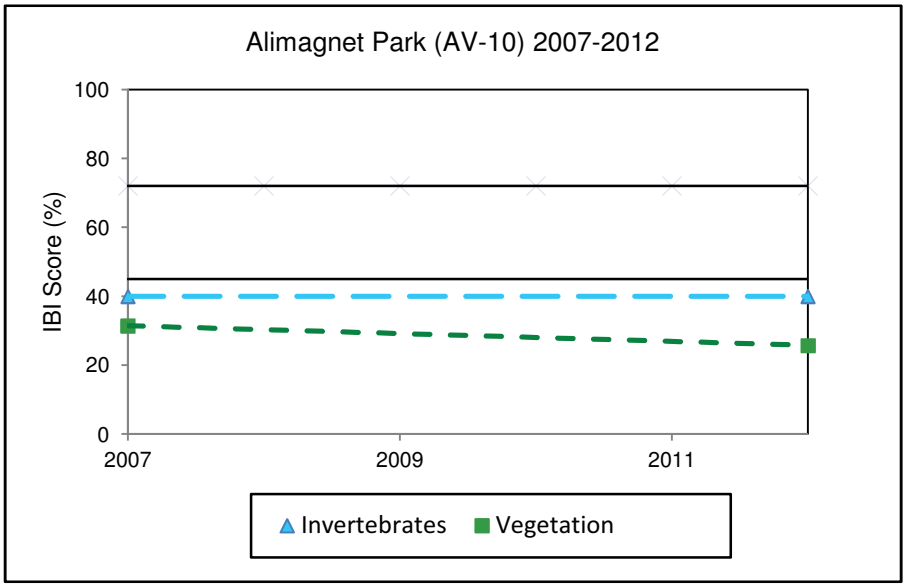
Wetland Health

Site Observations: A large amount of surface algae present during invertebrates sampling. Leeches, snails, midges, and mosquito larvae were the only invertebrates collected in the invertebrate survey. Duckweed, water-meal, spike rush, and reed canary grass along with a few woody species were the only vegetation observed during the vegetation survey.

Table 4.1.2 Alimagnet Park (AV-10) Wetland Health based on IBI

2007-2012 Data (AV-10)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Poor (12)	Poor (9)
Trend	Not enough data	Not enough data

Figure 4.1.2 Invertebrate and vegetation trends for Alimagnet Park (AV-10)



Site summary: This is the second year that AV-10 has been monitored. It scored poor in both the invertebrates and vegetation categories in 2007 as well as in 2012. There is not enough data to determine the health trend.

4.1.3 EVR-P14 (AV-13)

EVR-P14 (AV-13) is a 3.6 acre type 5 wetland located within the EVR-14 subwatershed of the Vermillion River watershed. The watershed has approximately 26 acres of total drainage in which all 26 acres drains directly. It is 35% impervious. There are two inlets along the eastern border of the wetland and two inlets along the northern border of the wetland. There is also an equalizer pipe along the southern border of the wetland. EVR-P14 is part of the City's stormwater management plan and is designated as a Manage 3 wetland. Wetlands assigned to this category have medium floral diversity/integrity, direct stormwater input, medium restoration potential and are not located in public or open space. Wetlands are also assigned to this category if they have low floral diversity/integrity and restoration potential is not exceptional.

EVR-P14 wetland is within the Farquar and Long Lakes TMDL area. Approximately 0.13 percent of the external phosphorus load entering Long Lake comes from this wetland. The area surrounding the wetland is primarily residential. EVR-P14 has a shallow, mucky bottom. It contains less algae and more submergent and emergent vegetation in comparison with other wetlands directly draining to Long Lake.

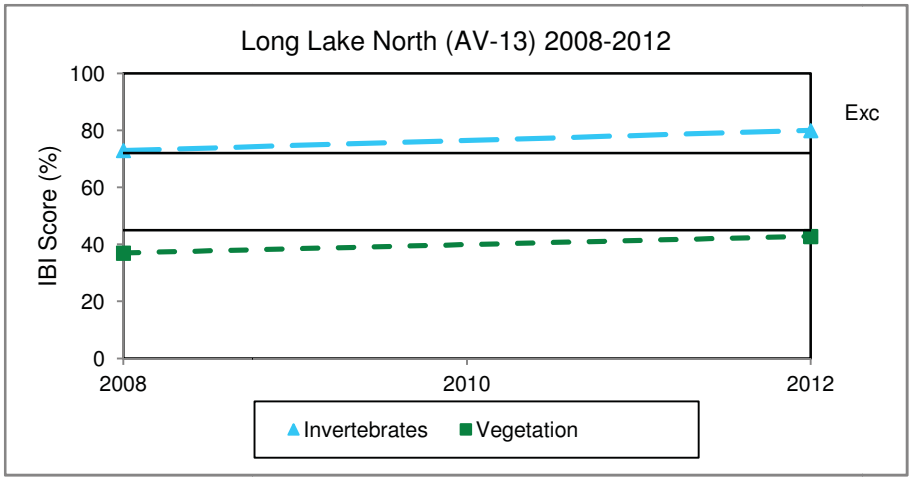
Wetland Health

Site Observations: Cattail is largely present around the perimeter of the wetland. Large lot single family residences surround the wetland.

Table 4.1.4 EVR-P14 (AV-13) Wetland Health based on Index of Biotic Integrity

2012 Data (AV-13)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Excellent (24)	Poor (15)
Trend 2008-2012	Not enough data	Not enough data

Figure 4.1.3 Invertebrate and vegetation trends for AVR-P14 (AV-13)



Site summary: AVR-P14 has been surveyed twice beginning in 2008. Both surveys indicate excellent invertebrate health and poor vegetation health. The dense cattail ring may be limiting the vegetation diversity. There is not enough data to determine a health trend.

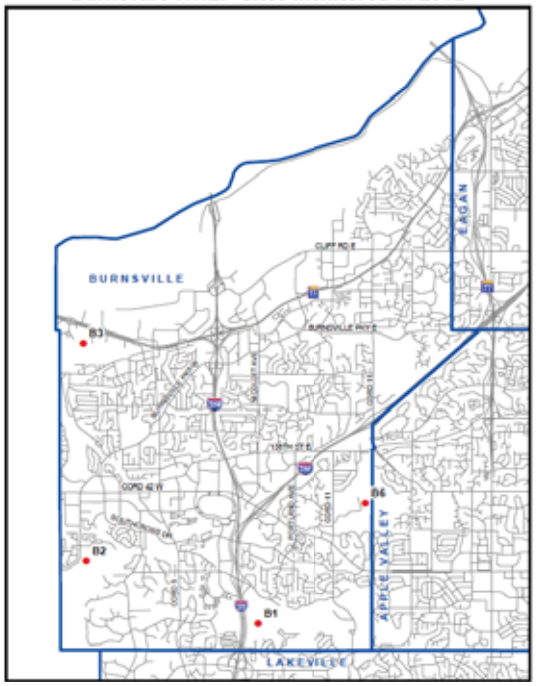
4.2 Burnsville Wetlands

Four wetlands were monitored within the City of Burnsville in 2012. Burnsville has monitored 16 wetlands through WHEP since 1997.

Team Leader: Jeff Zilka

Team Members: John Barton, Gary Blanch, Bill Block, Bernie DeMaster, Rick Graham, Bob Lorenzen, Jessica Oldfather, Lorene Sparks, Sam Svendahl, Dori Van Beek, Thomas Ward, and LuAnne Zilka.

Burnsville WHEP Sites Monitored in 2012



Jessical Oldfather, Lorene Sparks, Bob Lorenzen, John Barton, Jeff Zilka, Tom Ward, LuAnne Zilka, Bill Block, Sam Svendahl

This is Jeff's second year as a team leader, and seventh year as a WHEP volunteer. He remarks, "Another wonderful season for the WHEP program in the Burnsville area. Again, we were fortunate to have dedicated volunteers who were eager to learn and help out in any way they could. We were also fortunate to have 12 such volunteers! 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.

We appreciated that Liz Forbes, Natural Resources Technician from the City of Burnsville, visited us several times when we were monitoring the wetlands. She offered insight about the plants, bugs and the wetlands.

We even had dogs helping us out at the Lake Alimagnet Dog Park! We had just started setting out our bottle traps in the wetland when low and behold, two large dogs jumped into the water and circled the WHEP volunteers several times, looked at us all, and then swam away."


Liz Forbes

Liz Forbes is the city contact for Burnsville. She joined the City of Burnsville staff in March of 2011 as a Natural Resources Technician. Her duties include management of several city raingardens, lake monitoring, and habitat work in natural areas. She says that, "Jeff Zilka led a great Burnsville WHEP crew again this year! His wife & fellow volunteer, LuAnne, made a sign identifying the group while they were at work in the wetland. Several people stopped by to find out more, so it was a great way to inform the public and attract more volunteers."

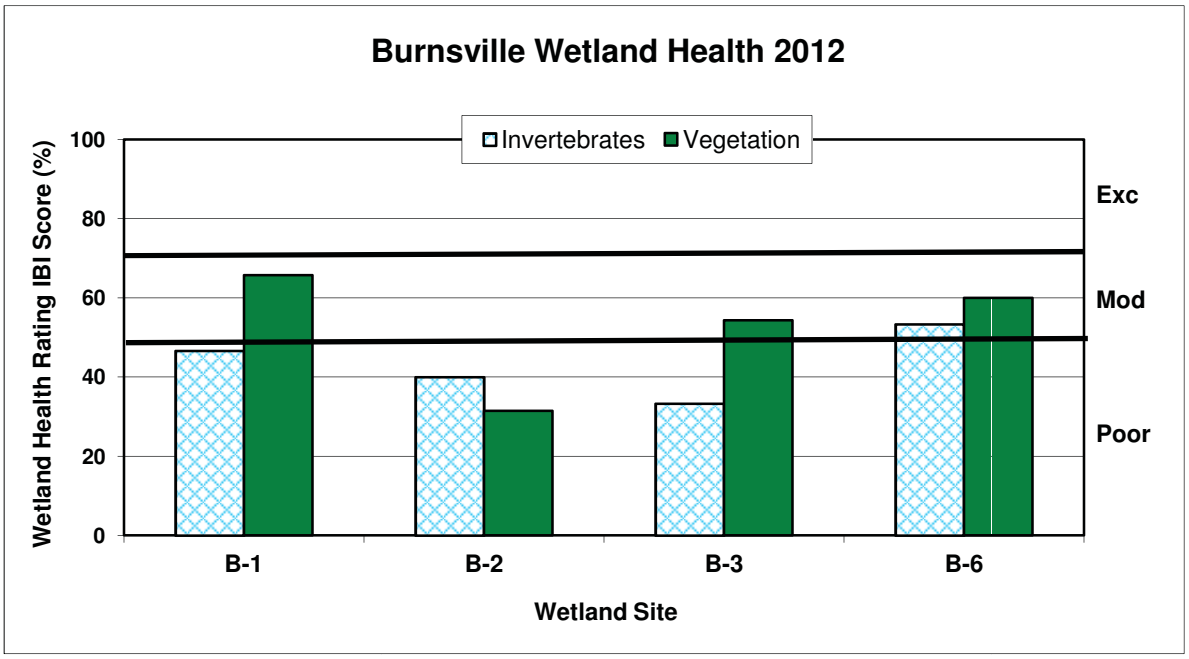
Burnsville General Wetland Health


Bob Lorenzen

Figure 4.2 presents an overall view of wetland health for all of the 2012 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 2012, the Burnsville wetlands showed poor to moderate wetland health. B-2 and B-6 had consistent invertebrate and vegetation scores. Vegetation scores were higher for B-1, B-3, and B-6.


Training day

Figure 4.2 Burnsville site scores (percent) for the 2012 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, none of which is impervious. 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.

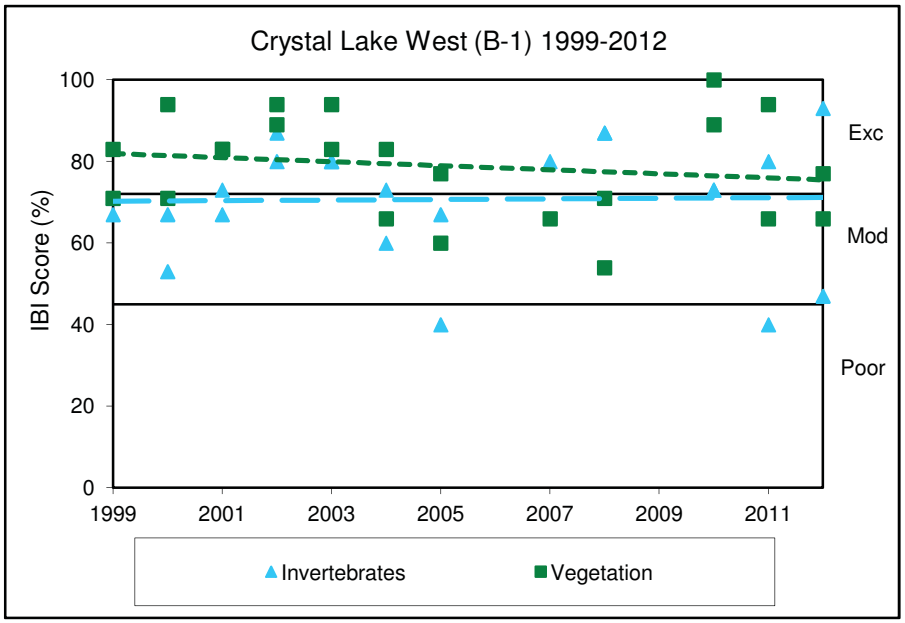
Wetland Health

Site Observations: This wetland is located off of a hiking trail system within a densely wooded natural area.

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

2012 Data (B-1)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Poor (14)	Moderate (23)
Cross-check Rating (IBI score)	Excellent (28)	Excellent (27)
Trend 1999-2012	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 twelfth year that B-1 has been surveyed since 1999. The invertebrate and vegetation scores indicate that the wetland has poor to excellent health. The scores between the City team and the cross-check team were not consistent. The cross-check team found higher scores in both categories. The City team calculated 14 (poor) for invertebrates and 19 (moderate) for vegetation. The cross-check team calculated 28 (excellent) for invertebrates and 27 (excellent) for vegetation. The cross-check team found a larger diversity of invertebrates and vegetation which boosted the wetland health scores. Most likely, sampling location was the variable affecting the scores. The trend lines indicate variable but overall stable wetland health.

4.2.2 Kellerher Park (B-2)

Kellerher Park (B-2), formally known as Cam Ram, is a 0.41 acre, type 3 wetland located within the Murphy-Hanrehan Subwatershed within the Credit River Watershed. Murphy-Hanrehan Subwatershed is 1,392 acres of which approximately 10 percent is impervious surface. This wetland has no known inlets or outlets, and is addressed within the City's wetland management plans. It is a protected wetland and is being managed for flood protections, sediment control, and nutrient removal.

This is a small depressional wetland located in Kellerher Park, and lies within an area where savanna restoration (seeding, buckthorn removal, prescribed burning) is in process. This wetland is impacted by invasive species and developmental pressures.

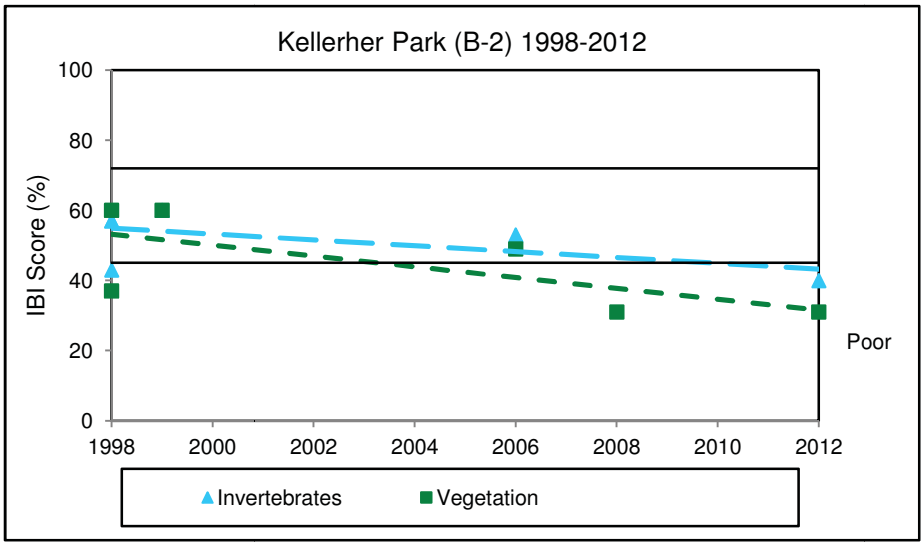
Wetland Health

Site Observations: The substrate is muddy and matted plant material. It is dominated by duckweed. Frogs, mosquitos and biting flies are heavily present.

Table 4.2.2 Kellerher Park (B-2) Wetland Health based on Index of Biotic Integrity

2012 Data (B-2)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Poor (12)	Poor (11)
Trend 2002-2011	Not enough data	Not enough data

Figure 4.2.2 Invertebrate and vegetation trends for Kellerher Park (B-2)



Site summary: This is the fifth time the wetland has been surveyed since 1998. It has exhibited poor to moderate health. Based on limited data, the invertebrate and vegetation trend lines indicate potential declining wetland health. Additional monitoring is recommended to better assess the health of this wetland.

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

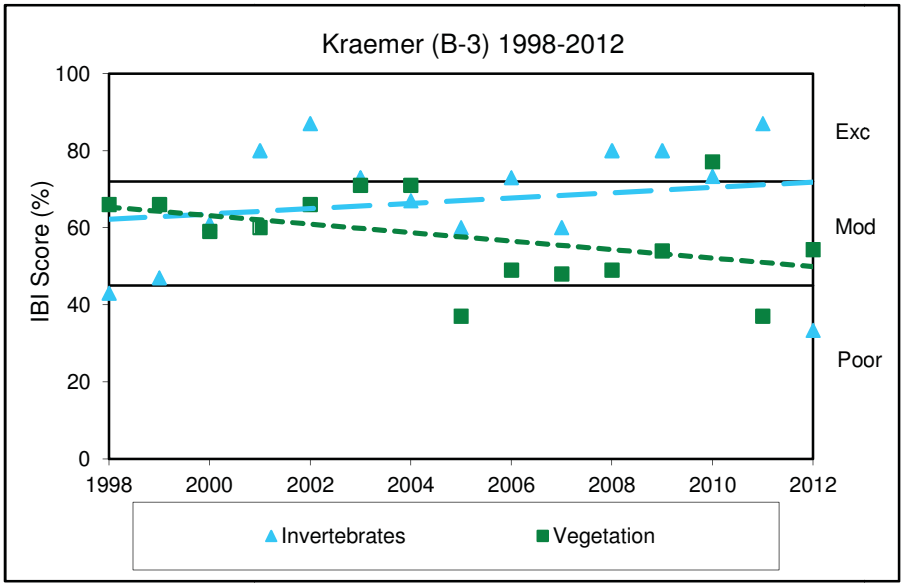
Wetland Health

Site Observations: The wetland substrate is muddy and weedy. There is a gentle slope to the wetland. Cattails and submerged vegetation present. Ducks present.

Table 4.2.3 Kraemer Preserve (B-3) Wetland Health based on Index of Biotic Integrity

2012 Data (B-3)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Poor (10)	Moderate (19)
Trend 1998-2012	Improving	Declining

Figure 4.2.3 Invertebrate and vegetation trends for Kraemer Preserve (B-3)



Site summary: This is the fifteenth year of sampling for Kraemer Preserve (B-3). In the past several years, the vegetation and invertebrate scores indicate poor to excellent wetland health, respectively; however in 2012, the invertebrates score plunged dramatically to poor. This could be due to low water levels. This wetland has maintained overall moderate conditions over most of the years of sampling.

4.2.4 Alimagnet Dog Park (B-6)

Alimagnet Dog Park (B-6) is a 2.5 acre, type 3 wetland located within the Lake Alimagnet Subwatershed within the Vermillion River Watershed. The Alimagnet Subwatershed is 1,392 acres and 10 percent impervious. There is one inlet on the west side of the wetland and no outlets. 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 for aesthetics, recreation, education, and science.

This wetland is located within the City dog park. A gravel trail surrounds the wetland. It is being impacted by stormwater, invasive species, dog association such as feces and soil disturbance.

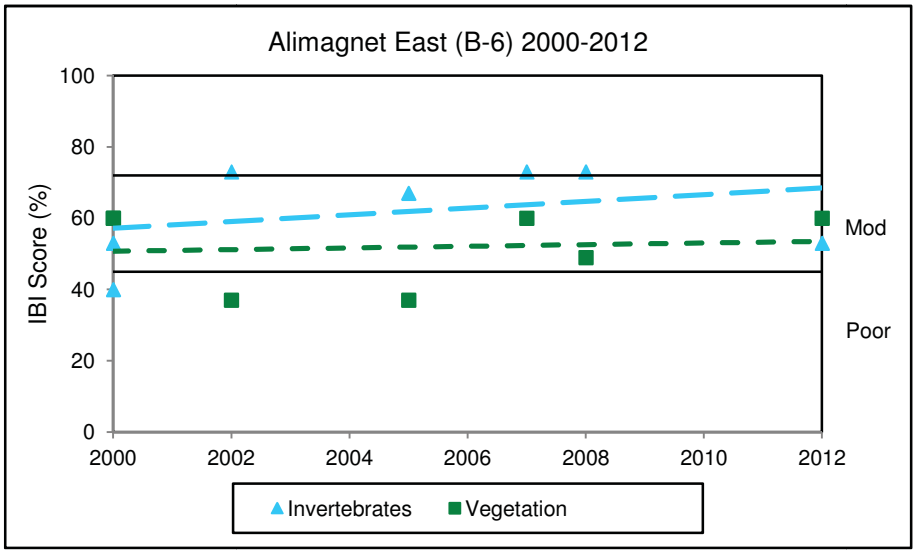
Wetland Health

Site Observations: Alimagnet Dog Park has a solid substrate and a gentle slope. Dragonfly exoskeletons, wood ducks, and redwing black birds were present.

Table 4.2.4 Alimagnet Dog Park (B-6) Wetland Health based on Index of Biotic Integrity

2012 Data (B-6)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (16)	Moderate (21)
Trend 2001-2011	Improving	Stable

Figure 4.2.4 Invertebrate and vegetation trends for Alimagnet Dog Park (B-6)



Site summary: This is the sixth time that B-6 has been surveyed since 2000. It exhibited poor to moderate wetland health. Based on limited data, the invertebrate trend line indicates improving health; however its score has fallen in 2012. This wetland has not been monitored since 2008. Continual monitoring of this wetland will help assess the health trend of this wetland.

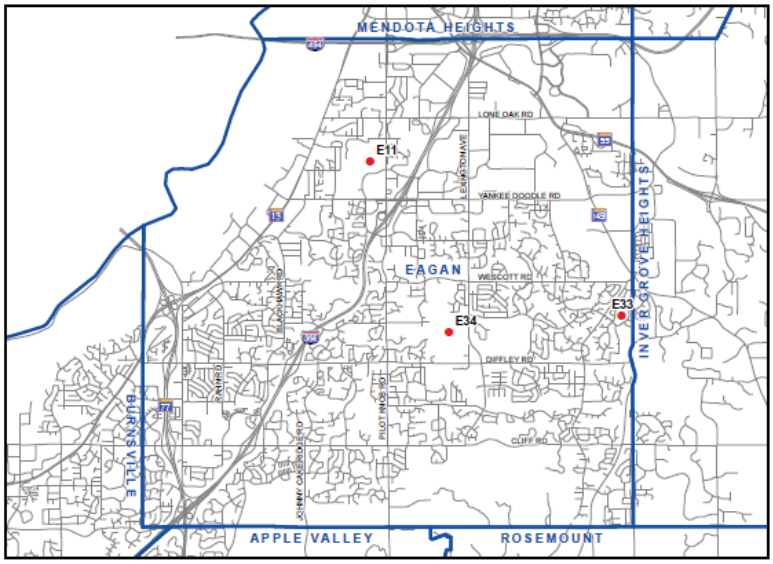
4.3 Eagan Wetlands

The Eagan team monitored three wetlands in 2012. Since WHEP began in 1997, Eagan has monitored 33 wetlands.

Team Leaders: Marianne McKeon

Team Members: Joanne Arenson, Amy Forslund, Ken Kunz, Mary Larson, Tom Larson, Rachel Larson, Kari Larson, Bill Larson, Cathy Marquardt, Maggie McEneny, Katie Ostrem, Ben Rietz, Daniel Schmitter, Daniel Sommers, Ed Turin, Danny Turin, Loren Voigt, David Von Ruden, and Brady Walter.

Eagan WHEP Sites Monitored in 2012




Marianne McKeon

Marianne McKeon, Eagan's team leader, expressed, "This is my second year as team leader and 6th year with WHEP. We once again had a large number of new volunteers so it was exciting to get to know everyone! I felt grateful to have our returning cititzen scientists who were a huge help to me assisting in training of new recruits, especially in the absence of Jessie Koehle our amazing city contact/co-lead, and we ended up really working well together as a team! We welcomed our newest and youngest unofficial/future WHEP member, baby Gretchen Koehle in June, congratulations to Jessie and her husband Karl!! The hot weather definitely kept us guessing and rescheduling and fortunately the team was very flexible with this. I felt lucky to have such a dedicated group!!"

Jessie Koehle is the Water Resources Technician for the City of Eagan. She confesses, "the real value of WHEP shines through our wonderful volunteers. I'm excited to be associated with an organization that enables people to be citizen scientists, produce reliable data, and be ambassadors for wetland health in our communities. Eagan has a great WHEP team: whether they are returning regulars or new volunteers, they always show up, work hard, have fun, and learn a lot. The City of Eagan appreciates having WHEP data as part of a larger package of the City's long term datasets on Eagan waterbodies. Thanks to everyone for all your efforts!"


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."

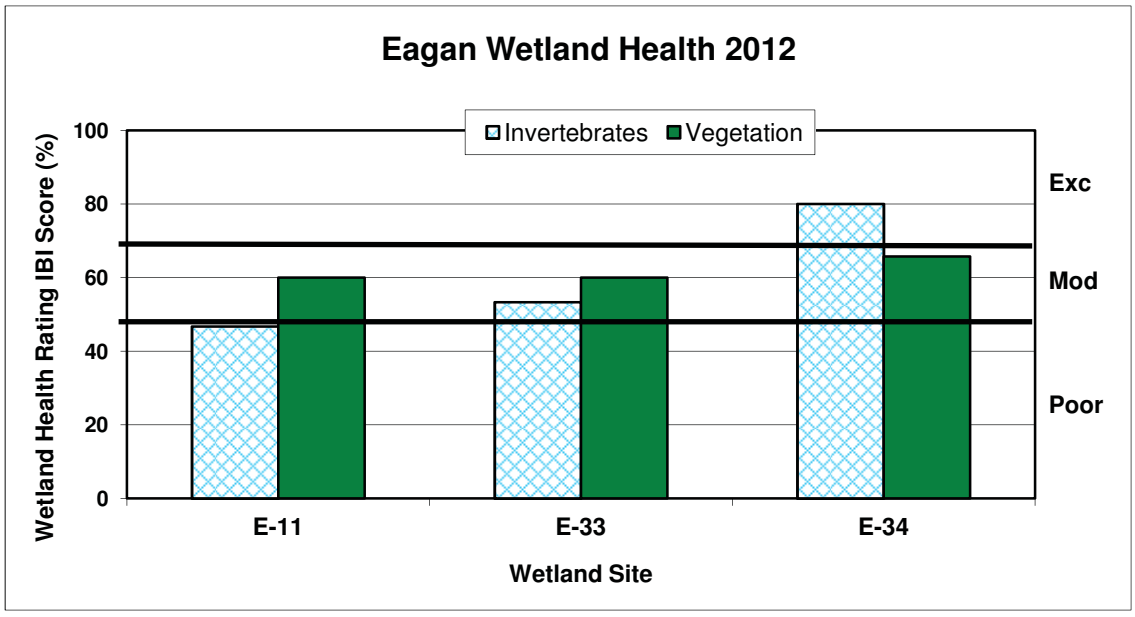
Jessie Koehle, Cathy Marquardt and Kari Larson

Joanne Arenson, Cathy Marquardt, Marianne McKeon

Eagan General Wetland Health

Figure 4.3 presents an overall view of wetland health for all of the 2012 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 2012. The Eagan wetlands exhibited poor to excellent wetland health based on both invertebrate and vegetation data. E-34 scored excellent for invertebrates. E-33 and E-34 were monitored for the first time in 2012.

Figure 4.3 Eagan site scores (percent form) for the 2012 sampling season



4.3.1 Central Park Pond (E-11)

Central Park Pond (E-11), also known as City Pond CP-4, is a 1.8 acre, type 4 wetland within the Gun Club Lake Watershed. Its stormwater watershed is 130 acres including approximately 20 percent impervious surface. There are two inlets; one in the northeast and one in the southeast corners. There is one outlet on the west side of the wetland. The wetland is part of the City's stormwater management and wetland management plans.

Sixty percent of the immediate shoreline is hilly woodland and 40 percent is public facility. The Lockheed campus is likely to be redeveloped, which could cause runoff changes.

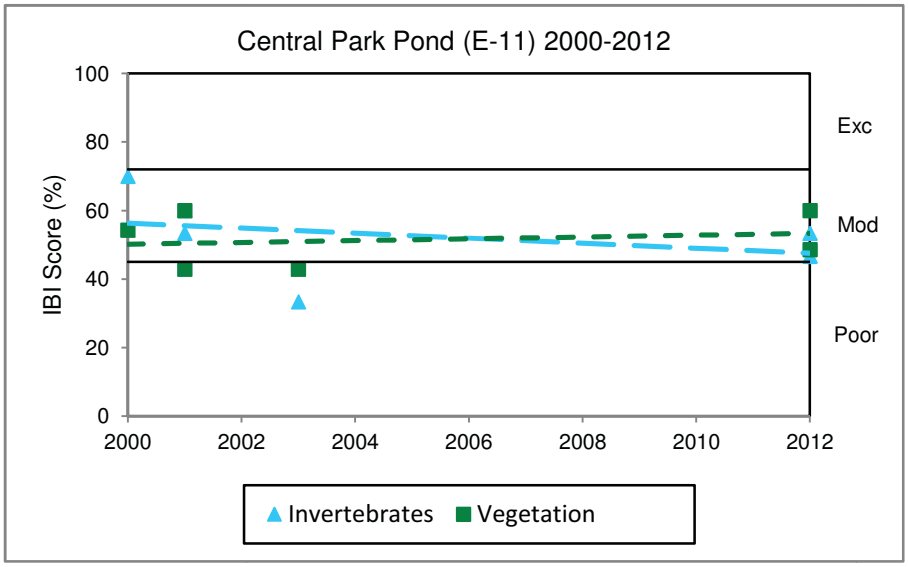
Wetland Health

Site Observations: Surrounded by trees. Vegetation is thick (20-30 foot buffer on the north side. Many floating logs present. Egret observed.

Table 4.3.1 Central Park Pond (E-11) Wetland Health based on Index of Biotic Integrity

2012 Data (E-11)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Poor (14)	Moderate (21)
Cross-check Rating (IBI score)	Moderate (16)	Moderate (17)
Trend 2012	Not enough data	Not enough data

Figure 4.3.1 Invertebrate and vegetation trends for Central Park Pond (E-11)



Site summary: This is the fourth year that this wetland has been surveyed since 2000, and has not been surveyed since 2003. The vegetation and invertebrate scores indicate moderate wetland health. Based on limited data, the invertebrates trend and vegetation trend appear to be stable; however, continual monitoring of this site will help better assess the health of this wetland. The City team found more grasses in their plot than the cross-check team. This is likely due to different sample locations.

4.3.2 Coventry Pond (E-33)

Coventry Pond (E-33), also known as City Pond JP-23, is a 5.5 acre, type 4 wetland within the Gun Club Lake Watershed. Considered a state public water wetland (DNR#19-0290), its stormwater watershed is 60 acres with approximately 35 percent impervious surface. It has four inlets: one on the north, south, east, and west sides of the wetland. There is one outlet on the south side of the wetland. It is part of the City's stormwater management and wetland management plans.

Coventry Pond is completely surrounded by residential property. Steep slopes lead into the pond, and street runoff drains directly to the pond. Some neighborhood raingardens have been installed to help improve water quality. The homeowners surrounding the pond have organized to hire contractors to manage the water quality with alum and herbicide applications as needed.

Wetland Health

Site Observations: Substrate varies from firm to mucky. Mallard and egret observed.

Table 4.3.2 Coventry Pond (E-33) Wetland Health based on Index of Biotic Integrity

2012 Data (E-33)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (16)	Moderate (21)
Trend 2012	Not enough data	Not enough data

Site summary: This is the first year that E-33 has been monitored. Both invertebrates and vegetation scored moderately. There are not enough data to determine wetland health trends for Coventry Pond.

4.3.3 McCarthy Lake (E-34)

McCarthy Lake (E-34), also known as City Pond JP-9, is a 11.3 acre, type 5 wetland located within the Gun Club Lake Watershed. Considered a state public water wetland (DNR# 19-0060), the City classifies McCarthy as one of its lakes. Its highest management goals are: wildlife habitat, education, and aesthetics. Its stormwater watershed has 220 acres of direct drainage and is approximately 15 percent impervious. It has two inlets: one on the north side and one on the east side. It also has one outlet on the north side. This wetland is part of the City's stormwater management plan.

Approximately 66 percent of the watershed is residential or street cover and roadway. The area immediately surrounding the pond is fairly unimpacted as it is located within the Patrick Eagan Park. However, stormwater runs off of the streets and residential areas into the lake. A large native buffer and trails exist around the lake.

Wetland Health

Site Observations: The pond is pretty shallow with the deepest part being at the southern end. Reed canary grass grows along the shore.

Table 4.3.3 McCarthy Lake (E-34) Wetland Health based on Index of Biotic Integrity

2012 Data (E-34)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Excellent (24)	Moderate (23)
Trend 2012	Not enough data	Not enough data

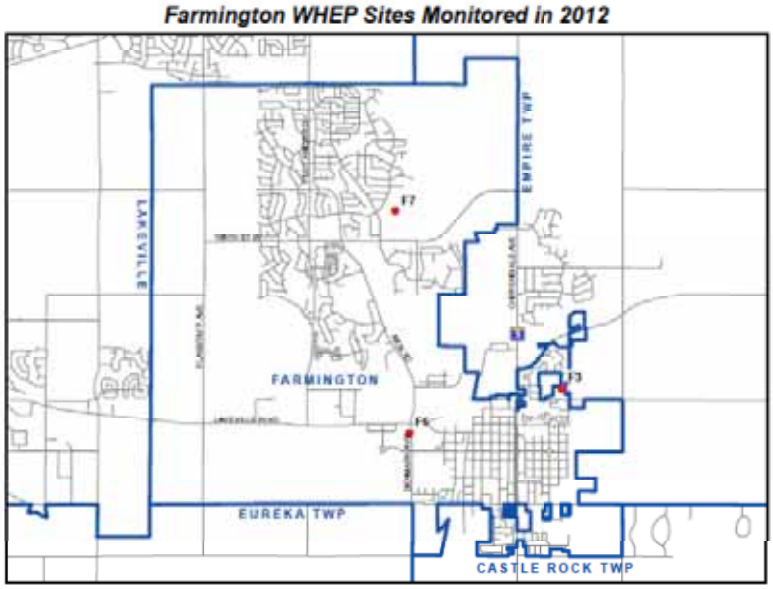
Site summary: This is the first year that E-34 has been monitored. The vegetation and invertebrate scored moderate to excellent, respectively.

4.4 Farmington Wetlands

The Farmington team sampled three wetlands in 2012. 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: Rollie Greeno, Josiah Hakala, Natalie Jorgenson, Marcia Richter, 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 asserts, "We enjoy each other very much as a team. Each of us has our area of expertise. We still agonize over the identification of grasses, though."

Katie remembers an interesting day in the wetland in 2010. "It started to rain when we arrived on site, but we were hopeful and just stood under our umbrellas. Soon the hail started. As we were returning to our car, a work-from-home neighbor noticed us, wet and foolish looking. She invited us inside out of the hail storm. We were very grateful as we observed the severe weather from the safety of her dining room window."

Jennifer Dullum

Jennifer Dullum administers the WHEP program for the City of Farmington. Her role is to publicize the program in local publications, determine which wetlands should continue to 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. WHEP volunteers are extremely dedicated and all their hard work is appreciated and a value to the City. Because of the volunteers, wetland health is monitored at a much higher level than it would be without their assistance."

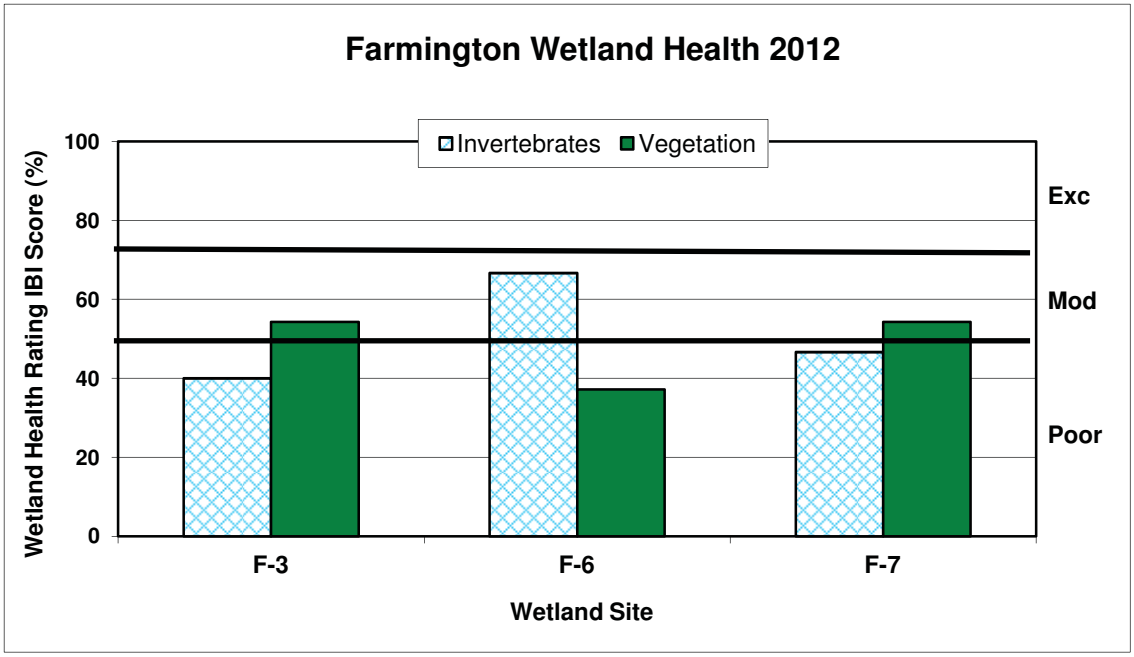
Rick Schuldt, Natalie Jorgenson

Farmington General Wetland Health

Rick Schuldt,Natalie Jorgenson,Katie Koch-Laveen,Josiah Hakala

Figure 4.4 presents an overall view of wetland health for all of the 2012 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 either invertebrates health or vegetation health.

Figure 4.4 Farmington site scores (percent) for the 2012 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 manmade wetlands.

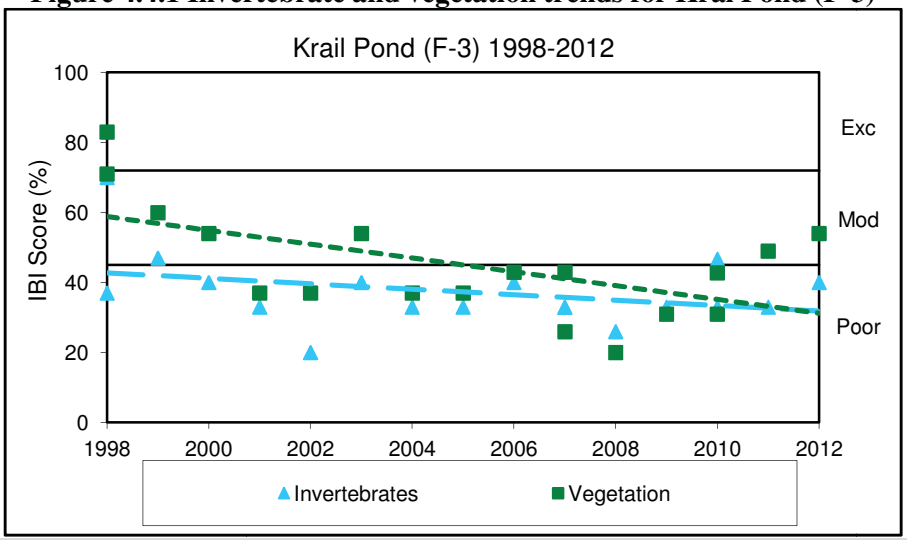
Wetland Health

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). Prior to that there was just a dirt road off Highway 66. Many housing units were built on that side. The developer probably had to account for drainage in some way. 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

2012 Data (F-3)	**Invertebrates** 	**Vegetation** 
Wetland Health Rating (IBI score)	Poor (12)	Moderate (19)
Trend 1998-2011	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 fifteen 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 both scores. The invertebrate trend appears to be stabilizing. The two indices have been consistent with each other for most years. Changes in the watershed may be impacting the wetland including development in this area that has been ongoing. The area is 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. 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. 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.

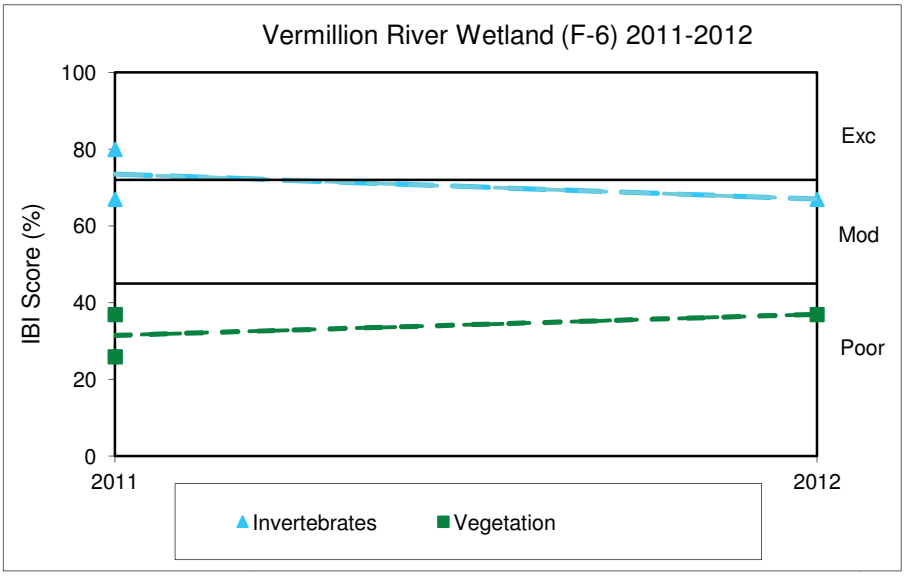
Wetland Health

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

2012 Data (F-6)	**Invertebrates** 	**Vegetation** 
Wetland Health Rating (IBI score)	Moderate (20)	Poor (13)
Trend 2011-2012	Not enough data	Not enough data

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



Site Summary: This is the second year that F-6 has been surveyed. Invertebrates scored moderate while the vegetation scored poor. This inconsistency in scores is similar to 2011. There is not enough data 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 wetland drainage area 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.

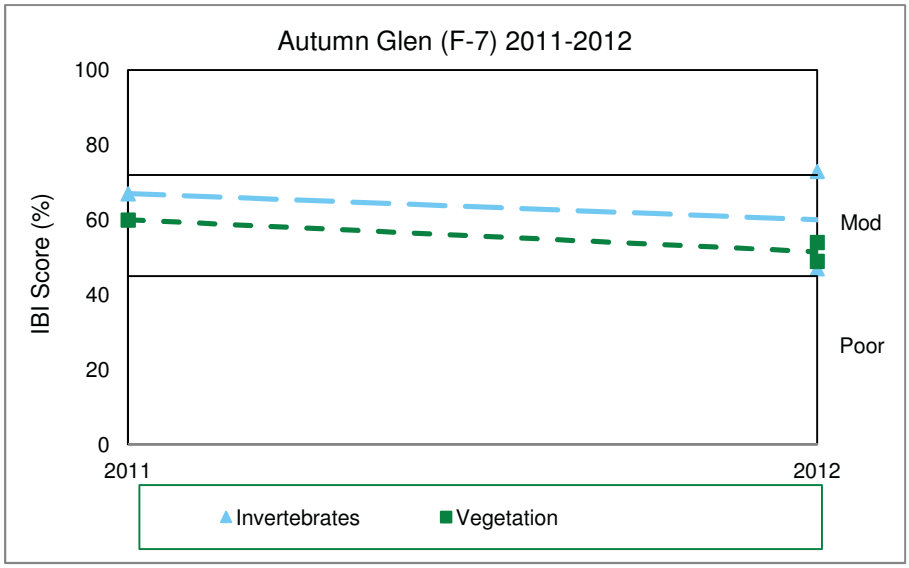
Wetland Health

Site Observations: Autumn Glen is located within a trail system, but is not easily spotted from the trail. Tall grasses and tree lines obstruct views. The wetland is approximately 50 meters from the trail.

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

2012 Data (F-7)	**Invertebrates** 	**Vegetation** 
Wetland Health Rating (IBI score)	Poor (14)	Moderate (19)
Cross-check Rating (IBI score)	Moderate (22)	Moderate (17)
Trend 2011-2012	Not enough data	Not enough data

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



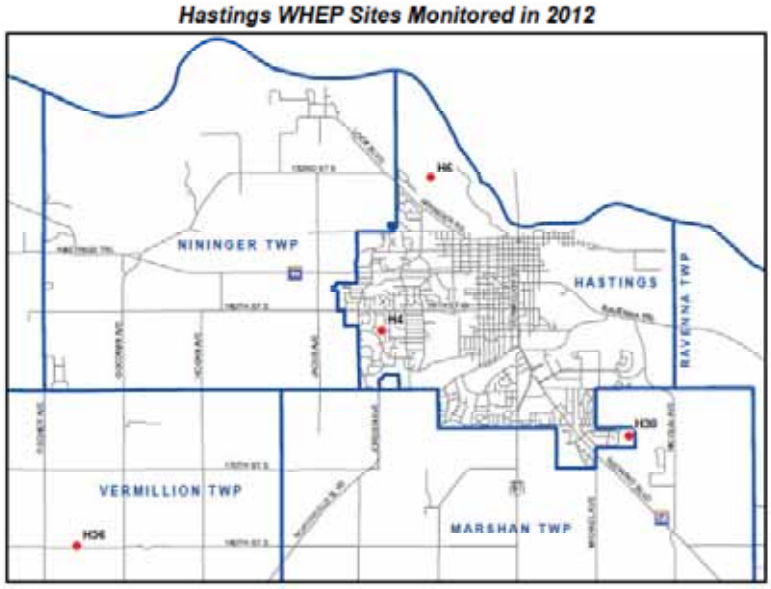
Site Summary: This is the second year that Autumn Glen has been monitored. The invertebrates scores between the City team and the cross-check team are quite inconsistent. The cross-check team found a larger diversity of invertebrates which increased the overall score. Several factors could have caused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

4.5 Hastings Wetlands

Four wetlands were monitored in Hastings in 2012. Eight wetlands have been sampled in the City of Hastings through the WHEP program since 1999.

Team Leader: Joe Beattie

Team Members: Alicia Beattie, Breanna Dodge, Chris Erickson, Summer Hendrickson, Brian Huberty, Jenna Johnson, Natalie Lundell, Maggie Lundell, Kelly Pechous, Mike Shelhamer, Connie Slaten, Dwight Smith, and Kevin Smith.



Joe Beattie became a WHEP team leader because he enjoys getting out into wetlands and introducing others to wetlands. He said, "The WHEP team is a terrific opportunity to become involved in a citizen-based monitoring program. People can get waist deep in a wetland, learn the fundamentals of invertebrate and plant identification, and work in both a field and lab setting. Along the way we have some fun and get to know some new and passionate people."

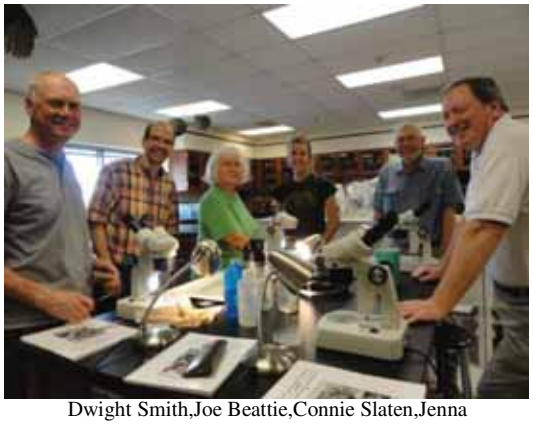
John Caven

John Caven administers WHEP for the City of Hastings. This is his third 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."

Dwight Smith

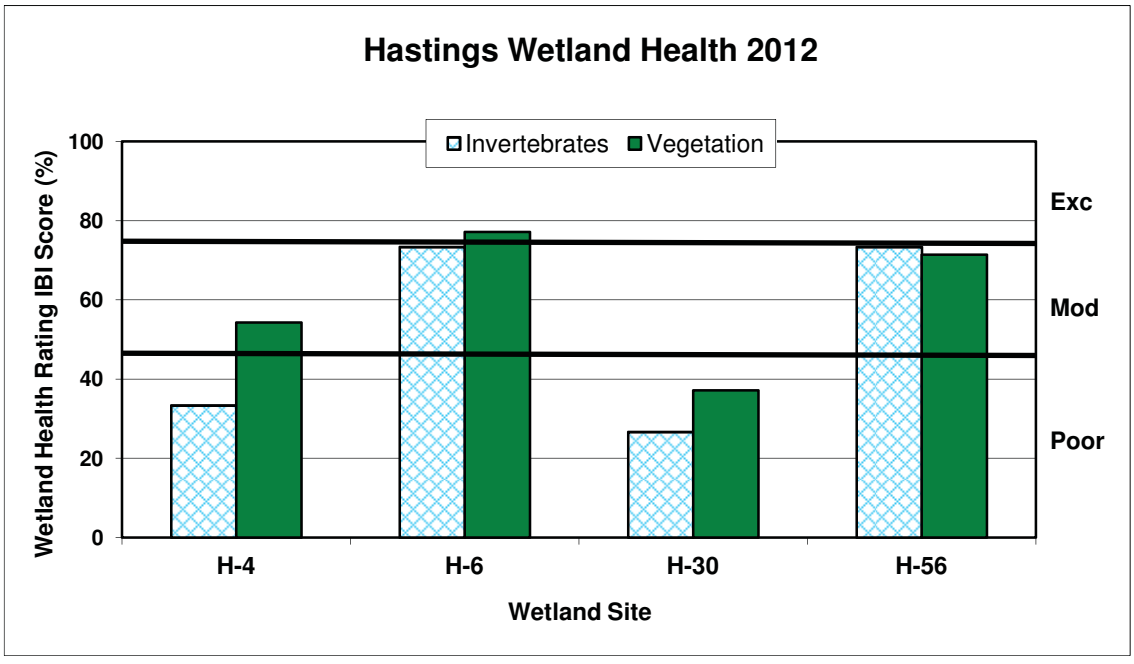
Hastings General Wetland Health

Figure 4.5 presents an overall view of wetland health for all of the 2012 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 2012. H-6 scored moderate for vegetation and nearly excellent for invertebrates. H-56 scored very high moderate to nearly excellent as well. H-30 scored poorly in both categories. The scores were quite consistent except for H-4.



Dwight Smith,Joe Beattie,Connie Slaten,Jenna Johnson,Kevin Smith,Brian Huberty

Figure 4.5 Hastings site scores (percent) for the 2012 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 wetland drainage area 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 surrounding turf.

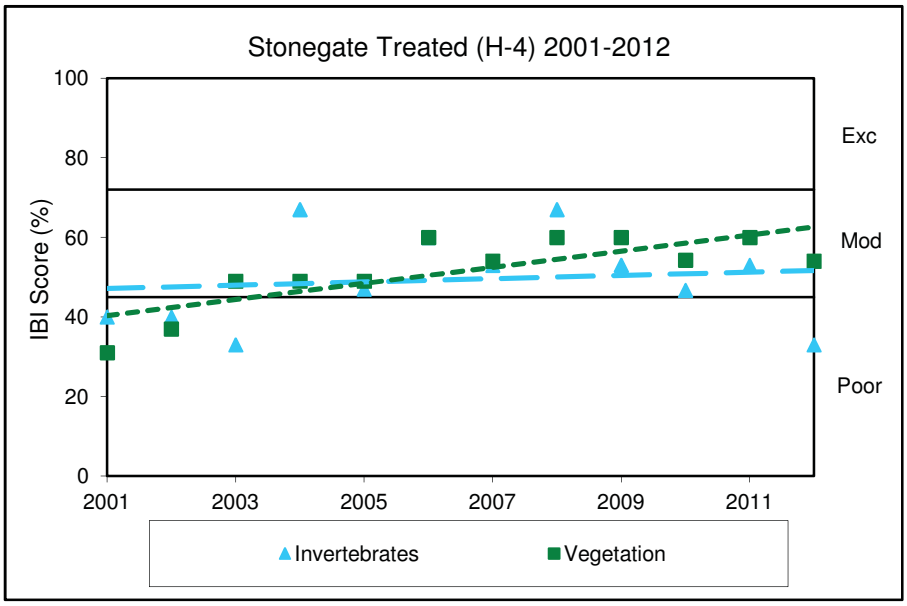
Wetland Health

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

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

2012 Data (H-4)	**Invertebrates** 	**Vegetation** 
Wetland Health Rating (IBI score)	Poor (10)	Moderate (19)
Trend 2001-2012	Improving	Improving

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



Site summary: This is the twelfth year that Stonegate Treated has been surveyed. The trend analysis indicates that wetland health is gradually improving; though the invertebrates score dropped significantly in 2012. The vegetation score appears to be stabilizing 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

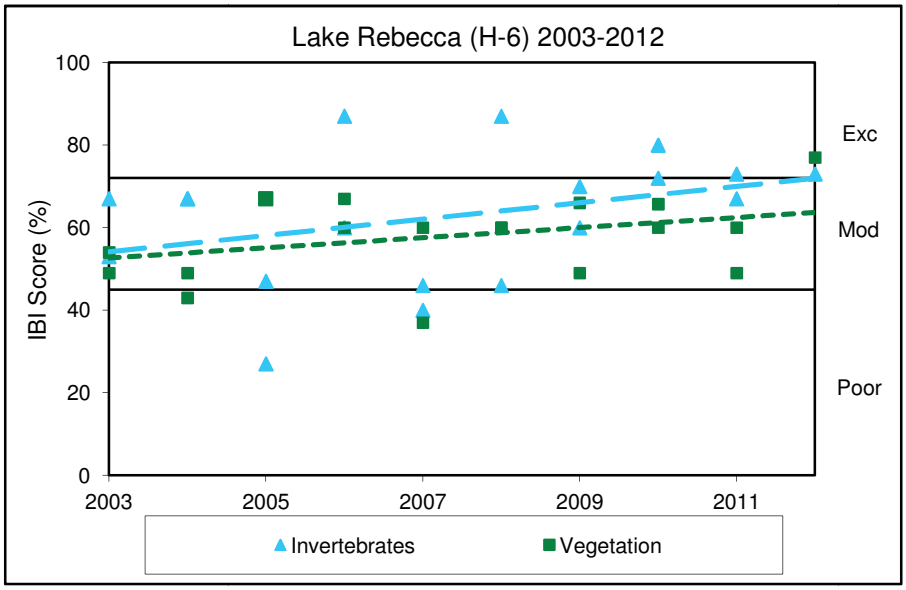
Site Observations: Bur-reed and sedges surround the wetland. Duckweed and water-meal are plentiful along with other submerged plants and floating logs.

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

2012 Data (H-6)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (22)	Excellent (27)
Cross-check Rating (IBI score)	Poor (12)*	Moderate (17)*
Trend 2003-2012	Improving	Improving

* The cross-check team actually surveyed an adjacent wetland to the one that the City team surveyed. This is most likely the cause of the scoring difference between teams.

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



Site summary: This is the tenth 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 both invertebrates and vegetation. In 2012, the vegetation health score jumped to an excellent rating. The cross-check team scores were not included in this analysis since they actually surveyed an adjacent wetland to the one that the City team surveyed.

4.5.3 Sand Coulee Pond (H-30)

H-30, also known as Sand Coulee Pond is a 0.92 acre stormwater detention pond located in the Vermillion River watershed. The wetland drainage area is 100 to 114 acres. The watershed area is 20 to 30 percent impervious. The wetland has one inlet in the southwest and one outlet on the north side. It is

part of the City's stormwater management plan, and is designated as a Medium Quality Wetland. Sand Coulee Pond serves as a sediment retention pond to provide a positive influence on water quality and wildlife habitat. Three years of vegetation improvements including control of invasive species and planting have occurred.

This pond is a man made water detention pond, and is in an area that is dedicated as a unique sand prairie by the DNR and is protected by joint landowner agreements. Water quality may be affected by future development within the watershed which may increase the volume of water discharging into the pond. Plans are in place for continuing restoration efforts including controlling invasive species such as spotted knapweed and common buckthorn. The City has erosion control regulations in place to minimize the impacts of development within the watershed.

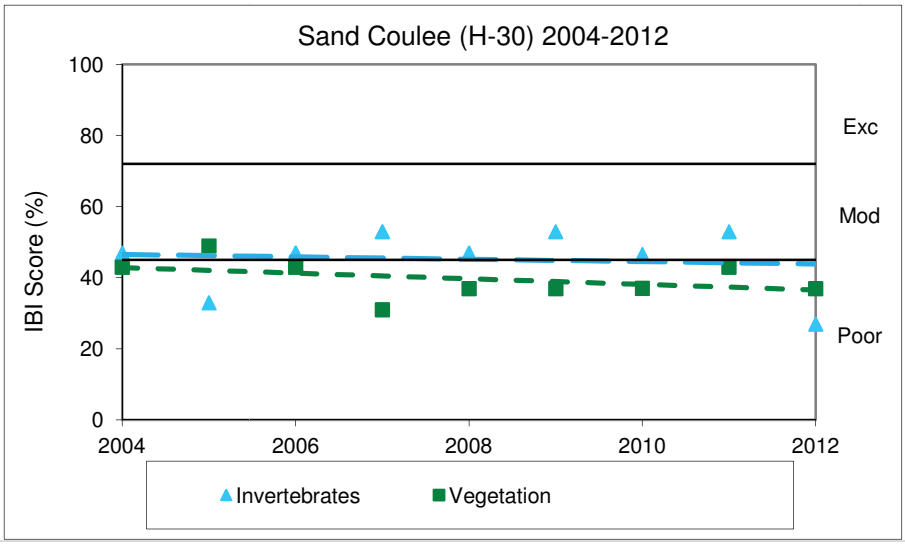
Wetland Health

Site Observations: The perimeter of the wetland includes cattails, giant bur-reed, and arrowhead. Many birds were observed, including grasshopper sparrow and towhee. During the vegetation survey in July, the substrate was "dry muck". There was rain and lightening during the invertebrate survey, and bottle traps were set for three nights (instead of two).

Table 4.5.3 Sand Coulee Pond (H-30) Health based on Index of Biotic Integrity

2012 Data (H-30)	**Invertebrates** 	**Vegetation** 
Wetland Health Rating (IBI score)	Poor (8)	Poor (13)
Trend 2004-2012	Stable to declining	Declining

Figure 4.5.3 Invertebrate and vegetation trends for Sand Coulee Pond (H-30)



Site summary: Sand Coulee wetland has been monitored nine consecutive years. Both the vegetation and invertebrate indexes have remained on the boundary between poor and moderate health until 2012 when they both dropped into the poor rating. Overall, the wetland conditions have remained stable. However, in 2012, the invertebrate trend has turned downward. In 2011, the overall invertebrate trend was improving slightly. The City team noted that two weeks prior to invertebrates sampling, the pond was dry. Rain did refill the wetland before sampling. This likely impacted the invertebrate sample. (Good notes, Team Hastings!) Continued monitoring will help determine if this drop in scores is temporary.

4.5.4 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 owned by a different party. Management practices are dependent on individual property owners. The landowner has not communicated any plans on management of the wetland. There is a concern that when the ponds are dry, the landowners may put the land into production. Farming practices to the south restrict any above ground outflow to the Vermillion River. Wildlife management is protected through the Farmland and Natural Area Program. The wetland management goal is for agriculture to continue on the surrounding land, and wildlife habitat management to be practiced in the wetland areas. Reed canary grass dominates.

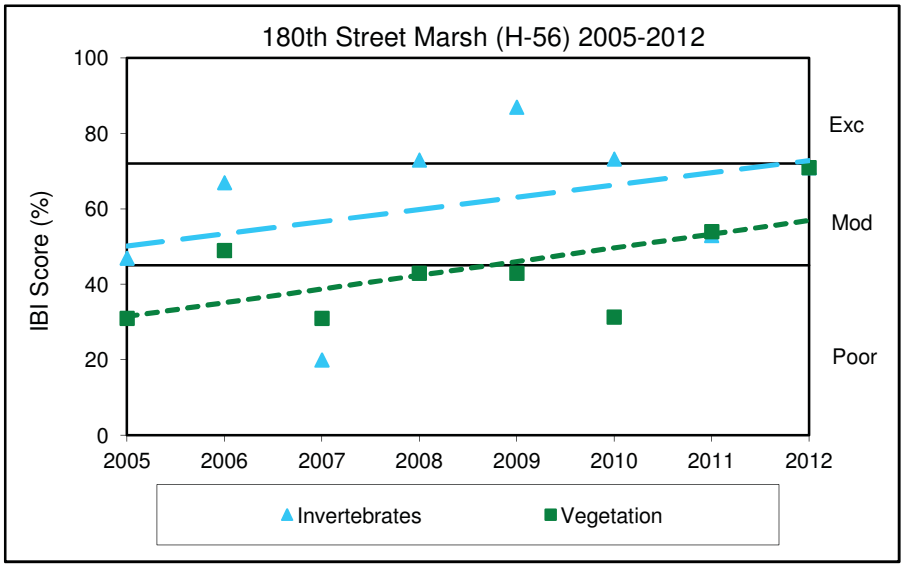
Wetland Health

Site Observations: Reed canary grass and smartweed along the perimeter of the wetland. The site is at the NE end of a farmland pond. Utricularia present!

Table 4.5.4 180th Street Marsh (H-56) Wetland Health based on Index of Biotic Integrity

2012 Data (H-56)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (22)	Moderate (25)
Trend 2005-2012	Improving	Improving

Figure 4.5.4 Invertebrate and vegetation trends for 180th Street Marsh (H-56)



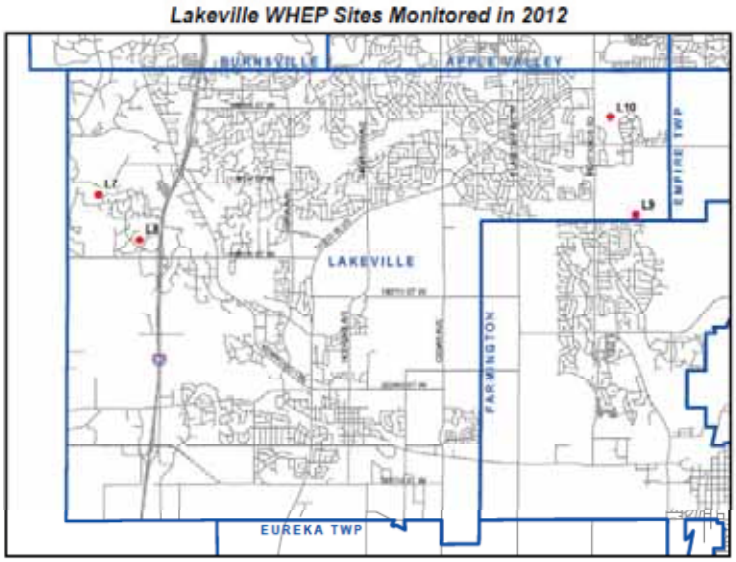
Site summary: This site has been monitored eight consecutive years since 2005. The data are variable between the invertebrates and vegetation for most years, ranging from excellent to poor wetland health, and have been significantly inconsistent; however, in 2011 and 2012, the scores have been exactly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

4.6 Lakeville Wetlands

Four wetlands were monitored in 2012 within the City of Lakeville. Ten wetlands have been monitored since WHEP began.

Team Leader: Steve Weston

Team Members: William Barnes, Claire Barnes, Rachel Barnes, Sydney Barron, Amanda Barron, Patrick Kilbride, Megan Kilbride, Erin Kilbride, Rhea Mehrkens, Kelly Rierson, Ted Sierad, Zachary Wenstad, Andrew Wenstad, and Matt Wiemann.



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."

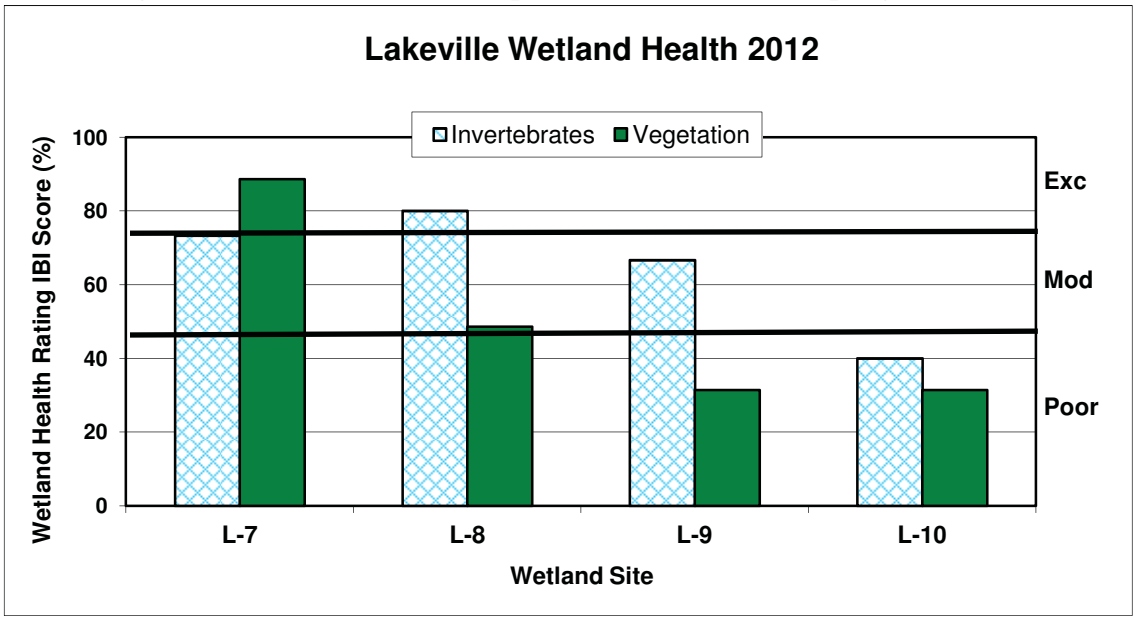
Training day

Lakeville General Wetland Health

Figure 4.6 presents an overall view of wetland health for all the 2012 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 four wetlands sampled ranged from poor to moderate. L-10 scores were consistent. L-7 scored excellent for vegetation and high moderate for invertebrates. L-8 and L-9 had quite inconsistent scores; both sites had much lower vegetation scores than invertebrates. This has been the trend for both sites in the past several years.

Steve Weston and Ted Sierad

Figure 4.6 Lakeville site scores (percent) for the 2012 sampling season



4.6.1 DNR Wetland #387 (L-7)

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.

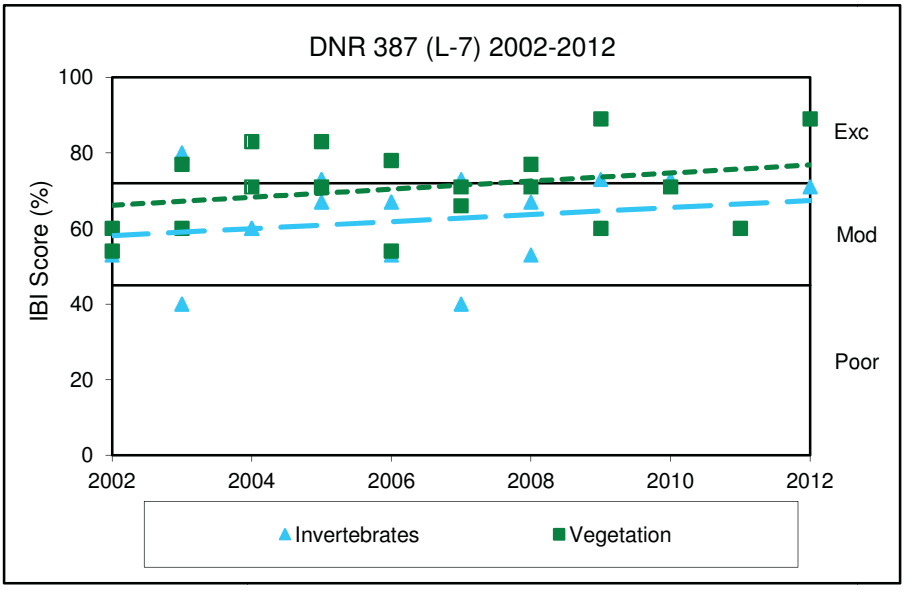
Wetland Health

Site Observations: The slope is steep and the substrate muddy. There is high vegetative diversity.

Table 4.6.2 DNR 387 (L-7) Health based on Index of Biotic Integrity

2012 Data (L-7)	**Invertebrates** 	**Vegetation** 
Wetland Health Rating (IBI score)	Moderate (22)	Excellent (31)
Trend 2002-2012	Improving	Improving

Figure 4.6.2 Invertebrate and vegetation trend for DNR 387 (L-7)



Site summary: This is the eleventh consecutive year that DNR 387 has been monitored. Scores were high in 2012 for this reference wetland. 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 no non-stormwater inlets, and one outlet on the southeast 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.

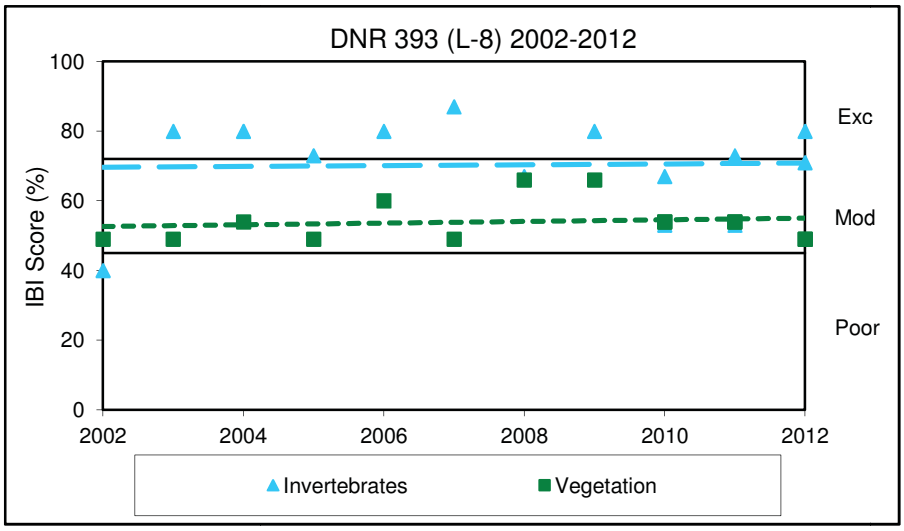
Wetland Health

Site Observations: The substrate is firm sand with a layer of silt. Yellow warbler observed.

Table 4.6.3 DNR Wetland 393 (L-8) Health based on Index of Biotic Integrity

2012 Data (L-8)	**Invertebrates** 	**Vegetation** 
Wetland Health Rating (IBI score)	Excellent (24)	Moderate (17)
Cross-check Rating (IBI score)	Moderate (22)	Moderate (17)
Trend 2002-2012	Stable	Stable

Figure 4.6.3 Invertebrate and vegetation trends for DNR 393 (L-8)



Site summary: DNR 393 has eleven consecutive years of monitoring data. 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 City scores and cross-check scores have been very consistent the past two years.

4.6.3 NC-54 Mitigation Wetland (L-9)

L-9, also known as NC-54 P.K. Wetland Mitigation, is a 13.84 acre, type 4 wetland located in the City of Lakeville. The wetland drainage area is 183 acres with 12 percent impervious surface. It is located in the Vermillion River Watershed and is on land owned by Dakota County. There is one inlet and no outlet. The wetland is part of the City's stormwater management plan and is designated as a Manage 1 area with a goal to maintain the existing wetland functions and values. It is a created wetland with agricultural disturbance in the area.

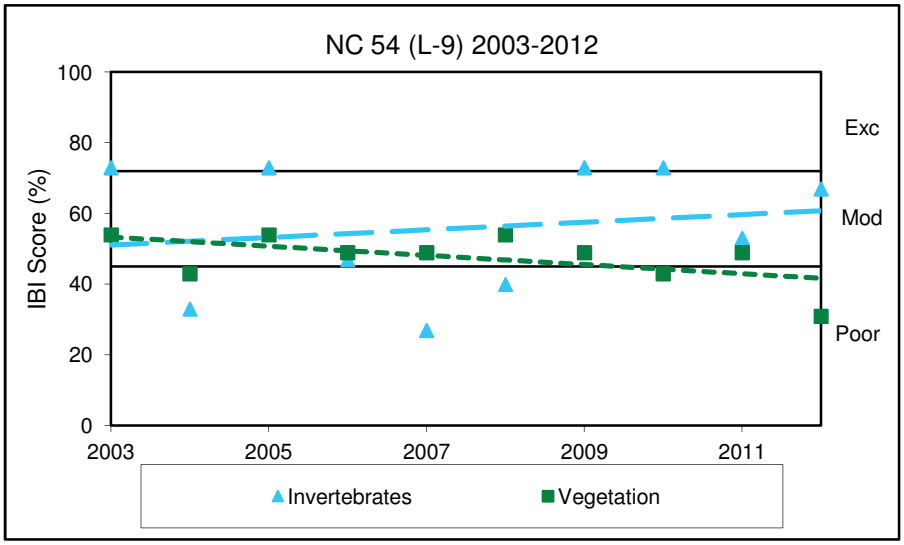
Wetland Health

Site Observations: The wetland shoreline is densly populated with willows and cattails. The slope is gentle with a muddy/sandy substrate.

Table 4.6.4 NC54 Mitigation (L-9) Wetland Health based on Index of Biotic Integrity

2012 Data (L-9)	**Invertebrates** 	**Vegetation** 
Wetland Health Rating (IBI score)	Moderate (20)	Poor (11)
Trend 2003-2012	Variable	Stable to declining

Figure 4.6.4 Invertebrate and vegetation trends for NC-54 (L-9)



Site summary: This is the tenth consecutive year that L-9 has been surveyed. The vegetation and invertebrate scores are not consistent. Vegetation scored poorly while invertebrates scored moderately. They appear to have opposite trends; though the invertebrate scores have been extremely variable over the years while the vegetation scores have stayed pretty stable along the poor-moderate line of division, although the 2012 score dropped substantially. The Lakeville team reported that the shoreline was densely populated with willow and cattail. These two species may be limiting the diversity of vegetation in the wetland and contributing to lower scores.

4.6.4 DNR #349W (L-10)

#349W (L-10) is a 40 acre, type 5 wetland located in the North Creek subwatershed of the Vermillion River watershed. This wetland is a DNR protected wetland. The subwatershed, NC9-1, is 213 acres. Potentially, 7,190.6 acres (44% impervious) could drain into L-10. The wetland is public property. There is one inlet on the northwest side of the wetland and one outlet on the south end of the wetland. It is included in the City's stormwater management plan. It is designated as a Manage 1 wetland. The City's wetland goal is to improve the existing wetland functions and values.

L-10 is surrounded by a 40 acre park and trail system, but receives large amounts of stormwater runoff, mainly from Apple Valley. Land use impacts include nearby residential development and gravel mining on the north end of the lake (which will eventually be residential land use in the future). Cormorants, herons and egrets use this wetland frequently. There has been confirmation in the past of koi present in the wetland. The northeast portion of the basin is the deepest (~10 feet). The north/south portion of the water body is very shallow (~5 feet). A 1.5 acre prairie is being restored on the hill in the northwest corner of the water body. Approximately 13 acres of mature oaks are present in the park.

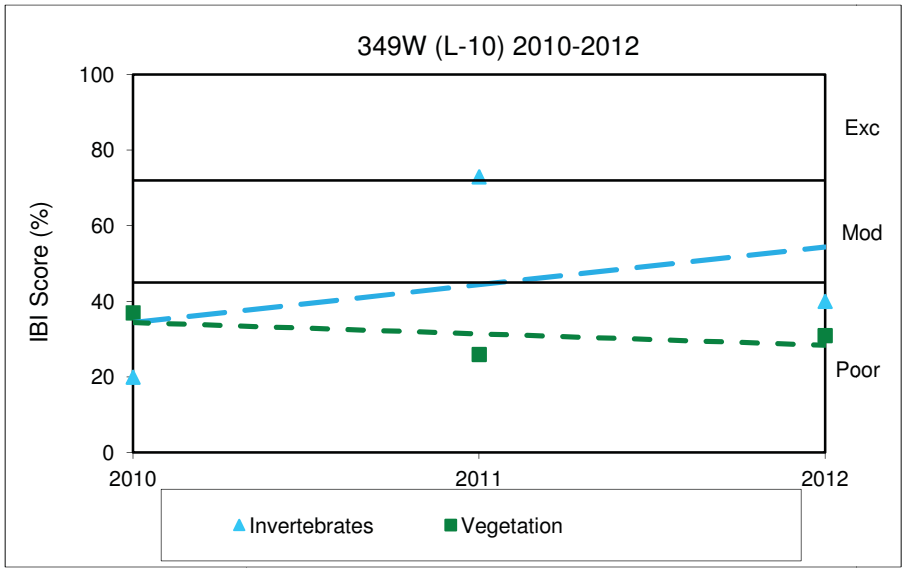
Wetland Health

Site Observations: The substrate is sandy. Very low vegetation diversity including reed canary grass.

Table 4.6.4 DNR #349W (L-10) Wetland Health based on Index of Biotic Integrity

2012 Data (L-10)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Poor (12)	Poor (11)
Trend 2010-2012	Not enough data	Not enough data

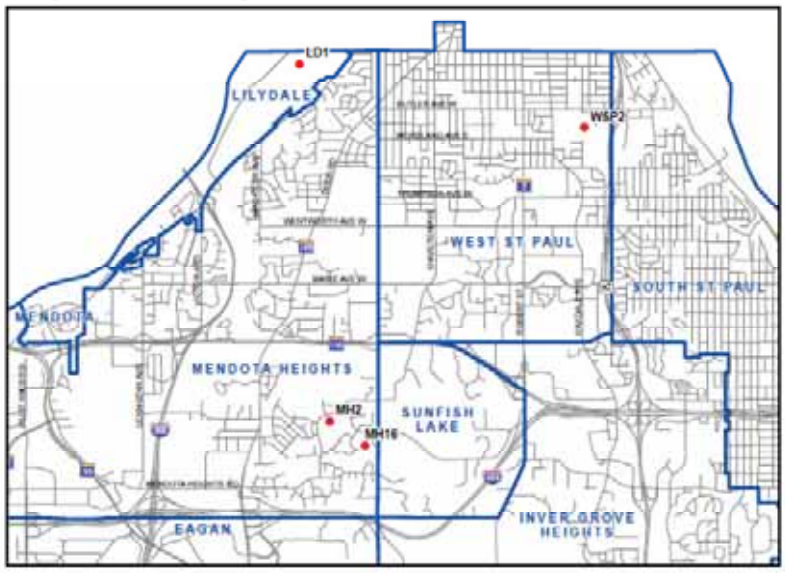
Figure 4.6.4 Invertebrate and vegetation trends for DNR #349W (L-10)



Site summary: L-10 has been monitored three consecutive years. The invertebrates scores are quite variable. The vegetation trend appears fairly stable; though there is not enough data to make a conclusion. Ongoing monitoring will help identify trends in wetland health as water quality improvement projects are implemented in the watershed.

4.7 Lilydale, Mendota Heights, & West St. Paul Wetlands

In 2012, the Mendota Heights team monitored one wetland in Lilydale, two wetlands in Mendota Heights, and one wetland in West St. Paul. The West St. Paul and Lilydale sites are located in a Dakota County Park. Thirteen wetlands have been monitored in Mendota Heights and eight in West St. Paul since the start of the WHEP program. The Lilydale wetland is new to WHEP in 2012.



Team Leader:
Darcy Tatham

Team Members:
Megan Beaudry, John Bottomley, James Chastek, Naomi Chavez, Alison Hruby, Katie Immel, Maggie Karschnia, Vincent Rosa-Chavez, Povi Rosa-Chavez, Jodi Schmelz, Jason Skog, Michelle Skog, Mary Stade, Anneliese Tatham, Johanna Tran, Bob Wright, and Micah Zimmerman.


Darcy Tatham


Alison Hruby, Anneliese Tatham, Micah Zimmerman

Mendota Height's team leader, Darcy Tatham, has been part of the program for twelve years. She reflected on the 2012 WHEP season, saying, "I remember the influence of the weather on the ponds and us. We impact urban ponds with what we do in our homes and businesses, but weather also is a huge variable. First it was wet and spring came early so that the plants appeared 2 weeks older than in past years. Then it was hot and dry. The water temperature was warmer than we've seen in the past. These are variables we can't control (nor would I want to!), but they make our sampling and observations of the ponds important and interesting.

"Another thing that I remember is our first encounter with the plant, water shield. Our simplified description of it might be that of a modified lily pad with Rain-X on the surface. Playing with beads of water on the water shields, while in waders on a warm summer's evening with an otter swimming nearby and deer coming closer to see what we're doing and dragonflies and damselflies flying around us – what could be better?! I've been team leader for about 11 years and I can't thank my team enough for coming out to collect samples and analyze the data so that we can monitor the health of our waters and wetlands. May we have many more experiences like the one described above."

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 is committed to maintaining and improving the water quality in our wetland habitat areas. I am very excited to be a part of a community that has preservation of its natural amenities as such a high priority."

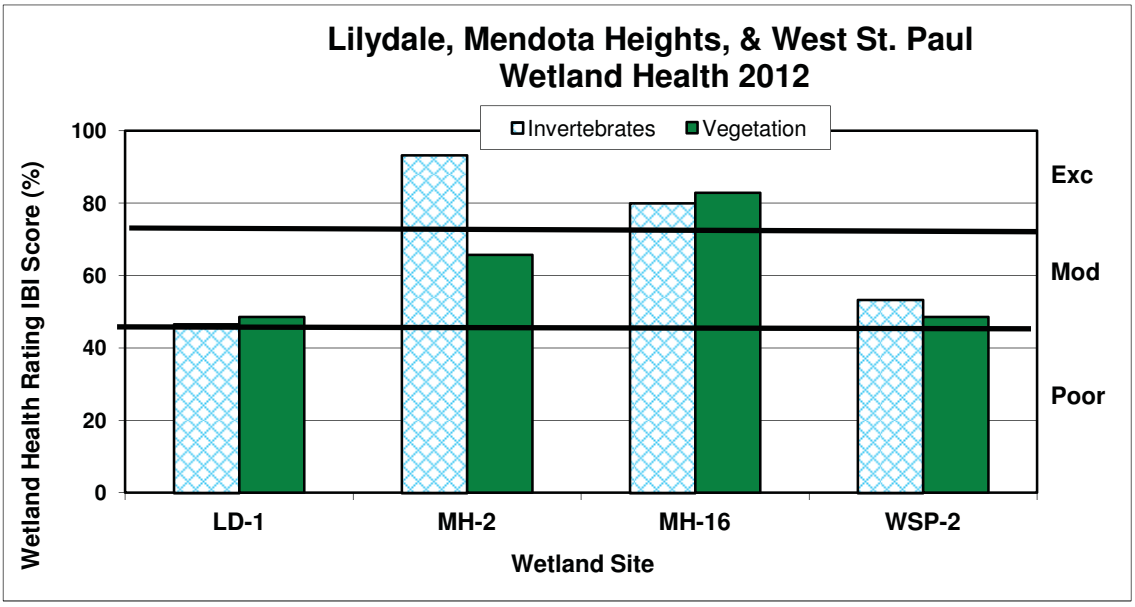
Ryan Ruzek is the assistant city engineer for the City of Mendota Heights. He has helped coordinate wetlands for monitoring in past seasons. Ryan's WHEP volunteer experience provided him with valuable knowledge helping him analyze the data.

Lilydale, Mendota Heights and West St. Paul General Wetland Health

Training day

Figure 4.7 presents an overall view of wetland health for all of the 2012 monitoring sites in Lilydale, Mendota Heights, and West St. Paul 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. One site was monitored in Lilydale, two sites in Mendota Heights, and one in West St. Paul. The wetland ratings ranged from poor to excellent wetland health. MH-2 and MH-16 show excellent ratings for invertebrate scores. MH-16 also scored excellent in vegetation. WSP-2 scores are quite lower than 2011 scores. LD-1 is a new wetland in 2012. The scores were quite consistent for all of the wetlands except MH-2. For MH-2, the invertebrates scored much higher than the vegetation.

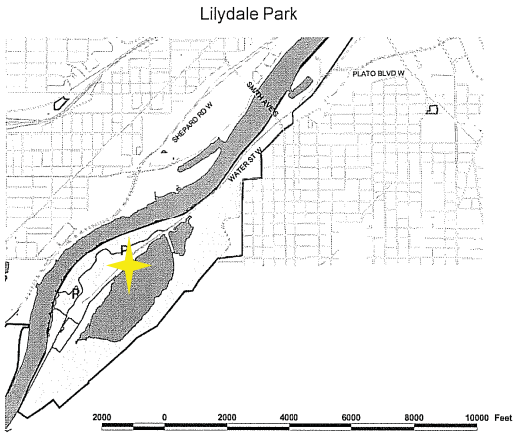
Figure 4.7 Lilydale, Mendota Heights, & West St. Paul site scores (percent) for the 2012 sampling season



4.7.1 Pickerel Lake (LD-1)

Pickerel Lake (LD-1) is located in Lilydale Park just south of the Mississippi River. It is within the Lower Mississippi River Watershed. Pickerel Lake is part of the Lower Mississippi River Watershed Management Organization's Watershed Restoration and Protection Plan (WRAPP). The area is a mixture of floodplain forest, wetlands, and old fields. The main wetland is Pickerel Lake which has open water, cattails, and shrub swamp.

A railroad line crosses the northern end of Pickerel Lake and runs around the eastern side of the lake. Lilydale road runs along the western side of the lake.



Wetland Health

Site Observations: There is a large variety of plants; however, smartweed dominates the water. Coontail, algae, white water lilies, bur-reed, cattails, water shield, scirpus, amur maple, and duckweed present. The wetland has a gentle slope, and the substrate is somewhat variable with sand bars present. River otter, ducks, ducklings, deer, egret, and dragonflies observed.

Table 4.7.1 Pickerel Lake (LD-1) Wetland Health based on Index of Biotic Integrity

2012 Data (LD-1)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Poor (14)	Moderate (17)
Trend 2012	Not enough data	Not enough data

Site Summary: This is the first year that Pickerel Lake has been monitored by WHEP. More data is needed to determine a health trend.

4.7.2 Copperfield (MH-2)

Copperfield (MH-2) is a 9.4-acre, type 4 wetland within the IV-18 watershed. The watershed is 865.3 acres and is 0.4 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 monitored for invasive species and vegetative growth trends that impact water quality. Copperfield is designated as a reference site.

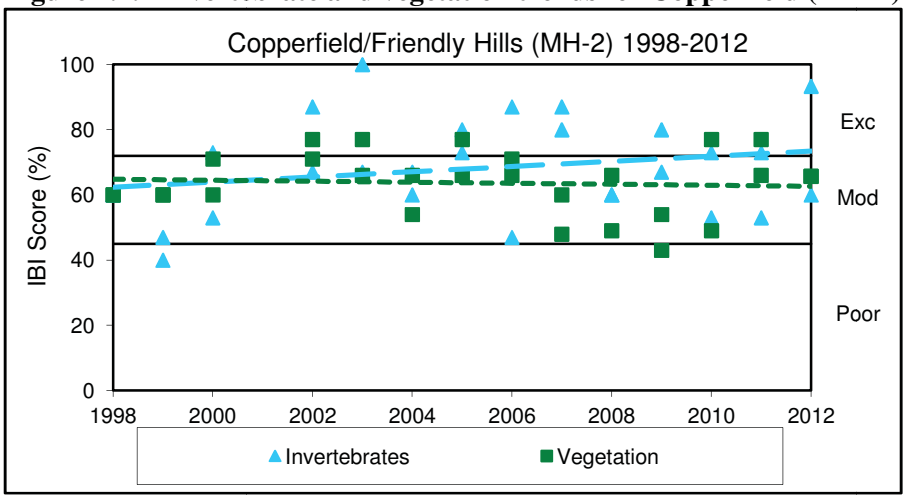
Wetland Health

Site Observations: The wetland is very mucky with a gentle slope. There is a walking/biking trail around the pond.

Table 4.7.2 Copperfield (MH-2) Wetland Health based on Index of Biotic Integrity

2012 Data (MH-2)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Excellent (28)	Moderate (23)
Cross-check Rating (IBI score)	Moderate (18)	Moderate (23)
Trend 1998-2012	Improving but variable	Stable

Figure 4.7.2 Invertebrate and vegetation trends for Copperfield (MH-2)



Site Summary: The long-term trend based on fourteen 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 found a moderate vegetation rating and an excellent invertebrate rating in 2012. The City team and cross-check team scored identical vegetation scores. Although the overall trend shows a slight decline, vegetation scores have been improving since 2007.

4.7.3 Field Stone Pond (MH-16)

Field Stone Pond (MH-16) is a 6.9 acre, type 4 wetland in the Lower Mississippi River watershed. Its watershed is 577.9 acres and 20 percent impervious. The wetland is publicly owned. There are several outlets on the north, east, and south side of the wetland. There is one outlet in the northwestern corner. The wetland is included in the City's storm water management plan and is designated as a PUBG waterbody. It is being monitored for impacts of water quality. The surrounding area is fully developed; though the pond is located within a natural park area with low density development. A buffer strip exists between the pond and the residences. A pond bubbler was added in 2010.

Wetland Health

Site Observations: The pond is in a residential development with houses all around and a buffer between the pond and the private lawns. The wetland bottom was highly variable including both solid and mucky substrate. Logs and rocks also present.

Table 4.7.3 Field Stone Pond (MH-16) Wetland Health based on Index of Biotic Integrity

2012 Data (MH-16)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Excellent (24)	Excellent (29)
Trend 2012	Not enough data	Not enough data

Site summary: This is the first year that MH-16 has been monitored. Both the vegetation and invertebrate scores indicate excellent wetland health. This may be a possible reference wetland.

4.7.4 Thompson Lake (WSP-2)

Thompson Lake (WSP-2) is an eight to ten acre "Kettle" lake located in West St. Paul. The lake is approximately eight feet deep and sits on top of a glacial moraine of Superior Lobe age. The sub-watershed is approximately 175 acres in size and consists of about 51-64% impervious land areas. It is part of the Simon's Ravine watershed in West St. Paul which is part of the Lower Mississippi River Watershed. Thompson Lake is a major attraction and takes up a large portion of Thompson County Park. An inlet to the lake is on the north end and an outlet is located on the south end. Dakota County has recently completed a two year water quality monitoring project on the lake that was initiated due to concerns discovered when the City of West St. Paul needed to evaluate stormwater discharge flowing into the lake as part of their MS4 permit requirements. The neighboring high school has also conducted water quality and biological assessments of the lake as part of their science and community service curriculum. Based on data accumulated by Dakota County, West St. Paul and the high school; the MPCA granted funds to the Lower Minnesota River Watershed Management Organization (LMRWMO) to complete additional water quality monitoring and develop a watershed restoration and protection plan for the lake.

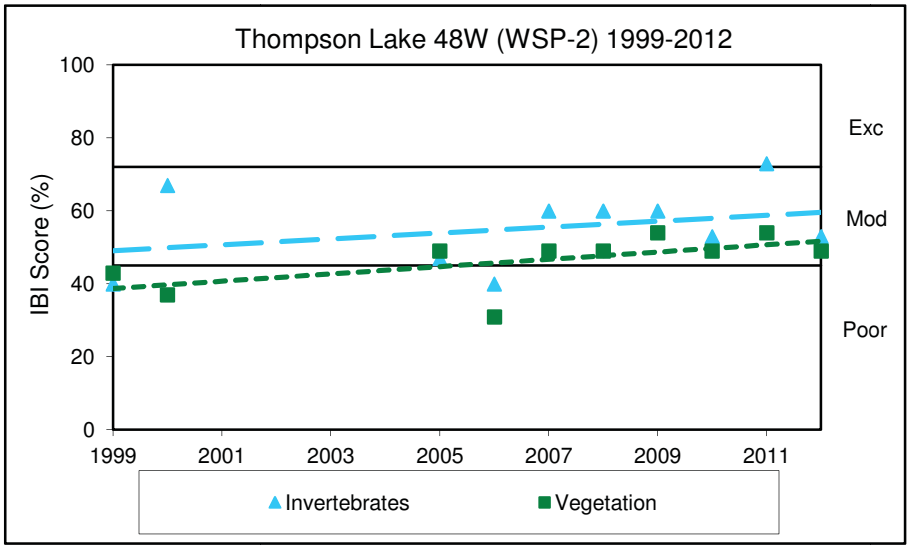
Wetland Health

Site Observations: The vegetation plot is located on the north end of Thompson Lake. Buckthorn and smartweed are abundant. Exotic snails were present in the water. Other observations noted were, garbage, oily film on the water, and lots of logs and branches in the water. Algae covers 5-75 percent of the surface. There is a gentle slope, and the substrate is silty. A muskrat was observed.

Table 4.7.4 Thompson Lake (WSP-2) Wetland Health based on Index of Biotic Integrity

2012 Data (WSP-2)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (16)	Moderate (17)
Trend 1999-2012	Improving	Improving

Figure 4.7.4 Invertebrate and vegetation trends for Thompson Lake (WSP-2)



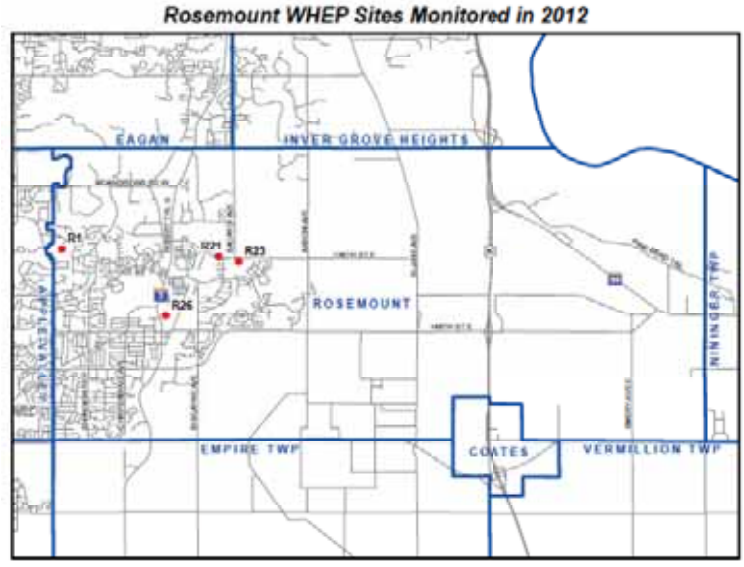
Site summary: This is the eighth consecutive year that WSP-2 has been surveyed, and tenth time since 1999. The trend lines indicate that the wetland health is improving in both categories. The 2012 data is quite consistent; though both scores are lower than in 2011.

4.8 Rosemount Wetlands

Four wetlands were monitored in the City of Rosemount in 2012. Twenty-four wetlands have been monitored in Rosemount since the start of WHEP. R-26 was monitored for the first time this year.

Team Leaders: Dan Stinnett

Team Members: Barbara Berggren, Brian Berggren, Benjamin Determan, James Kluender, Becca Newman, Terry Pearson, Jane Porterfield, Tom Wilkens, and Denise Wilkens.



Dan Stinnett

Dan Stinnett has been the Rosemount WHEP team leader for four years and previously spent two years as a member of the Lakeville WHEP team. He commented, "overall, field sampling and laboratory identification seemed to go fine with 183 total volunteer hours." A couple of noteworthy events that took place in 2012 as he describes below.

Kim Shoe-Corrigan, Max Shoe-Corrigan, Christine Watson

"Rosemount city council member Ms. Kim Shoe-Corrigan along with Rosemount public works officials Andy Brotzler and Christine Watson and WSB & Associates consultant Jed Chesnut participated in an April coordination meeting with Rosemount WHEP members Stinnett and Pearson and WHEP coordinator Liepold. The meeting is held annually at Rosemount City Hall to present WHEP results from the previous field season and to discuss plans for the upcoming year. This year's attendees were invited to accompany Rosemount WHEP team members for an afternoon field visit to nearby Erickson Pond during the June sampling season. This event was a good 'hands-on' learning opportunity for Rosemount officials and gave attendees a chance to experience wetland habitat while attired in chest waders.

Christine Watson, Kim Shoe-Corrigan, Max Shoe-Corrigan, Dan Stinnett, Jed Chesnut, Jane Porterfield, Jim Kluender

Fairy shrimp

While sampling Rosemount wetland site R-23 for macroinvertebrates, WHEP volunteer Ben Determan collected an unusually large fairy shrimp. His sophisticated capture technique consisted of dipping a collection tray beneath the animal and scooping it up like a bucket. Once identified as a fairy shrimp other team members began to observe a population present in the wetland. The crustaceans seemed to congregate near the surface and in the open portion of the small (0.3 acre) wetland mitigation site. Two live specimens were later collected and submitted to MPCA Joel Chirhart for identification. The Rosemount WHEP team waits to learn of a final identification but preliminary indications from Joel were a possible range extension for the giant fairy shrimp (*Branchinecta gigas*). A photo of the specimen is shown alongside a nickle for size comparison."

B.Determan, T.Wilkens, T.Pearson, D.Stinnett

The City of Rosemount enlists the help of engineering consultants from WSB & Associates, Inc. to make the site selections for the WHEP program each year.

Over the past several years, WHEP volunteers have provided the City with high quality, quantitative data for several wetlands. The data they collect is primarily used to document wetland quality, track changes in wetland health trends, and to augment the assessment of wetland replacement success for mitigation

projects. This data can be very difficult to obtain, and the volunteer efforts are greatly appreciated.

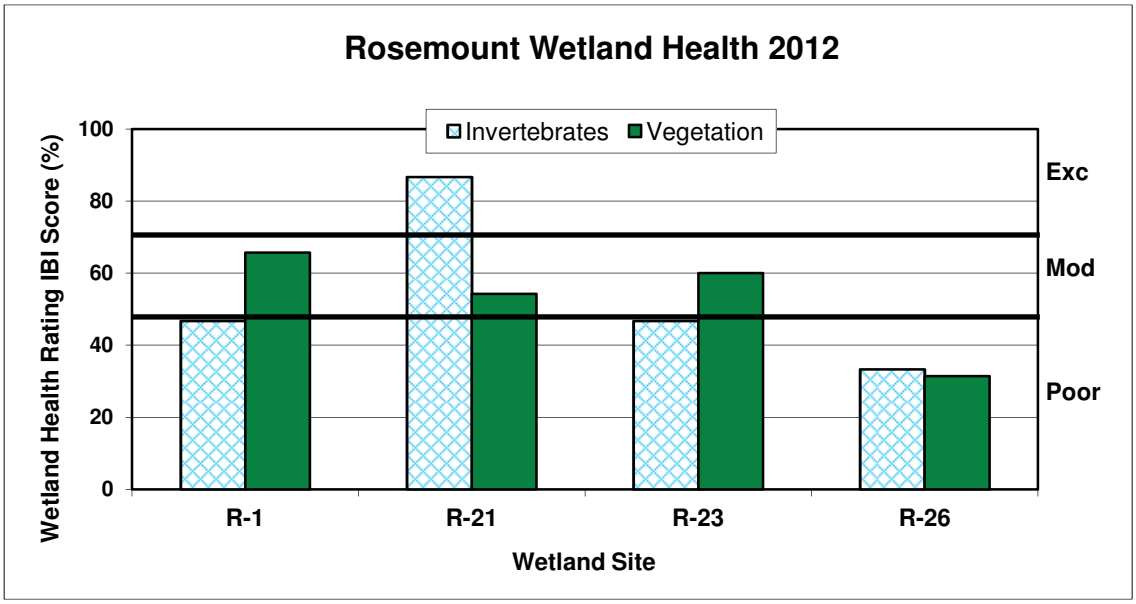
By participating in the WHEP program, the City better manages its wetland resources and has additional data to complement the City's Wetland Management Plan. The cumulative data will allow the city to better manage, restore, and maintain its wetland biodiversity in the future.

D.Stinnett, T.Wilkens B.Determan

Rosemount General Wetland Health

Figure 4.8 presents an overall view of wetland health for all the 2012 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 of R-26 were consistent with both categories scoring poorly. The other three wetland scores were variable. R-1 and R-23 scored poorly for invertebrates and moderately for vegetation. R-21 scored excellent for invertebrates while vegetation scored moderate.

Figure 4.8 Rosemount site scores (percent) for 2012



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

4.8.1 Kelly Marsh (R-1)

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

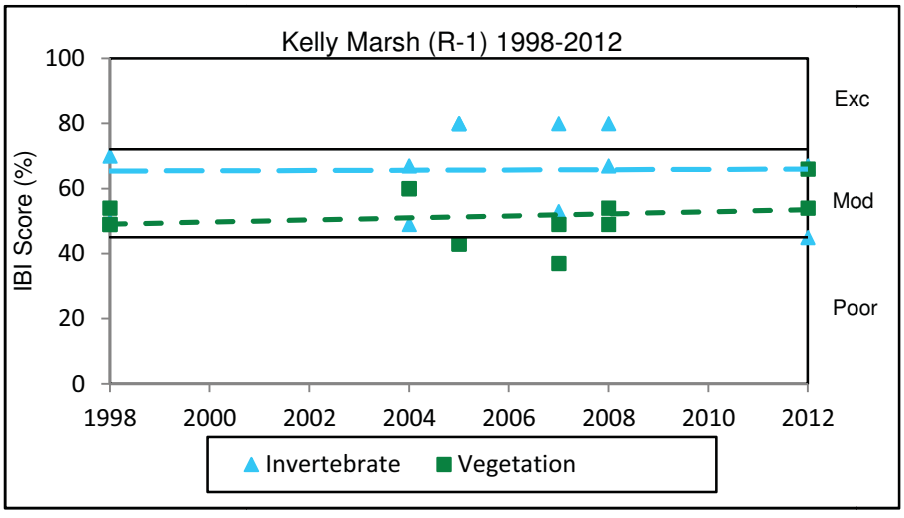
The wetland is located in a basin surrounded by a housing development and City park. The wetland basin is affected by storm water runoff from the nearby development which is encrouching upon the existing 75 foot buffer.

Site Observations: This wetland has a firm sandy bottom covered with 4-5 inches of silt. Duckweed, waterlilies, narrow leaf potomageton, and coontail were present.

Table 4.8.2 Kelly Marsh (R-1) Wetland Health based on Index of Biotic Integrity

2012 Data (R-1)	**Invertebrates** 	**Vegetation** 
Wetland Health Rating (IBI score)	Poor (14)	Moderate (23)
Cross-check Rating (IBI score)	Moderate (20)	Moderate (19)
Trend 2005-2011	Stable but variable	Stable

Figure 4.8.2 Invertebrate and vegetation trends for Kelly Marsh (R-1)



Site summary: This is the sixth time that Kelly Marsh has been surveyed since 1998. It has not been surveyed since 2008. The health scores are quite variable, though both trend lines indicate stability. The City team surveyed a more diverse vegetation plot than the cross-check team, but took a less diverse invertebrate sample. 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.

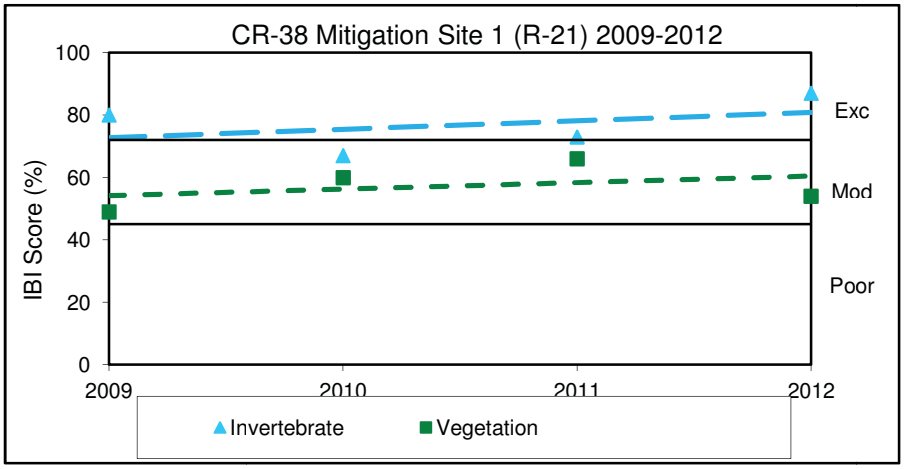
R-21 is a depressional shallow marsh wetland. The southern portion of this wetland complex was constructed as mitigation for impacts to other wetlands as a result of street reconstruction, and is an extension of an existing wetland dominated by reed canary grass. The Nutrient loading from adjacent agriculture 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 8-10 inches of sediment. It has a cattail perimeter and open water in the middle with *Spirodela* present.

Table 4.8.3 CR-38 Mitigation Site 1 (R-21) Wetland Health based on Index of Biotic Integrity

2012 Data (R-21)	**Invertebrates** 	**Vegetation** 
Wetland Health Rating (IBI score)	Excellent (26)	Moderate (19)
Trend 2009-2012	Improving slightly	Improving slightly

Figure 4.8.3 Invertebrate and vegetation trends for CR-38 Mitigation Site 1 (R-21)



Site summary: This is the fourth consecutive year that this site has been monitored. The 2012 scores are not consistent scoring excellent for invertebrates and moderate for vegetation. Both trend lines indicate slight improvement in health, though the 2012 vegetation score dropped below the line. More years of data will better indicate the 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 as a mitigation for impacts to other wetlands as a result of street reconstruction. It was constructed near an existing wetland that is dominated by reed canary grass that impedes upon this wetland.

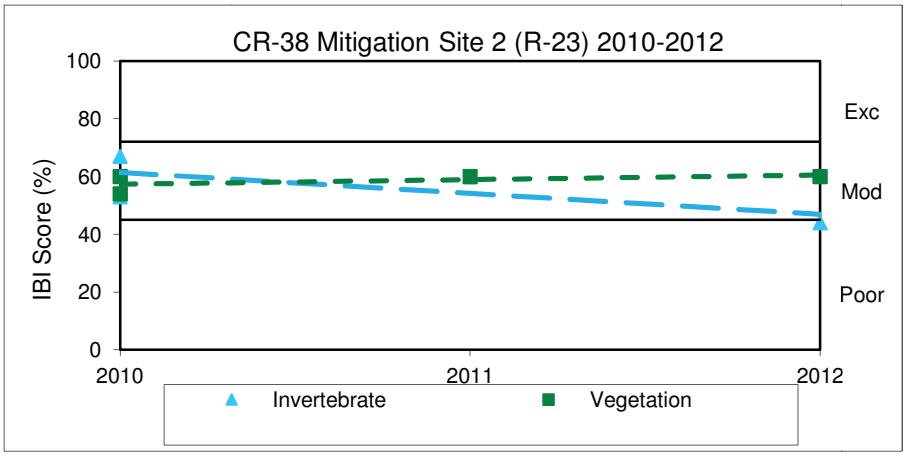
Wetland Health

Site Observations: The shoreline is dominated by cattail, reed canary grass, and spike rush. Arrowhead and round-stem bull rush also present. It has a gentle slope and a solid substrate in the western portion and mucky in the eastern portion.

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

2012 Data (R-23)	**Invertebrates** 	**Vegetation** 
Wetland Health Rating (IBI score)	Poor (14)	Moderate (21)
Trend 2010-2012	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 third year that R-23 has been monitored. The vegetation score was moderate while the invertebrates score was poor, but borderline moderate. The vegetation score appears quite stable over the last few years. The invertebrate health appears to be declining, but 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

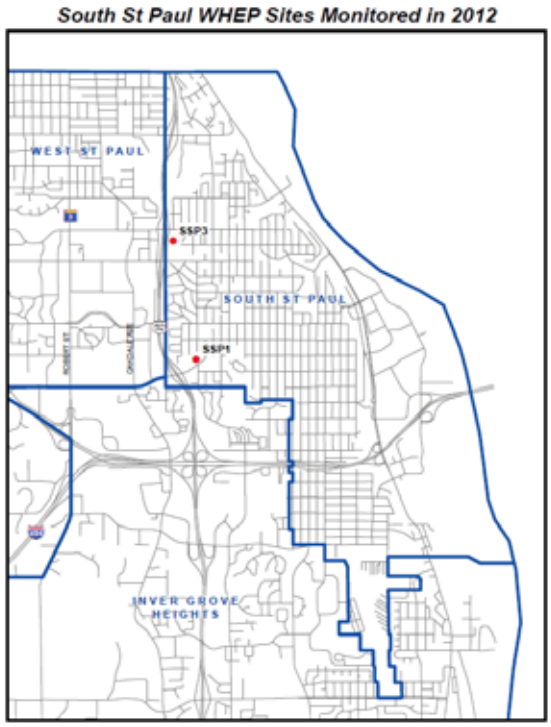
Site Observations: The substrate is firm to light silt. Two attempts of invertebrates collection was necessary because of extreme fluctuations of water levels. The water was high after heavy rains and flooded the shoreline vegetation. Two days later, the water levels dropped one foot.

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

2012 Data (R-26)	**Invertebrates** 	**Vegetation** 
Wetland Health Rating (IBI score)	Poor (10)	Poor (11)
Trend 2012	Not enough data	Not enough data

Site summary: This is the first year that R-26 has been monitored. The wetland scores are consistent. Both invertebrates and vegetation scored poorly. 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 2012 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 first year that South St. Paul has had a City team of its own to monitor it. In the past, the Mendota Heights team has always been in charge of monitoring these sites.

Team Leader:
Michelle Skog

Team Members: John Bottomley, James French, Maggie Karschnia, Ronald Morgan, Jason Skog, and Bob Wright.

Michelle Skog

This is Michelle's first year as team leader of South St. Paul; though she has been involved in WHEP for six years. She commented, "This is the first year South St Paul has had its own WHEP team, so this year was both new and challenging in many ways. Not only did our team have brand new equipment, but a new team lead and several new volunteers. We all learned together and overcame many obstacles, and had fun doing it! Fortunately, I had amazing volunteers! They helped in coming up with creative solutions to lacking or incorrect equipment, like Styrofoam floats for our sorting trays in the water. A big 'Thanks' to all my volunteers!

WHEP does so many great things, not only for our wetlands and how we choose to manage them, but also in educating people about our natural surroundings. It gives anyone who's interested in wetlands, young or old, the tools to learn and participate in actual hands-on research – and it's fun!"

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.

Bob Wright,Ron Morgan, Michelle Skog, Jim French

Given the City's limited staff resources, it is unlikely the City would participated without the help of these dedicated volunteers.'

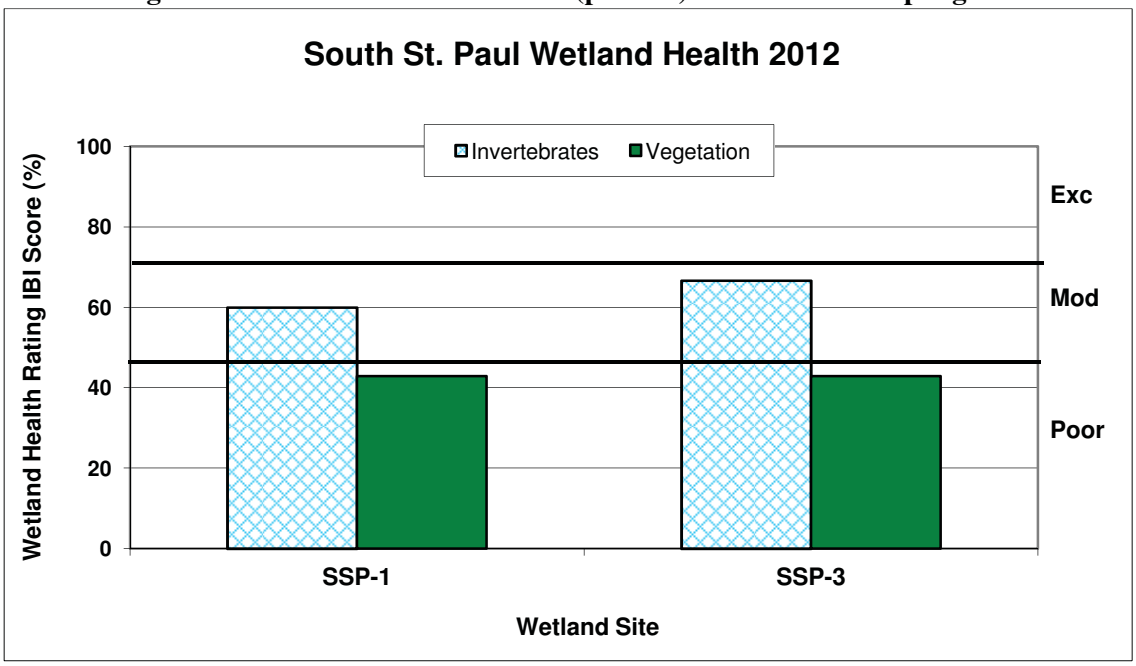
South St. Paul General Wetland Health

Michelle Skog and John Bottomley

Jim French, Bob Wright, Michelle Skog, John Bottomley and Maggie Karschnia

Figure 4.7 presents an overall view of wetland health for all of the 2012 monitoring sites in South St. Paul 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. The wetland ratings ranged from poor to moderate wetland health. Both wetlands scored almost identically. The invertebrates scored moderately while the vegetation scored poorly.

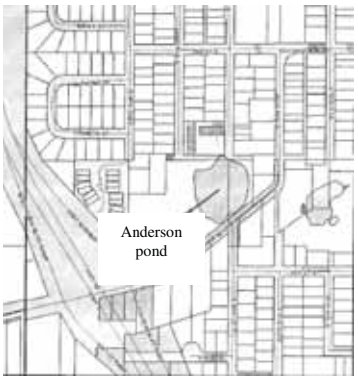
Figure 4.7 South St. Paul site scores (percent) for the 2012 sampling season



4.7.3 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.



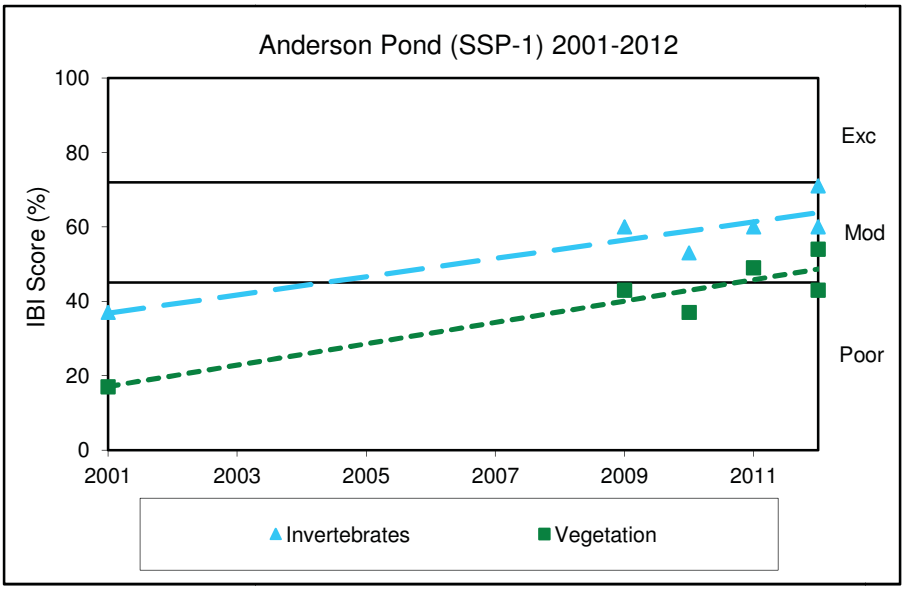
Wetland Health

Site Observations: Cattails line the shore, and coontail was the dominant submergent plant. Jewelweed was abundant on the west side of the vegetation releve. The substrate was slightly mucky, but not too difficult to walk on.

Table 4.7.3 Anderson Pond (SSP-1) Wetland Health based on Index of Biotic Integrity

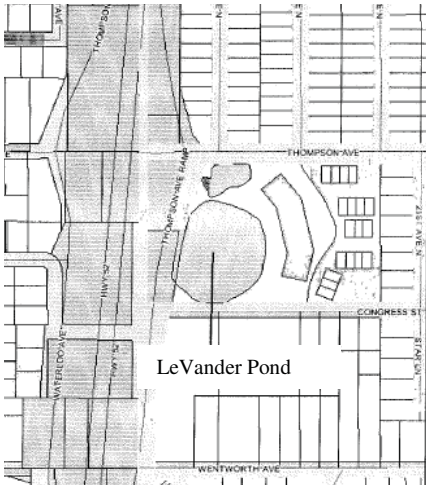
2012 Data (SSP-1)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (18)	Poor (15)
Cross-check Rating (IBI score)	Moderate (22)	Moderate (19)
Trend 2001-2012	Improving	Improving

Figure 4.7.3 Invertebrate and vegetation trends for Anderson Pond (SSP-1)



Site Summary: This is the fourth consecutive year that SSP-1 has been monitored, and the fifth time monitored overall since 2001. The scores remain much higher than in 2001, and still appear to be in an upward trend; however, additional data is needed to confirm this trend. The cross-check team scored higher in both categories than the City team. The cross-check team collected a larger diversity of both invertebrates and vegetation. FCI surveyed the vegetation plot of the City team and calculated the exact same score. The difference in scores between the City team and cross-check team most likely is the effect of different plot locations (which is fine). The cross-check plot was situated on the north side and the City team plot was on the west.

4.7.4 LeVander Pond (SSP-3)



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

Virtually all of the area that contributes to this wetland is fully developed. In 2008, LeVander Estates, a new development was completed on the east side of LeVander Pond. A trail was constructed down to the pond. Mn/DOT recently completed an upgrade of Wentworth/Thompson interchanges and in doing so enhanced some of the drainage in LeVander Pond by installing a pretreatment basin south of the pond. TH52 is a major contributor to LeVander Pond as is the City of West St. Paul.

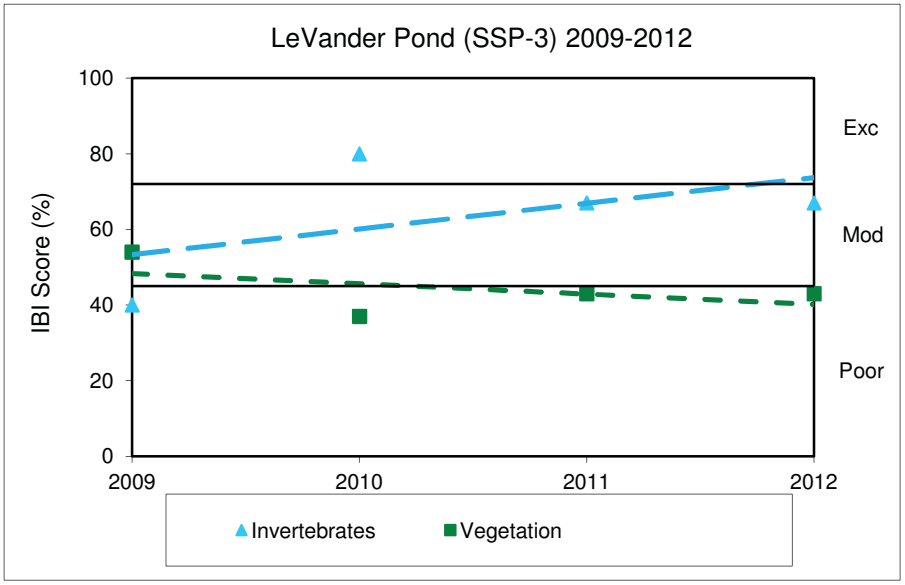
Wetland Health

Site Observations: The entire surface of the pond was covered in duckweed and water-meal. Cattails and reed canary grass lined the shores. Coontail was the dominant submergent plant. There was heavy tree cover 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 4.7.4 LeVander Pond (SSP-3) Wetland Health based on Index of Biotic Integrity

2012 Data (SSP-3)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (20)	Poor (15)
Trend 2009-2012	Improving	Declining

Figure 4.7.4 Invertebrate and vegetation trends for LeVander Pond (SSP-3)



Site summary: This is the fourth 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 fairly inconsistent over the course of monitoring and, based on limited data, appear to have opposite trends. Additional monitoring is recommended to determine the health of this wetland and identify solid trends.

Appendix A

Dakota County Wetland Sites: Invertebrates

KEY:			
Range:	6 - 14	15 - 22	23 - 30
Percent:	< 50%	50 - 76%	> 76%

na = no data available

Multiple Scores listed in following order:
As of 2007, scores read as follows: Team Score/Cross-check/QC Score
QC Score is listed in bold font

Site ID	Site Name	1997	1998*	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
AV-1	Hidden Valley		19/21	10	8/8	24/14	14/16	14/12/24	16/12	22/20	26		20/24/**24**	20/24/**20**	20/22/**18**	18/26/**16**	18/16/**18**
AV-2	Kelley Property		17/19	16/16	10/8	16	16										
AV-3	Palomino		25/21	12													
AV-4	Elderberry Court		9/7	8	12	6											
AV-5	Cedar Knolls				16	16	18	12								14	
AV-6	Belmont Pond						18	18	14	18	12					14	
AV-7	Podojil							8	6							10	
AV-8	Chaparral Pond								12	14	18			16			
AV-9	Watrud Pond									26	22/14	18/16					
AV-10	Alimagnet Park											12					12
AV-11	Farquar Lift Station											24					
AV-12	EVR-P12 Public Water											12	16				
AV-13	EVR-P14 (Long Lake North)												22				24
AV-14	EVR-P43 (East Park)												12				
AV-15	Carrollwood													10			
AV-16	Nordic Park													na			
AV-17	AL-P9.1, Alimagnet Lift Station Chain of Ponds														18		
AV-18	Sunset Park Pond														24		
AV-19	AL-P9.3, Alimagnet Lift Station Chain of Ponds														22		
B-0	Terrace Oaks	17/15/19	13/21/23							26							
B-1	Crystal Lake West			20/22	16/20	20/22	24/26	24/24	18/22	20/12		24	26/26/**26**		22/22	18/24/**12**	14/28/**14**
B-1 Alt.	Crystal Lake West Alternate													15/na			
B-2	Kellerher Park/Cam Ram		17/13/17	18							16		na				12
B-3	Kraemer		15/13/19	14	18	24	26	22	20	18	22	18	24	24	22	26	10
B-4	Alimagnet		19/21/13	20													
B-5	Judicial Park North				16												
B-6	Alimagnet East/Dog Park				16/12		22			20		22	22				16
B-7	Terrace Oaks North					20										12	
B-8	Red Oak					26										18	
B-9	Crosstown West						6								18		
B-10	Rosemount Aerospace Pond							26	18		24						
B-11	Valley View							14	20	16	24/14			16			
B-12	Terrace Oaks (by BV Parkway)											??					
B-13	Sunset Lake													24/**22**			
B-17	Alimagnet Powerline ROW														12/**12**		
E-1	Thompson Lake Park		21/17/19														
E-2	Rahn Park		25/21														
E-3	BP- 25 Diffley Pond		15/23		16/16		14										
E-4	Town Center		21/13														
E-6	DP-13 Northwoods			18													
E-7	DP-11 Opus			28								26/26/**18**					
E-8	AP 52.1 Trapp Farm			18													
E-9	LP-5- Wilderness Run			20/22					14/16			16					
E-10	AP-3 Cedar Pond				10	6	10	12	6	8/10	12/16	12	22/22/**20**				
E-11	Central Park Pond/CP-4 Lockheed				24	18/16		10									14/16
E-12	FP 7.5 Lone Oak Drive				18/14												
E-13	FP 7.6 Lone Oak Drive					22											
E14	LP-27 Highway 3					16			18								
E-15	JP-11.2 Wescott						10										
E-16	EP - 3 Faithful Sheperd						26/14	18									
E-17	EP 3.2 Aldrin Rd							14/14/24	16								
E-18	DP 14 Moonshine Park							10								22/18/**22**	

Site ID	Site Name	1997	1998*	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
E-19	FP-4.1									14							
E-20	Shanahan Lake									18						20	
E-21	FP-11.5										18		22		20		
E-22	FP-11.6										10		18		20		
E-23	FP-4.2										16						
E-24	JP-42											16					
E-25	FP-4.5												16				
E-26	DP-6.2, Northwoods Businees Park													14			
E-27	LP-26.54, Thomas Woods Site													18/24/**18**			
E-28	HDP-1, Kennerick Addition Site													16			
E-29	LP-15, Lily Pond in Lebanon Hills Park														12/12		
E-30	JP-42, Carriage Hill Pond																
E-31	Walnut Hill Pond														20/**20**		
E-32	JP-6, City Hall Pond															18	
E-33	Coventry Pond																16/**16**
E-34	McCarthy Lake																24
LH-1	Lilypad Knoll, Lebanon Hills				22												
F-1	Pine Knoll		11/21/17	10/10/12	14/12	14/12	10/12	20/16	18/16	20/26			12/ na	na	na		
F-2	Muskrat		25/17														
F-3	Kral Pond		21/11	14	12	10	6	12	10	10	12	10/10	8	10	8/14/**10**	10	12
F-4	Lake Julia		15	16	10	8	10	14	18	10	10	8	10	6/8	8		
F-5	Pilot Knob			20	20/26	16	12						na				
F-6	Vermillion River Wetland															18/24	20
F-7	Autumn Glen															20/**20**	14/22/**14**
H-1	Louis Lane			10/10	6/16	8											
H-2	Bullfrog Pond			14	10												
H-3	Stonegate Untreated					8	14										
H-4	Stonegate Treated					12	12	10	20	14	18	16	20	16	14	16	10
H-5	Lower Vets						18/18										
H-6	Lake Rebecca							20/16	20/20	14/8	18/26	12/14/**14**	16/26/**14**	22/20/**21/18**	22/24/**22**	22/20/**22**	20/12/**22**
H-30	Sand Coulee								14	10	14	16	14	16	14	16	8
H-56	180th Street Marsh									14	20	6	22	26	22	16	22
T-1	Lake Byllesby				10	16											
T-2	Northfield				18												
IGH-1	KP-9		23/27/23	16/16/26		18/14	24/18										
IGH-2	CP-13			16													
IGH-3	BP-21		23/17	18													
IGH-4	EP-18		23/15	20													
IGH-5	CP-6		19/19														
IGH-6	MP-67				10												
IGH-7	LP-2				18												
IGH-8	HP-1				12												
IGH-9	QP-1				22	18											
IGH-10	NP-15					26	20										
IGH-11	NP-12					20											
IGH-12	NP-13						12										
IGH-13	NP-10						12										
IGH-14	DC 2 or Ordway							12									
L-1	Ritter Farm Park		19/23/29	20/20/22													
L-2	Orchard		19/23														
L-3	Raven Lake		19/13	20	14	18	14/16										
L-4	Water Treatment Wetland Bank		11/23	14	12	10	16	26	22	24			14	14			
L-5	Country View Marsh			14	10	6											
L-6	Kingsley Lake				20	18/26											
L-7	DNR 387						16	24/12	18/18	20/22	20/16	22/12	22/16/**20**	18/22	24/**22**	18	22
L-8	DNR 393						12	24	24	22	24	26	20	24	20/16	20/22/**16**	24/22/**24**

Site ID	Site Name	1997	1998*	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
L-9	NC 54							22	10	22	14	8	12	22/**22**	22	16	20
L-10	349W														6	22	12
LD-1	Pickerel Lake in Lilydale Park																14
MH-1	Valley Park		29/27/23	12													
MH-2	Copperfield/Friendly Hills		21/21	12/14	16/22		26/20	30/20	20/18	24/22	26/14	24/26	22/18/**18**	24/20/**24**	22/16/**22**	22/16	24/18/**28**
MH-3	Visitation		19/23	24													
MH-4	Industrial Park		27/19	16	18	18											
MH-5	Pagel Pond				12	22											
MH-6	City Hall				10	14											
MH-7	Copperfield II					22/24/22											
MH-9	Hagstrom-King						22	24	18								
MH-10	Wentworth Park										18						
MH-11	Lockwood Pond									18		14					
MH-13	MH Par 3												12	20			
MH-14	Wagon Wheel														22		
MH-15	Upper Bridgeview															16	
MH-16	Field Stone																24
R-1	Kelly Marsh - Derryglen Ct in 2004		15/21						20/14	24/24		24/16/**20**	22/24/**20**				14/20
R-2	White Lake		15/17								22			28			
R-3	O'Leary					16	10				6						
R-4	Schwartz Pond		21/13/25	18	14								16				
R-5	Wilde Lake					24/28	18										
R-6	Keegan					16	10/18				22/24						
R-7	Marcotte Pond					12					26						
R-8	Wachter Lake						6										
R-10	Deepwoods Court							20	16			16					
R-11	Bicardi Avenue							12	16								
R-12	Avalon							22/16	12	12							
R-13	130th Way							20									
R-14	WMP #379									20			22			28	
R-15	Birger Pond									20		20					
R-16	Unnamed											na					
R-17	Unnamed											18					
R-18	WMP #279												26				
R-20	Unnamed													20/22/**18**	18		
R-21	CR-38 Mitigation Site 1													24	20/**20**	22	26
R-22	Mare Pond, South													20	24		
R-23	CR-38 Mitigation Site 2														20/16	18	14
R-24	WMP # 349																
R-25	WMP #306															10/14/**12**	
R-26	Erickson Pond																10/**10**
SSP-1	Anderson Pond					6								18	16	18/**18**	18/22/**18**
SSP-2	Seidl's Lake						10/10	10									
SSP-3	LeVander													12	24	20	20
WSP-1	Mud Lake			12/10/20	10/10												
WSP-2	Thompson Lake 48W			12	20					14	12	18	18	18	16	22	16
WSP-3	Duck Pond			18	12												
WSP-4	Weshke Pond				12	20											
WSP-5	Lilly Lake					16	24										
WSP-6	Marthaler Park					26	24	20									
WSP-7	Vivian Pond					24/24											
WSP-8	DNC Prairie Pond							24									

Appendix B

Dakota County Wetland Sites: Vegetation

na = no data available

KEY:			
Range:	7 - 15	16 - 25	26 - 35
Percent:	< 46%	46- 71%	> 71%

Multiple Scores listed in following order:
As of 2007, scores read as follows: Team Score/Cross-check/QC Score
QC Score is listed in bold font

Site ID	Site Name	1997	1998*	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	
AV-1	Hidden Valley		21/23	15	23/23	21/25	19/17	23/25/21	25/21	27/19	21		19/21/**21**	13/17	23/17	17/25	15/23/**21**	
AV-2	Kelley Property		17/27	23/27	23/17	25	23											
AV-3	Palomino		29/25	na														
AV-4	Elderberry Court		17/17	13	17	15												
AV-5	Cedar Knolls				17	19	15	21								19		
AV-6	Belmont Pond						21	17	25	23	15					15		
AV-7	Podojil							13	13							13		
AV-8	Chaparral Pond								19	21	19			15/**23**				
AV-9	Watrud Pond									25	19/21	17/15						
AV-10	Alimagnet											11					9	
AV-11	Farquar Lift Station											9						
AV-12	EVR-P12 Public Water											21	11					
AV-13	EVR-P14 Long Lake North												13				15	
AV-14	EVR-P43 East Park												9					
AV-15	Carrollwood													13				
AV-16	Nordic Park													17				
AV-17	AL-P9.1, Alimagnet Lift Station Chain of Ponds														19			
AV-18	Sunset Park Pond														17			
AV-19	AL-P9.3, Alimagnet Lift Station Chain of Ponds														15			
B-0	Terrace Oaks									na								
B-1	Crystal Lake West			29/25	33/25	29/29	31/33	29/33	29/23	27/21		23	25/19/**23**		35/31	23/33	19/27/**23**	
B-1 Alternate	Crystal Lake West - Alternate													21/21/**23**				
B-2	Kellerher Park/Cam Ram	na	21/13	21							17		11				11	
B-3	Kraemer		23/21	23	21	21	23	25	25	13	17	17	17	19	27	13	19	
B-4	Alimagnet																	
B-5	Judicial Park North				23													
B-6	Alimagnet East/Dog Park				21/21		13			13		21	17				21	
B-7	Terrace Oaks North					17										17		
B-8	Red Oak					17										13		
B-9	Crosstown West						13								9			
B-10	Rosemount Aerospace Pond							15	13		13							
B-11	Valley View							27	25	21	17/19			13				
B-12	Terrace Oaks (by BV Parkway)											??						
B-13	Sunset Lake	x												21				
B-17	Alimagnet Powerline ROW														25			
E-1	Thompson Lake Park	na	17/21/23															
E-2	Rahn Park		17/15/15															
E-3	BP- 25 Diffley Pond		15/25/23		17/25		13											
E-4	Town Center		21/15															
E-6	DP-13 Northwoods			15														
E-7	DP-11 Opus			19								19/11/**17**						
E-8	AP 52.1 Trapp Farm			21														
E-9	LP-5- Wilderness Run			29/27					27/19			17						
E-10	AP-3 Cedar Pond				11		21	23	17	23/15	13	13	19/17					
E-11	Central Park Pond/CP-4 Lockheed				19	21/15		15									21/17	
E-12	FP 7.5 Lone Oak Drive				21/19													
E-13	FP 7.6 Lone Oak Drive					21												
E14	LP-27 Highway 3					23			23									
E-15	JP-11.2 Wescott						23											
E-16	EP - 3 Faithful Sheperd						17/15	21										
E-17	EP 3.2 Aldrin Rd							21/21/17	19									
E-18	DP 14 Moonshine Park							23								21/17/**19**		
E-19	FP-4.1									21								
E-20	Shanahan Lake									25						27		
E-21	FP-11.5										15		17		19			
E-22	FP-11.6										15		15		17			
E-23	FP-4.2										11							
E-24	JP-42											21						
E-25	FP-4.5												19					
E-26	DP-6.2, Northwoods Businees Park													15/**15**				
E-27	LP-26.54, Thomas Woods Site													21/23				
E-28	HDP-1, Kennerick Addition Site													21				
E-29	LP-15, Lily Pond in Lebanon Hills Park														27/29			
E-30	JP-42, Carriage Hill Pond																	
E-31	LP-69.1, Walnut Hill Pond														13			

Site ID	Site Name	1997	1998*	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	
E-32	JP-6, City Hall Pond															19		
E-33	Coventry Pond																21	
E-34	McCarthy Lake																23	
LH-1	Lilypad Knoll, Lebanon Hills				31		31											
F-1	Pine Knoll		21/21	23/29	17/15	11/23	17/31	17/15	17/21	13/15	13/21	13	13/17	na	13			
F-2	Muskrat		15/15															
F-3	Kral Pond	na	25/29	21	19	13	13	19	13	13	15	9/15	7	11	11/15	17	19	
F-4	Lake Julia		19/15	21	17	15	17	17	19	15	15	11	11	13/15	11			
F-5	Pilot Knob			21	19/21	13	17	15	19	15	15	13	na					
F-6	Vermillion River Wetland															9/13	13	
F-7	Autumn Glen															19/**21**	19/17	
H-1	Louis Lane			15/15	11/11	11												
H-2	Bullfrog Pond			17	9													
H-3	Stonegate Untreated					9	15											
H-4	Stonegate Treated					11	13	17	17	17	21	19	21	21	19	21	19	
H-5	Lower Vets						11/23											
H-6	Lake Rebecca							19/17	15/17	21/23	23/21	21/13/**21**	21/21	23/17	23/21/**23**	21/17	27/17	
H-30	Sand Coulee								15	17	15	11	13	13	13	15	13	
H-56	180th Street Marsh									11	17	11	15	15	11	19	25	
T-1	Lake Byllesby				13	13												
T-2	Northfield				15													
IGH-1	KP-9		25/29/27	29/23/23		23/33	15/19											
IGH-2	CP-13			23														
IGH-3	BP-21		17/15	19														
IGH-4	EP-18		15/19	21														
IGH-5	CP-6		13/11															
IGH-6	MP-67				25													
IGH-7	LP-2				15													
IGH-8	HP-1				15/15													
IGH-9	QP-1				29	25												
IGH-10	NP-15					15	15											
IGH-11	NP-12					13												
IGH-12	NP-13						15											
IGH-13	NP-10						23/25											
IGH-14	DC 2 or Ordway							23										
L-1	Ritter Farm Park		23/21/17	23/23/21														
L-2	Orchard		29/21															
L-3	Raven Lake		23/21	29	17	25	27/15											
L-4	Water Treatment Wetland Bank		23/25	29	23	21	21	17	19	21	17	17	13	15				
L-5	Country View Marsh			17	15	23												
L-6	Kingsley Lake				27	31												
L-7	DNR 387						19/21	27/21	25/29	29/25	27/19	25/23	25/27	21/31	27/**25**	21	31	
L-8	DNR 393						17	17	19	17	21	17	23	23	19/19	19/19	17/17	
L-9	NC 54							19	15	19	17	17	19	17	15	17	11	
L-10	349W														13	9	11	
LD-1	Pickerel Lake at Lilydale Pond																17	
MH-1	Valley Park		19/17/23															
MH-2	Copperfield/Friendly Hills		21/21	21/21	21/25		27/25	27/23	23/19	27/23	23/25	21/17	23/17/**19**	19/15	27/17	23/27	23/23	
MH-3	Visitation		15/17	13														
MH-4	Industrial Park		17/15	17	17	17												
MH-5	Pagel Pond			15	17	15												
MH-6	City Hall				11	15												
MH-7	Copperfield II					23/25/25												
MH-9	Hagstrom-King						23	21	25									
MH-10	Wentworth Park										17							
MH-11	Lockwood Pond									19		19						
MH-13	MH Par 3												21	21				
MH-14	Wagon Wheel														25			
MH-15	Upper Bridgeview															21		
MH-16	Field Stone																29	
R-1	Kelly Marsh - Derryglen Ct in 2004		17/19/17						21/21	15/15		17/13/**19**	19/17				23/19	
R-2	White Lake		13/23								15			17				
R-3	O'Leary		17/11			19	15				11							
R-4	Schwartz Pond			13	11								15					
R-5	Wilde Lake					15/15	19											
R-6	Keegan						15/7				17/19							
R-7	Marcotte Pond					19					17							
R-8	Wachter Lake						11											
R-10	Deepwoods Court							17	19			19						

Site ID	Site Name	1997	1998*	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	
R-11	Bicardi Avenue							27	15									
R-12	Avalon							15/11	17	11								
R-13	130th Way							15										
R-14	WMP #379									23			25			27		
R-15	Birger Pond									17		13						
R-16	Unnamed											13						
R-17	Unnamed											17						
R-18	WMP #279												19					
R-20	Unnamed													23/21	19			
R-21	CR-38 Mitigation Site 1													17	21/**21**	23	19	
R-22	Mare Pond, South													19	25			
R-23	CR-38 Mitigation Site 2														21/19	21	21	
R-24	WMP # 349																	
R-25	WMP #306															23/17		
R-26	Erickson Pond																11	
SSP-1	Anderson Pond					11								15	13	19/**17**	15/19/**15**	
SSP-2	Seidl's Lake						13/13	11										
SSP-3	LeVander													19	13	15	15	
WSP-1	Mud Lake			15/13/13	17/13													
WSP-2	Thompson Lake 48W			15	13					17	11	17	17	19	17	19	17	
WSP-3	Duck Pond			17	21													
WSP-4	Weshke Pond (aka Pond 1)				21	23												
WSP-5	Lilly Lake					17	17											
WSP-6	Marthaler Park					21	21	23										
WSP-7	Vivian Pond					19/19												
WSP-8	DNC Prairie Pond							15										

* Note 1998 spot checks conducted by URS, some with more than one sampl
*1998 totals include amphibian metric