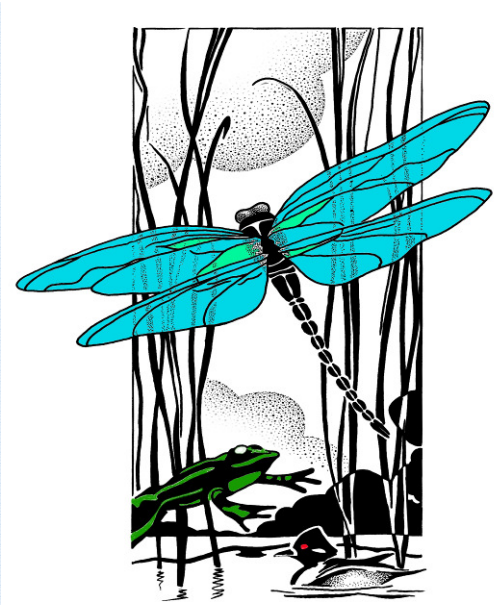
Wetland Health Evaluation Program

2011 Final Report

Dakota County, Minnesota

2011 Wetland Health Evaluation Program Report
Dakota County, MN



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Report
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FORTIN CONSULTING, INC.
serving the environment

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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
Vermillion River Watershed

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Mark Gernes, Joel Chirhart, Michael Bourdaghs, John Genet; MPCA Technical Experts
Paula Liepold, Dakota County WHEP Coordinator
Mary Karius, Hennepin County WHEP Coordinator
Mary Kay Lynch, Co-Citizen Monitoring Coordinator
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Paula Liepold

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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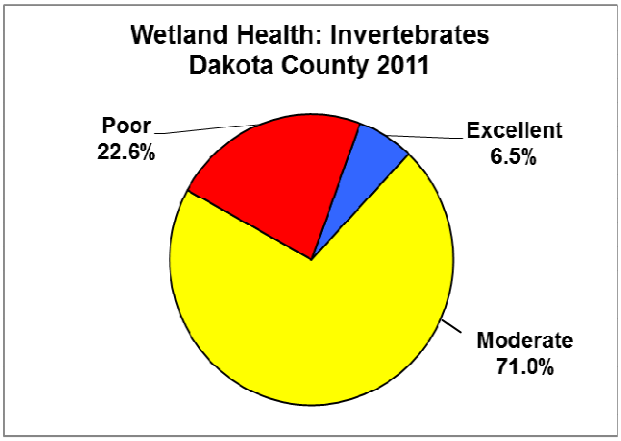
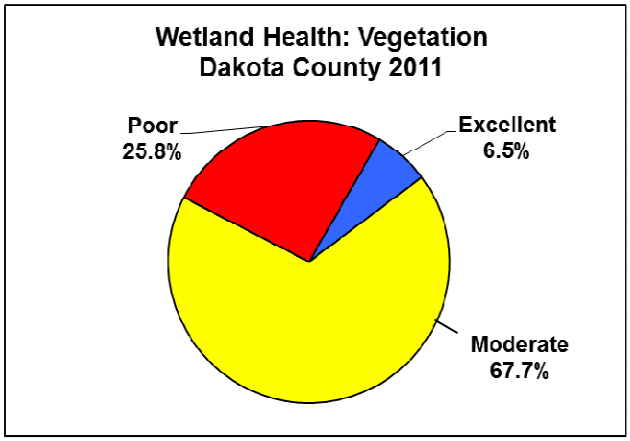
Executive Summary
Dakota County Wetland Health Evaluation Program 2011

Dakota County began sponsoring the Wetland Health Evaluation Program (WHEP) in 1997. Since then, 154 wetlands have been monitored by many volunteers across the County. In 2011, nine cities participated in WHEP, monitoring 31 different wetlands. Several wetlands were monitored for the first time in 2011. 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.





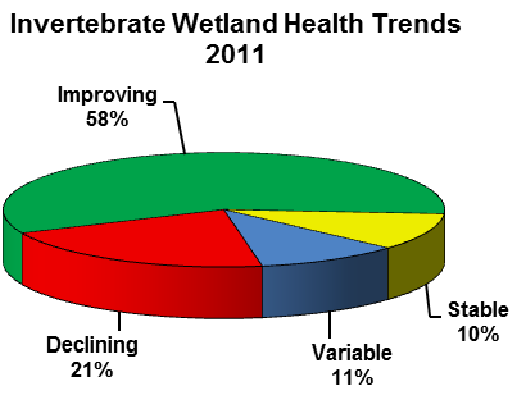
The results of the monitoring for 2011 showed a variety of wetland conditions. The Index of Biotic Integrity was used to determine wetland health ranging from poor to excellent. The majority of wetlands were in the moderate category for both macroinvertebrates and vegetation. Two wetland sites rated excellent for macroinvertebrates and two wetland sites rated excellent for vegetation. Fewer macroinvertebrates scores rated excellent in 2011 than in 2010. Seven macroinvertebrates scores and eight vegetation scores indicated poor wetland health.

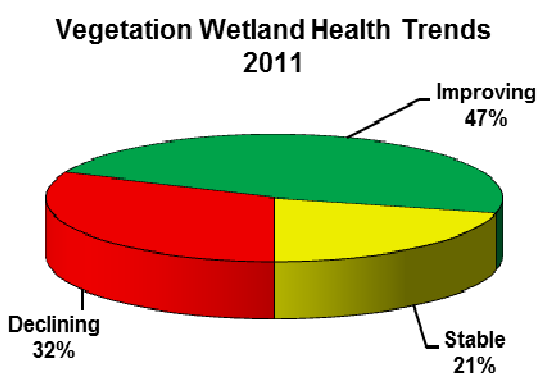
The City of Rosemount's Mare Pond North (R-14) and the City of Eagan's Shanahan Lake (E-20) tied for the highest scores for vegetation (27). R-14 also had the highest score for macroinvertebrates (28) in 2011. Kraemer wetland (B-3) in Burnsville earned a score of excellent for macroinvertebrates (26) as well. Kral Pond (F-3) in Farmington had the lowest macroinvertebrates score (10). Vermillion River Wetland (F-6) in Farmington and Lakeville's wetland 349W both had the lowest score for vegetation (9).

A trend analysis was conducted for all of the wetlands monitored in 2011 that had enough data to analyze trends. For invertebrates, 58% of wetlands appear to be improving while 21% are declining. For vegetation, 47% of the wetlands showed improved wetland health while 32% are declining. See graphs on next page.

Several analyses were done to try to identify some of the causes of wetland health conditions found. IBI scores were compared to impervious area of the watershed and wetland. No significant relationship was found between impervious area and IBI scores for invertebrates or vegetation when comparing individual scores. However, a negative relationship was found when comparing average vegetation IBI scores and average impervious area within impervious area categories. No significant relationships were found between IBI scores and wetland alterations.

2011 Dakota County Wetland Health Trends*





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

In 2011, 118 Dakota County WHEP volunteers donated 1,877 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 is the Dakota County WHEP Coordinator. She enjoys coordinating the program, and said, "I am impressed that over 100 men, women, adults, and youth volunteer for WHEP. They volunteer for different reasons, but because of the program, they learn about wetland plants and macroinvertebrates, spend quality time with a family member or friend, and become involved in their community. These citizen scientists are a valuable extension of city staff."

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 says, "Whenever I have thoughts of retiring from WHEP, it seems there is a news piece in the paper or on TV discussing the importance of wetlands. I can't tolerate the thought of not doing something to try to recognize and protect them. There is much to do! The dedication of the volunteers is an inspiration and their efforts and enthusiasm represent hope for our wetlands."

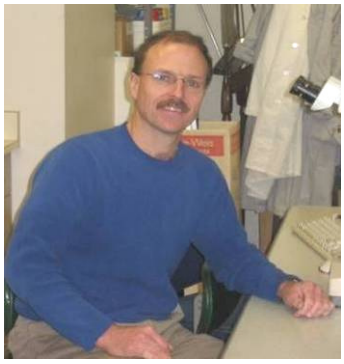
Mary Kay Lynch

2.0 Methods

2.1 Training

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

Vegetation and Invertebrate Experts



Mark Gernes

Michael Bourdaghs

Joel Chirhart

John Genet

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

Mark Gernes commented, "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.

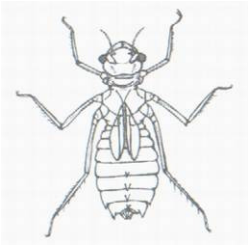
Vegetation Index of Biological Integrity (IBI)

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

Blake Fortin, Caitlin Fortin, Connie Fortin, Carolyn Dindorf, Kseniya Voznyuk, Katie Farber, Roman Rowan

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 2011. This review identifies and corrects errors in scoring, transfer 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 2011, Fortin Consulting cross-checked the vegetation plots of three wetlands, one in Eagan, Farmington, and South St. Paul: E-18, F-5, 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 2011 Sampling Season Results

During the 2011 sampling season, eight citizen teams monitored 31 wetlands in ten cities in Dakota County (Apple Valley, Burnsville, Eagan, Farmington, Hastings, Lakeville, Mendota Heights, Rosemount, South St. Paul, and West St. Paul). Eight of these wetlands were sampled twice through citizen cross-checks. Three wetland vegetation samples and eight invertebrate samples were checked for accuracy through the Fortin Consulting quality control check.

Figure 3.1.1 Dakota County Wetland Ratings

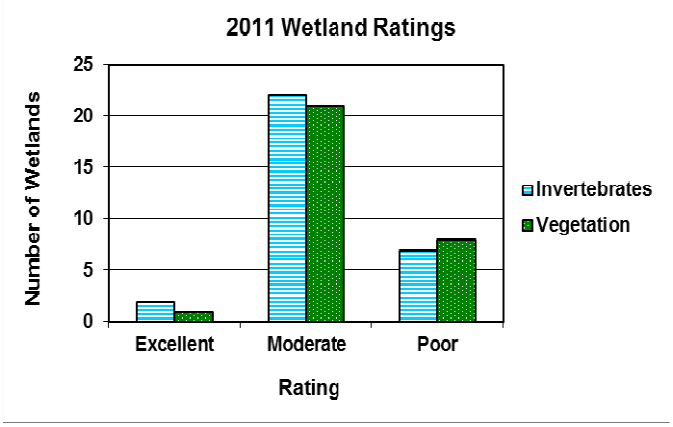


Figure 3.1.1 and Table 3.1.1 show the vegetation and invertebrate ratings for all of the wetlands assessed during the 2011 sampling season. Based on vegetation scores, two of the wetlands rated excellent, 21 of the wetlands were rated moderate, and 8 rated poor. Vegetation scores ranged from nine to 27 out of a maximum of 35 points. Mare Pond North (R-14) and Shanahan Lake (E-20) rated excellent.

The invertebrate analysis resulted in two wetlands rating excellent, 22 rating moderate and seven poor. Invertebrate scores ranged from 10 to 28 out of a maximum of 30 points. The wetlands rated excellent included, Kraemer (B-3) and Mare Pond North (R-14). Several of the sites showed different ratings for vegetation versus invertebrates. In general, vegetation scores were lower than invertebrate scores. 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)	3/2	1/2	0/0
Burnsville (B)	2/2	1/2	1/0
Eagan (E)	0/0	3/2	0/1
Farmington (F)	1/1	2/2	0/0
Hastings (H)	0/1	4/3	0/0
Lakeville (L)	0/1	4/3	0/0
Mendota Heights (MH)	0/0	2/2	0/0
Rosemount (R)	1/0	2/3	1/1
South Saint Paul (MH)	0/1	2/1	0/0
West Saint Paul (MH)	0/0	1/1	0/0
Totals	**7/8**	**22/21**	**2/2**

Figures 3.1.2 and 3.1.3 show the distribution of wetland health ratings for each of the sites monitored in 2011.

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

Figure 3.1.2

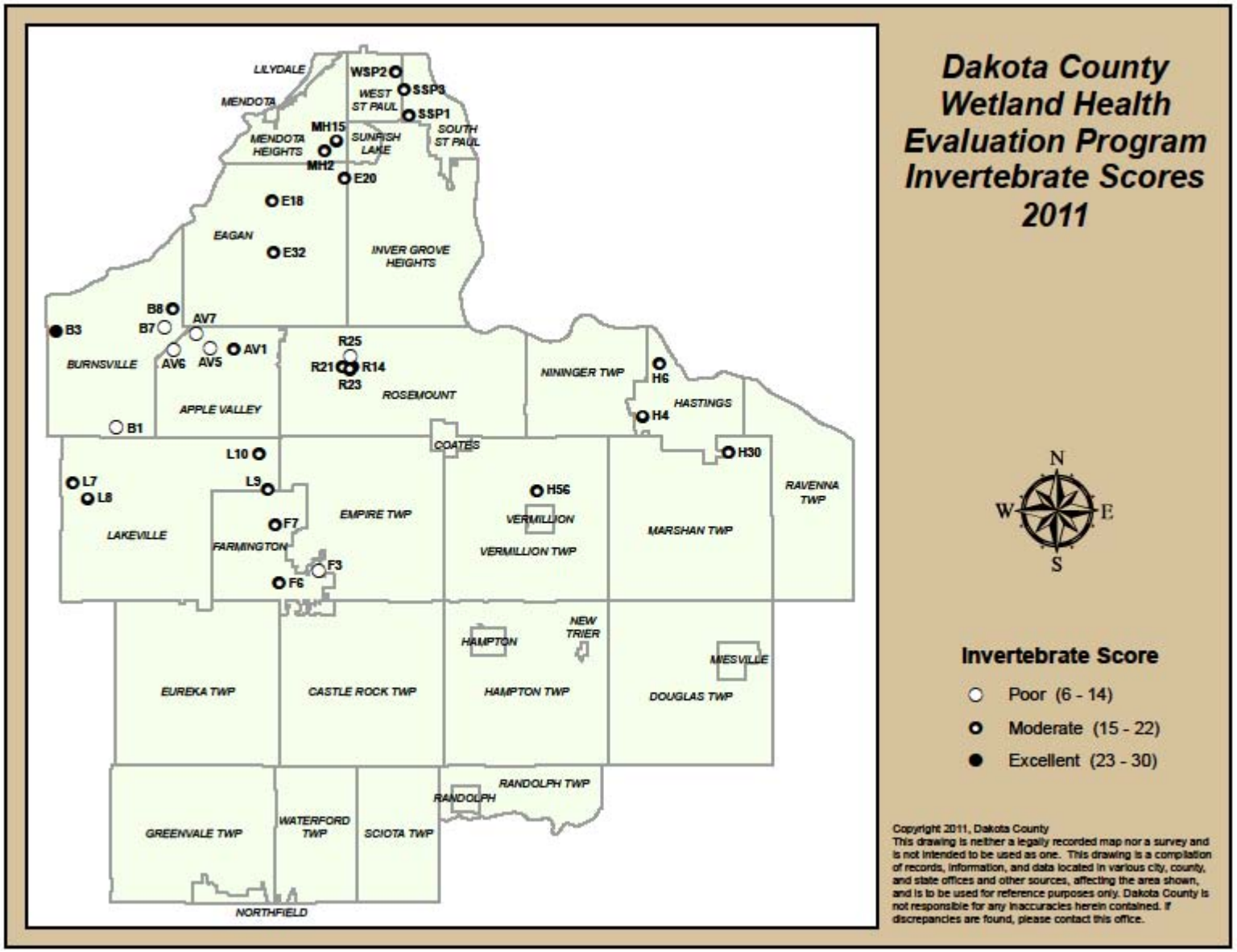

Dakota County
Wetland Health
Evaluation Program
Invertebrate Scores
2011
LILYDALE
MENDOTA
MENDOTA HEIGHTS
WEST ST PAUL
SUNFISH LAKE
SOUTH ST PAUL
EAGAN
INVER GROVE HEIGHTS
BURNSVILLE
APPLE VALLEY
ROSEMOUNT
NININGER TWP
HASTINGS
COATES
RAVENNA TWP
LAKEVILLE
FARMINGTON
EMPIRE TWP
VERMILLION
VERMILLION TWP
MARSHAN TWP
HAMPTON
NEW TRIER
MIESVILLE
EUREKA TWP
CASTLE ROCK TWP
HAMPTON TWP
DOUGLAS TWP
RANDOLPH
RANDOLPH TWP
GREENVALE TWP
WATERFORD TWP
SCIOTA TWP
NORTHFIELD
WSP2
SSP3
SSP1
MH15
MH2
E20
E18
E32
B8
B7
B3
B1
AV7
AV6
AV5
AV1
R25
R21
R14
R23
H6
H4
L10
L7
L8
L9
H56
H30
F7
F3
F6
N
W
E
S
Invertebrate Score
Poor (6 - 14)
Moderate (15 - 22)
Excellent (23 - 30)
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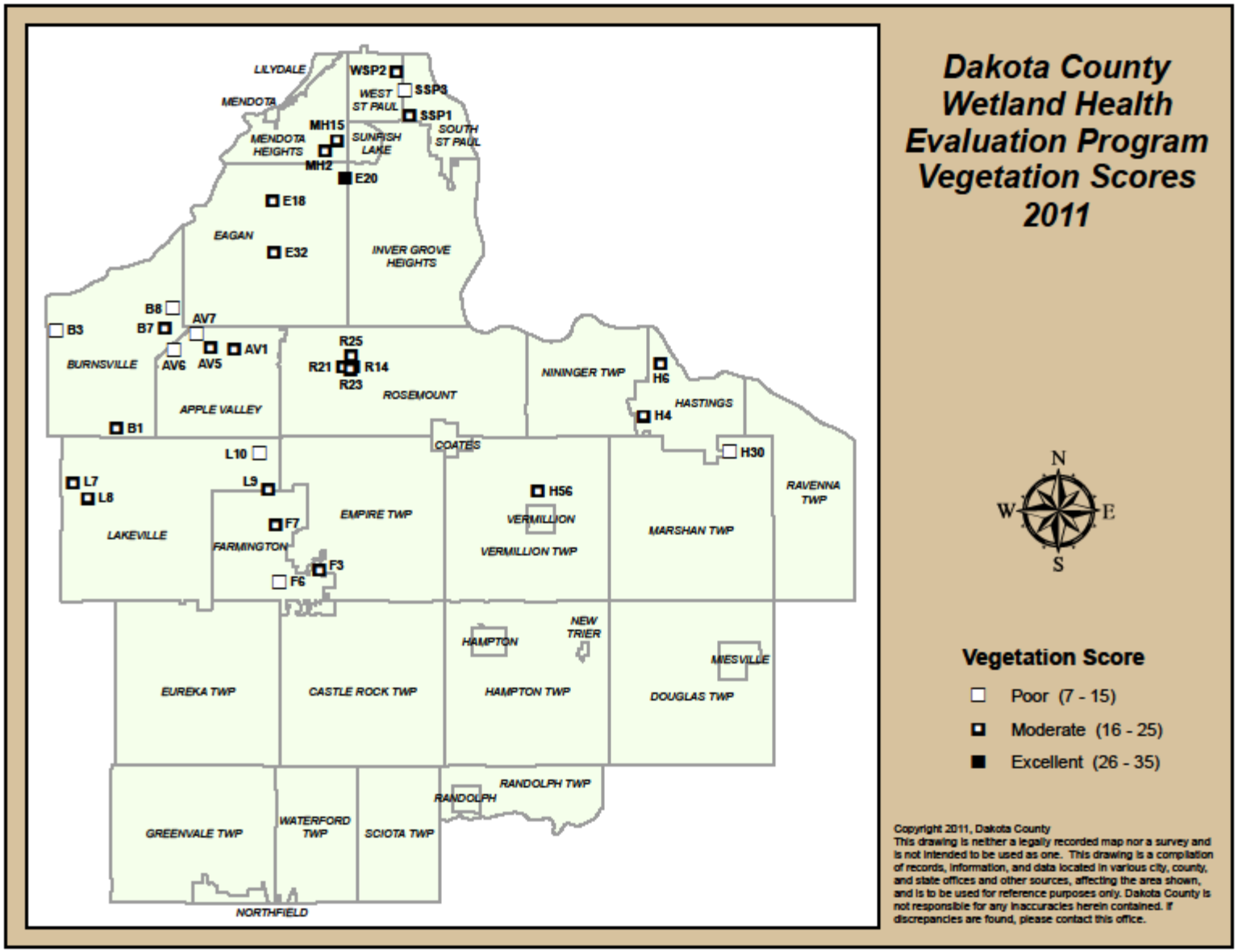
Figure 3.1.3


Dakota County
Wetland Health
Evaluation Program
Vegetation Scores
2011
LILYDALE
MENDOTA
MENDOTA HEIGHTS
WEST ST PAUL
SUNFISH LAKE
SOUTH ST PAUL
WSP2
SSP3
SSP1
MH15
MH2
E20
E18
E32
EAGAN
INVER GROVE HEIGHTS
B8
B3
B7
AV7
AV6
AV5
AV1
BURNSVILLE
APPLE VALLEY
R25
R21
R14
R23
ROSEMOUNT
NININGER TWP
H6
HASTINGS
H4
B1
L10
COATES
H30
L7
L8
L9
H56
RAVENNA TWP
LAKEVILLE
F7
FARMINGTON
EMPIRE TWP
VERMILLION
VERMILLION TWP
MARSHAN TWP
F3
F6
NEW TRIER
HAMPTON
MIESVILLE
EUREKA TWP
CASTLE ROCK TWP
HAMPTON TWP
DOUGLAS TWP
RANDOLPH TWP
RANDOLPH
GREENVALE TWP
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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 (2008-2011) 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 (2008-2011) of Created, Stormwater and Natural Wetlands

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

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

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 16% of the wetlands, and reed canary grass in 77% of the wetlands monitored in 2011. Purple Loosestrife will grow in deeper water than reed canary grass, which can grow in both upland and wetland conditions. A new invasive species, Water lettuce (*Pistia stratiotes*), was identified in 2011 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 55% (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. This was true again in 2011 when looking at all of the data. The majority of the sites have impervious areas that exceed the 10% threshold. However, there are some that are below 10%. IBI means were calculated for sites in the following categories of impervious percentage: 0 – 10%, 10.1 – 20%, 20.1 – 30%, 30.1 – 40%, 40.1 – 50% and 50.1 – 60%. The mean IBI scores for each of the categories was compared to the mean percent imperviousness. There was a negative trend in Vegetation IBI score with increasing watershed imperviousness (r^2 = .56). This was not true for invertebrates. 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 2008-2011

Site ID	Site Name	Wetland size (Acres)	Watershed Size (Acres)	% Imperv	Invert. Score	Veg. Score
AV-1	Hidden Valley	2	21	35	16	17
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-12	EVR-P12 Public Water	5.7	571	25	16	11
AV-13	EVR-P14	3.6	26	25	22	13
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	12	23
B-1 Alt	Crystal Lake West Alternate	6	550	0	15	23
B-2	Cam Ram	0.41		0		11
B-3	Kraemer	30	93	30	26	13
B-6	Alimagnet East/Dog Park	2.5	34	15	22	17
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
E-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-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
F-1	Pine Knoll	35	107.5	10.4	NA	13
F-3	Kral Pond	10	41.8	6.6	10	17
F-4	Lake Julia	10	233	21.2	8	11
F-5	Autumn Glen	2.9	10	NA	20	21

Site ID	Site Name	Wetland size (Acres)	Watershed Size (Acres)	% Imperv.	Invert. Score	Veg. Score
F-6	Vermillion River	6.3	16	NA	18	9
F-7	Autumn Glen	2.9	10	NA	20	21
H-4	Stonegate Treated	1	9.5	35	16	21
H-6	Lake Rebecca	19	56	1	22	21
H-30	Sand Coulee	1	107	25	16	15
H-56	180th Street Marsh	20	340	1	16	19
L-4	Water Treatment Wetland Bank	22.85	99.8	20	14	15
L-7	DNR 387	10	2087	21	18	21
L-8	DNR 393	9.6	4987	17	16	19
L-9	NC 54	13.8	183	12	16	17
L-10	DNR#349W	40	213	NA	22	9
MH-2	Copperfield/Friendly Hills	9.4	865.3	0.4	22	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
R-1	Kelly Marsh - Derryglen Ct in 2004	1	12.5		20	19
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	22	23
R-22	Mare Pond, South	8	81	10	24	19
R-23	CR-38 Mitigation Site 2	0.3	81	30	18	21
R-25	WMP #306	1.7	81	30	12	23
SSP-1	Anderson Pond	2.4	168	15	18	17
SSP-3	LeVander	3.4	37.9	20	20	15
WSP-2	Thompson Lake 48W	9	73,920	50	22	19

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 2011 Cross-checks

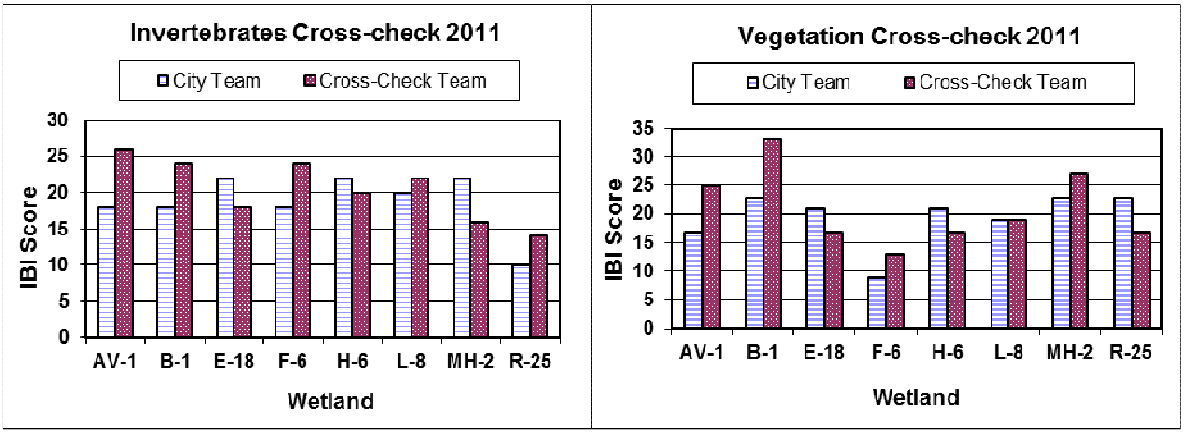
Each city team was responsible for evaluating one wetland in another city (Table 3.2.1). This citizen cross-check provides a second sample for the selected wetland. The purpose of this check is to determine if two different samples provide similar results for the vegetation and invertebrate IBI. Large 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). The L-8 site

found identical scores for vegetation. The AV-1 site was not consistent for invertebrates, and the B-1 site was not consistent for vegetation. There was an 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. The cross-check team (Lakeville) collected and identified a larger variety of invertebrate families from the AV-1 site than the City Team. This is true for the vegetation sampling as well. The cross-check team (Lakeville) included several woody species in which the city team Apple Valley did not have any. It appears that the placement of each team's plot must have been significantly different in terms of vegetation species present. Lakeville also found bladderwort (*Utricularia*), and Apple Valley did not. This creates a large score difference as well. The cross-check team (Rosemount) identified a larger variety of vegetation families from the B-1 site than the City Team. Data collected by the original city team is used for the individual wetland analysis in Section 4.0 of this report.

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	Lakeville	**AV-1**	**18**	**26**	**17**	**25**
Burnsville	Rosemount	**B-1**	18	24	**23**	**33**
Eagan	Hastings	**E-18**	22	18	21	17
Farmington	Mendota Heights	**F-6**	18	24	9	13
Hastings	Eagan	**H-6**	22	20	21	17
Lakeville	Apple Valley	**L-8**	20	22	19	19
Mendota Heights	Farmington	**MH-2**	22	16	23	27
Rosemount	Burnsville	**R-25**	10	14	23	17

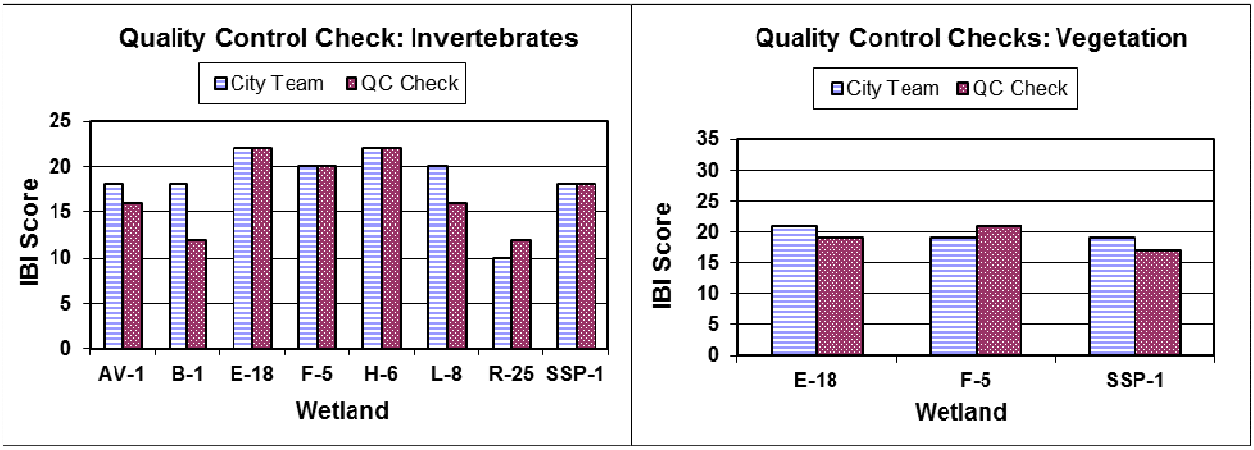
Figure 3.2.1 Invertebrate and Vegetation Cross-Check Comparisons of IBI Scores



3.2.2 2010 Quality Control Checks

Quality control checks were conducted at three sites for vegetation and eight sites for invertebrates in 2011 (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. There were 50 data transfer errors and 37 metric errors most commonly associated with data transfers errors. Seventeen sites resulted in score changes of one to 16 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	17	17	0
	AV-5	14	14	0	19	19	0
	AV-6	14	14	0	12	15	1
	AV-7	12	10	2	13	13	0
	L-8 cc*	22	22	0	19	19	0
Burnsville	B-1	22	18	7	23	23	1
	B-3	42	26	2	14	13	8
	B-7	18	12	4	17	17	1
	B-8	30	18	5	17	13	8
	R-25 cc*	22	14	4	19	17	4
Eagan	E-18	22	22	0	19	21	7
	E-20	18	20	4	23	27	5
	E-32	18	18	0	17	19	5
	H-6 cc*	20	20	4	15	17	4

Table 3.2.2 continued

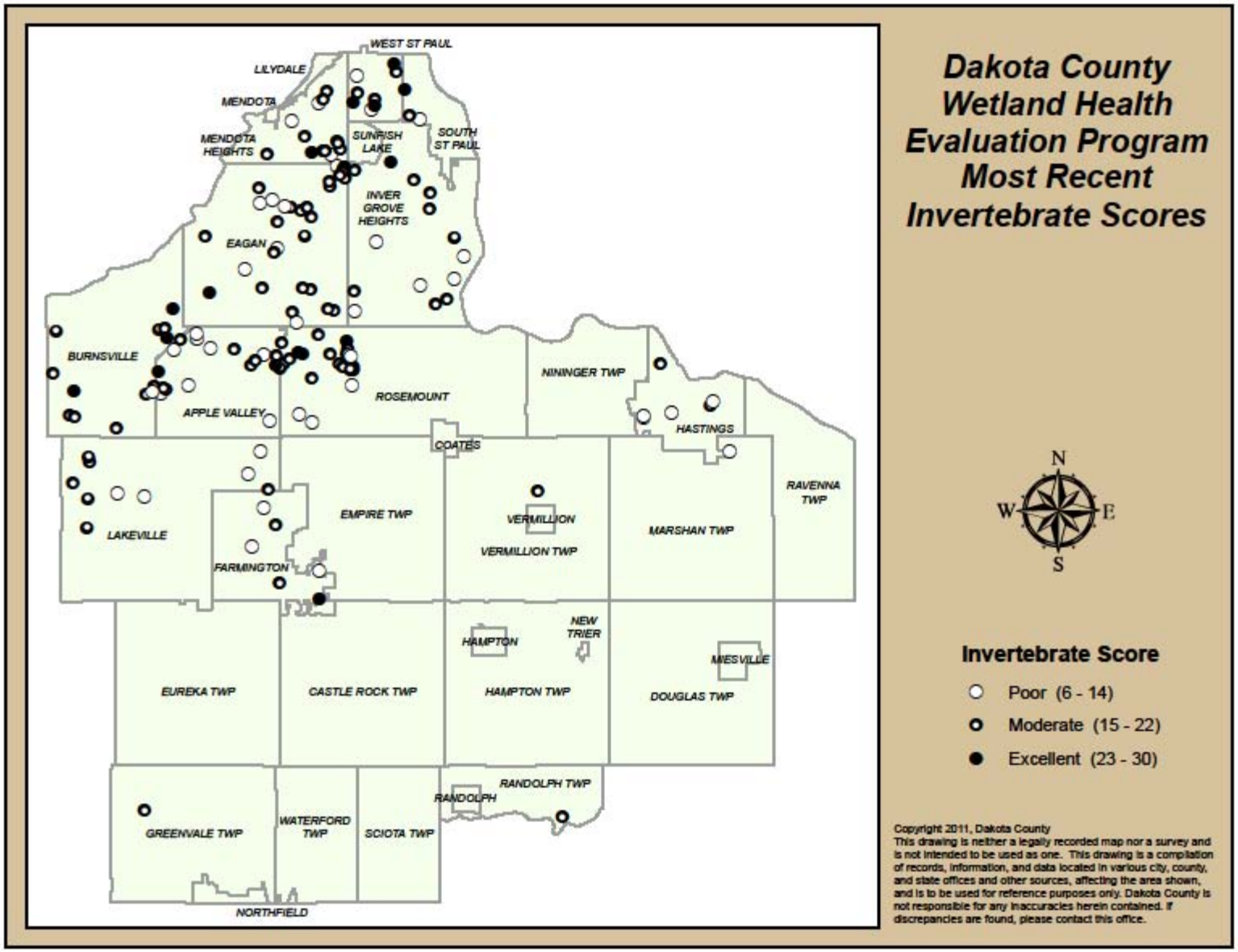
		Invertebrate IBI Scores			Vegetation IBI Scores		
Team Name	**Site**	**Team**	**Review**	**Errors**	**Team**	**Review**	**Errors**
Farmington	F-3	10	10	0	17	17	1
	F-6	16	18	3	9	9	1
	F-7	20	20	0	19	19	1
	MH-2 cc*	18	16	3	27	27	1
Hastings	H-4	16	16	0	21	21	0
	H-6	22	22	0	21	21	0
	H-30	16	16	0	15	15	0
	H-56	16	16	0	17	17	0
	E-18 cc*	18	18	0	17	17	0
Lakeville	L-7	18	18	1	21	21	0
	L-8	20	20	0	19	19	0
	L-9	16	16	0	9	9	0
	L-10	22	22	0	25	25	0
	AV-1 cc*	26	26	0	25	25	0
Rosemount	R-14	28	28	0	27	27	0
	R-21	22	22	0	23	23	0
	R-23	18	18	0	21	21	0
	R-25	10	10	0	23	23	0
	B-1 cc*	24	24	1	33	33	0
Mendota Heights	MH-2	22	22	0	23	23	0
	MH-15	16	16	0	21	21	0
	SSP-1	18	18	0	19	19	0
	SSP-3	20	20	0	15	15	0
	WSP-2	22	22	0	19	19	0
	F-6 cc*	24	24	0	21	21	0

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

3.3 WHEP Historical Data

Since WHEP began in 1997, 154 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 2011 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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LILYDALE
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MENDOTA HEIGHTS
SUNFISH LAKE
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APPLE VALLEY
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RAVENNA TWP
LAKEVILLE
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VERMILLION
VERMILLION TWP
MARSHAN TWP
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HAMPTON
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SCIOTA TWP
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Dakota County Wetland Health Evaluation Program Most Recent Invertebrate Scores
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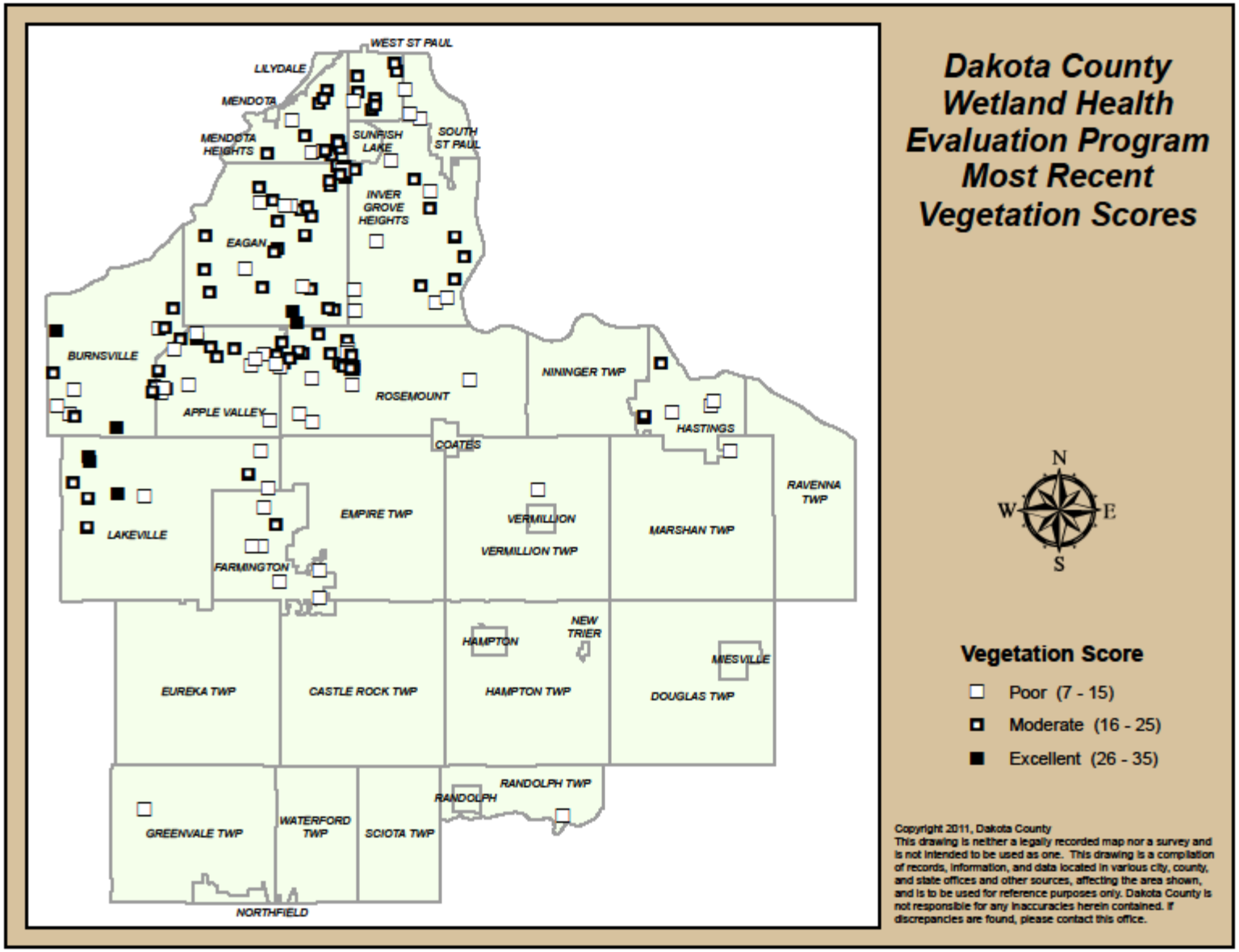
Figure 3.3.2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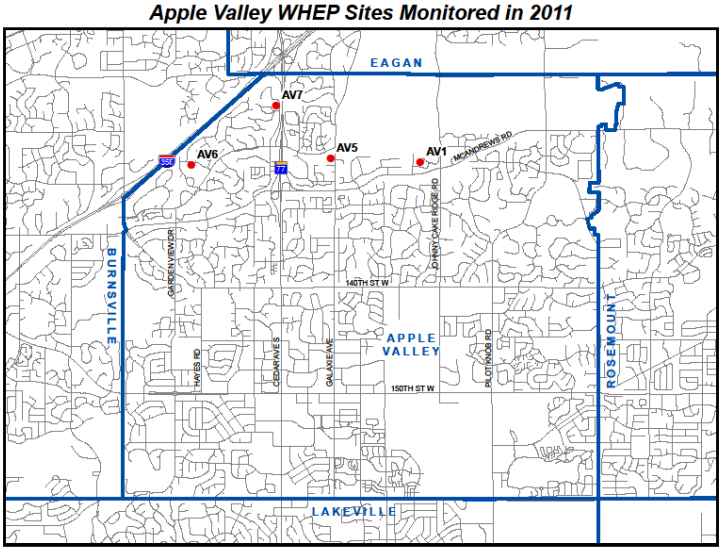
4.0 Wetland Evaluations

4.1 Apple Valley Wetlands

Four wetlands were monitored within the City of Apple Valley in 2011. This is the fourteenth year the City has participated in WHEP, and 19 wetlands have been monitored in that time period.

Apple Valley WHEP Sites Monitored in 2011



Team Leader: Jeff Korpik

Team Members: Erin Adams, Madison Adams, Eric Barnes, Reggie Bennett, Andrea Brownlow, Colin Brownlow, Helen Goeden, Hannah Larson, Mandy Nelson, Dan Perron, Nancy Pope, Jordan Priester, Noah Ricard, Rachel Ricard, Scott Rivenburg, Emma Soderstrom, Erik Soderstrom, Scott Soderstrom, Cynthia Stetz, Katherine Stetz, and Eric Vavra.

Jeff Korpik

Many of the Apple Valley team members have been participating in the WHEP program since the induction of WHEP. Jeff Korpik, the team leader, has also been part of the WHEP program for many seasons, and this is his fourth year as a team leader. Jeff said, "the season went fairly well. We had a great group of volunteers as always, including some very dedicated new teammates. None of the sites were in as good of condition as we had hoped, but we still had fun. We only had one person fall in (better than most years), and I found out that when we collect the invert samples, it is a good idea to remember to bring jars, instead of having to run home in the middle to get some. Oh well, the team were good sports about it. I hope that we get a lot of returning volunteers next year!"

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."

Jeff told us, in 2007, that Apple Valley has been monitoring a wetland that had a pre-treatment basin constructed upstream to treat parking lot and site runoff prior to discharge into the wetland. WHEP data provided support that the pre-treatment basin was effective. He said, "WHEP provides sound baseline data about wetland quality in Apple Valley, which we can also compare to neighboring WHEP wetlands Ongoing wetland sampling data is important for monitoring wetland health and necessary for making sound decisions on project proposals."

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."

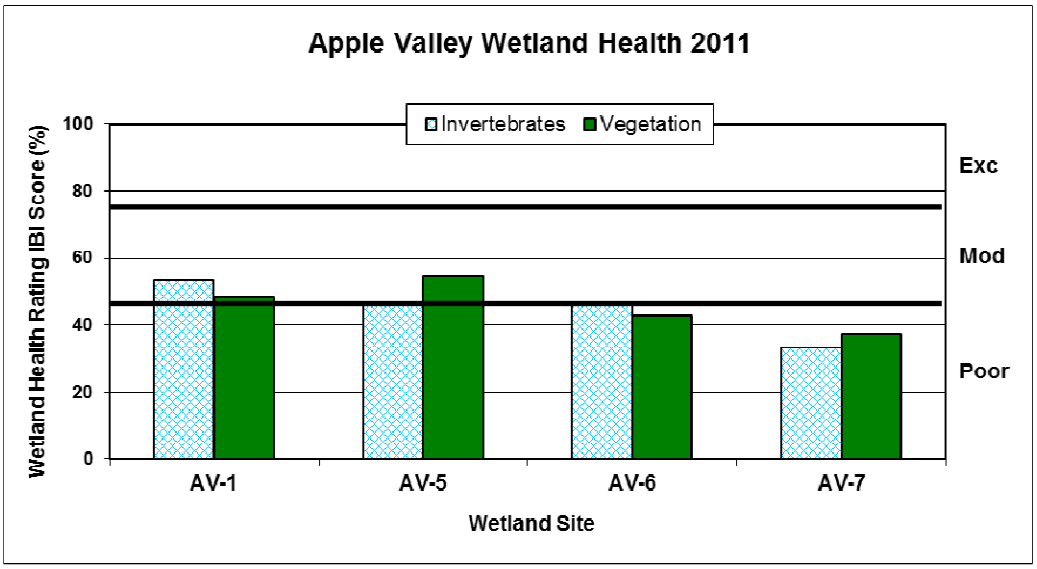
Jane Byron

Apple Valley General Wetland Health

Apple Valley team members

Figure 4.1 presents an overall view of wetland health for all of the 2011 monitoring sites in Apple Valley based on the IBI scores for invertebrates and vegetation presented as a percent. Figure 4.1 also illustrates the consistency between the IBI scores (in percent form) for each wetland sampled. Scores that differ by less than ten percent are considered consistent. Based on the IBI scores, a wetland health rating is assigned as excellent, moderate or poor. The Apple Valley wetlands exhibited poor to moderate wetland health based on both invertebrate and vegetation data. AV-6 and AV-7 had scored poorly for both invertebrates and vegetation. AV-1 and AV-5 both scored closely to the poor-moderate division.

Figure 4.1 Apple Valley site scores (percent) for the 2011 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 EVR-53 toward the East Vermillion River and into the Vermillion River. 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 thirteenth year that this site has been surveyed since 1998.

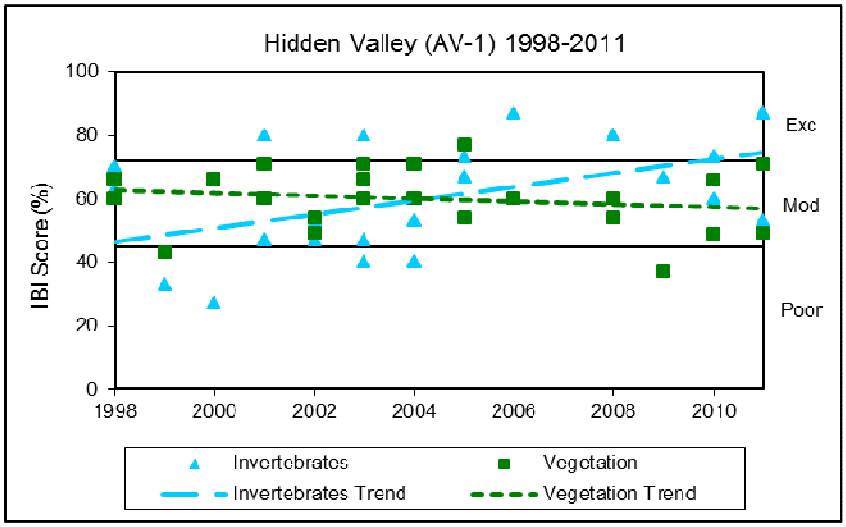
Wetland Health

Site Observations: The water was reportedly high in 2011. The substrate was mucky and the water warm. Duckweed and water-meal were heavily present. Baltimore oriole, common yellow throat, house wren, Cooper's hawk, green heron, Cope's gray tree frog, red-winged blackbird, and catbird were present.

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

2011 Data (AV-1)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (18)	Moderate (17)
Cross-check Rating (IBI score)	Moderate (26)	Moderate (25)
Trend 1998-2011	Improving	Stable to possible decline

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



Site Summary: Hidden Valley was found to have moderate health in 2011. The scoring was 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 thirteen years of monitoring, the data indicates stable to improving wetland health.

4.1.2 WVR-P15, Cedar Knolls (AV-5)

Cedar Knolls (AV-17), also known as WVR-P15, is a 0.5 acre, type 4 wetland located within WVR-15 subwatershed of the Vermillion River Watershed. The wetland watershed has approximately eight acres of direct drainage and is 20 percent impervious. There are no inlets or outlets. It is part of the City's stormwater management plan and is designated as a Manage 3 wetland with a goal to continue monitoring periodically. Wetlands assigned to this category have medium floral diversity/integrity, direct stormwater input, medium restoration potential and are not located in public/open space.

The wetland is located within a city park. A new development has gone in at the southern portion of the watershed since 2005. Not all the homes have been constructed yet. An infiltration basin was installed to treat runoff prior to entering the pond. Grading may have altered the original watershed and wetland dimensions when the park was constructed in the 1970's. The area around the wetland is heavily wooded and provides a buffer.

Wetland Health

Site Observations: Stumps and branches are present in the water.

Table 4.1.2 WVR-P15, Cedar Knolls (AV-5) Wetland Health based on IBI

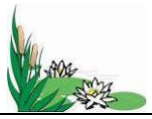
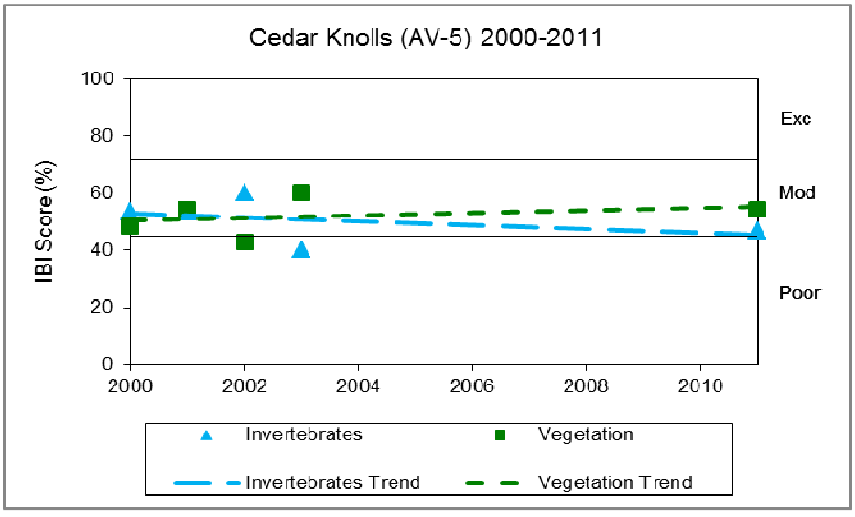
2011 Data (AV-5)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (14)	Moderate (19)
Trend 2000-2011	stable	stable

Figure 4.1.2 Invertebrate and vegetation trends for Cedar Knolls (AV-5)



Site summary: This is the fifth year that AV-5 has been monitored since 2000; however until 2011, it had not been surveyed since 2003. The wetland health appears to be stable.

4.1.3 Belmont Park (AV-6)

Belmont Park (AV-6), also known as BD-P10, is a 1.3 acre type 3 wetland located within the BD-10 subwatershed of the Black Dog Lake watershed. The watershed has approximately 202 acres of total drainage and 32 acres of direct drainage. It is 20% impervious. There are three inlets and one outlet. Belmont Park is part of the City's stormwater management plan and is designated as a Manage 1 Restore wetland with a management goal to continue monitoring periodically. Wetlands in this classification have medium floral diversity/integrity, but also have direct stormwater input. The wetland must have high or exceptional restoration potential and be located in public or open space in order to meet the restoration classification.

AV-6 is located in a city park. Residential areas are scattered around the wetland. This wetland was altered in the early 1970's for stormwater management. The outlet is a lift station. The City has placed barley straw pellets within the pond in an effort to control algae for several years.

Wetland Health

Site Observations: The slope to the wetland is gentle. The substrate is very mucky. A lot of submerged vegetation was present. Ducks and minnows were observed in July.

Table 4.1.4 Belmont Park (AV-6) Wetland Health based on Index of Biotic Integrity

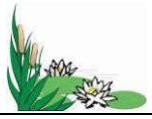
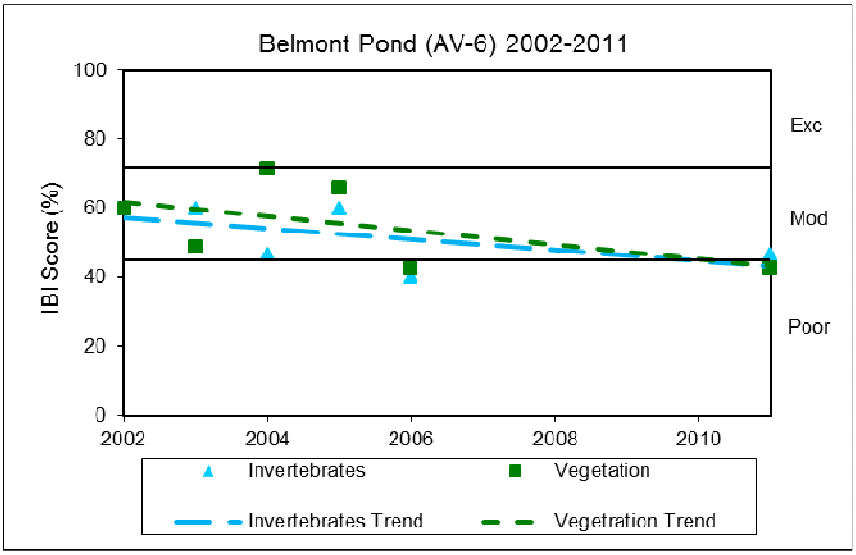
2011 Data (AV-6)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Poor (14)	Poor (15)
Trend 2002-2011	Declining	Declining

Figure 4.1.3 Invertebrate and vegetation trends for Belmont Park (AV-6)



Site summary: Belmont Park has been surveyed five times since 2002; however, until 2011 it had not been surveyed since 2006. The wetland health appears to be declining.

4.1.4 Podojil Pond (AV-7)

Podojil Pond (AV-7), also known as WVR-P6 is a 1.3 acre, type 3 wetland located within the WVR-6 subwatershed of the Vermillion River Watershed. The wetland watershed drains approximately eight acres and is 25 percent impervious. There is one inlet and one outlet. It is part of the City's stormwater management plan and is designated as a Manage 2 wetland with a management goal to continue to monitor periodically. 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.

The majority of the wetland is privately owned, but adjacent parcels are under state, local, and private ownership. The wetland was altered in the late 1980's or early 1990's for stormwater management. Aerial photos indicate the wetland was excavated at that time.

Wetland Health

Site Observations: The water level within the vegetation plot was between 0.5 meters and 1.5 meters. The wetland substrate is slightly mucky. Interstate-35 E and Highway 77 are nearby.

Table 4.1.3 Podojil Pond (AV-7) Wetland Health based on IBI

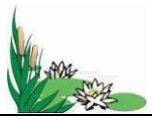
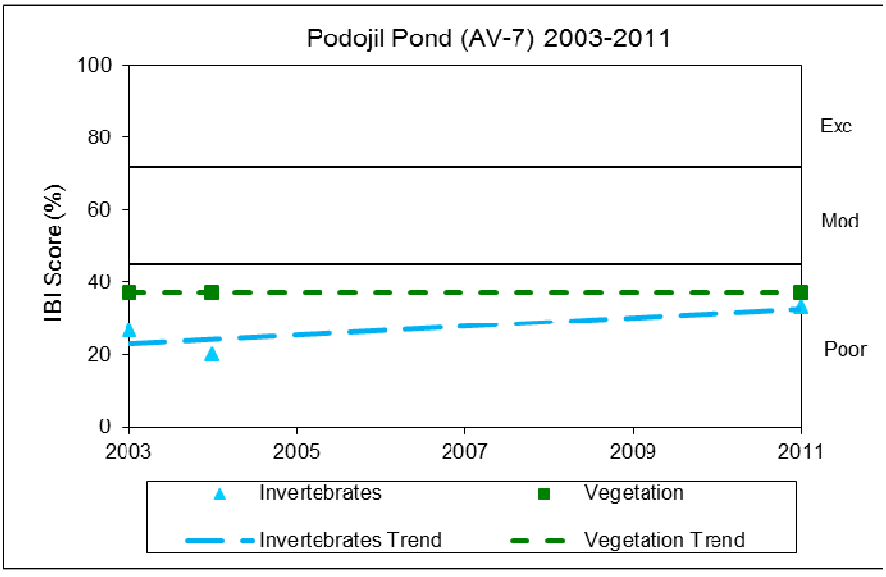
2011 Data (AV-7)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (22)	Poor (15)
Trend 2003-2011	Not enough data	Not enough data

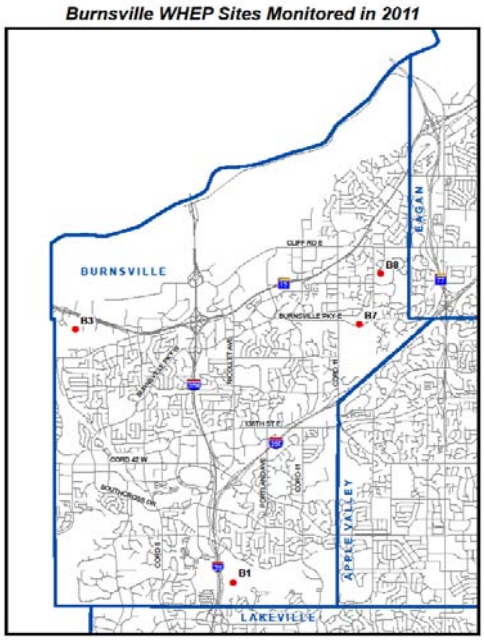
Figure 4.1.4 Invertebrate and vegetation trends for Podojil Pond (AV-7)



Site summary: Podojil Pond has only been surveyed three times since 2003. Until 2011, it had not been sampled since 2004. There is not enough data to determine a health trend.

4.2 Burnsville Wetlands

Four wetlands were monitored within the City of Burnsville in 2011. Burnsville has monitored 15 wetlands through WHEP since 1997.



Team Leader: Jeff Zilka

Team Members: Bernie DeMaster, Allison Flickinger, Tony Fragiacomo, Randy Hills, Robert Lorenzen, Lorin Mislan, Karin Steinert, Barbara Sterner, Madeline Turbes, Brady Walter, Thomas Ward, Derek West, and LuAnne Zilka.

Jeff and LuAnne Zilka

Burnsville team members

This is Jeff's first year as a team leader, though he was involved in WHEP for five years prior. He enjoys being outdoors hunting, fishing, boating, camping and hiking. He has learned a lot about nature from the program, its workshops and reference materials. He enjoys being a team leader especially because he meets great volunteers who are dedicated and fun to be with. He says, "The year went very well. I had many dedicated volunteers that helped share the load of documentation. We saw several interesting animals at the sites. When crossing the road at Terrace Oaks, we were met by a family of turkeys. They looked at us in our waders and just walked on by! When in the middle of the wetland at Kraemer, we looked up and saw several turkey vultures circling us. A few minutes later, a bald eagle decided to look down on us as well." He commented that the wet spring provided nice water levels this year.

Liz Forbes

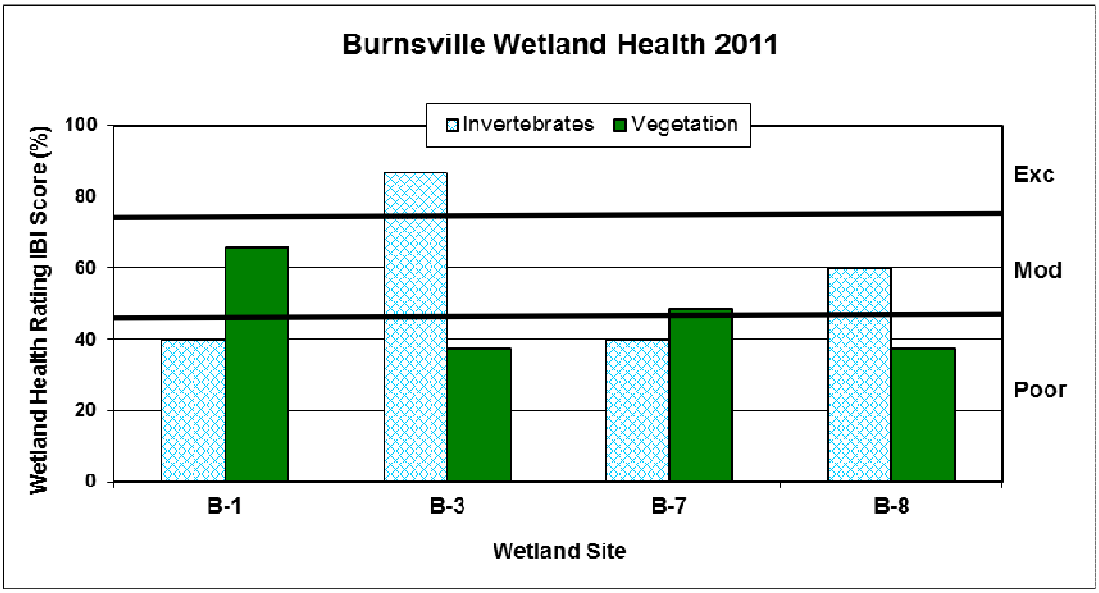
Liz Forbes is the city contact for Burnsville. She started working for the City of Burnsville in March of 2011 as a Natural Resources Technician. She moved to Minnesota with her family in 2010 from Missouri where she worked for the Missouri Department of Conservation for seven years. Her duties include management of several city raingardens, lake monitoring, and habitat work in natural areas. She says that, "as the city contact for the WHEP program, I determine which wetlands to sample, spread the word about volunteering in the program and review the data that is collected by volunteers. Four wetlands are monitored in Burnsville. Two of the wetlands are sampled every year, which provides great baseline data on wetland health trends over time. The other two wetlands are either sites that are new to the WHEP program or sites that have not been visited for several years."

Burnsville General Wetland Health

Figure 4.2 presents an overall view of wetland health for all of the 2011 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 2011, the Burnsville wetlands showed poor to excellent wetland health. B-3 had consistent invertebrate and vegetation scores just as in 2010. All four of the wetlands scored poorly for either invertebrates or vegetation. B-3 scored an excellent for invertebrates.

Figure 4.2 Burnsville site scores (percent) for the 2011 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 Crystal Lake West Watershed. The 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: Submerged and emergent vegetation present. The wetland was spongy/boggy. Crayfish and tadpoles were observed.

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

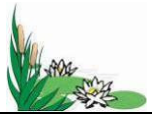
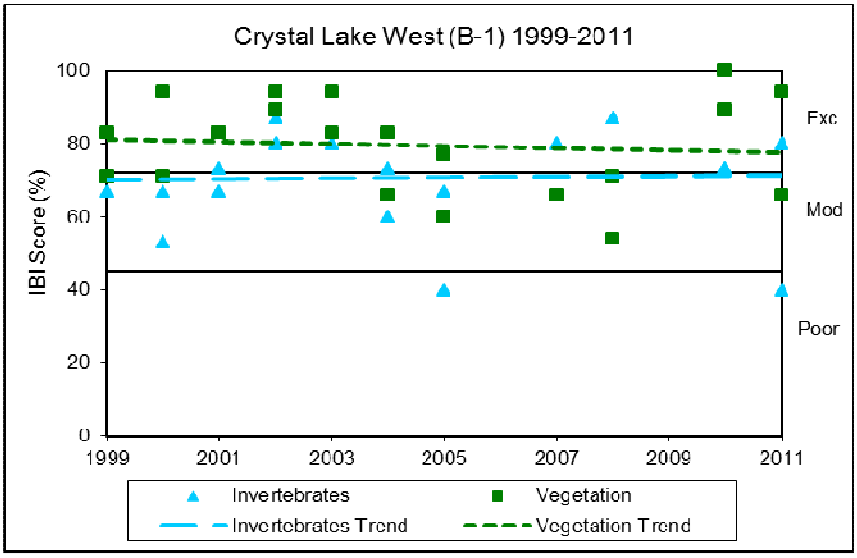
2011 Data (B-1)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Poor (12)	Moderate (23)
Cross-check Rating (IBI score)	Moderate (24)	Excellent (33)
Trend 1999-2011	Stable	Stable

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



Site summary: This is the eleventh year that B-1 has been surveyed since 1999. The invertebrate and vegetation scores indicate that the wetland has poor to excellent health, respectively. The scores between the City team and the cross-check team were not consistent. The cross-check team found higher scores in both categories; invertebrate and vegetation diversity was higher in cross-check samples. The trend lines indicate variable but overall stable wetland health. The lower scores from 2005-2009 may be associated with lower water levels which will impact wetland vegetation.

4.2.2 Kraemer Preserve (B-3)

B-3, also known as Kraemer Preserve, is a restored public water wetland in the City of Burnsville. It is a 30 acre, type 3 wetland located within the Kraemer Nature Preserve subwatershed of the Blackdog Watershed. The wetland drainage area is 415 acres, and is approximately 30 percent impervious. Land use in the watershed is mainly residential and industrial. 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.

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 nutrient.

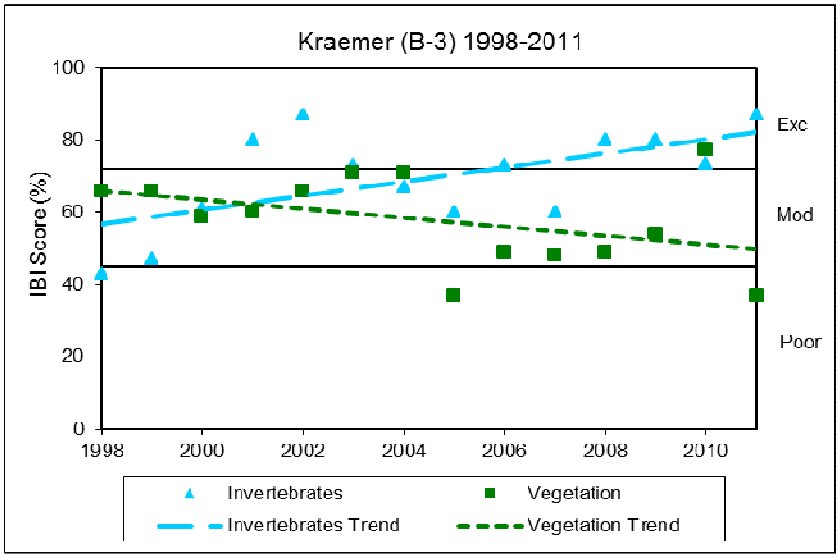
Wetland Health

Site Observations: The wetland was very mucky in 2011. Ducks were observed.

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

2011 Data (B-3)	**Invertebrates** 	**Vegetation** 
Wetland Health Rating (IBI score)	Excellent (26)	Poor (13)
Trend 1998-2011	Improving	Stable

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



Site summary: This is the fourteenth year of sampling for Kraemer Preserve (B-3). The vegetation and invertebrate scores indicate poor to excellent wetland health, respectively. This wetland has maintained overall moderate conditions over most of the years of sampling. In 2011, however, the vegetation scored poorly. This is opposite of 2010 when it scored excellent in both categories. The vegetation trend line indicates declining health. Vegetation scores in the previous few years may have been affected by lower water levels which will impact wetland vegetation.

4.2.3 Terrace Oaks North (B-7)

Terrace Oaks North (B-7) is a 2.2 acre, type 4 wetland located within the E15 Drainage Area of East Subwatershed which is part of the Black Dog Watershed. Its watershed is 15.7 acres and five percent impervious. This wetland has one outlet (12-inch pipe) located on the southeast corner. The wetland is addressed within the City's stormwater and wetland management plans. It is a protected wetland and is being managed to maintain wetland and existing functions, values and wildlife habitat.

Terrace Oaks North is located on the north end of Terrace Oaks Park. There is an approximately 150 foot buffer on the northern edge of the wetland. Burnsville Parkway lies less than 50 feet to the south. Invasive species, runoff from residential areas to the north, and road salt and sand from Burnsville Parkway are typical disturbances for this wetland.

Wetland Health

Site Observations: The slope to the wetland is gentle on the north, east, and west, but steep on the south side. The substrate is solid. A ring of trees surrounds the wetland with an inner ring of grasses.

Table 4.2.3 Terrace Oaks North (B-7) Wetland Health based on Index of Biotic Integrity

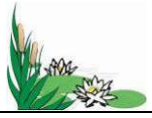
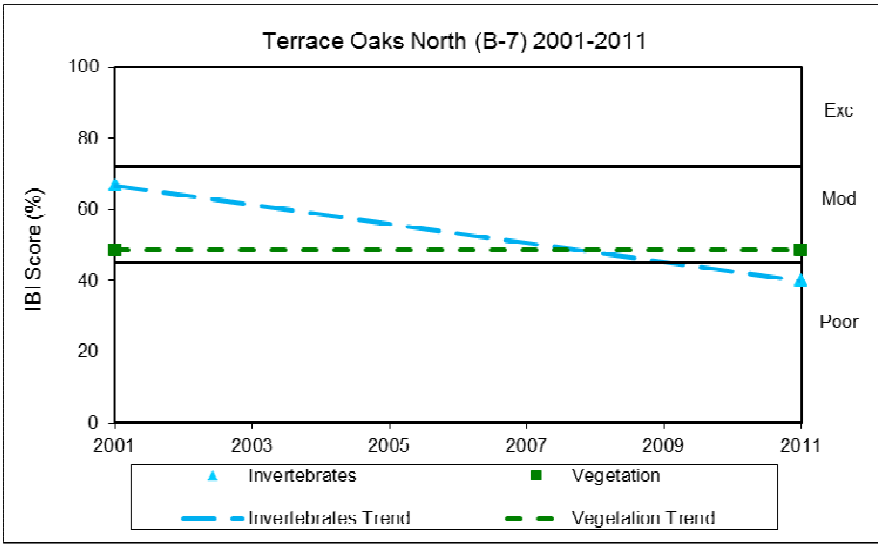
2011 Data (B-7)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Poor (12)	Moderate (17)
Trend 2002-2011	Not enough data	Not enough data

Figure 4.2.3 Invertebrate and vegetation trends for Terrace Oaks North (B-7)



Site summary: This is the second time the wetland has been surveyed since 2001. It has exhibited poor to moderate health. Based on very limited data, the invertebrate trend line indicates potential declining wetland health. Additional monitoring is recommended to better assess the health of this wetland.

4.2.4 Red Oak (B-8)

Red Oak (B-8) is a 0.5 acre, type 3 wetland located within the E4 Drainage Area of East Subwatershed of Black Dog Watershed. The E4 Drainage Area is 115 acres and 25 percent impervious. There are no inlets or outlets; however GIS images indicate the presence of a 15 inch stormwater pipe approximately 20 feet from the north end of the wetland flowing away. The wetland is not part of the City's stormwater management plan. It is a protected wetland with a goal to maintain and improve the existing habitat.

Red Oak is located within the northwest edge of the 36 acre Red Oak Park. Mixed grassland/forest buffers the wetland. A large soccer field is less than 100 feet away to the east. The area near the wetland is part of the parks disc golf course. There is runoff from a nearby residential area 20 feet to the north.

Wetland Health

Site Observations: Red Oak has a solid substrate. Cattails, reed canary grass, willows, ash, and assorted grasses surround the wetland.

Table 4.2.4 Red Oak (B-8) Wetland Health based on Index of Biotic Integrity

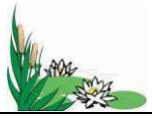
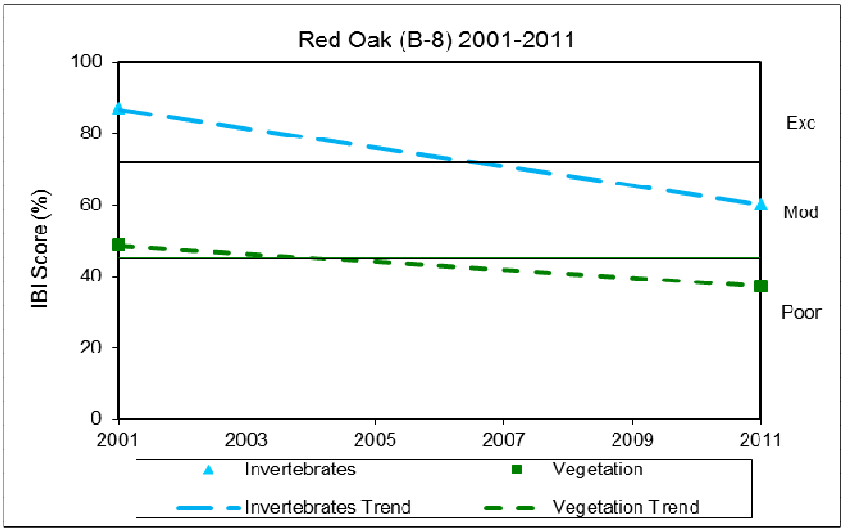
2011 Data (B-8)	**Invertebrates** 	**Vegetation** 
Wetland Health Rating (IBI score)	Moderate (18)	Poor (13)
Trend 2001-2011	Not enough data	Not enough data

Figure 4.2.4 Invertebrate and vegetation trends for Red Oak (B-8)



Site summary: This is the second time that B-8 has been surveyed since 2001. It exhibited poor to moderate wetland health. Both trend lines indicate potential declining health; however, additional monitoring is needed to better assess the health of this wetland.

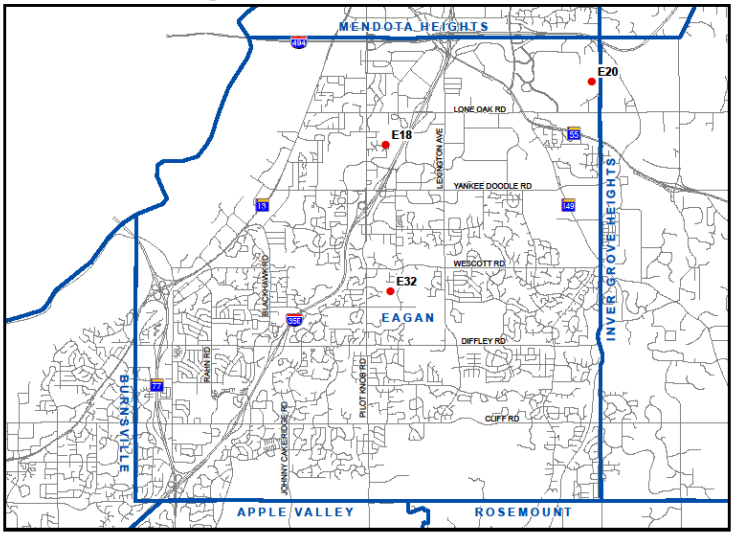
4.3 Eagan Wetlands

The Eagan team monitored three wetlands in 2011. Since WHEP began in 1997, Eagan has monitored 31 wetlands.

Team Leaders: Marianne McKeon

Team Members: Patrick (Dotche) Afidegnon, Tim Callister, Cheri Citrowske, Adam Haecker, Jessie Koehle, William Larson, Daniel Schmitter, Danny Turin, Ed Turin, Loren Voigt, and David Von Ruden.

Eagan WHEP Sites Monitored in 2011



Marianne McKeon

Marianne McKeon is the Eagan team leader. She said, "I've been a WHEP volunteer for 5 years now and this was my first year as team leader. I had some big shoes to fill with Jane Tunseth and Tom Goodwin (School of Environmental Studies) being gone now but I really enjoyed my new role and I had a **GREAT** team to support me! Our city contact Jessie Koehle is a tremendous resource and although the majority of members were new this year, everyone had very rich and diverse backgrounds adding strength (and interest) to our team. We had an MPCA retiree, "retired" airport director, water resources grad student, a scientist, a teacher, an ecology student and of course our new and returning citizen-scientists! I definitely felt lucky and was proud to have such a cool team. We had a good time and learned new things together!"

Jessie Koehle is the Water Resources Technician for the City of Eagan. She commented that "Eagan's 2011 WHEP season was fun and interesting, as always. It was a big change for us with Jane Tunseth stepping down as team leader, but we still did great with the help of our new team leader, Marianne. She

charged ahead with confidence and energy and her years of experience as a volunteer definitely showed. Marianne even got her family involved; one week when no one else could empty the traps, she went out in the rain to collect samples with her husband and children in tow! Now that's dedication."

Jessie Koehle

The Eagan team sampled some new wetlands in 2011. Jessie said, "some turned out to have better insect and plant life than we expected, and some worse. We also sampled Hasting's cross check site, which was an adventure as water levels were high and slopes were steep! It was neat to see the series of waterways related to the lock and dam at that location too."

"The Eagan team has lots of dedicated and sociable people, and I really enjoyed being a part of it, as always. Looking forward to another great season in 2012!"

Eric Macbeth

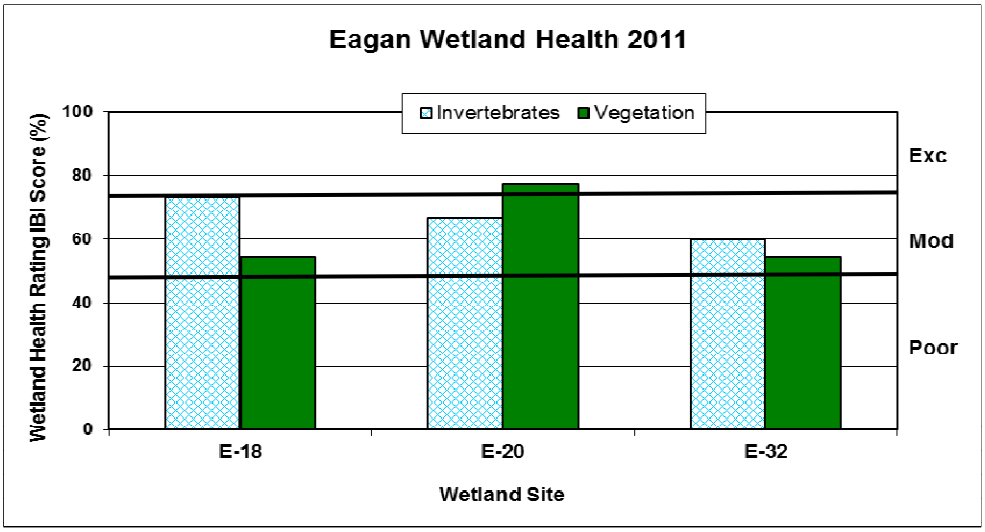
Eric Macbeth has almost 25 years' experience in planning, policy, management, research, and public education of lakes, rivers, and wetlands. Since 1999, he has coordinated Eagan's stormwater pollution prevention, lakes, and wetlands programs. He said, "my role with WHEP is administrative/budgetary. I annually propose to Eagan City Council and authorize payment of funding support for WHEP." He believes that a benefit of WHEP is to provide to interested residents another public education and involvement opportunity.

Eagan team members

Eagan General Wetland Health

Figure 4.3 presents an overall view of wetland health for all of the 2011 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 2011. The Eagan wetlands exhibited moderate to excellent wetland health based on both invertebrate and vegetation data. E-20 scored excellent for vegetation. E-32 was monitored for the first time in 2011.

Figure 4.3 Eagan site scores (percent form) for the 2011 sampling season



4.3.1 Moonshine Park Pond (E-18)

Moonshine Park Pond (E-18) also known as DP-14 is a 2.5 acre, type 4 wetland within the Gun Club Lake Watershed. Its watershed is 34 acres including approximately 25 percent impervious surface. There are two inlets; one in the southwest and one on the western shore. There is one outlet on the east side of the wetland. The wetland is part of the City's storm water management plan.

Most of the pond is located within Moonshine Park. Approximately ten percent of the surrounding area is private yard and the rest in undeveloped. Most of the shoreline is hilly woodland. The private property is turfgrass. Buckthorn has invaded the brushy buffer, and water lettuce (*Pistia stratiotes*) (a non-native floating plant species) has been introduced to the wetland. Water lettuce is a plant sold through aquarium and pond supply dealers. It is believed to be susceptible to hard freezes, so likely is not a long term threat in Minnesota. It is illegal to introduce non-native species to public waters.

Wetland Health

Site Observations: Reed canary grass and trees surround the wetland. It has a mucky bottom.

Table 4.3.1 Moonshine Park Pond (E-18) Wetland Health based on Index of Biotic Integrity

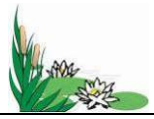
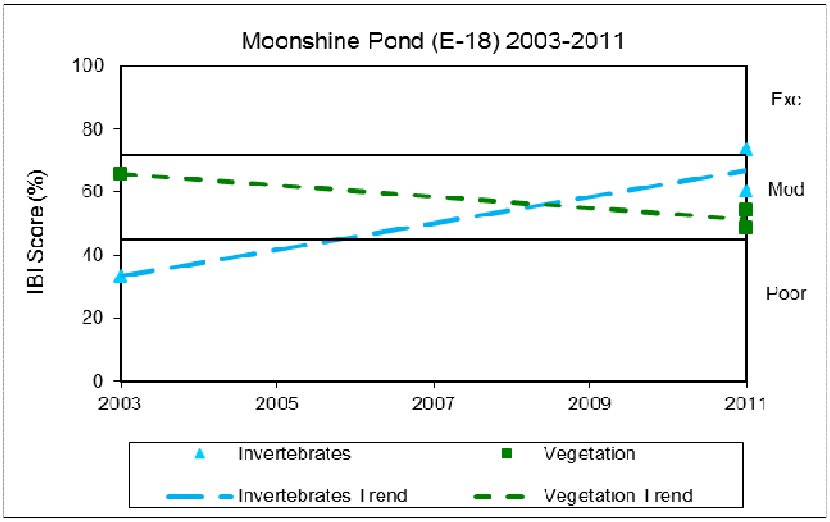
2011 Data (E-18)	**Invertebrates** 	**Vegetation** 
Wetland Health Rating (IBI score)	Moderate (22)	Moderate (19)
Cross-check Rating (IBI score)	Moderate (18)	Moderate (17)
Trend 2003-2011	Not enough data	Not enough data

Figure 4.3.1 Invertebrate and vegetation trends for Moonshine Park Pond (E-18)



Site summary: This is the second year that this wetland has been surveyed since 2003. The vegetation and invertebrate scores indicate moderate wetland health. The invertebrate and vegetation trends appear opposite. More data are needed to verify trends in Moonshine Park Pond. If water lettuce gets out of control in this pond, it could adversely affect native plant life.

4.3.2 Shanahan Lake (E-20)

Shanahan Lake (E-20) also known as FP-8 is a 10.9 acre, type 4 wetland within the Gun Club Lake Watershed. Its watershed is 56.4 acres with less than one percent impervious surface. It has one inlet on the south shore and one at the farthest western tip of the wetland. There is one outlet on the north shore near the largest central bay. It is part of the City's storm water management plan.

Shanahan Lake is owned by a commercial development, Eagan Heights LLC. When sampled in 2005, there were no inlets or outlets, and the watershed had almost no impervious surface. Now trees have been slashed and there is a commercial development going in nearby, with roads closer to the lake. Some raingardens have been installed but functionality was questionable when they were first put in place. The immediate shoreline has wooded and grassy buffers. The upland area is partly wooded, partly clear-cut, and partly commercial. A conservation easement was established in the direct buffer and lake area in 2008.

Wetland Health

Site Observations: This wetland has a steep slope. The substrate is firm and grassy.

Table 4.3.2 Shanahan Lake (E-20) Wetland Health based on Index of Biotic Integrity

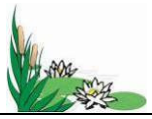
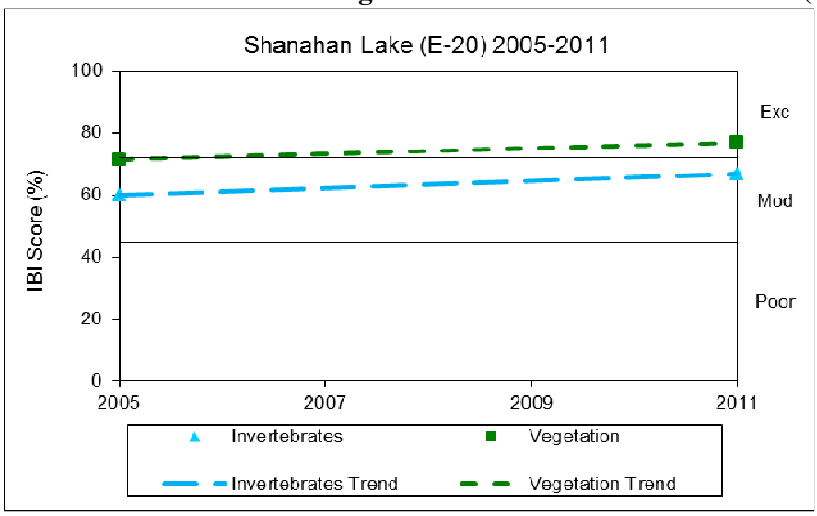
2011 Data (E-20)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (20)	Excellent (27)
Trend 2005-2011	Not enough data	Not enough data

Figure 4.3.2 Invertebrate and vegetation trends for Shanahan Lake (E-20)



Site summary: This is the second year that E-20 has been monitored since 2005. There are not enough data to determine wetland health trends for Shanahan Lake. This site is one of the higher quality wetlands monitored in the City. More frequent monitoring will help track impacts from the pending development.

4.3.3 City Hall Pond (E-32)

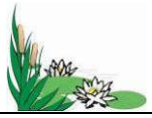
City Hall Pond (E-32), also known as JP-6, is a 6.6 acre, type 4 wetland located within the Gun Club Lake Watershed. It has 81.3 acres of direct drainage and is approximately 14 percent impervious. It has one inlet at the northwestern tip and another on the mid-western shore. There is one outlet near the middle of the northern shore. This wetland is part of the City's stormwater management plan. It is designated as Class L3, wildlife habitat with a goal to protect it from stormwater impacts.

The City of Eagan owns property on the north side. The south and east sides are privately owned residential areas. The wetland receives street runoff and indirect runoff from the City Hall, Civic Center, and Cascade Bay parking lots. Infiltration opportunities may be explored for future development at the City Hall. The City is interested in monitoring conditions now to watch for changes overtime. The surrounding area is wooded and slightly hilly with grasslands. Residential backyards border the eastern shore. A stormwater pond receives parking lot runoff before it flows into this natural wetland.

Wetland Health

Site Observations: The wetland is surrounded by gently sloping banks. It has some boulders in the otherwise firm-to-mucky substrate, and wetland depth change is fairly rapid farther out from shore.

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

2011 Data (E-32)	**Invertebrates** 	**Vegetation** 
Wetland Health Rating (IBI score)	Moderate (18)	Moderate (19)
Trend 2011	Not enough data	Not enough data

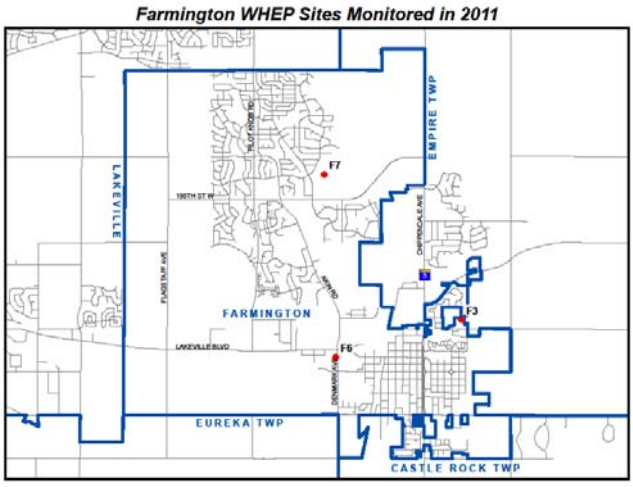
Site summary: This is the first year that E-32 has been monitored. The vegetation and invertebrate scores are consistent; however there are not enough data to determine a trend. It will be valuable to monitor this wetland as development of City Hall advances in the future.

4.4 Farmington Wetlands

The Farmington team sampled three wetlands in 2011. 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: Garrett Bartholme, 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."

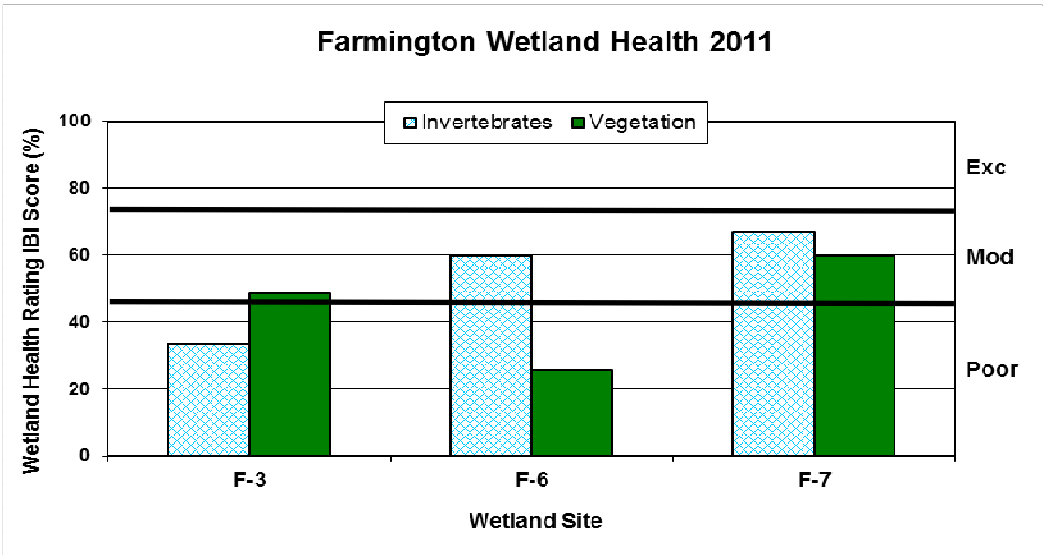
"For the first time since we began monitoring wetlands in Farmington; the City decided to replace two long-term sites with two new wetlands. Lake Julia and Pine Knoll Pond were removed from the monitoring rotation due to low water levels and / or dry conditions. New in 2011 is the Autumn Glen wetland which is situated between two manmade stormwater ponds in a residential and open space landscape and the Vermillion River wetland which is tributary to the Vermillion River very near downtown Farmington in an area designated for business/commercial use, mixed residential opportunities and City park and open space. Our hope is that these two new sites will provide for improved, and lasting, monitoring."

Farmington General Wetland Health

Figure 4.4 presents an overall view of wetland health for all of the 2011 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. F-3 is a reference wetland. F-6 is a new wetland being monitored in 2011. All of Farmington is within the Vermillion River Watershed.


Farmington team members

Figure 4.4 Farmington site scores (percent) for the 2011 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.

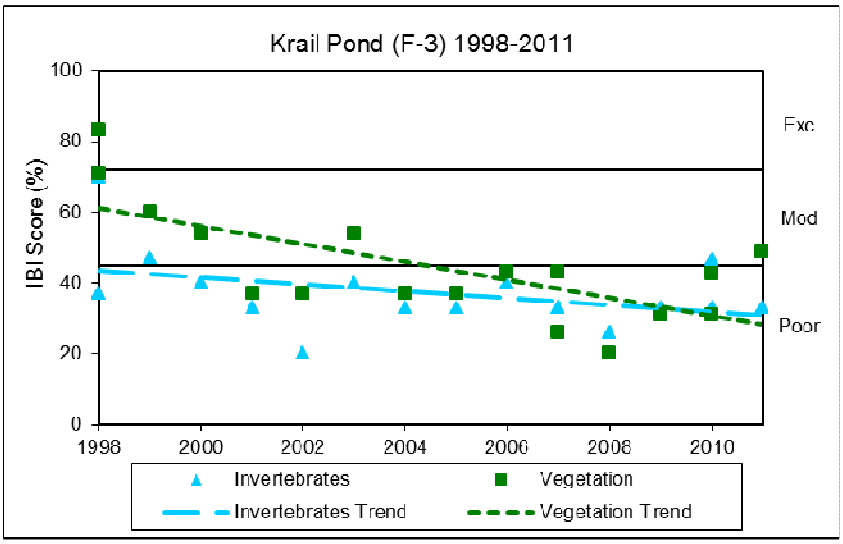
Wetland Health

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.

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

2011 Data (F-3)	**Invertebrates** 	**Vegetation** 
Wetland Health Rating (IBI score)	Poor (10)	Moderate (17)
Trend 1998-2011	Declining	Declining

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



Site summary: Kral Pond has been monitored for fourteen consecutive years. Recent monitoring indicates poor to moderate wetland health. The long term trend shows a decline in wetland health based on both indexes, although since 2009 data show an increase in scores. The two indices have been consistent with each other for most years. It appears that the wetland is being impacted from changes in the watershed, including the development that has occurred. Development in this area has been ongoing over the years as separate segments of land are converted from agriculture. 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)

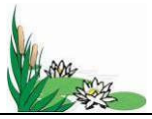
Vermillion River (F-6) is a 6.3 acre wetland within the Vermillion River Watershed. The wetland drainage area is 16 acres. There is one inlet on the west side of the wetland past the infiltration areas. There is one outlet in the southeast corner. The wetland is included in the City's stormwater management 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 slope to the pond from the east is medium, the slope from the south and west is gradual, and the slope into the pond is steep and drops off quickly.

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

2011 Data (F-6)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (18)	Poor (9)
Cross-check Rating (IBI score)	Excellent (24)	Poor (13)
Trend 2011	Not enough data	Not enough data

Site Summary: This is the first year that F-6 has been surveyed. The invertebrate score and the vegetation score are quite inconsistant. The cross-check team scored slightly higher in both invertebrates and vegetation. The plot that the City team set up included a higher density of cattail than the cross-check team. This difference affected the persistant litter calculations which affected the overall vegetation score. The cross-check team collected and identified a greater variety of invertebrates which increased the invertebrates score significantly.

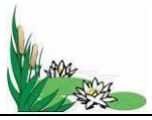
4.4.3 Autumn Glen (F-7)

Autumn Glen (F-7) is a 2.9 acre wetland within the Vermillion River Watershed. The wetland drainage area is ten acres. 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.

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. Reed canary grass dominates the surrounding area.

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

2011 Data (F-7)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (20)	Moderate (21)
Trend 2011	Not enough data	Not enough data

Site Summary: This is the first year that Autumn Glen has been monitored. More years of data are necessary to analyze a data trend.

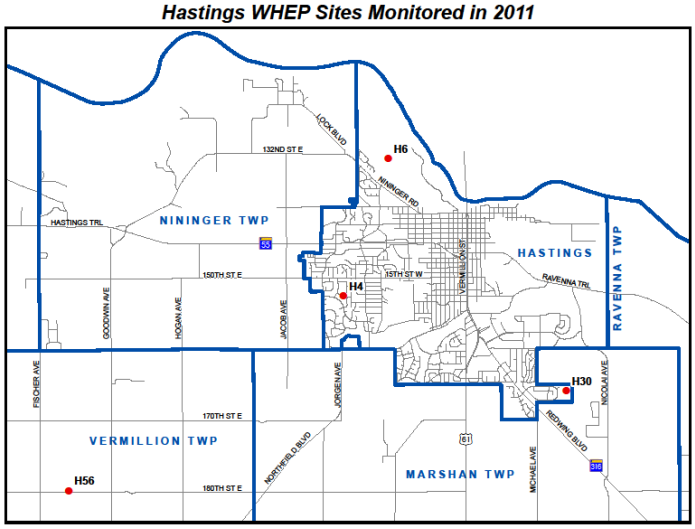
4.5 Hastings Wetlands

Four wetlands were monitored in Hastings in 2011. Eight wetlands have been sampled in the City of Hastings through the WHEP program since 1999.

Team Leader: Joe Beattie

Team Members: Tara Allington, Alicia Beattie, Summer Hendrickson, Brian Huberty, Chester Kong, Patrick La Belle, Natalie Lundell, Maggie Lundell, Kelly Pechous, Wesley Powers, Jill Prokup, Kassandra Remmel, Mike Shelhamer, Connie Slaten, Dwight Smith, Kevin Smith.

Hastings WHEP Sites Monitored in 2011



Joe Beattie (center) with Dwight Smith and Summer Hendrickson

Joe Beattie became a WHEP team leader to enrich his knowledge of wetlands. He said, "the Hastings WHEP team enjoyed another successful monitoring season. We have a terrific team composed of diverse volunteers. Armed with copious water and Freezies, we managed to get to each of our wetlands, even during those incredibly hot days this past summer. Our team enjoyed a wonderful experience while monitoring vegetation at the 180th Street Marsh. One of the volunteers noted what initially appeared to be a frog. Then with closer inspection, we learned that it was a baby duck. We learned from a fellow WHEP leader, Steve Weston, that our "ducks" were actually grebes!"

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

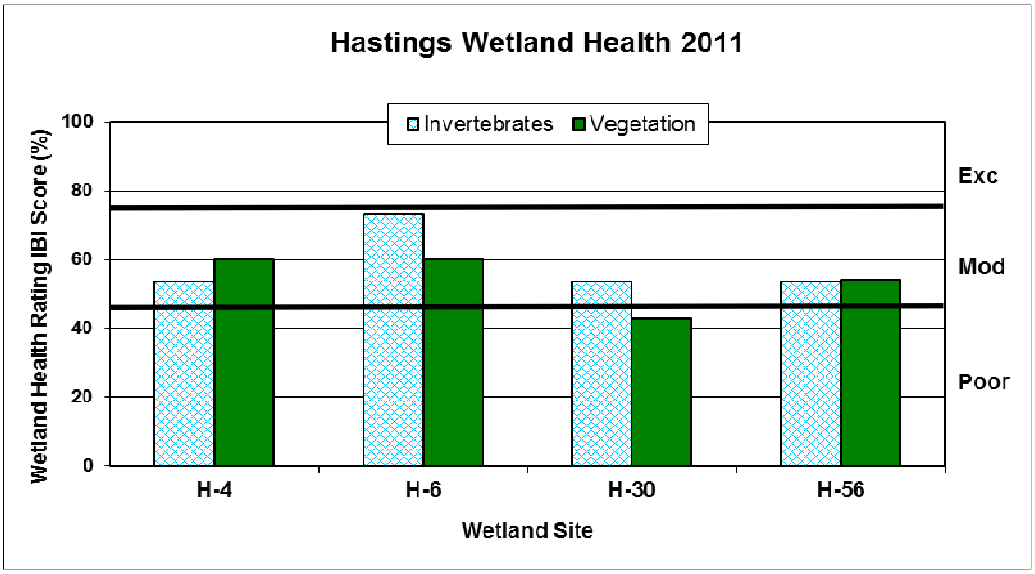
John Caven

Hastings General Wetland Health

Hastings team members

Figure 4.5 presents an overall view of wetland health for all of the 2011 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. All of the wetlands showed poor to moderate wetland health in 2011, with most scores in the moderate range.

Figure 4.5 Hastings site scores (percent) for the 2011 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. 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. Several property owners demonstrate good management practices by maintaining shoreland buffers to protect water quality and provide wildlife habitat.

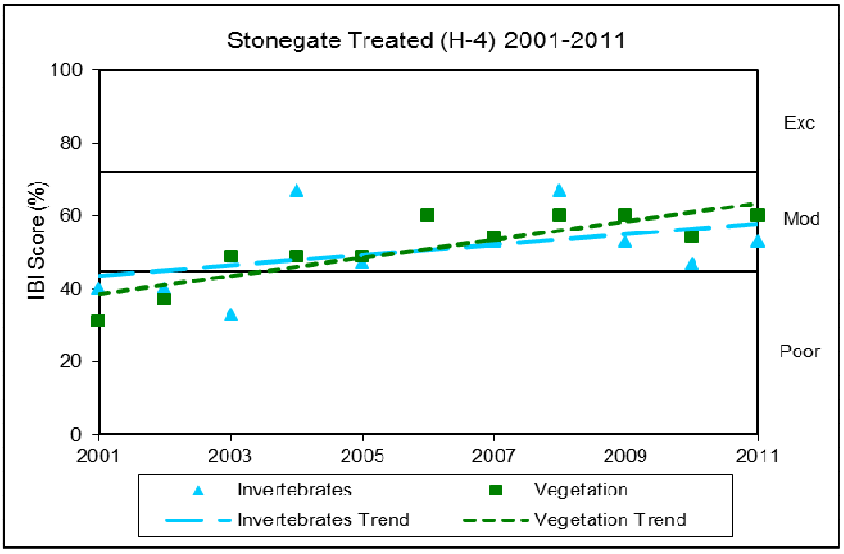
Wetland Health

Site Observations: This is a restoration area with sedges, willows, dogwood, and cattails. The wetland bottom is mucky. Some surrounding houses have native vegetation thriving while other properties are mowed to the wetland edge. Invasive species are a concern.

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

2011 Data (H-4)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (16)	Moderate (21)
Trend 2001-2011	Improving	Improving

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



Site summary: A trend analysis on the eleven years of data indicates that wetland health is gradually improving. Scores moved from the poor range in 2001 through 2003 up to the moderate range. Both indexes have tracked each other well. Restoring native vegetation around the pond may have helped improve wetland health.

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 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 help 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: Lake Rebecca wetland (H-6) is adjacent to Spring Lake and the Mississippi River. A tall levy with a walking/biking trail is located on the north side of the wetland.

It is a large open water wetland surrounded by trees. In 2011, it was jammed with floating logs. Beavers were observed by the cross-check team. Duckweed and water-meal were present, but little other vegetation. Purple loosestrife is spreading.

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

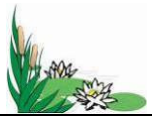
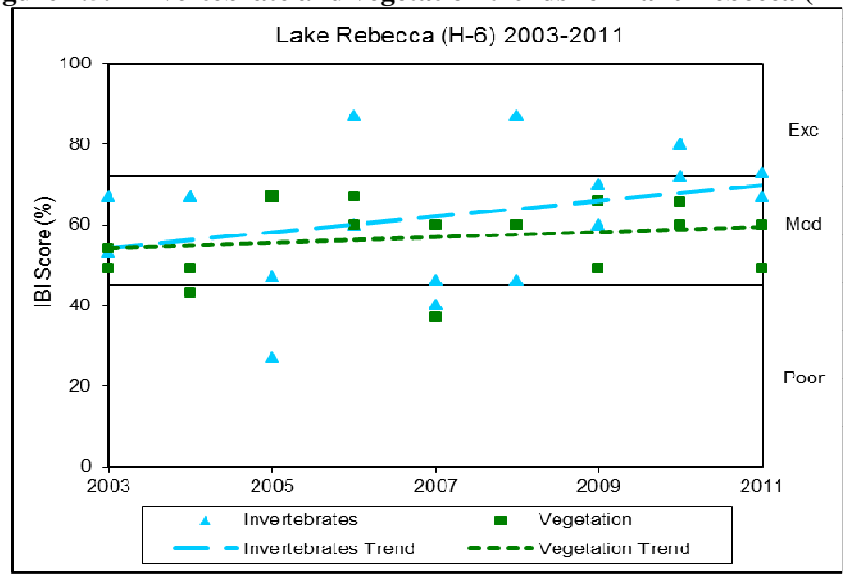
2011 Data (H-6)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (22)	Moderate (21)
Cross-check Rating (IBI score)	Excellent (20)	Moderate (17)
Trend 2003-2011	Improving	Improving slightly

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



Site summary: This is the ninth year of monitoring for Lake Rebecca. Although there is a lot of variation in the data, overall, the wetland has maintained moderate health with both invertebrates and vegetation showing improving trends. The cross-check was consistent with the original scores. The invertebrate scores are always quite high showing moderate to excellent health. Biological control of purple loosestrife at this site should be considered, if it is not already being implemented.

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. 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.

The pond is within a valuable and significant dry sand prairie remnant. There is increased development within the watershed. Invasive species such as spotted knapweed and changing water levels threaten

plant restoration plans and/or efforts. The City has erosion control regulations in place to minimize the impacts of development within the watershed.

Wetland Health

Site Observations: Giant burreed and arrowhead are present in the wetland as well as invasive plants including spotted knapweed surrounding the wetland. Lark sparrow, grasshopper sparrow, and indigo bunting were observed.

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

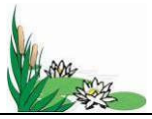
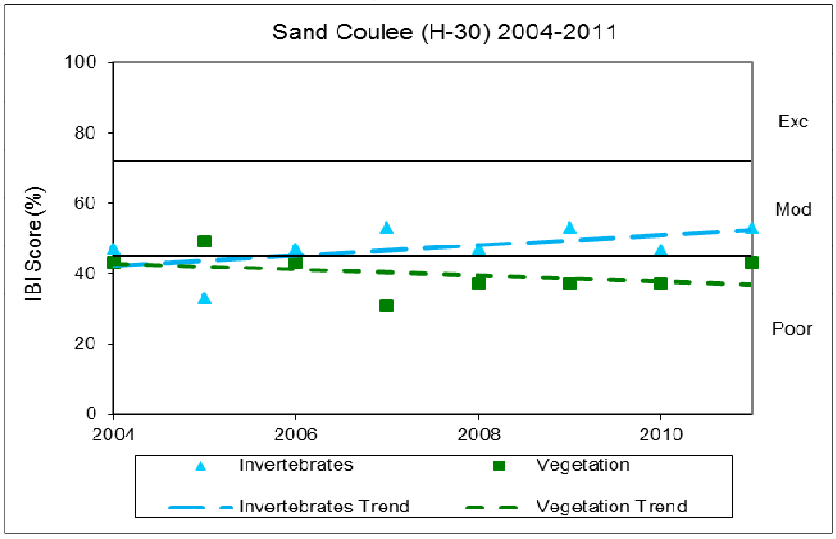
2011 Data (H-30)	**Invertebrates** 	**Vegetation** 
Wetland Health Rating (IBI score)	Moderate (16)	Poor (15)
Trend 2004-2011	Improving	Declining

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



Site summary: Sand Coulee wetland has been monitored eight consecutive years. Both the vegetation and invertebrate indexes have remained on the boundary between poor and moderate health. Overall, the wetland conditions have remained stable. However, there appears to be slight opposite trends for the invertebrates (improving) and vegetation (declining). Because part of the wetland vegetation has been restored to native species, selecting a location for the releve plot that reflects the diversity of the wetland as accurately as possible is critical to assessing the health of the wetland.

4.5.4 180th Street Marsh (H-56)

H-56, also known as 180th Street Marsh, is a 20 acre type 5 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 the immediate area. Agricultural use on the surrounding land is expected to continue. There is a concern that when the ponds are dry, the landowners may put the land into production. The ponds partially cover several parcels of land, each owned by a different party. Farming practices to the south restrict any above ground outflow to the Vermillion River. Management practices are dependent on individual property owners. 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: River bulrush, arrowhead, and giant burreed grow along the shore. In 2007, the team noted the presence of several invasive species in the upland area, including honeysuckle, spotted knapweed and buckthorn. The vegetation is dominated by reed canary grass. Pied billed grebe was observed.

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

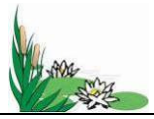
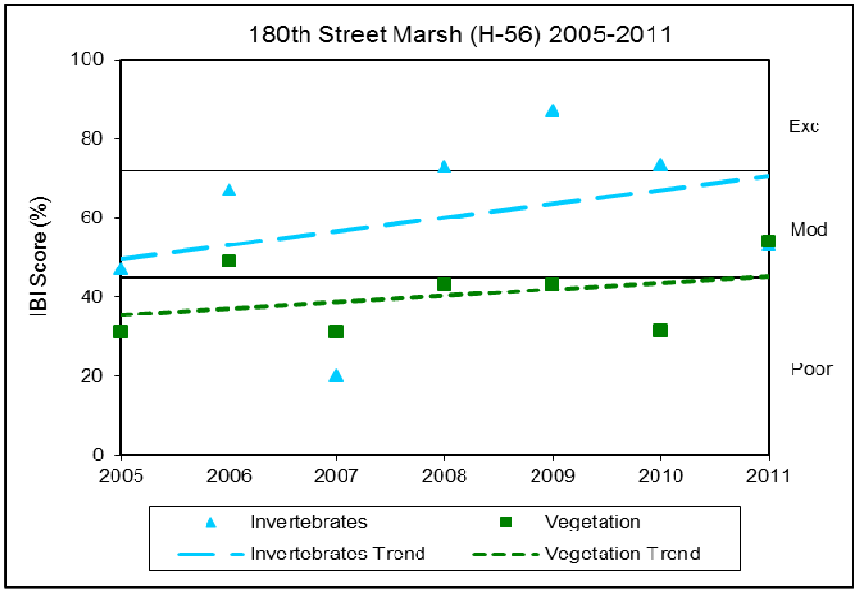
2011 Data (H-56)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (16)	Poor (19)
Trend 2005-2011	Improving	Improving

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



Site summary: This site has been monitored seven consecutive years. 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 the scores are exactly consistent. The invertebrate data has been quite variable over the years. There is a positive trend in the invertebrate index, though the score lowered from excellent in the past three years to moderate this year. The vegetation index which has remained stable over the years, improved from poor health to moderate health in 2011, with the trend analysis indicating a positive trend.

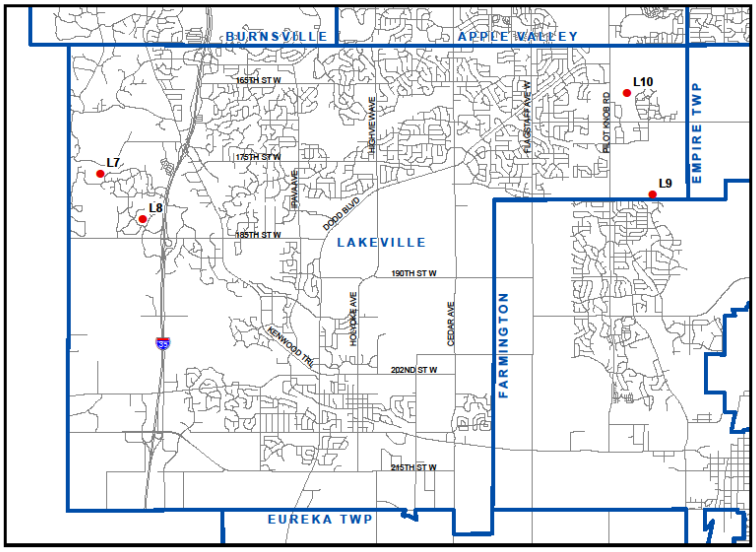
4.6 Lakeville Wetlands

Four wetlands were monitored in 2011 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, Don Conniff, Lily Conniff, Ed Harkins, Patrick Kilbride, Carol Kilbride, Megan Kilbride, Erin Kilbride, James Kilbride, David Leard, David Smith, Andrew Wenstad, and Lauren Wood.

Lakeville WHEP Sites Monitored in 2011



Steve Weston

Steve Weston describes himself as a naturalist. "I am best known for my bird observations, but people who join me on field trips realize that I am really interested in all components of the environment."

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

Ann Messerschmidt

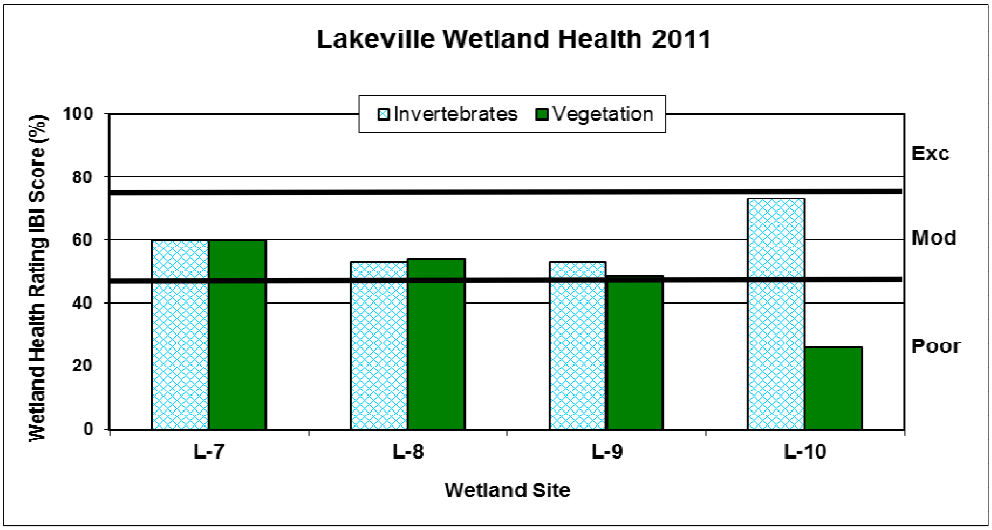
Ann Messerschmidt is the WHEP contact at the City of Lakeville. Her role is to determine which wetlands should be monitored by WHEP volunteers as well as review the collected data. She uses the data to compare to past years data and see what changes are occurring with the wetlands. She says, "Over time,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

Lakeville team members

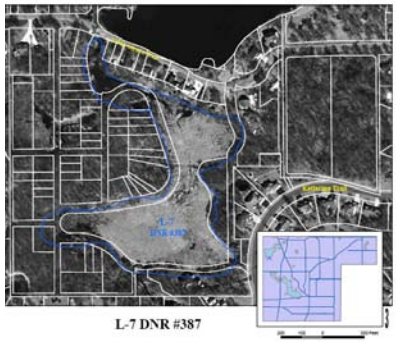
Lakeville General Wetland Health

Figure 4.6 presents an overall view of wetland health for all the 2011 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 reference wetland, L-7, has had very consistent vegetation and invertebrate scores the past three years. The vegetation and invertebrate data for the four wetlands sampled ranged from poor to moderate, with most in the moderate wetland health category. L-10 had a very low vegetation score, and was inconsistent with the invertebrate score.

Figure 4.6 Lakeville site scores (percent) for the 2011 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 and two outlets along the north side. The wetland is part ofthe City's stormwater management plan. The wetland designated to preserve. The management goal is to actively protect and preserve the functions and values of the wetland. A woodland buffer surrounds most of the west side of the wetland, with woodland buffers between the few properties along the north and southeast wetland boundary. In an effort to improve water quality of Orchard Lake, an aeration system was installed in L-7 in 2010. There are four diffuser heads installed near the north outlet into Orchard Lake. The goal is to precipitate phosphorous out of the water column and drop it out into the sediments in L-7 so that less phosphorous will enter into Orchard Lake. The aeration system is scheduled to run from May 1 to September 30 annually.

Wetland Health

Site Observations: The slope is steep and the substrate muddy. The Lakeville team observed orange-spot sunfish, red-eyed vireo, white-breasted nuthatch, Baltimore oriole, American toad, green heron, red-wing blackbird, common yellowthroat, black-capped chickadee and American goldfinch.

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

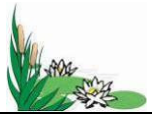
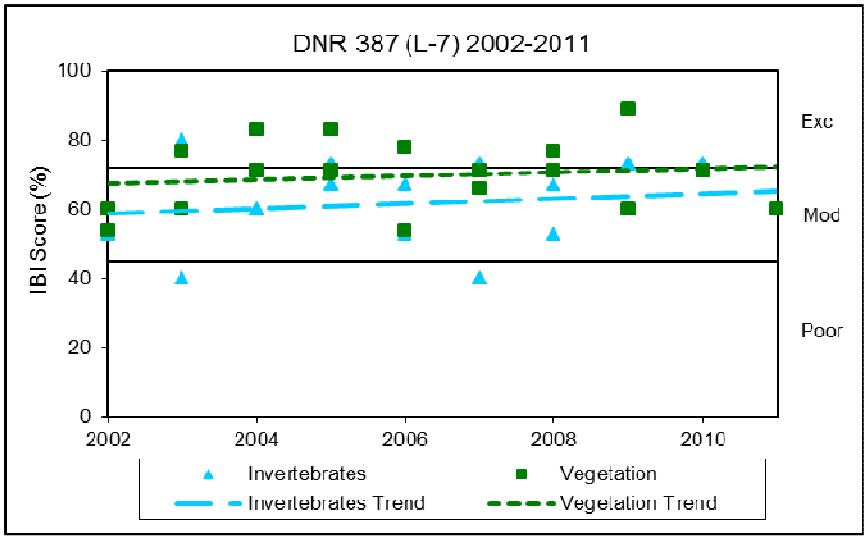
2011 Data (L-7)	**Invertebrates** 	**Vegetation** 
Wetland Health Rating (IBI score)	Moderate (18)	Moderate (21)
Trend 2002-2011	Improving slightly	Improving slightly

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



Site summary: This is the tenth consecutive year that DNR 387 has been monitored. Dry conditions may have altered the invertebrate scores for this site in the past. The 2011 scores indicate moderate conditions for this reference wetland. The invertebrates and vegetation scores were very consistent in 2011. A trend analysis indicates possible slight improvement in the vegetation and invertebrate community health over time although there has been a lot of variability in the data. This wetland has a lot of vegetation diversity, but will need ongoing maintenance to keep the purple loosestrife population under control.

4.6.2 DNR #393 (L-8)

L-8 DNR #393

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 water was clear but with a heavy layer of silt and algae coating vegetation and logs. The water level was at its highest in the last six years or so. There was very little submerged vegetation present. Wildlife observed: mud minnow, muskrat, red-winged blackbird, yellow warbler, mallard, red-shouldered hawk, Cooper's hawk, hooded marganser with babies, barn swallow, tree swallow, American robin, and Baltimore oriole.

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

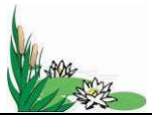
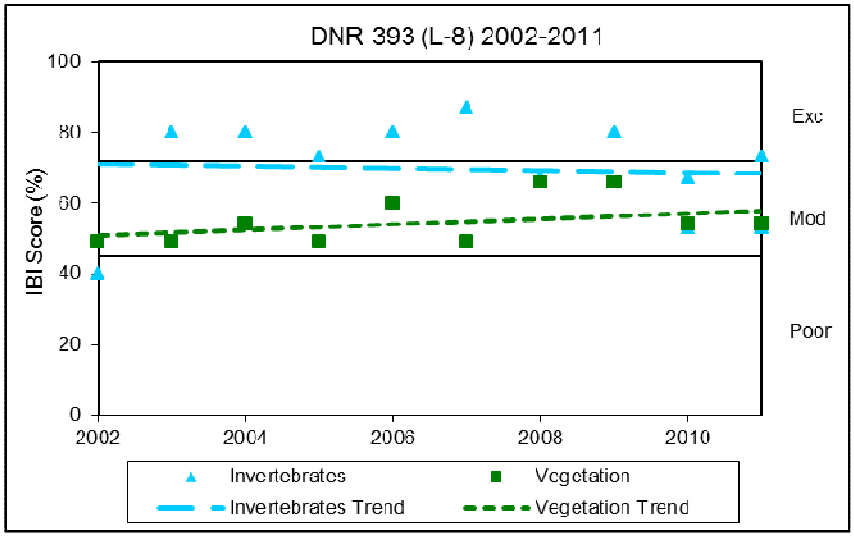
2011 Data (L-8)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (16)	Moderate (19)
Cross-check Rating (IBI score)	Moderate (22)	Moderate (19)
Trend 2002-2011	Stable to slightly declining	Improving slightly

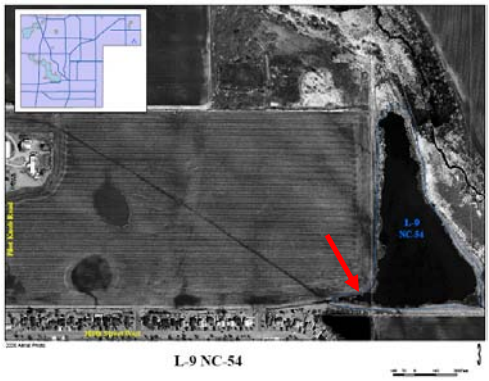
Figure 4.6.3 Invertebrate and vegetation trends for DNR 393 (L-8)



Site summary: DNR wetland 393 (L-8) has ten consecutive years of monitoring data. The trend analysis indicates a slight improvement in wetland health based on vegetation and more variable conditions based on the invertebrates. The 2002 data influences the overall trend. If that point is disregarded as an outlier, there would be more of a declining trend. However, it should be noted that the majority of the scores are in the excellent category. The buffer surrounding this wetland, and lack of inlets is likely helping preserve and improve this wetland.

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.



Wetland Health

Site Observations: The wetland shoreline is densly populated with willows and cattails. The slope is gentle with a muddy/sandy substrate. Wildlife observed: orange-spotted sunfish, American toad, crayfish, grackle, great blue heron, tree swallow, barn swallow, spotted sandpiper, eastern phoebe, cormorant, chickadee, common yellow throat, yellow warbler, great egret, red-winged blackbird, mallard, robin.

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

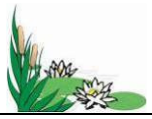
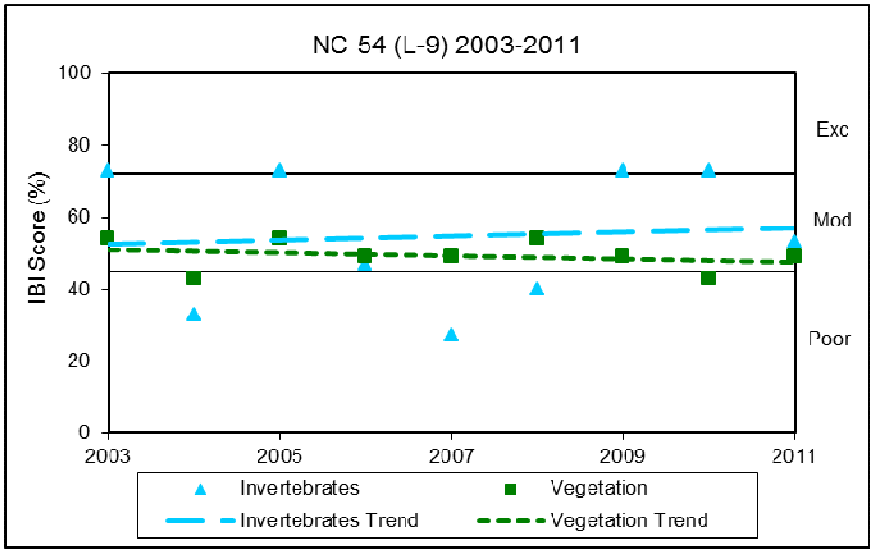
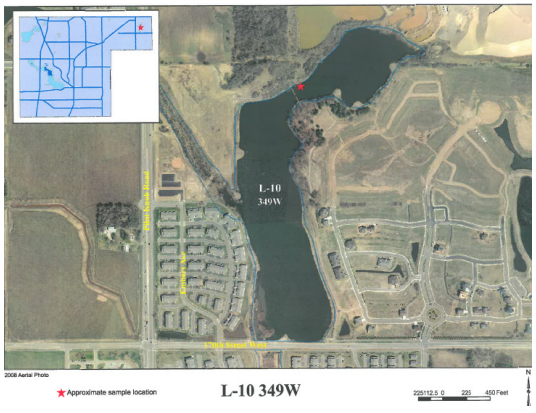
2011 Data (L-9)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (16)	Poor (17)
Trend 2003-2011	Variable	Stable to declining slightly

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



Site summary: Nine consecutive years of data exists for NC-54 (L-9). The vegetation and invertebrate scores are consistent and show a health rating of moderate. The invertebrates score in 2011 is lower than it has been in the past couple of years. Vegetation scores show a slight downward trend.

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.

The water quality of the basin is currently very poor, but the data collected will provide baseline information to determine if future activities are improving water quality. The City is working with Blue Water Science to implement activities aimed at improving water quality with funding assistance from the Vermillion River Joint Powers Organization. Ongoing activities to improve water quality of this basin will continue in 2011.

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 shoreline has little vegetative diversity. Large stands of smartweed and reed canary grass dominate. Wildlife observations: muskrat, tree swallow, barn swallow, Canada goose, red-winged blackbird, brown headed cowbird, eastern phoebe, pewee, cormorant, red-eyed vireo, song sparrow, crow, catbird, American toad, goldfinch, blue-gray gnatcatcher, robin, Baltimore oriole, house wren, egret, great-blue heron.

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

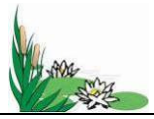
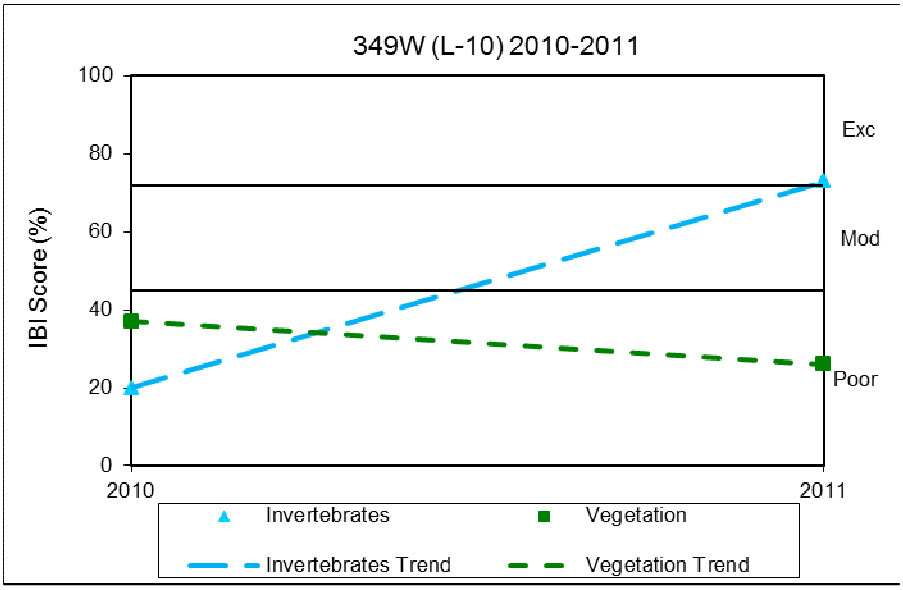
2011 Data (L-10)	**Invertebrates** 	**Vegetation** 
Wetland Health Rating (IBI score)	Moderate (22)	Poor (9)
Trend 2010-2011	Not enough data	Not enough data

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

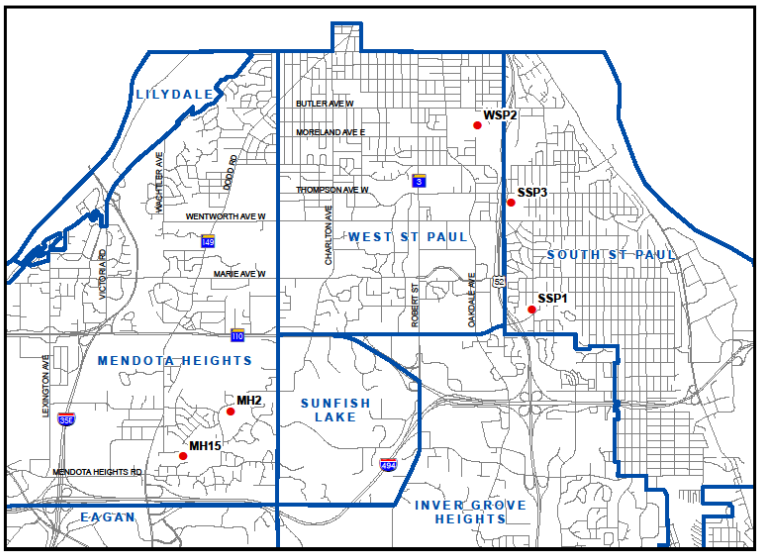


Site summary: This is the second year that L-10 has been monitored. The health trends drastically diverged since 2010. The invertebrates score is on the verge of excellent while the vegetation score remains poor. Ongoing monitoring will help identify trends in wetland health as water quality improvement projects are implemented in the watershed.

4.7 Mendota Heights, South St. Paul, and West St. Paul Wetlands

Two wetlands were monitored in Mendota Heights, two in South St. Paul, and one in West St. Paul in 2011 by the Mendota Heights team. The West St. Paul site is located in a Dakota County Park. Thirteen wetlands have been monitored in Mendota Heights, three in South St. Paul, and eight in West St. Paul since the start of the WHEP program.

Mendota Hts, West St Paul, and South St Paul WHEP Sites Monitored in 2011



Team Leader:
Darcy Tatham

Team Members:
James Chastek, Naomi Chavez, Alison Hruby, Amy Hunter, Maggie Karschnia, Jim Neuharth, Susan Morgan, Ronald Morgan, Rachel Olmanson, Jennifer Plaster, Povi Rosa-Chavez, Kevin Senander, Michelle Skog, Mary Stade, Tamara Swanson, Elizabeth Tatham, Anneliese Tatham, Iona Tatham.

Darcy Tatham

Mendota Height's team leader, Darcy Tatham, has been part of the program for eleven years. She believes, "when you have the opportunity to get up close to wetlands and discover how unique they all are, even in the same area, and how they can be beautiful in their own way, that is when you start to understand the value and importance they play in our lives. It is exposing people to this in their own neighborhoods and continually learning about our inter-dependence with nature that has brought me back year after year." Darcy said, "As ever, I can't thank my team members enough for showing up time and time again. The work truly couldn't be done without them!"

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."

John Sachi

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.

John Sachi is the City Engineer for South St. Paul, and the City contact for WHEP. 2011 is the third year the City has been involved in WHEP since 2003, and John is responsible for convincing the City Council to be part of the program again. He recruited volunteers and identified the ponds to be sampled. John recognizes that, "the City should benefit from this program by helping to establish baseline information for future wetland/pond improvement projects. The City has only a few wetlands, and maintaining and sustaining them to be viable is vital to the City. The volunteers were a great help as our dwindling staff has extra demands put on it and the City could not likely have been part

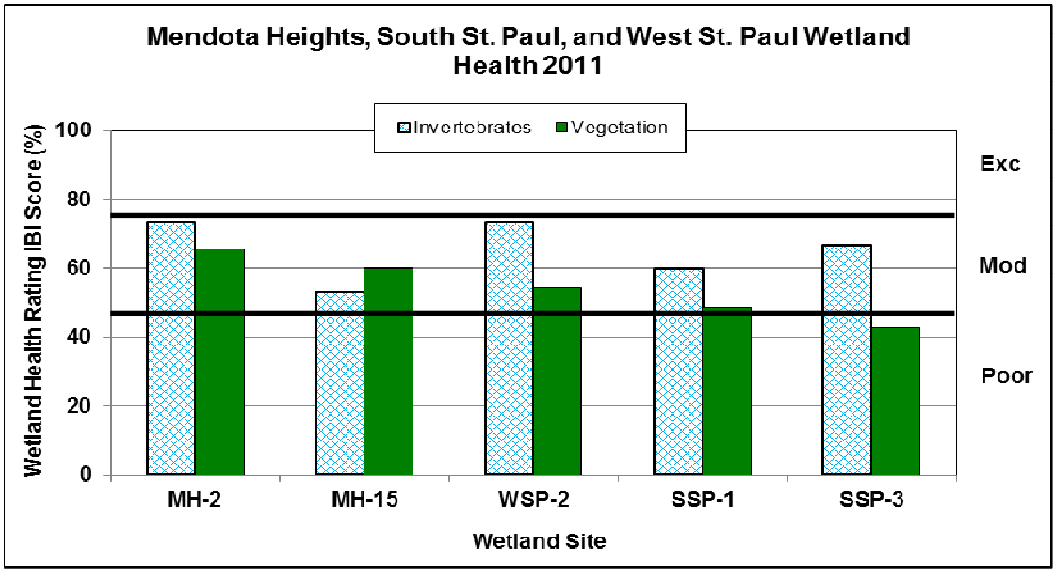
of the program without the volunteer effort. While the City has not seen changes because of the program yet, we are confident it will help direct us in our water quality efforts in the future."

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

Mendota Hts/South St. Paul team

Figure 4.7 presents an overall view of wetland health for all of the 2011 monitoring sites in Mendota Heights, South St. Paul, 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. Two sites were monitored in Mendota Heights, two in South St. Paul, and one in West St. Paul. The wetland ratings ranged from poor to moderate wetland health. MH-2 and WSP-2 show near excellent ratings for invertebrate scores. The invertebrate and vegetation scores for SSP-3 are inconsistent with a moderate score for invertebrates and a poor score for vegetation.

Figure 4.7 Mendota Heights, South St. Paul, & West St. Paul site scores (percent) for the 2011 sampling season



4.7.1 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: In June of 2011 the wetland was dominated by dead cattails from previous years and very little new growth. Bladderwort was blooming. Many grasses were present, but the emergent plants seemed behind in growth. This is public property surrounded by private residences.

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

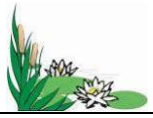
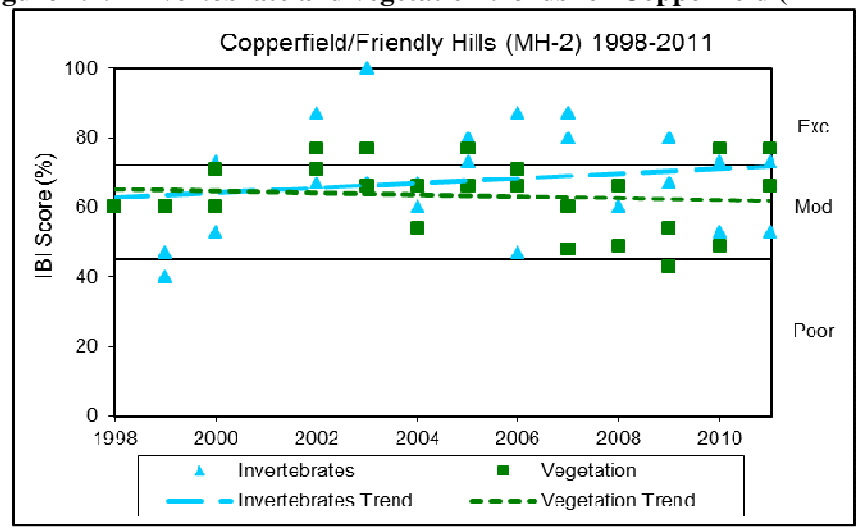
2011 Data (MH-2)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (22)	Moderate (23)
Cross-check Rating (IBI score)	Moderate (16)	Excellent (27)
Trend 1998-2011	Improving but variable	Stable

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



Site Summary: The long-term trend based on thirteen years of data shows improving invertebrate health and slightly declining vegetation health, although there is a lot of variability in the data. The City team found a moderate vegetation rating and a nearly excellent invertebrates rating in 2011. The cross-check team found an excellent vegetation rating and moderate invertebrate rating in 2011. Although the overall trend shows a slight decline, vegetation scores have been improving since 2007. The scoring between the City team and the cross-check team were relatively consistent compared to past years. MH-2 is designated as a reference wetland for the City.

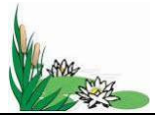
4.7.2 Upper Bridgeview (MH-15)

Upper Bridgeview (MH-15) is a 4.1 acre, type 4 wetland in the Lower Mississippi River watershed. Its watershed is 66.4 acres. The wetland is privately owned with a City easement. There is one inlet on the east and one on the southwest side of the wetland. There is one outlet in the southeast near the bridge. It is part of the City's stormwater management plan, and is designated as a PUBG Freshwater Pond, and is being monitored for invasive species and vegetative growth trends that may impact water quality. The surrounding area is fully developed.

Wetland Health

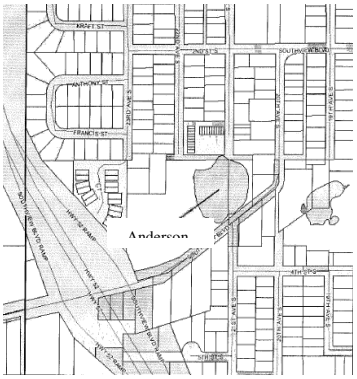
Site Observations: The vegetation site sampled was the smaller pond to the east of a larger pond. There is a walking bridge over the meeting point of these two ponds. Both ponds are surrounded by houses of which several have buffers along the property shoreline. The smaller pond is rumored to be 14 feet deep at center. Hostas and tiger lilies are present. There is a steep slope to the water's edge and the substrate is mucky, yet solid.

Table 4.7.2 Upper Bridgeview (MH-15) Wetland Health based on Index of Biotic Integrity

2011 Data (MH-15)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (16)	Moderate (21)
Trend 2011	Not enough data	Not enough data

Site summary: This is the first year that MH-15 has been monitored. Both the vegetation and invertebrate scores indicate moderate wetland health.

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).

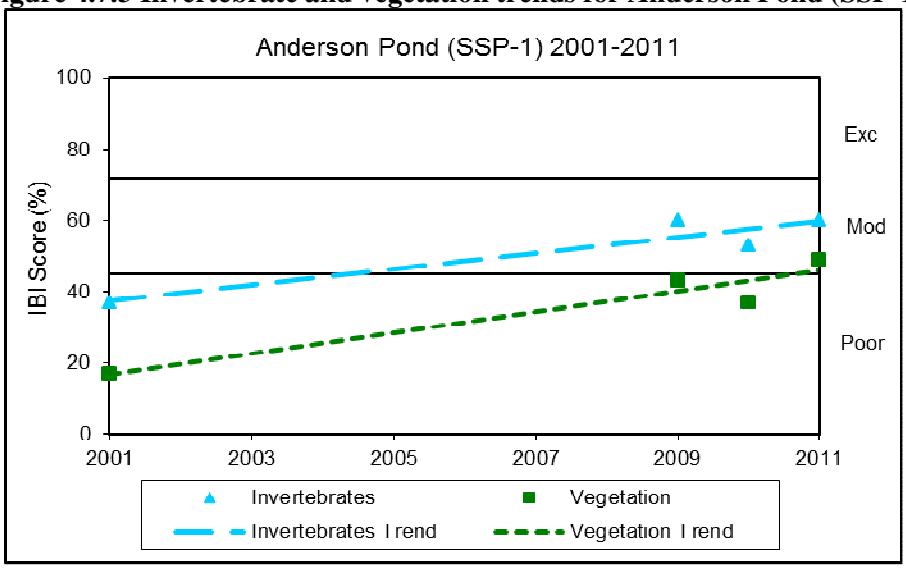
Wetland Health

Site Observations: The pond is in an older established residential area surrounded by roads, apartment blocks, and houses. Jewelweed and vervain were observed. Coontail is prolific. Algae covered the surface of the water. Wildlife observed: blue heron, ducks, geese, red-winged blackbirds, fish.

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

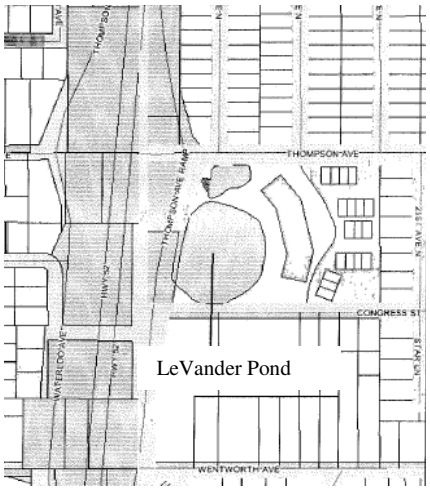
2011 Data (SSP-1)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (18)	Moderate (17)
Trend 2001-2011	Improving	Improving

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



Site Summary: This is the fourth year that SSP-1 has been monitored since 2001. It has been monitored now for three consecutive years. The scores remain much higher than in 2001, with the invertebrates and vegetation both in the moderate range in 2011. This may be due to the dredging work that was done in the wetland. The wetland receives a substantial amount of stormwater from a developed watershed and is therefore not likely to be of high quality. There appears to be a positive trend in both the invertebrate and plant health, however, additional data is needed to confirm this trend.

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. A new development was completed on the east side of LeVander Pond in the last few years. A trail was constructed down to the pond. Mn/DOT recently completed an upgrade of Wentworth/Thompson ramp terminal with Highway 52 and added a pretreatment basin south of LeVander. TH52 is a major contributor to LeVander Pond as is the City of West St. Paul.

Wetland Health

Site Observations: Overhanging trees and reed canary grass grow along the shoreline. The pond is 100 percent covered with duckweed, greater duckweed, and water-meal. Pondweed and coontail are also present. The cattails looked dead in June. Two stop lights were installed at Thompson Avenue and Highway 62 causing wetland disturbance.

Table 4.7.4 LeVander Pond (SSP-3) Wetland Health based on Index of Biotic Integrity

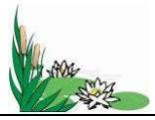
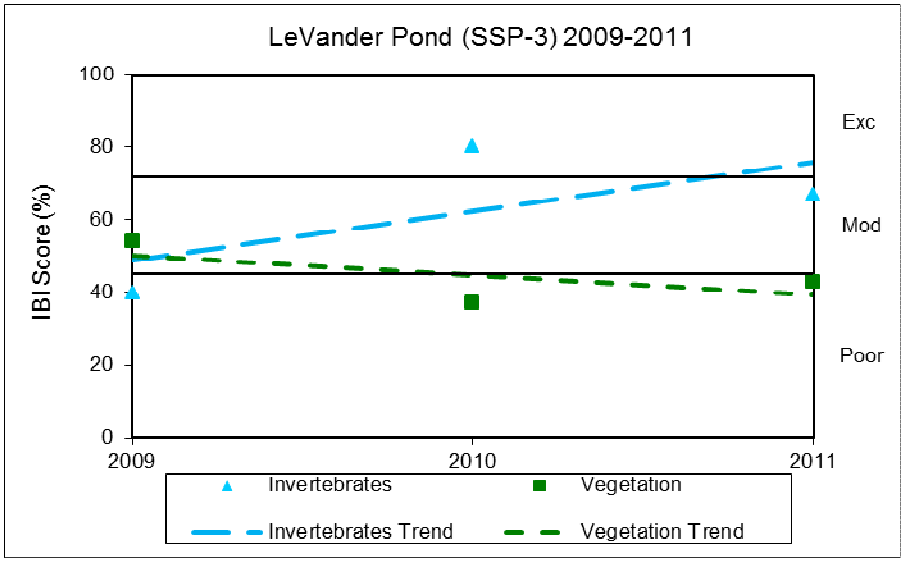
2011 Data (SSP-3)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (20)	Poor (15)
Trend 2009-2011	Improving	Declining

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



Site summary: This is the third consecutive year of monitoring LeVander Pond (SSP-3). The initial data indicates opposite trends for vegetation and invertebrate scores. The vegetation and invertebrates scores remain fairly inconsistent again in 2011. The vegetation earned a poor rating while the invertebrates earned a high-moderate rating. The scores have varied from poor up to excellent. Additional monitoring is recommended to determine the health of this wetland and identify solid trends.

4.7.5 Thompson Lake (WSP-2)

Thompson Lake (WSP-2) is an eight to ten acre "Kettle" lake about eight feet deep surrounded by glacial moraine hills and silty soils. The subwatershed is approximately 175 acres and is 51-64 percent impervious. It is part of the Simon's Ravine watershed in West St. Paul which is part of the Lower Minnesota River Watershed. It is located within a Dakota County Park. An inlet enters the lake on the north end and an outlet is located on the south end. The City of West St. Paul, Dakota County, and the neighboring school are working together to create a cohesive stormwater management plan, including a plan to correct past stormwater management deficiencies. The school began a year-long lake monitoring project thru a science grant and the County is conducting a two-year water quality monitoring project starting January 2011. This is the ninth year of evaluation for this wetland.

Wetland Health

Site Observations: Thompson Park is a County Park which is heavily trafficked. St. Croix Lutheran School is to the west. The 2011 sampling site had a lot of persistent litter from cattails, branches, logs, and quite a bit of garbage. The surface of the water had an oily sheen. Exotic snails were identified in 2011.

Table 4.7.5 Thompson Lake (WSP-2) Wetland Health based on Index of Biotic Integrity

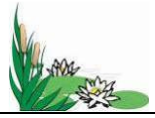
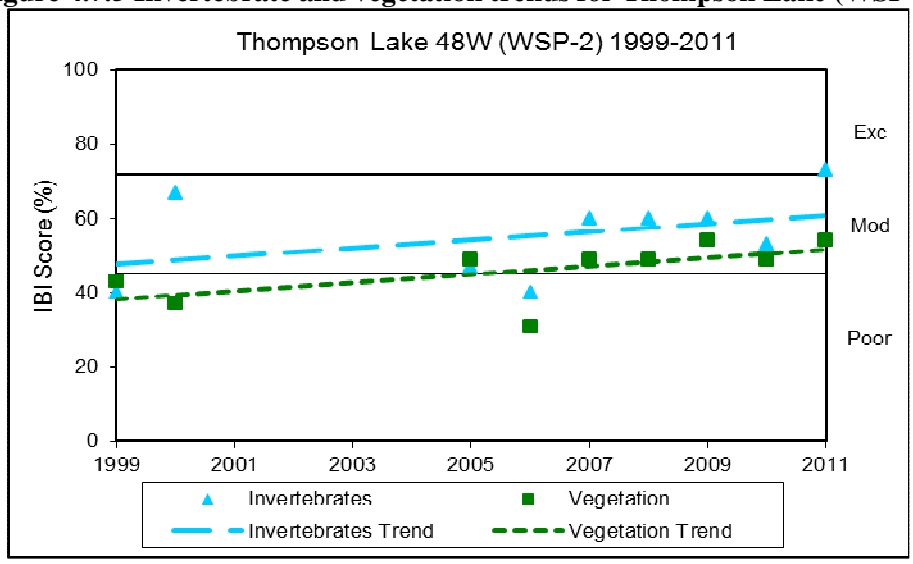
2011 Data (WSP-2)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (22)	Moderate (19)
Trend 1999-2011	Improving	Improving

Figure 4.7.5 Invertebrate and vegetation trends for Thompson Lake (WSP-2)



Site summary: WSP-2 has been sampled nine times since 1999, but there was a four year period between samples in 2000 to 2005. The data indicate that the wetland conditions were fairly stable in the past and appear to be improving with the 2011 data. The 2011 data indicate moderate wetland health for both vegetation and invertebrates. There appears to be a slight improvement in scores which may be attributed to some improvements in the surrounding watershed. The 2011 invertebrates score rated close to excellent.

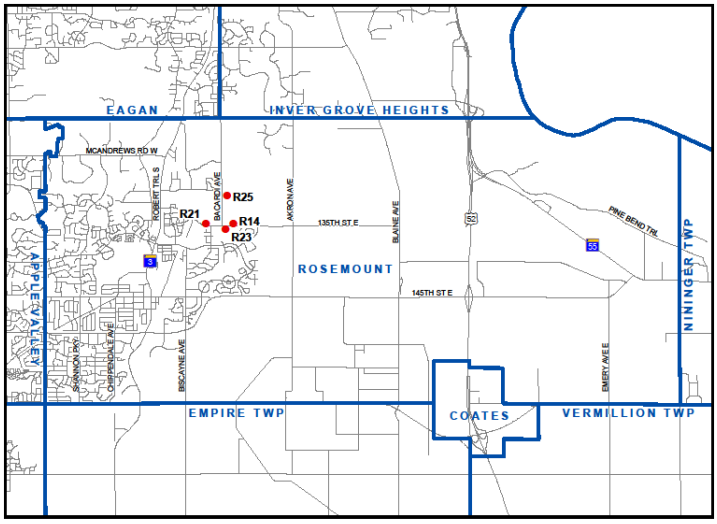
4.8 Rosemount Wetlands

Four wetlands were monitored in the City of Rosemount in 2011. Twenty-three wetlands have been monitored in Rosemount since the start of WHEP. R-25 was monitored for the first time this year.

Team Leaders: Dan Stinnett

Team Members: Brian Berggren, Barbara Berggren, Benjamin Determan, Lauren Dietemann, Becca Newman, Terry Pearson, Kailyn Pederson, Jane Porterfield, Emily Rekstad, and Denise Wilkens.

Rosemount WHEP Sites Monitored in 2011



This is Dan Stinnett's third year as team leader for the Rosemount team. He commented, "The 2011 Rosemount WHEP field season began with a late-April meeting between Rosemount City officials and consultants, WHEP County Coordinator Liepold, and Rosemount WHEP team members Stinnett and Pearson. This annual meeting has proven an invaluable forum to exchange ideas and to maintain open lines of communication between city planners and the team. Following the April coordination meeting a schedule was established for June and July to collect invertebrate and vegetation field data and to establish dates for laboratory identification. We were extremely fortunate this year to have weather conditions that cooperated precisely with the schedule we had planned and all field work was accomplished without incident. Similarly, invertebrate identification was successfully completed at the laboratory facilities of Inver Hills Community College. The Rosemount WHEP team thanks County Coordinator Liepold for obtaining the necessary approval to gain access to the excellent lab facilities. All required data sheets and reference materials were submitted at the August team leader meeting.

Dan Stinnett with Terry Pearson

Rosemount team members

The summer 2011 WHEP season was particularly rewarding as Rosemount team members welcomed four new wetland enthusiasts. Ben Determan, Kailyn Pederson, Lauren Dietemann, and Becca Newman were valuable new additions this past season. Eager to learn and anxious to get their feet wet, these young volunteers participated alongside veteran members in both field and laboratory activities. The Rosemount team looks forward to the return of its newest members for the upcoming 2012 WHEP season."

Christine Watson is the City contact for Rosemount. She helps select the wetlands to be monitored, recruit volunteers, coordinate and support the Rosemount team. The WHEP volunteers have provided the City with high quality quantitative data for several wetlands, which can be very difficult to obtain. Their efforts are greatly appreciated. As part of 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.

Jed Chesnut is a Wetlands/Natural Resource Specialist in WSB's Environmental Planning and Natural Resource Group. Jed has over five years of experience in environmental review and natural resource consulting. His experience includes natural resource inventories, environmental permitting and review, land cover classification and assessment, invasive species management, wetland assessments, wetland delineations, and wetland restoration.

Jed Chesnut, WSB & Associates

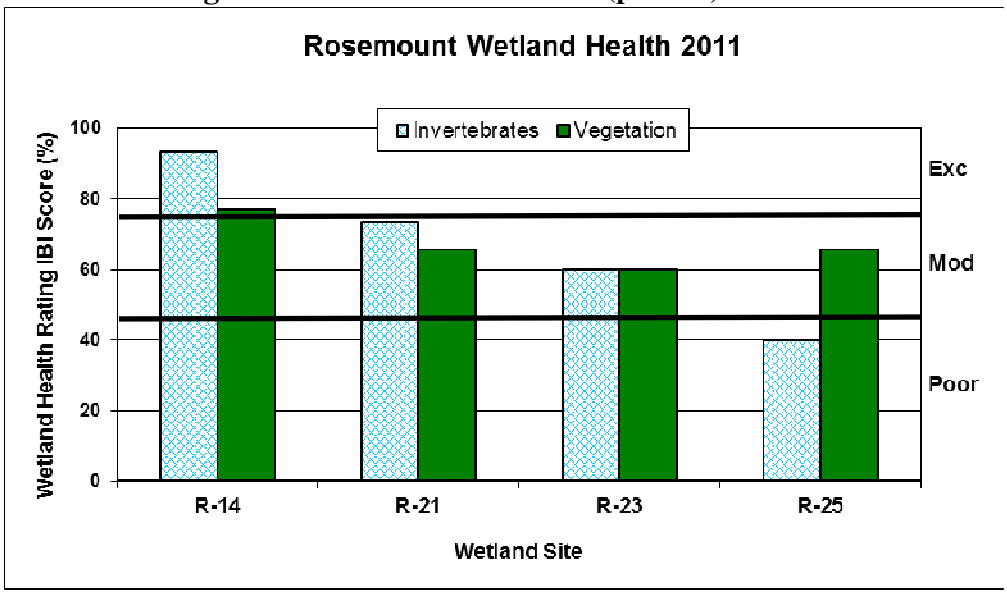
Jed selects the WHEP sample sites each year and coordinates the program between the City and the WHEP team. The WHEP data are primarily used to document wetland quality in Rosemount, track changes in wetland health trends, and most recently to augment the assessment of wetland replacement success for wetland mitigation projects.

The City of Rosemount has developed new signs for the WHEP program which they are placing in their wetlands.

Rosemount General Wetland Health

Figure 4.8 presents an overall view of wetland health for all the 2011 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 2011 wetland health scores were consistent for vegetation and invertebrates, except for R-25 in which the invertebrates score rated poor while the vegetation score rated moderate. R-14 rated excellent for both vegetation and invertebrates.

Figure 4.8 Rosemount site scores (percent) for 2011



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 Mare Pond (R-14)

Mare Pond (R-14), also known as WMP #379 and DNR 012W, is a 4.8 acre, type 3/4 wetland within the White Lake watershed. The watershed is 998 acres with 30 percent impervious surface, and the subwatershed drainage area is 81 acres. There is one outlet on the south side of the wetland near County Road 38. The wetland 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. Baseline monitoring is being established to measure the impacts of potential future development.

The wetland is located in a basin surrounded by grassland with sparse tree cover and shrubs with an adjacent road to the south. It receives runoff from adjacent roads and potentially receives direct nutrient loading from nearby agriculture.

Site Observations: The water level was high in 2011. The bottom of the wetland is mostly vegetated.

Table 4.8.2 Mare Pond (R-14) Wetland Health based on Index of Biotic Integrity

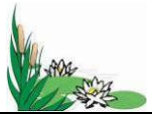
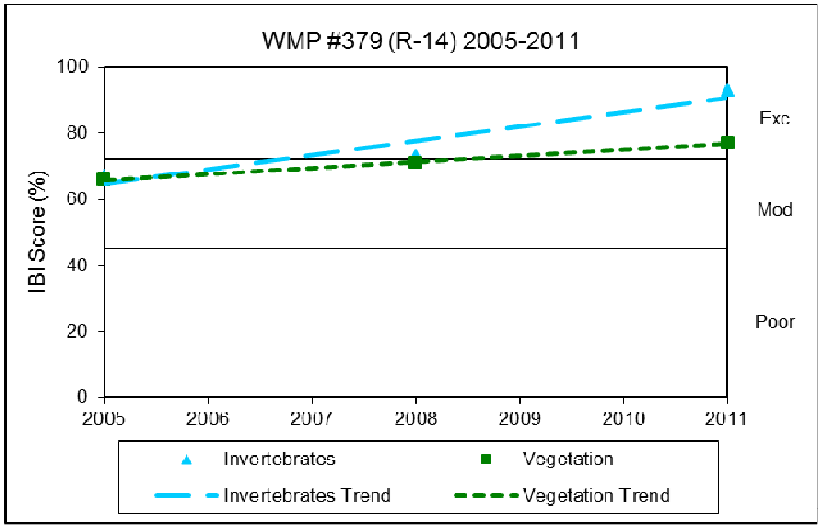
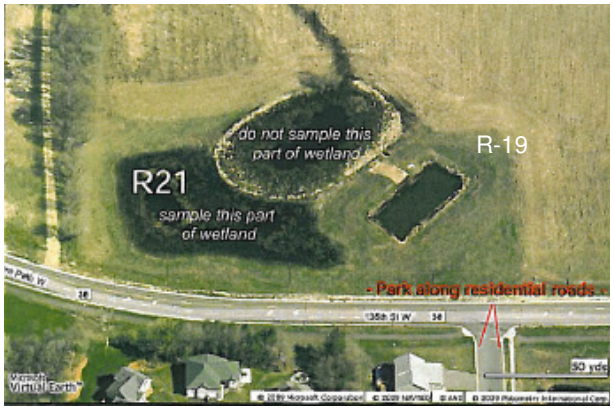
2011 Data (R-14)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Excellent (28)	Excellent (27)
Trend 2005-2011	Improving	Improving

Figure 4.8.2 Invertebrate and vegetation trends for Mare Pond (R-14)



Site summary: This is the third year that the wetland has been monitored since 2005. It was last monitored in 2008. The IBI scores for both invertebrates and vegetation indicate excellent wetland health. There appears to be a positive trend in both scores, although the data points are few and infrequent. Additional data will help confirm this trend.

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



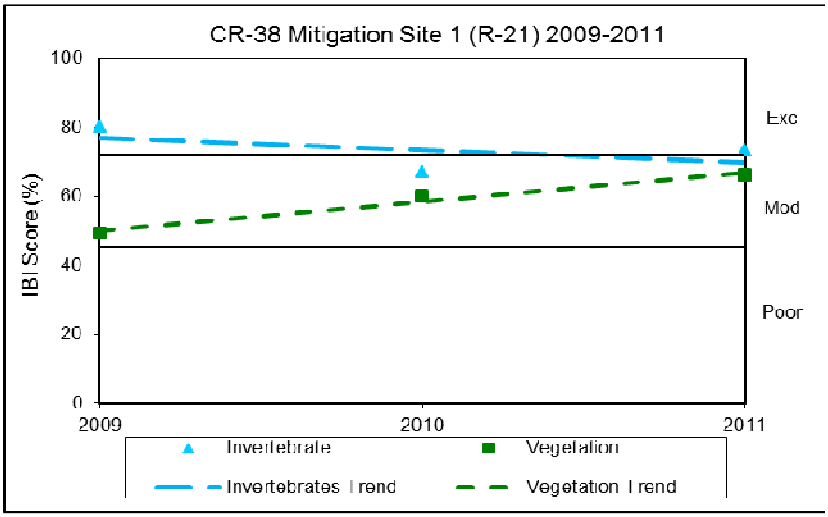
CR-38 Mitigation Site 1 (R-21) is a 1.7 acre, type 3 wetland in the Keegan Lake watershed. The watershed is 1,530 acres and 30 percent impervious. The wetland has no inlets or outlets. It is designated as Manage II, and is managed to maintain the wetland without any loss of its functions or values. The wetland may be affected by runoff from the adjacent road, and there is potential for impact from future development in the area and nutrient loading from the adjacent agriculture. The City requires that any new development have a 30 foot buffer. The wetland is located in a basin surrounded by agriculture and a road to the south.

Site Observations: The water level was high again in 2011. The upland soil around the shoreline is saturated. Dense vegetation grows along the margins with cattail and reed canary grass. Slender riccia and duckweed are abundant in open water.

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

2011 Data (R-21)	**Invertebrates** 	**Vegetation** 
Wetland Health Rating (IBI score)	Moderate (22)	Moderate (23)
Trend 2009-2011	Declining slightly	Improving

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



Site summary: This is the third consecutive year that this site has been monitored. The IBI scores for both invertebrates and vegetation indicate moderate wetland health. The scores are close to rating excellent. The wetland health trends for vegetation and invertebrate appear to be opposite based on the limited data available. Future years of data will help identify a solid 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.

Wetland Health

Site Observations: In June, the water level was above the cattails. Cattail, sedges, spike-rush, and bulrush are present around shoreline. A bike path runs around northern and western edge of wetland. Red-winged blackbirds and ducks were observed.

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

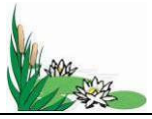
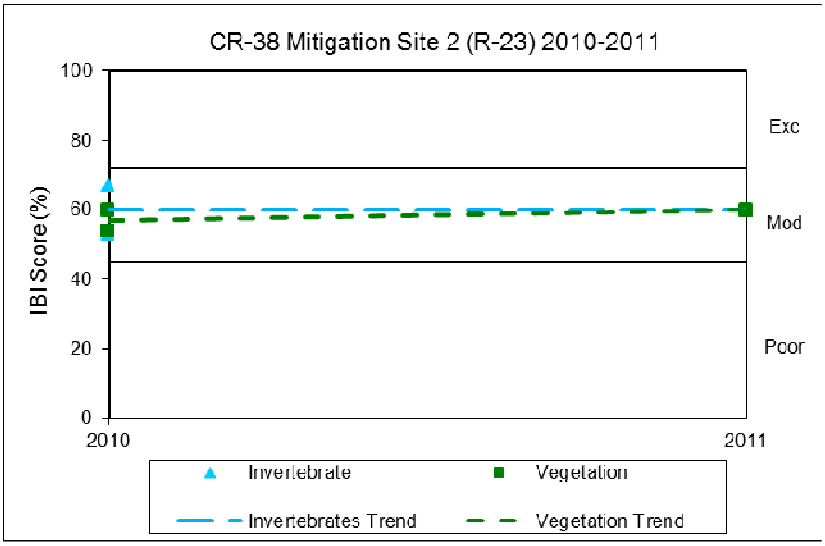
2011 Data (R-23)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (18)	Moderate (21)
Trend 2010-2011	Not enough data	Not enough data

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



Site summary: This is the second year that R-23 has been monitored. The wetland scored moderate for both invertebrates and vegetation. For two years of consecutive data, the trend appears stable. Further monitoring should be completed to determine health trends. This wetland has a fairly high rating for a created wetland.

4.8.4 WMP #306 (R-25)

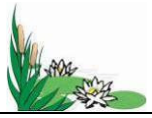
WMP #306 (R-25) is a 1.7 acre, type 3 wetland in the White Lake Watershed. The watershed is 998 acres of which 30 percent is impervious surface. The subwatershed is 81 acres. There is one inlet on the west side and no outlet. The wetland is included in the City's stormwater management plan and is designated to preserve with a management goal to maintain the wetland without any loss of function and value.

R-25 is a depressional shallow marsh with open water. Stormwater runoff from adjacent roadways and potential future development may impact the wetland.

Wetland Health

Site Observations: Hardwood forest surrounds the wetland. Its margins are dominated by reed canary grass, and the open water is covered with duckweed. Utricularia is present. The substrate is solid and the slope is gentle. Team leader, Dan Stinnett commented, "This small, 1.7 acre site, maintained a diverse community of submergent, emergent, floating leaved, and perimeter woody vegetation but was scored unusually low for invertebrate fauna. Based on what appeared to be an abundance of suitable invertebrate features in the wetland substrate, team members were surprised at the [scarcity] of invertebrate diversity and abundance. Further sampling at this site may prove useful to determine if water temperature or select water quality parameters serve as limiting factors to a diverse community of invertebrates. With further investigation it may also be determined that adjustments to the IBI score may be required to properly account for these small unique wetland types."

Table 4.8.4 WMP #306 (R-25) Wetland Health based on Index of Biotic Integrity

2011 Data (R-25)	**Invertebrates** 	**Vegetation** 
Wetland Health Rating (IBI score)	Poor (12)	Moderate (23)
Cross-check Rating (IBI score)	Poor (14)	Moderate (17)
Trend 2011	Not enough data	Not enough data

Site summary: This is the first year that R-25 has been monitored. The wetland scores of the City team and cross-check team are consistent. Invertebrates scored poor and vegetation scored moderate. More data is necessary to determine health trends.

To view the historical data, please visit: www.mnwhep.org.