

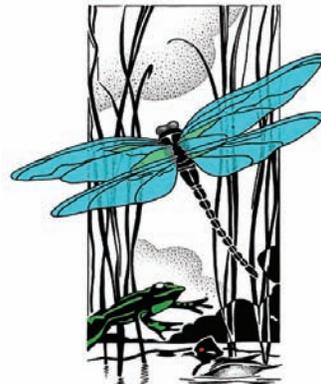
Wetland Health Evaluation Program



“We cannot win this battle to save species and environments without forging an emotional bond between ourselves and nature as well---for we will not fight to save what we do not love.”

-Stephen Jay Gould

● 2009 Final Report



2009 Wetland Health Evaluation Program Report Dakota County, MN



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

January 2010

Report
Prepared by:

F  **RTIN**
CONSULTING, INC.
serving the environment

Acknowledgements

The following organizations participated in and provided funding for the 2009 Wetland Health Evaluation Program

Local Government:

Dakota County
City of Apple Valley
City of Burnsville
City of Eagan
City of Farmington
City of Hastings
City of Lakeville
City of Mendota Heights
City of Rosemount
City of South St. Paul
Vermillion River Watershed

Special Recognition:

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

Cover design by:

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.

Table of Contents

1.0	Background	1
1.1	The Wetland Health Evaluation Program (WHEP)	1
1.2	Why Monitor Wetlands?	2
1.3	Wetland Types.....	2
1.4	Dakota County Wetland Monitoring.....	4
2.0	Methods.....	5
2.1	Training	5
2.2	Data Collection.....	5
2.3	Spot Checks and Quality Control.....	6
2.4	Wetland Scores and Quality Ratings.....	7
2.5	Using the Data.....	8
3.0	General Results and Recommendations.....	9
3.1	2009 Sampling Season Results	9
3.1.1	Natural Versus Altered Wetlands	12
3.1.2	Impervious Area in the Watershed	14
3.2	Is Volunteer Data Usable?.....	16
3.2.1	2009 Spot Checks	16
3.2.2	2009 Quality Control Checks.....	17
3.3	WHEP Historical Data.....	19
4.0	Wetland Evaluations	22
4.1	Apple Valley Wetlands	22
4.1.1	Hidden Valley (AV-1)	24
4.1.2	Chaparral Pond (AV-8),	25
4.1.3	Carrollwood Park (AV-15)	26
4.1.4	Nordic Park Pond (AV-16).....	27
4.2	Burnsville Wetlands.....	28
4.2.1	Crystal Lake West Alternate (B-1 Alternate)	29
4.2.2	Kraemer Preserve (B-3)	30
4.2.3	Valley View (B-11).....	31
4.2.4	Sunset Pond (B-13).....	32
4.3	Eagan Wetlands	34
4.3.1	DP-6.2 (E-26).....	35
4.3.2	LP-26.54 (E-27)	36
4.3.3	HDP-1 (E-28).....	37
4.4	Farmington Wetlands.....	38
4.4.1	Pine Knoll Pond (F-1).....	39
4.4.2	Kral Pond (F-3).....	40
4.4.3	Lake Julia (F-4).....	41
4.5	Hastings Wetlands	43
4.5.1	Stonegate Treated Wetland (H-4)	44
4.5.2	Lake Rebecca Wetland (H-6).....	45
4.5.3	Sand Coulee Pond (H-30)	47
4.5.4	180 th Street Marsh (H-56).....	48
4.6	Lakeville Wetlands	50
4.6.1	Water Treatment Wetland Bank (L-4).....	51
4.6.2	DNR Wetland #387 (L-7).....	53
4.6.3	DNR #393 (L-8).....	54

4.6.4 NC-54 Mitigation Wetland (L-9).....	55
4.7 Mendota Heights, South St. Paul, and West St. Paul Wetlands.....	57
4.7.1 Copperfield (MH-2).....	59
4.7.2 MH Par 3 (MH-13).....	60
4.7.3 Anderson Pond (SSP-1).....	61
4.7.4 LeVander Pond (SSP-3).....	62
4.7.5 Thompson Lake (WSP-2).....	63
4.8 Rosemount Wetlands.....	65
4.8.1 White Lake (R-2).....	67
4.8.2 Unnamed Wetland (R-20).....	68
4.8.3 CR-38 Mitigation Site 1 (R-21).....	69
4.8.4 Mare Pond South (R-22).....	69

Appendices

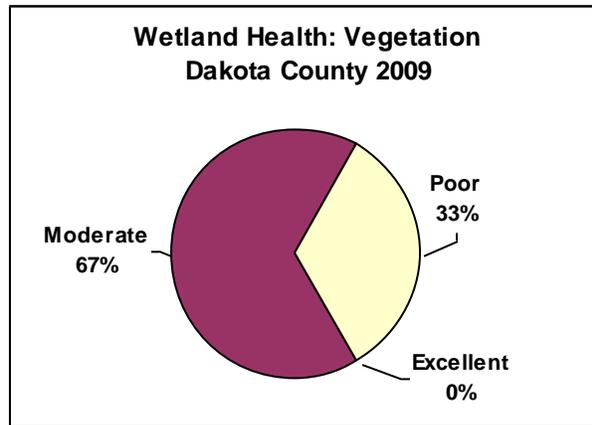
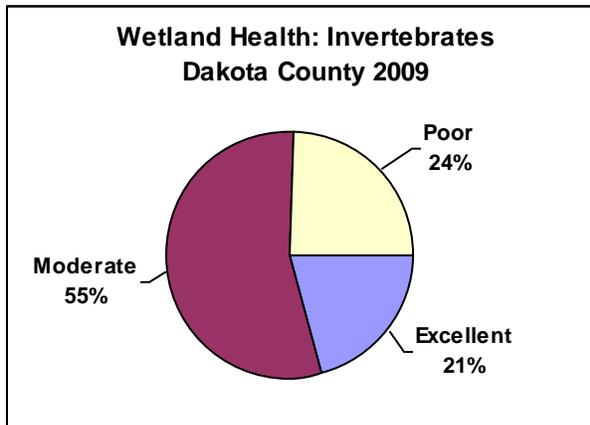
Appendix A. Invertebrate Sampling History

Appendix B. Vegetation Sampling History

Executive Summary

Dakota County Wetland Health Evaluation Program 2009

Dakota County began sponsoring the Wetland Health Evaluation Program (WHEP) in 1997. Since then, 139 wetlands have been monitored by many volunteers across the County. In 2009, eight cities participated in WHEP, monitoring 31 different wetlands. Several wetlands were monitored for the first time in 2009. 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.

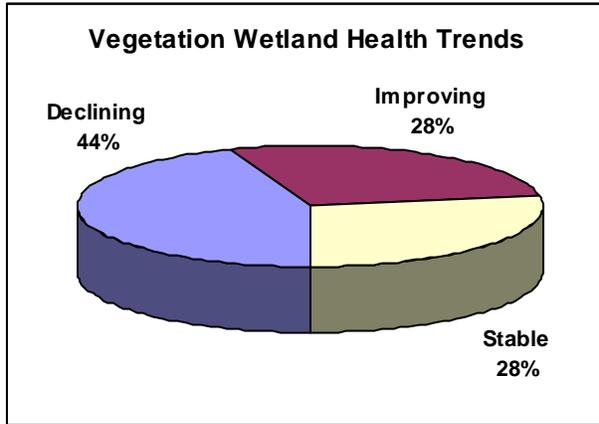
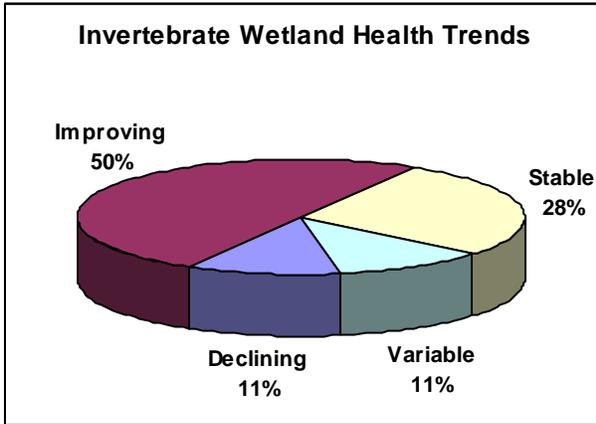


The results of the monitoring for 2009 showed a variety of wetland conditions. The Index of Biotic Integrity was used to determine wetland health ranging from poor to excellent. The majority of wetlands were in the moderate category for both macroinvertebrates and vegetation. Twenty-one percent rated excellent for invertebrates while no wetlands rated excellent for vegetation. This is fairly similar to recent previous year's monitoring.

The City of Rosemount wetlands rated the highest, with two excellent and two moderate ratings for invertebrates and four moderate ratings for vegetation. The two Farmington wetlands rated the lowest in terms of wetland health. Both wetlands rated poor for vegetation and invertebrates. Two sites were not sampled for macroinvertebrates due to low water levels; one of those sites was not sampled for vegetation either.

A trend analysis was conducted for all of the wetlands monitored in 2009 that had enough data to analyze trends. For invertebrates, 50% of wetlands appear to be improving while 11% are declining. For vegetation, 28% of the wetlands showed improved wetland health while 44% 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 alterations. No significant relationship was found between impervious area and IBI score for both invertebrates and vegetation. There were some statistically significant findings for IBI score versus wetland alteration. Vegetation scores for natural wetlands were significantly different than those for altered by stormwater input and created wetlands.



2009 Dakota County Wetland Health Trends*

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

Low water level was a problem in 2009 as it was in 2007 and 2008, in some cases preventing collection of invertebrate samples. Some wetlands were not sampled at all because of low water.

In 2009, WHEP volunteers donated 2,183 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 (Appendices A and B). The metrics are based on species diversity and richness for both vegetation and macroinvertebrate. 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.

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



Judy Helgen, 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.

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. MPCA continues to provide the training, but the organization of teams and other logistics is handled by the counties and communities.

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. MPCA continues to provide the training, but the organization of teams and other logistics are handled by the counties and communities. Up to eleven cities/citizen teams have participated in the project in Dakota County.

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 plants and 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, spikerush, 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, spikerush, and wild rice grow in these wetlands. Pondweed, naiad, coontail, watermilfoil, waterweed, duckweed, waterlily, 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 "because I know the volunteers and participants have a passion for understanding the health of area wetlands. They are committed to learning about wetland health and confident in sharing the results with decision-makers. I am proud of the tradition and history of Dakota County's Wetland Health Evaluation Program. The program attracts participation from over 100 volunteers and team leaders, many of whom have supported WHEP for several years and have involved one or more family members as volunteers. WHEP volunteers, trained by Minnesota Pollution Control Agency

(MPCA) biologists, use professionally-developed sampling protocols and quality assurance measures, and bring commitment, enthusiasm, and scientific integrity to the program. Through training, monitoring wetlands, and identifying macroinvertebrate species in labs, volunteers are converted into citizen biologists. When volunteers assess the health of wetlands on behalf of their city, they not only provide extra workforce, but also serve as advocates for protecting wetlands. The intense involvement of volunteers in receiving and providing training, presenting reports to cities, participating in environmental education at the county fair, coordinating with MPCA biologists and a professional consulting firm, and maintaining support from cities distinguishes WHEP from many citizen-monitoring programs. The annual recognition event affirms the value of WHEP volunteers in assessing wetland health and promoting environmental stewardship."



Mary Kay Lynch

Mary Kay Lynch is the WHEP Field Monitoring Coordinator. She has a master's degree in biology and taught biology for 22 years, 20 of which were in Dakota County. She was a team leader in the pilot program as it was developed by Judy Helgen of the MPCA. She served as the Burnsville team leader for five years when the program began in Dakota County. She says, "Each year I'm impressed with the high level of motivation and dedication of volunteers. Everyone is welcome, and team members and leaders help each other. Team leaders are keys to the success of the program. Effective team leaders facilitate members' learning throughout the experience and provide opportunities for active volunteer participation. As important, they help develop a positive

experience and team spirit. The fact that team members return year after year, some becoming team leaders, is indicative of the success of leaders. I've observed much resourcefulness and creativity as leaders have developed field techniques and tools for recording and processing data. With experience, team leaders and members seem to relax and have even more fun."



Chris Kline

Chris Kline is a zoologist at the Minnesota Zoo, and has been involved with WHEP since 1997 playing a variety of roles. He is a Citizen Monitoring Coordinator for the Dakota County WHEP teams. He thinks, "The project successfully works in both directions, simultaneously collecting meaningful data while educating people about wetland communities and their value."

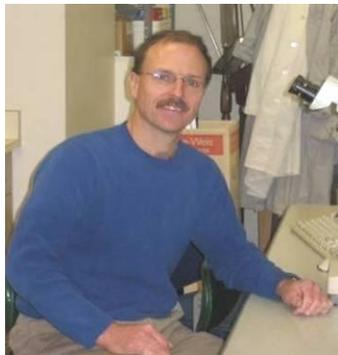
2.0 Methods

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

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.



Joel Chirhart



John Genet

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)

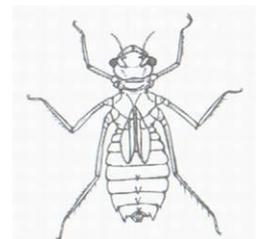
Vegetation is analyzed using a 100 square meter releve plot. All species within the sampling plot are identified to the genus level, and documented on the field data sheet. Vegetation is divided into categories based on their ecological function or relationship. The categories include nonvascular, woody, 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 Spot Checks and Quality Control

Each city is responsible for evaluating one wetland in another city as a means of providing a spot check. The citizen spot check provides a second sample for the selected wetland. The purpose of the spot 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 2009. 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.



Connie Fortin, Katie Farber, Nathan Ebnet, Roman Rowan, Caitlin Fortin, Carolyn Dindorf, and Kseniya Voznyuk

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 2009, Fortin Consulting cross-checked the vegetation plots of three wetlands, one in Apple Valley, Burnsville, and Eagan: AV-

8, B-1 Alternate, and E-26. 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 Fortin Consulting. 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 2009 Sampling Season Results

During the 2009 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 spot 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

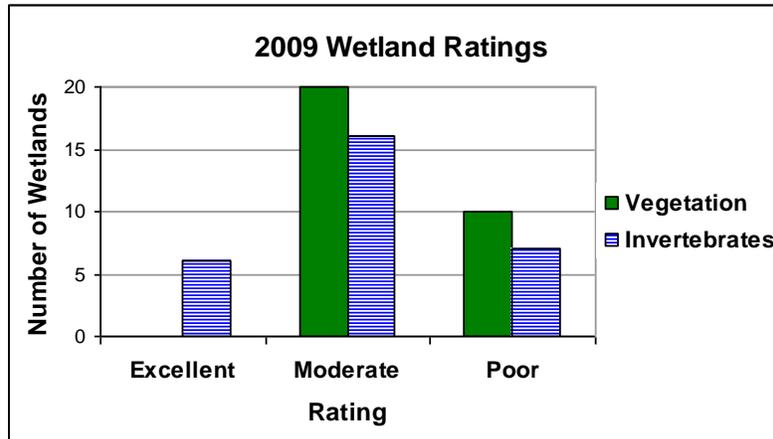


Figure 3.1.1 and Table 3.1.1 show the vegetation and invertebrate ratings for all of the wetlands assessed during the 2009 sampling season. More than half (20) of the wetlands were rated moderate based on vegetation. This is consistent with previous years. Ten wetlands were rated poor. Not one of the wetlands rated excellent for the vegetation analysis. Vegetation scores ranged from 11 to 23 out of a maximum of 35 points.

The invertebrate analysis resulted in seven wetlands rating poor, sixteen rating moderate and six excellent. Two of the wetlands could not be sampled due to dry conditions. Invertebrate scores ranged from 6 to 28 out of a maximum of 30 points. The wetlands rated excellent included, Kraemer (B-3), 180th Street Marsh (H-56), DNR 393 (L-8), Copperfield (MH-2), White Lake (R-2) and CR-38 Mitigation Site (R-21). Rosemount had the most (two) wetlands with excellent ratings. Farmington wetlands all ranked poor. 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)	1/2	2/2	0/0
Burnsville (B)	0/1	3/3	1/0
Eagan (E)	1/1	2/2	0/0
Farmington (F)	2/2	0/0	0/0
Hastings (H)	1/2	2/2	1/0
Lakeville (L)	1/1	2/3	1/0
Mendota Heights (MH)	0/0	1/2	1/0
Rosemount (R)	0/0	2/4	2/0
South Saint Paul (MH)	1/1	1/1	0/0
West Saint Paul (MH)	0/0	1/1	0/0
Totals	7/10	16/20	6/0

Figures 3.1.2 and 3.1.3 show the distribution of wetland health ratings for each of the sites monitored in 2009.

Figure 3.1.2

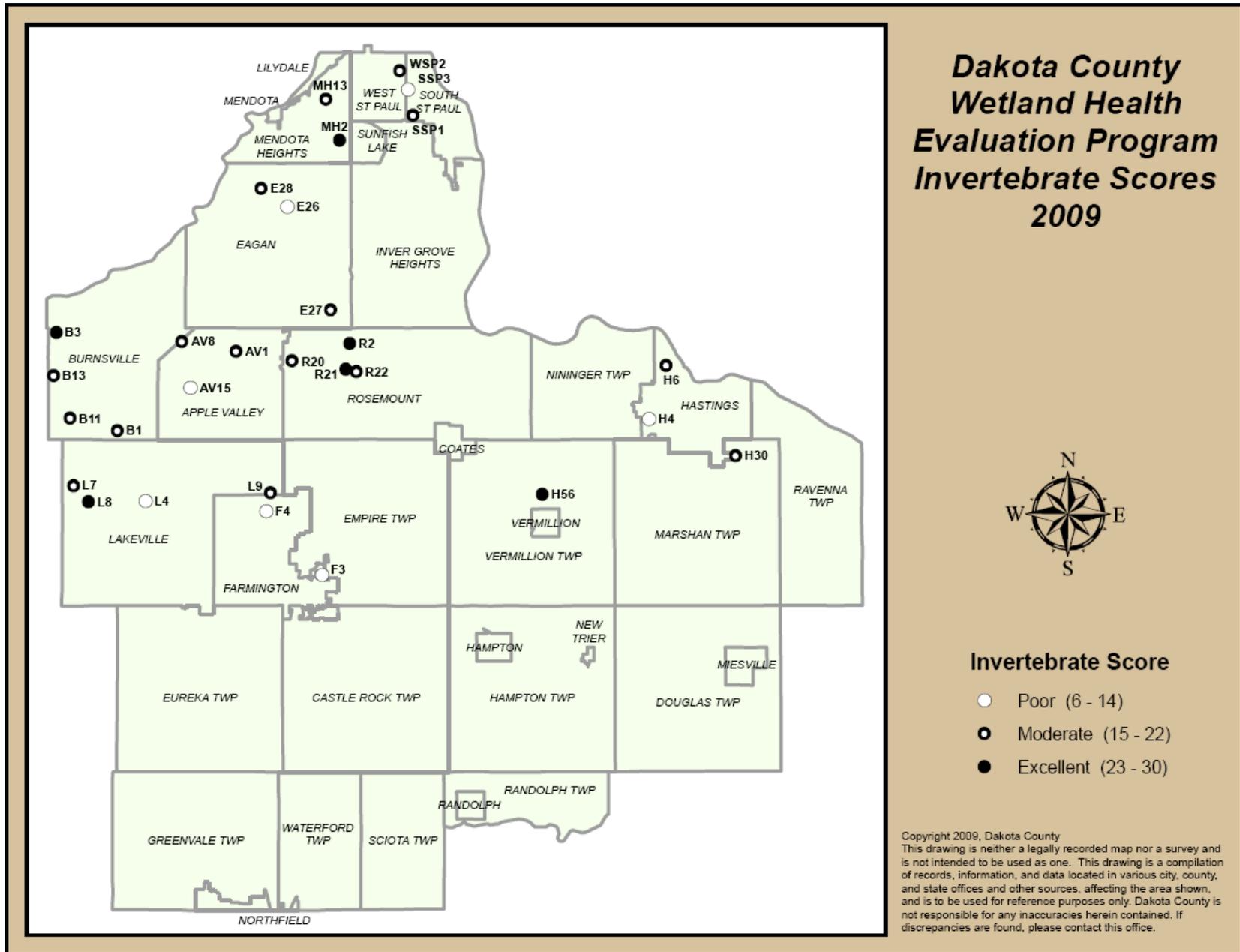
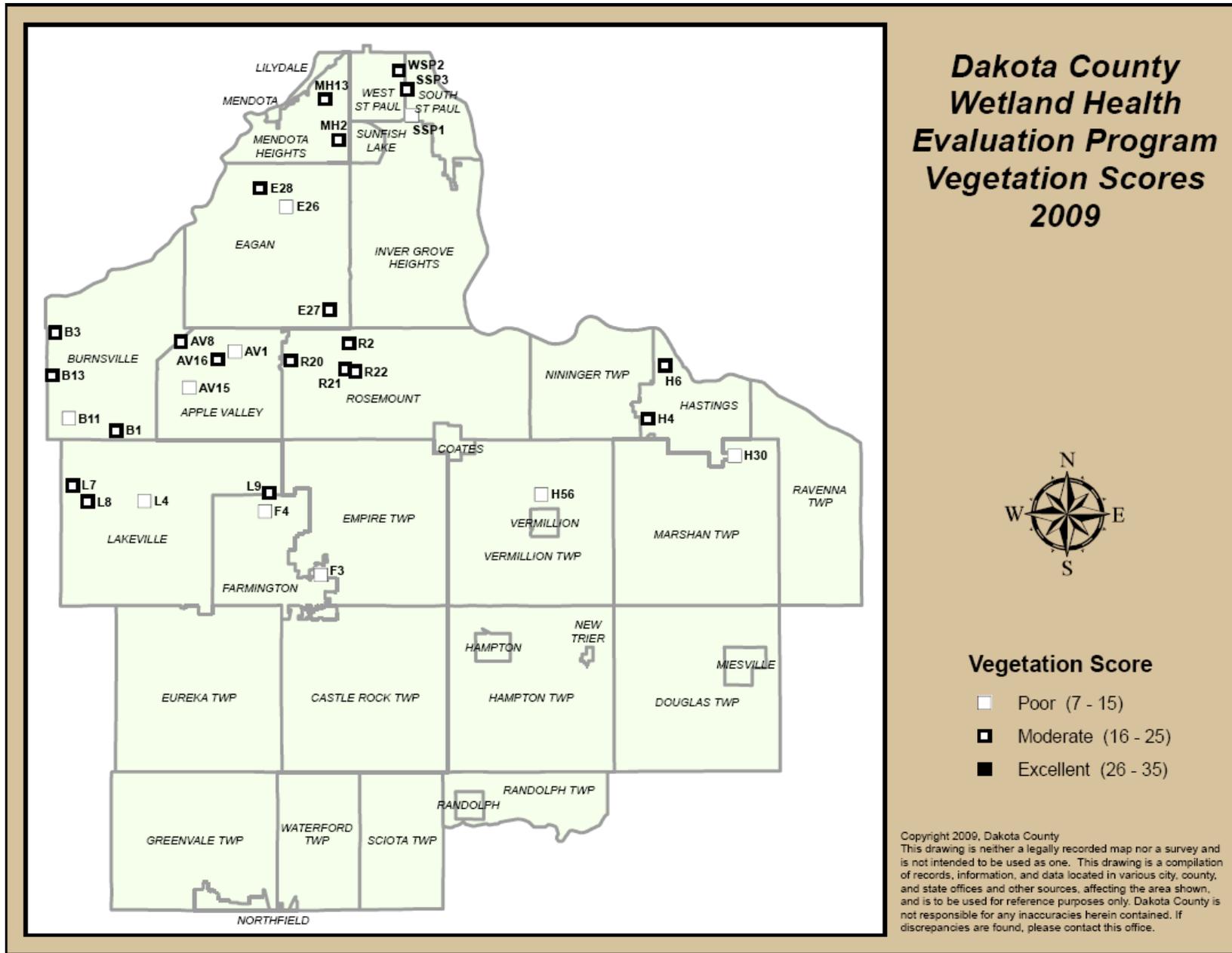


Figure 3.1.3



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 from 2008 and 2009 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 (2008-2009) indicates natural wetlands scored higher for both invertebrates and vegetation (Table 3.1.2). An EXCEL analysis of variation (ANOVA) was run to determine if the differences were statistically significant. For invertebrates, there was no significant difference between the scores of all three categories, or between each of the three different categories of wetlands. Average scores for the natural wetlands showed the best invertebrate health, but there was no statistically significant difference between natural and other wetlands.

For vegetation, the natural wetlands scored the highest on average. For purposes of this analysis, the low score of 11 for Cam Ram (B-2) from 2008 was removed as a possible outlier. It does not fit with the other data and seems artificially low. Natural wetlands scores were significantly different than both the created and stormwater wetland scores. However, the created and stormwater wetland scores were not significantly different from each other. There also was a statistically significant difference between the scores for all three categories together (when the low score for Valley View, B-11, was removed).

It is not surprising that natural wetlands would support the richest and most diverse invertebrate and plant communities. We do not restore insect communities in our restored wetlands and it seems like they are having a difficult time re-colonizing the new wetlands. 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. 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.

Table 3.1.2 Most Recent IBI Scores (2008-2009) of Created, Stormwater and Natural Wetlands

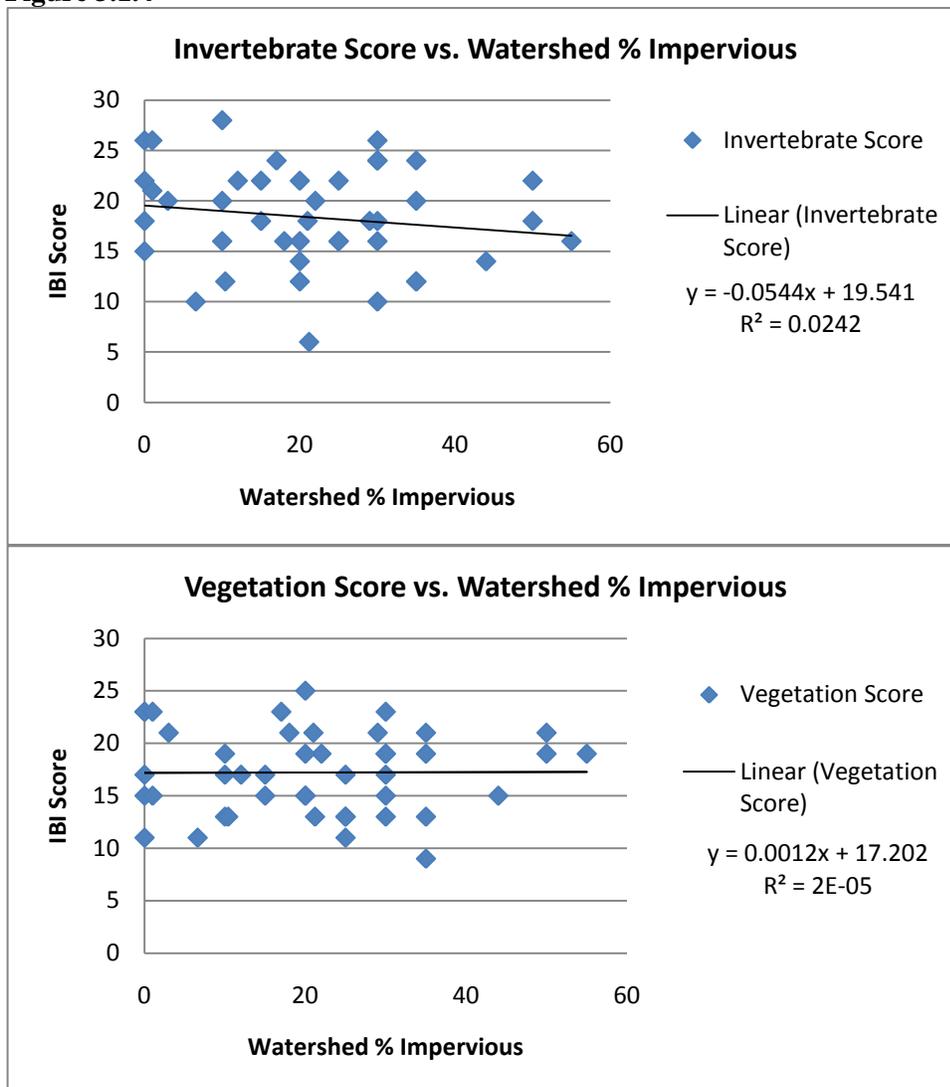
Wetland	Invertebrates			Vegetation		
	Created Wetlands	Stormwater wetlands	Natural Wetlands	Created Wetlands	Stormwater wetlands	Natural Wetlands
AV-1		20			13	
AV-8		16			23	
AV-12		16			11	
AV-13		22			13	
AV-14		12			9	
AV-15		10			13	
AV-16		Na			17	
B-1			26			23
B-1 Alt.			15			23
B-2			na			11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

3.1.2 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 percent (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.

Impacts from watershed inputs can often be measured in the aquatic community. To help determine if a relationship exists between watershed impervious area and wetland health, linear regressions were completed using the 2009 IBI's for both invertebrates and vegetation and the watershed impervious areas for each wetland. Scatter plots of the data are shown in Figure 3.1.4 below. As indicated by the low R² values, the variation in 2009 IBI scores cannot be explained based on watershed imperviousness. In other words, watershed impervious area may be a factor, but there are other factors that are impacting the plant and invertebrate communities.

Figure 3.1.4



¹Schueler, 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 2008-2009

Site ID	Site Name	Wetland size (Acres)	Watershed Size (Acres)	% Imperv	Invert. Score	Veg. Score
AV-1	Hidden Valley	2	21	35	20	13
AV-8	Chaparral 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
B-1	Crystal Lake West	0.9	550	0	26	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	415	30	24	19
B-6	Alimagnet East/Dog Park	2.5	34	15	22	17
B-11	Valley View	1	80	10	16	13
B-13	Sunset Lake	30	436	50	22	21
E-10	AP-3 Cedar Pond	3.1	212	22	20	19
E-21	FP-11.5	0.26	1.6	0	22	17
E-22	FP-11.6	0.58	2.7	0	18	15
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
F-1	Pine Knoll	35	107.5	10.4	12	13
F-3	Krail Pond	10	41.8	6.6	10	11
F-4	Lake Julia	10	233	21.2	6	13
H-4	Stonegate Treated	1	9.5	35	12	21
H-6	Lake Rebecca	19	56	1	21	23
H-30	Sand Coulee	1	107	25	16	13
H-56	180th Street Marsh	20	340	1	26	15
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	24	23
L-9	NC 54	13.8	183	12	22	17
MH-2	Copperfield/Friendly Hills	6	700	35	24	19
MH-13	MH Par 3	0.5	36	3	20	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	80.9	20	22	25
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	24	17

Site ID	Site Name	Wetland size (Acres)	Watershed Size (Acres)	% Imperv	Invert. Score	Veg. Score
R-22	Mare Pond, South	8	81	10	20	19
SSP-1	Anderson Pond	2.4	168	15	18	15
SSP-3	LeVander	3.4	37.9	20	12	19
WSP-2	Thompson Lake 48W	9	73920	50	18	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; spot 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.

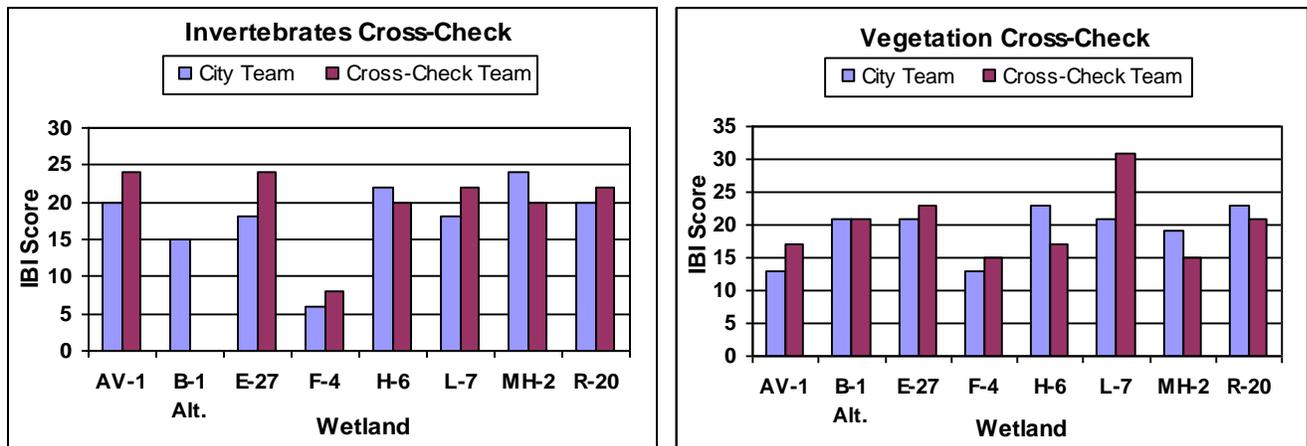
3.2.1 2009 Spot Checks

Each city team was responsible for evaluating one wetland in another city (Table 3.2.1). This citizen spot 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 Burnsville site (B-1 Alt.) invertebrate spot check was not completed due to dry conditions. The majority of the samples are consistent (Table 3.2.1 and Figure 3.2.1). One (B-1 Alt. found identical scores for vegetation. The L-7 site was not consistent for vegetation. There was a 10 point difference in scores. The varied scores may indicate a difference in sampling technique, a change in conditions between sample dates, differences in identification accuracy, or some other cause. FCI only surveyed three wetlands for vegetation in 2009, and none of the three wetlands were associated with either team that surveyed L-7. The data sheets show that there was a difference in the number of species identified at the wetland. Two of the spot checks were at the 6 point difference. 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 spot checks (those considered inconsistent are shown in bold)

City Team	Spot Check Team	Wetland Evaluated	Invertebrate Score Comparison		Vegetation Score Comparison	
			City	Spot Check	City	Spot Check
Apple Valley	Mendota Heights	Hidden Valley (AV-1)	20	24	13	17
Burnsville	Eagan	Crystal West Alt. (B-1 Alt.)	15	Dry-no sample	21	21
Eagan	Burnsville	LP-26.54 (E-27)	18	24	21	23
Farmington	Hastings	Lake Julia (F-4)	6	8	13	15
Hastings	Farmington	Lake Rebecca (H-6)	22	18	23	17
Lakeville	Rosemount	DNR 387 (L-7)	18	22	21	31
Mendota Heights	Apple Valley	Copperfield (MH-2)	24	20	19	15
Rosemount	Lakeville	Unnamed (R-20)	18	22	23	21

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

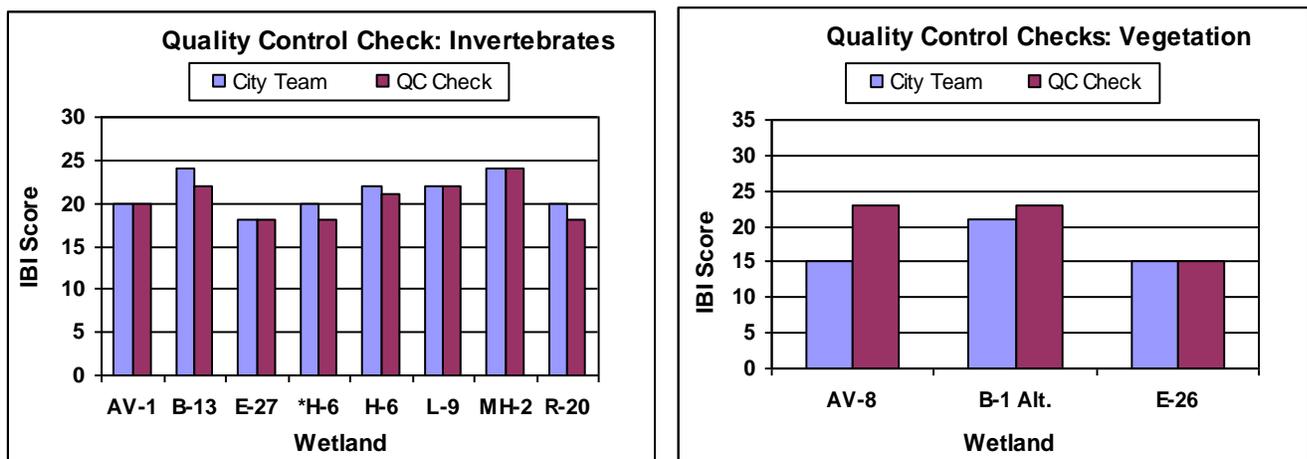


3.2.2 2009 Quality Control Checks

Quality control checks were conducted at three sites for vegetation and eight sites for invertebrates in 2009 (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)

*Note: The City of Farmington submitted their cross-check site (H-6) as their invertebrate check.



The team scores were found to be consistent with the quality control checks. All sites were within the 6 point margin expected.

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. Most of the mathematical errors were the math in the data sheet. Several errors were the result of misunderstanding the directions associated with computing the Persistent Litter Metric. There were 17 data transfer errors, 5 math errors in the scoring total, and 7 other errors. Eight of the errors were with vegetation metric number one. Only three of the errors resulted in score changes of 2

points each. 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

Team Name	Site	Invertebrate IBI Scores			Vegetation IBI Scores		
		Team	Review	Errors	Team	Review	Errors
Apple Valley	AV-1	20	20	1	13	13	1
	AV-8	16	16		15	15	
	AV-15	10	10	2	13	13	
	AV-16	No data	No data		17	17	1
	MH-2 sc*	20	20		15	15	2
Burnsville	B-1 Alt.	15	15	1	21	21	1
	B-3	24	24		19	19	
	B-11	16	16		13	13	1
	B-13	24	24		19	19	1
	E-27 sc*	24	24	1	23	23	1
Eagan	E-26	14	14		15	15	1
	E-27	18	18	2	21	21	
	E-28	16	16		21	21	
	B-1 sc*	No data	No data		23	21	3
Farmington	F-1	No data	No data		No data	No data	
	F-3	10	10		9	11	2
	F-4	6	6		13	13	
	H-6 sc*	20	20		17	17	
Hastings	H-4	12	12		21	21	
	H-6	22	22		23	23	
	H-30	16	16		13	13	
	H-56	26	26	2	17	15	2
	F-4 sc*	8	8		15	15	
Lakeville	L-4	14	14		15	15	
	L-7	18	18		21	21	
	L-8	24	24		23	23	
	L-9	22	22		17	17	
	R-20 sc*	22	22		21	21	1
Rosemount	R-2	28	28		17	17	
	R-20	20	20		23	23	
	R-21	24	24		17	17	
	R-22	20	20		19	19	
	L-7 sc*	22	22		31	31	1
Mendota Heights	MH-2	24	24		19	19	
	MH-13	20	20		21	21	
	SSP-1	18	18		15	15	
	SSP-3	12	12		19	19	
	WSP-2	18	18	1	19	19	
	AV-1 sc*	24	24		17	17	

*sc- indicates spot check of another team's wetland

3.3 WHEP Historical Data

Since WHEP began in 1997, 139 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. Appendices A and B list the data for each site since the start of the program. Section 4.0 includes the sites sampled in 2009 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. Only a few wetlands have rated excellent for vegetation.

Figure 3.3.1

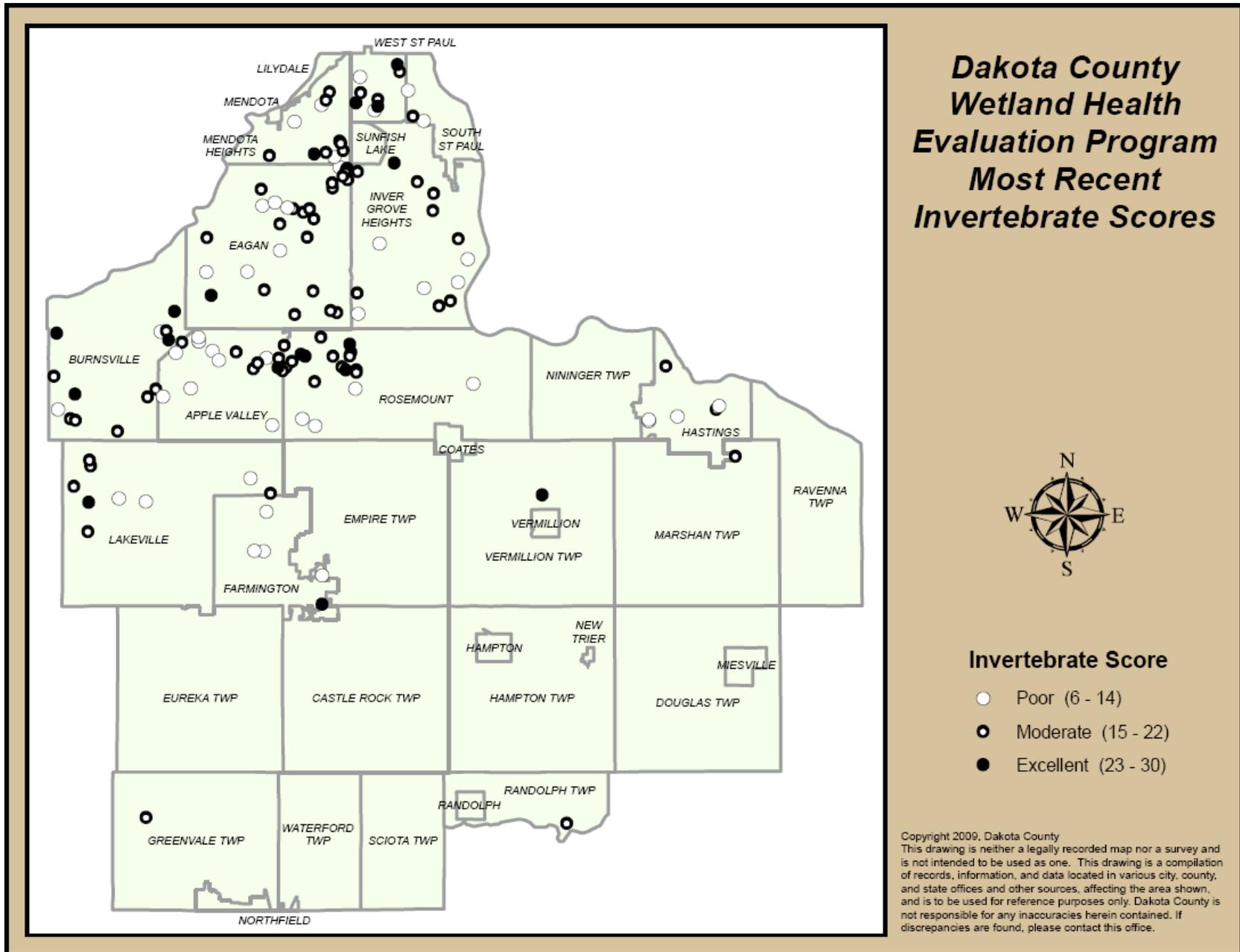
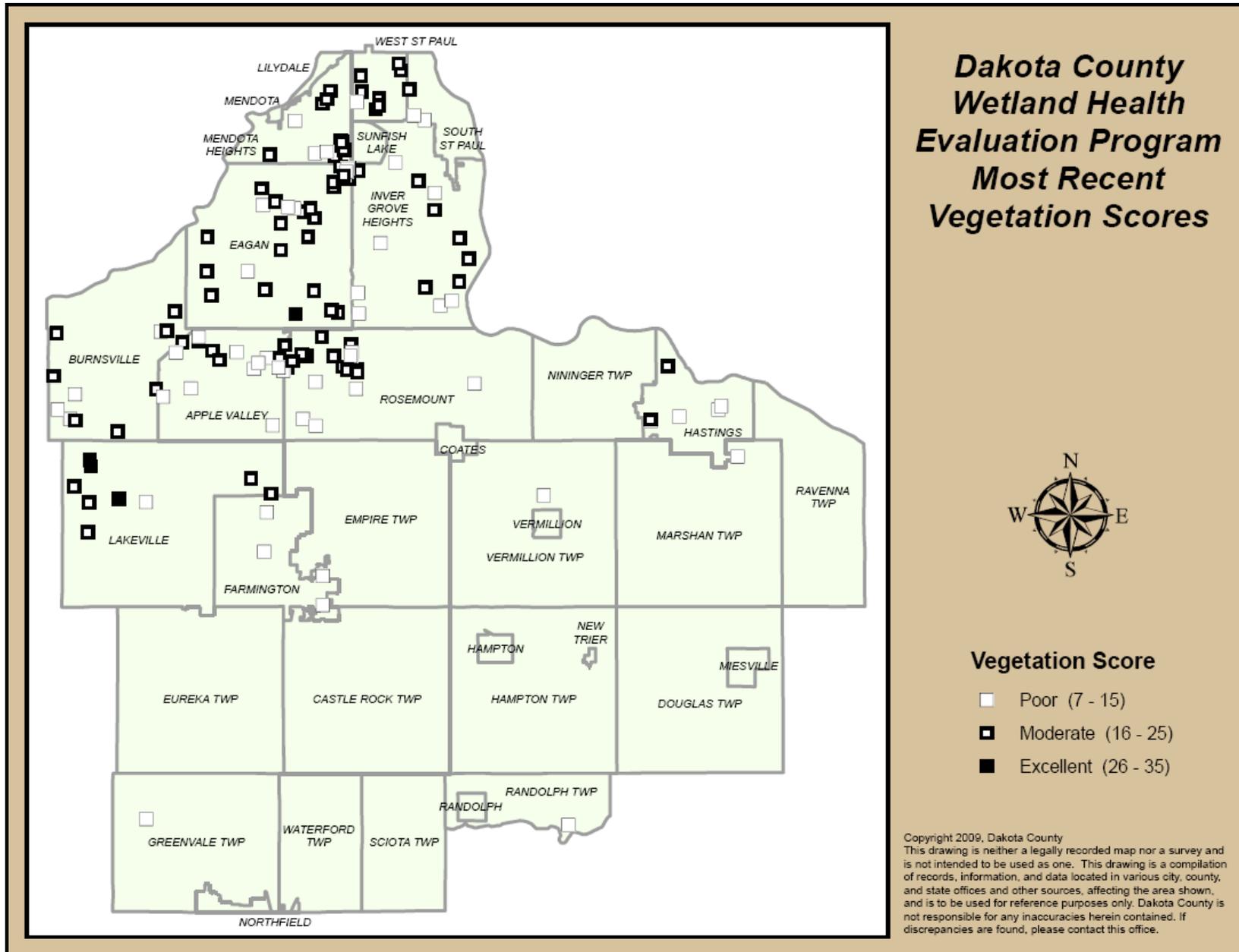


Figure 3.3.2



4.0 Wetland Evaluations

4.1 Apple Valley Wetlands

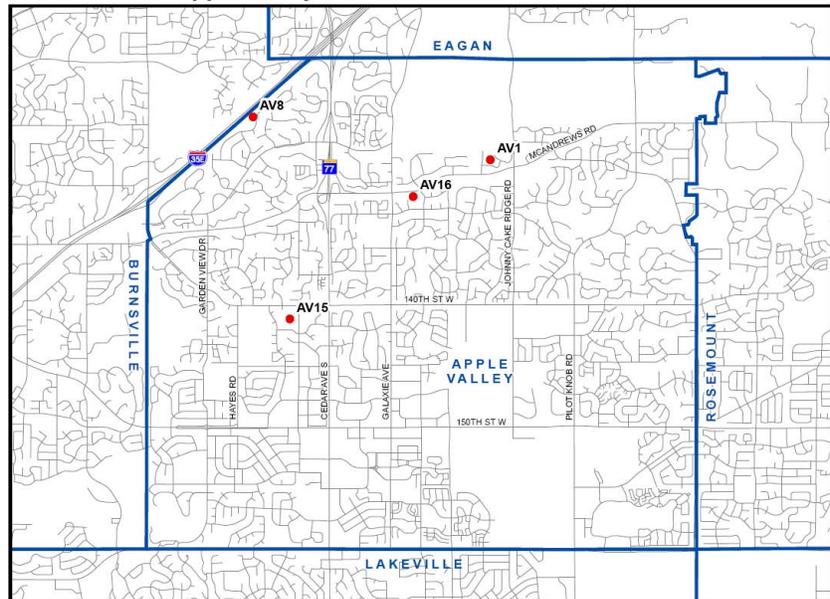
Four wetlands were monitored within the City of Apple Valley in 2009. Many team members have been monitoring since the start of WHEP. This is the twelfth year the City has participated in WHEP.

Team Leader: Jeff Korpik

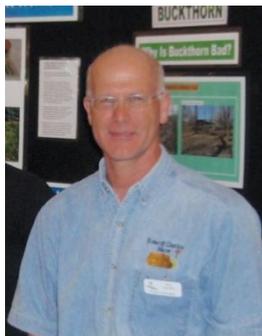
Team Members: Andrea Brownlow, Colin Brownlow, Duncan Brownlow, Melanie Chaput, Kate Fridley, Patty George, Helen Goeden, Christine Miller, Michelle Miller, Nancy Pope, Caelyn Swendiman, Brian Taintor, and Cindy Taintor.

This is Jeff Korpik's second year as team leader, though he has been a part of the WHEP program prior to his leadership. Jeff said that it was another good season. He admitted that dry wetland conditions posed complications for the season. The reference site was at record low water levels and it was hard to find appropriate places for the bottle traps at sites, due to muddiness or low water levels. He said, "It was a very fun season, and comical to witness the occasional stumble into the water (a few by me). Monitoring different locations than in past years was fun, too. As always, we had a great group of volunteers. Several new, hard workers, who I hope return, and many seasoned veterans who contribute helpful experience."

Apple Valley WHEP Sites Monitored in 2009



Jeff Korpik



Jeff Kehrer

Jeff Kehrer is the Natural Resources Coordinator at the City of Apple Valley and has been the 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

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

Apple Valley General Wetland Health



Figure 4.1 presents an overall view of wetland health for all of the 2009 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 10 percent are considered consistent. Based on the IBI scores, a wetland health rating is assigned as excellent, moderate or poor. Two of the four wetlands were monitored for the first time this year. The Apple Valley wetlands exhibited poor to moderate wetland health based on both invertebrate and vegetation data. The reference wetland, AV-1, showed considerably different invertebrate and vegetation scores (moderate and poor respectively). AV-1 had the highest invertebrate score in Apple Valley in 2009. AV-8 had the highest vegetation score. AV-16 was not sampled for invertebrates due to low water levels.

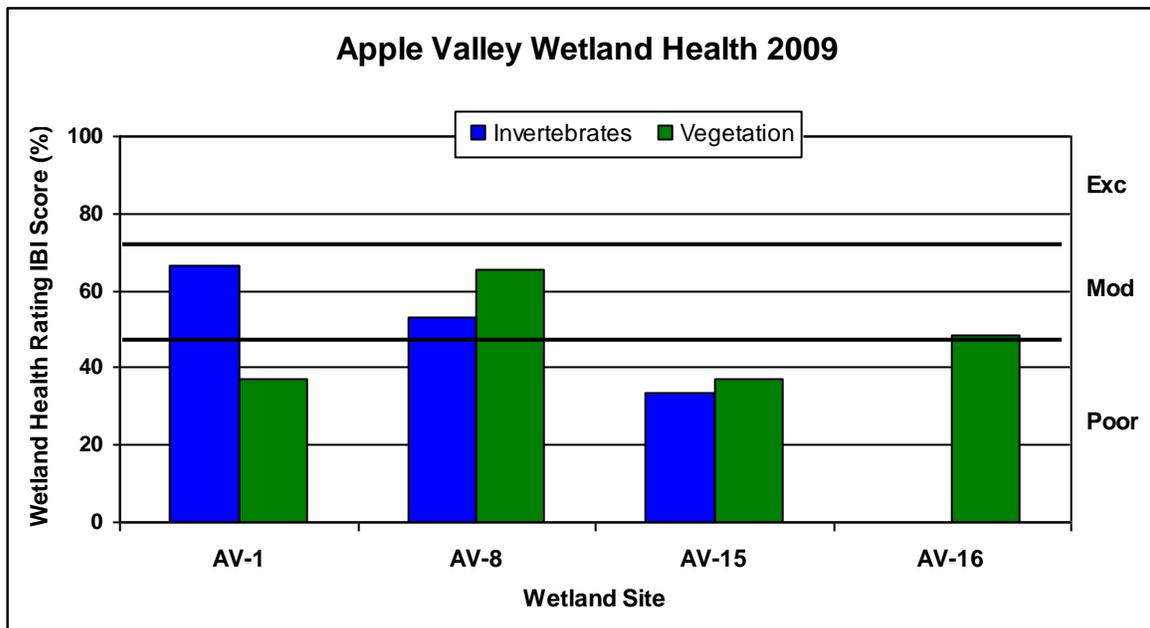


Figure 4.1 Apple Valley site scores (percent) for the 2009 sampling season

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 subwatershed is 21 acres with 15 acres of direct drainage. The subwatershed 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 a privately-owned residential property enclosed by homes and dense lines of deciduous trees such as oaks, box elders, 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. This wetland is included in the City's

stormwater management plan; however, the city does not have a wetland management plan at this time. This is the eleventh year that this site has been surveyed.

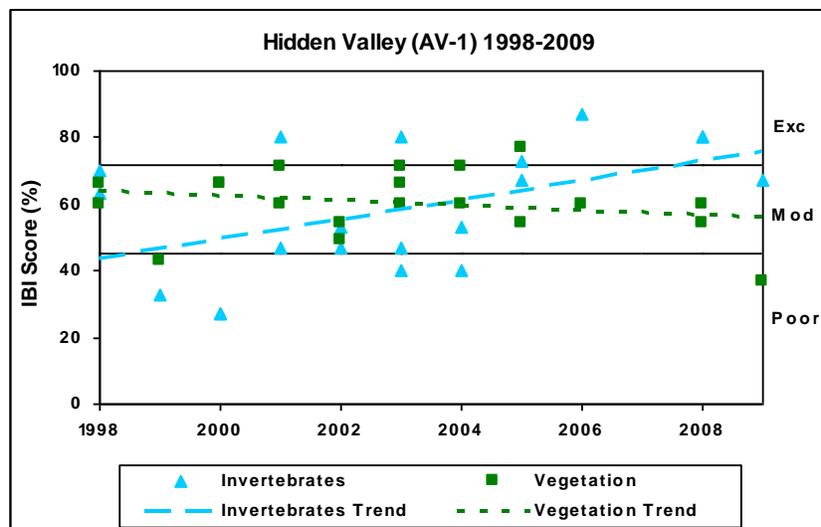
Wetland Health

Site Observations: The wetland's water level was unusually low in 2009. It is the lowest that the Apple Valley Team has seen in several years. The cross-check team also noted the water level as low and difficult to sample for invertebrates.

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

	Invertebrates 	Vegetation 
2009 Data (AV-1)		
Wetland Health Rating (IBI score)	Moderate (20)	Poor (13)
Spot Check Rating (IBI score)	Excellent (24)	Moderate (17)
Trend 1998-2009	Improving	Declining

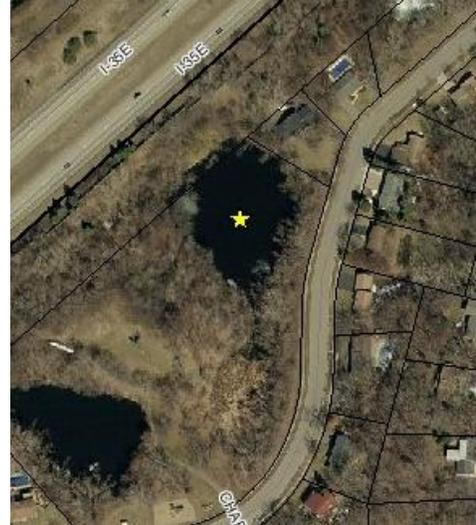
Figure 4.1.1 Invertebrate and vegetation trends for Hidden Valley (AV-1)



Site Summary: Hidden Valley was found to have moderate to poor wetland health in 2009. However there was a difference in scoring categories between the City team and spot check team findings, although the scores are within the range considered consistent. The cross-check team found an invertebrate score of 24 which is rated excellent. 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 a factor such as changes in water level. The vegetation has remained in the moderate category for most of the samples. Based on the eleven years of monitoring, the data indicates stable to improving wetland health.

4.1.2 Chaparal Pond (AV-8),

Chaparal Pond (AV-8), also known as BD-P14 is a 1.5 acre, type 4 wetland located within the Black Dog Watershed. The wetland subwatershed is 110 acres with 44 acres of direct drainage. The subwatershed area is 30 percent impervious. The wetland has one inlet on the south side, one inlet on the east side, one equalizer pipe on the southern lobe of the western border, and one outlet on the northern end which drains to Burnsville.



The wetland is within a City park, and is surrounded by private residences. There is a vegetative buffer surrounding part of the wetland. Historic aerial maps show increasing open water over the years. It is possible that a portion of the wetland was excavated in the past for stormwater management purposes. This wetland is included in the City of Apple Valley's stormwater management plan; however, the city does not have a wetland management plan at this time. It is designated as a "Manage 1 Restore Wetland". The City of Apple Valley will monitor it periodically. This is the fourth year that this site has been surveyed.

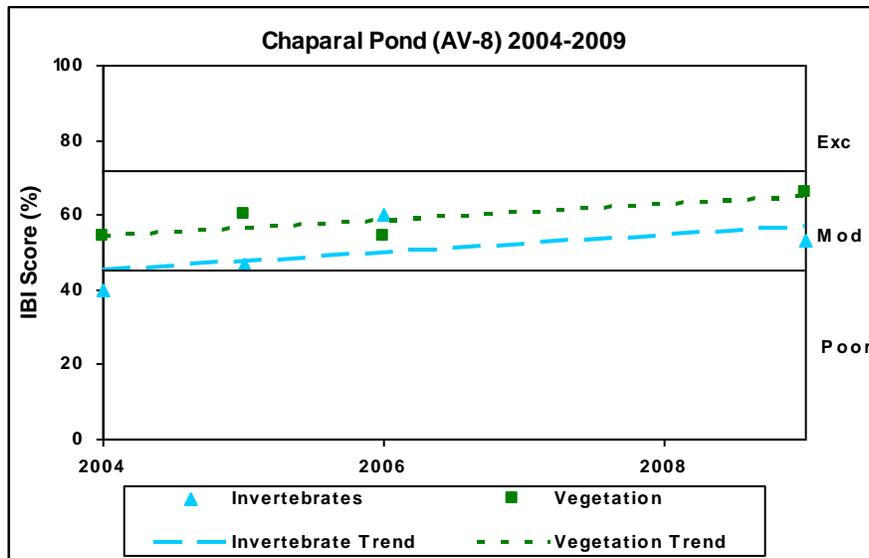
Wetland Health

Site Observations: The Apple Valley Team noted mixed grasses, willow trees, broad-leaved vegetation, and a high density of duckweed in the wetland in 2009.

Table 4.1.2 Chaparal Pond (AV-8) Wetland Health based on Index of Biotic Integrity

	Invertebrates 	Vegetation 
2009 Data (AV-8)		
Wetland Health Rating (IBI score)	Moderate (16)	Moderate (23)
Trend 2004-2009	Improving	Improving

Figure 4.1.2 Invertebrate and vegetation trends for Chaparal Pond (AV-8)



Site summary: This wetland has been surveyed four times since 2004. Both the invertebrate scores and vegetation scores indicate a slight improvement in wetland health.

4.1.3 Carrollwood Park (AV-15)

Carrollwood Park (AV-15) is a 1.2 acre, type 4 wetland located within the Vermillion River Watershed. The watershed is 398 acres with 16 acres of direct drainage and 30 percent impervious. The minor sub-watershed is WVR-231. The wetland has two inlets along the western border, two inlets along the eastern border, and one outlet to the south.

The wetland is within public parkland primarily surrounded by private residences. A vegetation buffer surrounds portions of the wetland. Historic aerial photos show increased open water over the years. The water depth increased when the outlet was constructed. Several trees drowned and were removed.

This wetland is part of the City of Apple Valley's stormwater management plan; however, the city does not have a wetland management plan. It is designated as a "Manage 2 Wetland." The City of Apple Valley will continue monitoring it periodically.



Wetland Health

Site Observations: The Apple Valley team observed little to no aquatic vegetation in the wetland. They noticed a lot of litter, submerged logs, and overhanging trees with lots of shade. There was a little alga, and ducks were present at time of survey.

Table 4.1.3 Carrollwood Park (AV-15) Wetland Health based on Index of Biotic Integrity

	Invertebrates	Vegetation
2009 Data (AV-15)		
Wetland Health Rating (IBI score)	Poor (10)	Poor (13)
Trend 2009	Not enough data	Not enough data

Site summary: This is the first year of monitoring for Carrollwood Park. Both indexes found the wetland in poor health. "Normal" disturbance is associated with residential and parkland use. Buckthorn is dense in the wooded understory. Swathes of trees have been removed due to periodic attacks of Dutch Elm disease through sections of the surrounding wooded area. The adjacent pond to the north was cleaned out in 2008. The numerous inlets (4) and large drainage area indicate that a lot of water likely enters the wetland. Frequent and large fluctuations in water level may result. This provides a difficult environment for vegetation and invertebrates and may explain the poor conditions.

4.1.4 Nordic Park Pond (AV-16)

Nordic Park Pond (AV-16), also known as Nordic Reservoir, WVR-P30, is a type 4 wetland located within the Vermillion River Watershed. The wetland is approximately one acre. It has a 17 acre watershed which is 25 percent impervious. There is one inlet on the eastern border and one outlet to the north.

The wetland is within public parkland surrounded by private residences. A vegetative buffer surrounds portions of the wetland. The depth of the water in the wetland appears to be increasing as development expands in the area. Historic aerial photos show increasing water levels through the years.



Wetland Health

Site Observations: The Apple Valley team recorded that the wetland was 100% cattail. Data sheets noted that the wetland is very bog-like with open water in only one small corner.

Table 4.1.4 Nordic Park Pond (AV-16) Wetland Health based on Index of Biotic Integrity

	Invertebrates	Vegetation
2009 Data (AV-16)		
Wetland Health Rating (IBI score)	Not sampled due to low water level.	Moderate (17)
Trend 2009	Not enough data	Not enough data

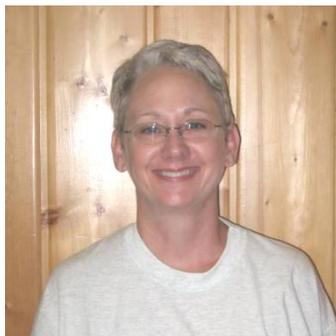
Site summary: This is the first year of monitoring for Nordic Park Pond (AV-16). A large buckthorn removal effort was conducted in the park for the 2009 Earth Day Celebration. Data sheets reflect that the vegetation plot was set outside of the open water area that existed. An invertebrate survey could not be conducted because of low water levels.

4.2 Burnsville Wetlands

Four wetlands were monitored within the City of Burnsville in 2009. Burnsville has monitored 15 wetlands through WHEP since 1997.

Team Leader: Amy Bruner

Team Members: Michael Amos, James Ingram, Brenda Ingram, Rebecca Ingram, Abby Ingram, Tamera McKeehan, Luke Nichols, Mindy Paurus, Tracy Stewert, Karla TenClay, and Thomas Ward.



Amy Bruner

This is Amy Bruner's third year as team leader; however, she was involved in WHEP four years prior to leadership.

Angela Hanson

is the coordinator for the City of Burnsville.

Her role with WHEP is to select the wetlands to monitor. Each year she selects two "long-term monitoring" wetlands and two "snapshot" wetlands in varying parts of the city in order to determine both temporal trends and to obtain baseline wetland health data from the long-term wetlands, and to determine spatial trends and pollution impacts from the snapshot wetlands. Angela commented that "the WHEP program is a very important tool in our water resources monitoring toolbox. The City lacks the staff and resources to effectively monitor all but the largest water bodies, but WHEP fills in the data gap and provides very interesting and useful information about the water

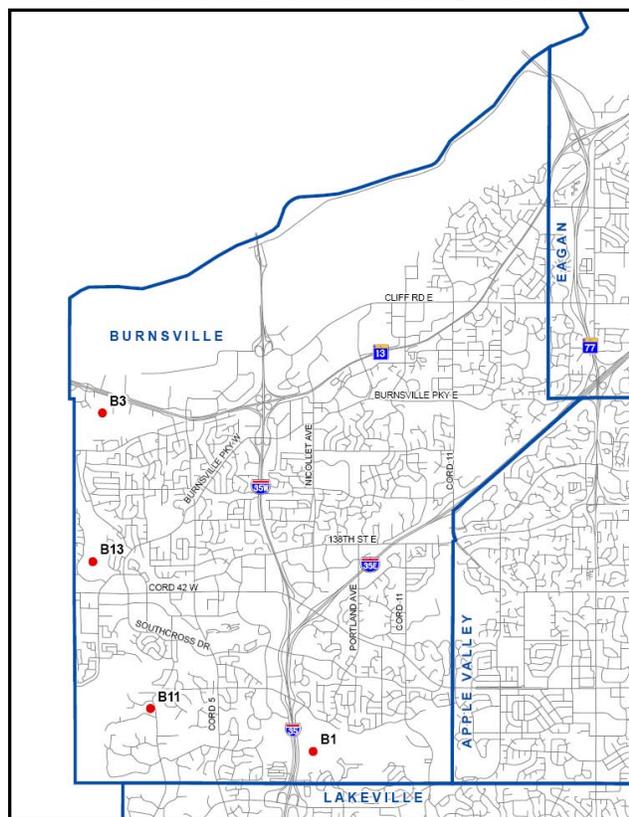


bodies that would have otherwise been unexamined. The City also regards the program as a window through which citizens can discover the value and benefit of wetlands in their community. The hard work and time that volunteer monitors commit is transformed into excellent biological data that the City uses to identify trends and issues. I am happy to assist with the program and thank everyone for their great work."



Angela Hanson

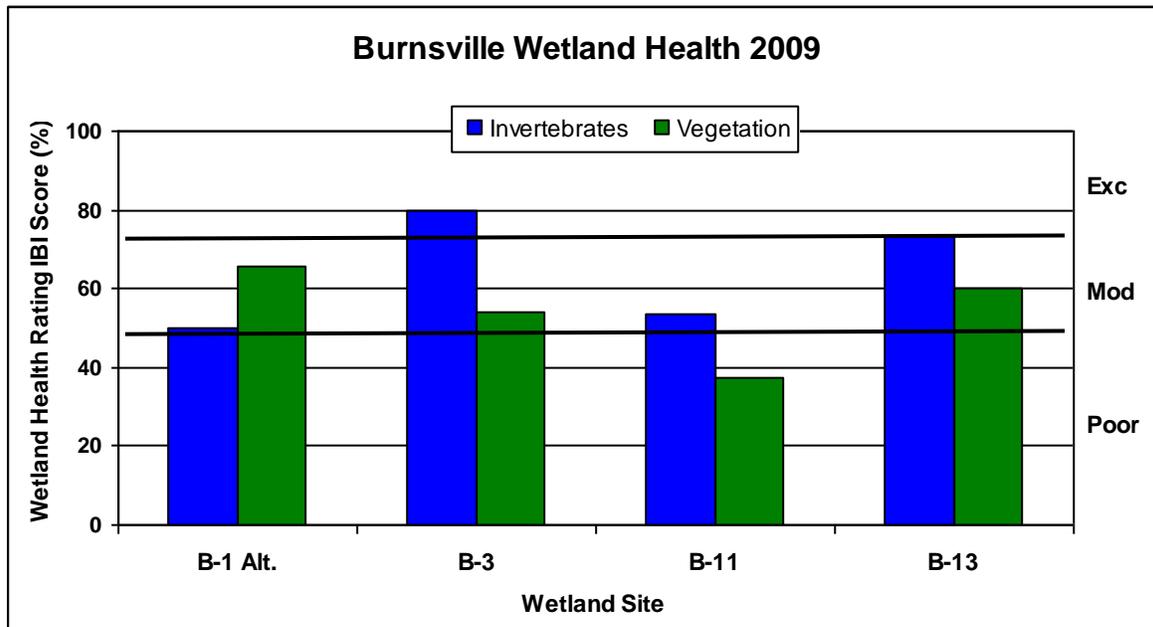
Burnsville WHEP Sites Monitored in 2009



Burnsville General Wetland Health

Figure 4.2 presents an overall view of wetland health for all of the 2009 monitoring sites in Burnsville based on the IBI scores for invertebrates and vegetation presented as a percent. For 2009, the wetlands showed poor to excellent wetland health. The reference wetland, B-1 had low water levels in 2009, so B-1 Alternate was sampled instead for the first time.

Figure 4.2 Burnsville site scores (percent) for the 2009 sampling season



4.2.1 Crystal Lake West Alternate (B-1 Alternate)

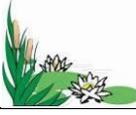
B-1 Alternate, also known as Crystal Lake West Alternate, is a six acre, type 3 wetland located in the Crystal Lake West Watershed. The wetland drainage area is 103 acres and 20% impervious. The wetland is not included in the City's stormwater management plan. It is part of the wetland management plan with a designation of "aesthetic/recreation/education & science." 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: The Burnsville Team observed deer, great blue heron, and an owl during the survey. The cross-check team recorded that the wetland is surrounded by dense woods. Filamentous algae was noted.

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

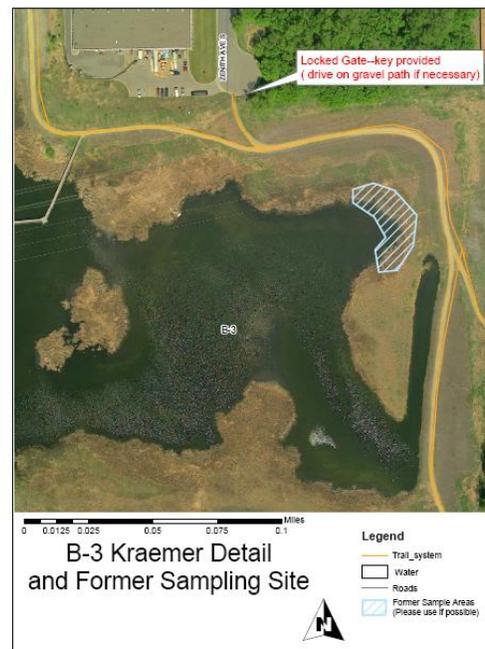
	Invertebrates 	Vegetation 
2009 Data (B-1 Alternate)		
Wetland Health Rating (IBI score)	Moderate (15) Not a complete sample	Moderate (23)
Spot Check Rating (IBI score)	NA	Moderate (21)
Trend 2009	Not enough data	Not enough data

Site summary: This is the first year that B-1 Alternate was surveyed. The bottle trap sample was dropped during collection, resulting in an incomplete sample. The invertebrate score without the bottle trap sample is 15 which is a moderate rating. The score could have possibly improved if the bottle trap sample had been secure or redone to capture a higher diversity of invertebrates and/or to score the Corixidae Proportion Metric. The cross-check team was unable to locate the site, and therefore did not sample this site for invertebrates. Both teams scored the vegetation as moderate.

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 Lower Minnesota River 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, sediment control, and nutrient removal.



Wetland Health

Site Observations: It has been noted that the wetland ranges from open water composed of *Potamogeton* on the south side to moderately dense cattail stands on the north side.

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

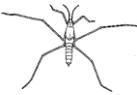
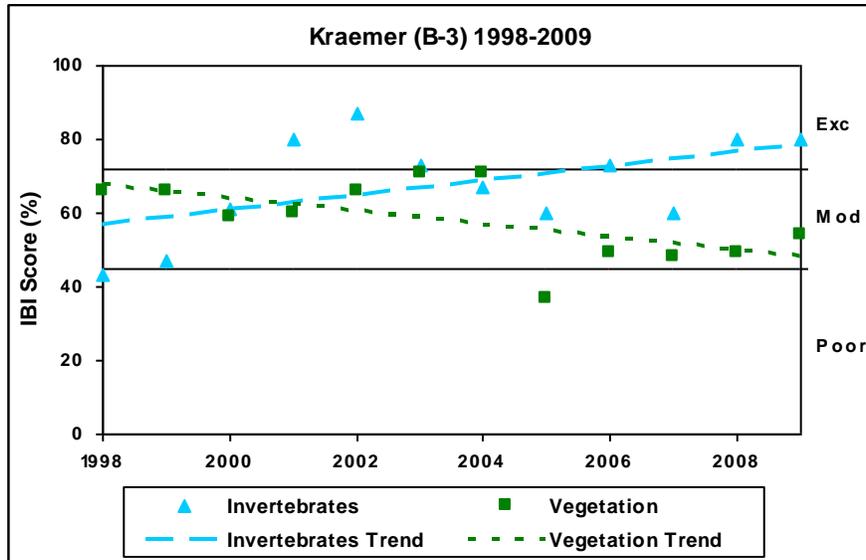
	Invertebrates 	Vegetation 
2009 Data (B-3)		
Wetland Health Rating (IBI score)	Excellent (24)	Moderate (19)
Trend 1998-2009	Improving	Declining

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



Site summary: This is the twelfth year of sampling for Kraemer Preserve (B-3). The vegetation index indicates moderate conditions, while the invertebrate score was in the excellent range in 2008 and 2009. The trend analyses show opposite trends. This wetland has maintained overall moderate conditions over most of the 12 years of sampling with a move into the excellent range for invertebrates in 2001 – 2002 and again in 2008. The vegetation index remained stable until 2005, when it dropped into the poor range and has remained low, although a slightly improved vegetation score occurred in 2009.

4.2.3 Valley View (B-11)

B-11, also known as Valley View, is a one acre, type 3 wetland located within the Valley View Watershed which is part of the Black Dog Watershed. Its drainage area is 80 acres and 10 percent impervious. The wetland is addressed within the city's stormwater and wetland management plans. It is designated in the "Improvement Class" and is considered a valuable area for its open space and aesthetics. It is used for aesthetics, recreation, education, and science. This wetland is one of the largest in the heavily wooded area of southwest Burnsville that receives stormwater. The surrounding area is primarily single family residential homes on large lots. This wetland has a known nesting site for the endangered Blanding's turtles. The impact of recent construction is a concern for the turtles.



Wetland Health

Site Observations: The Burnsville team noted that the water in B-11 was low with a lot of the wetland bottom exposed. The wetland was silty and extremely mucky. A lot of submerged vegetation, cattails, and Scirpus was present, however, the team commented that plant diversity appeared low. A gentle slope leads to the wetland. Over 30 tadpoles were caught in the bottle traps.

Table 4.2.4 Valley View (B-11) Wetland Health based on Index of Biotic Integrity

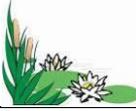
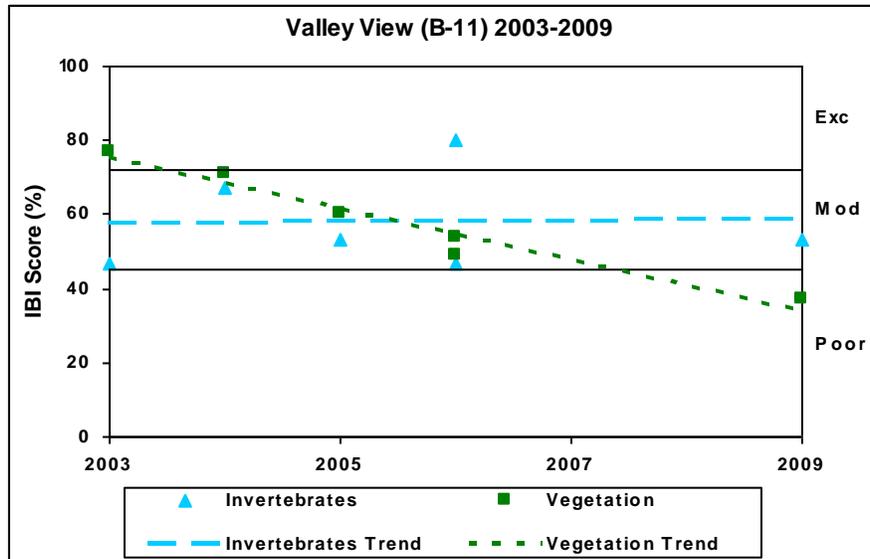
	Invertebrates 	Vegetation 
2009 Data (B-11)		
Wetland Health Rating (IBI score)	Moderate (16)	Poor (13)
Trend 2003-2009	Steady	Declining

Figure 4.2.4 Invertebrate and vegetation trends for Valley View (B-11)



Site summary: Five years of data have been collected for Valley View (B-11). The invertebrate score indicates moderate wetland health while the vegetation score grades the wetland with poor health. The invertebrate scores have remained fairly stable with perhaps a slight improvement in health. This wetland is a known nesting site for the endangered Blanding's turtles.

4.2.4 Sunset Pond (B-13)

Sunset Pond (B-13) is a 30 acre, type 3 wetland located within the Black Dog Watershed. The wetland watershed is 436 acres, and is approximately 50 percent impervious. It has seven inlets all around the wetland and one outlet on the northern end. The wetland is designated as an “Improvement Class” wetland. A paved trail encircles the entire wetland and is used heavily for recreation. The entire shoreline is owned by the city and maintained as a natural park. In addition, a conservation easement exists on neighboring private property that restricts the placement of structures and requires natural vegetation buffers. There is little recreational use of the wetland except by an occasional canoeist.



B-13 Sunset Pond Detail and former sample site

Legend

-  Storm Sewer
-  Trail system
-  Roads
-  Former Sampling Area
-  Paved access path

Wetland Health

Site Observations: The Burnsville Team observed red-winged blackbirds. A ring of cattails surrounds the open water wetland. Diversity was low in the submergent forbs, but higher in the emergents.

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

2009 Data (B-13)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (22)	Moderate (19)
Trend 1997-2009	Not enough data	Not enough data

Site summary: This is the first time since 1997 that B-13 has been surveyed. It exhibited moderate wetland health. The 1997 data is unavailable for comparison.

4.3 Eagan Wetlands

The Eagan team monitored three wetlands in 2009. Since WHEP began in 1997, Eagan has monitored 27 wetlands.

Team Leaders: Jane Tunseth and Steve Briggs

Team Members: Amy Jo Forslund, Vivianne Hanke, Maggie Karschnia, Jessie Koehle, Bill Larson, Rachel Larson, Marianne McKeon, Anna Munson, Anders Olmanson, Leif Olmanson, Wolf Ruhmann, David Smith, and Elizabeth Weidenhaft.



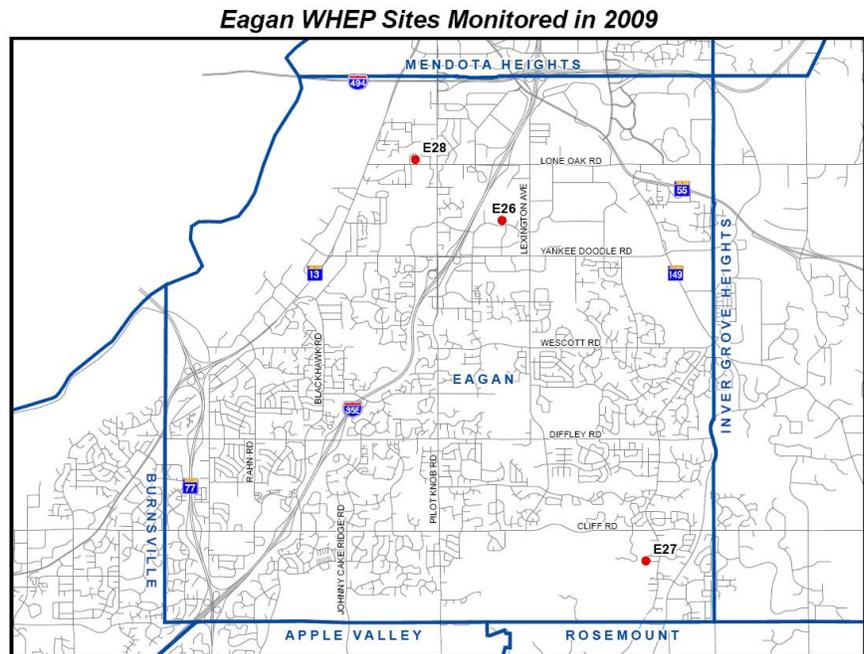
Jane Tunseth



Steve Briggs



Jessie Koehle



The success and growth of the WHEP program is obvious in Eagan. Jane Tunseth, team leader for Eagan, is a teacher at the School of Environmental Studies at the Minnesota Zoo. This is her 13th summer working on WHEP. Jane said, "My work with WHEP has helped me in teaching my students, several of whom have been WHEP volunteers. I have enjoyed seeing many citizens of Eagan open their eyes to the wonders of wetlands. We can only value what we know, and I believe WHEP has helped many people in our community know more and therefore value more about wetlands."

Steve Briggs is the Assistant Team Leader for Eagan. He is a part-time WHEP volunteer and also works for the City of Eagan as a softball umpire.

Jessie Koehle is the Water Resources Assistant for the City of Eagan. She expressed, "WHEP is important to the City of Eagan because it is a great opportunity for the general public to be literally up to their elbows in local wetlands, helping people to appreciate the value, beauty, diversity, and human impacts on water bodies. Volunteers not only learn about and care for their local water bodies, but because of their WHEP experiences they become great wetland health ambassadors to the rest of the community. WHEP provides the City with valuable and reliable



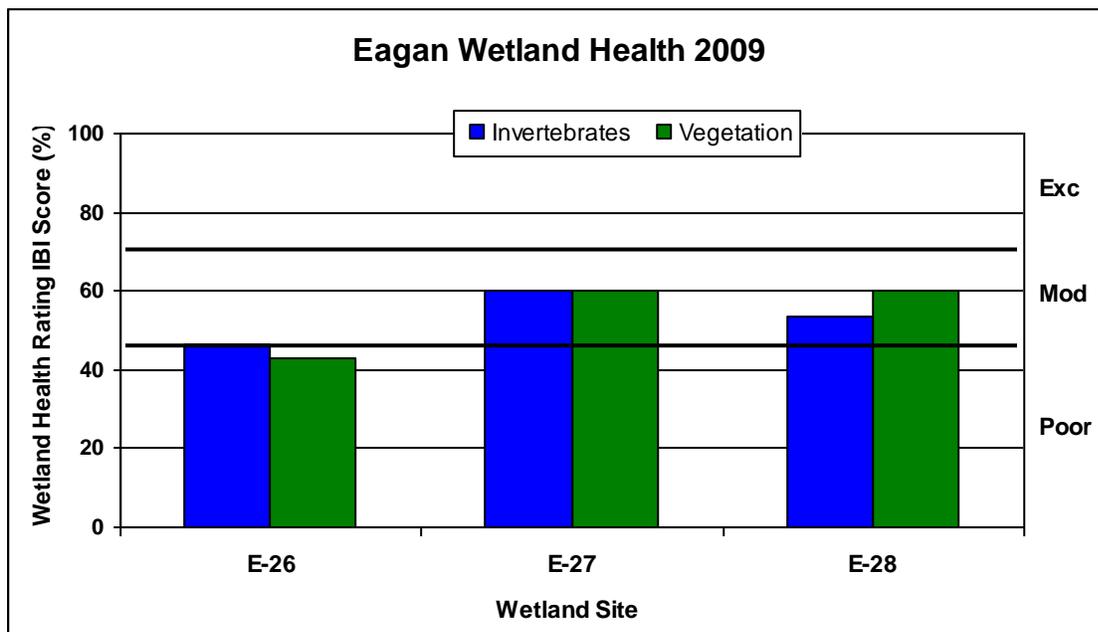
information about invertebrate and plant species that often would not be available otherwise. Personally, I thoroughly enjoy my role as City representative on our Eagan WHEP team. Not only do I value the

time spent learning more about Eagan’s water bodies, but I also deeply appreciate our team’s dedication and camaraderie. The Eagan WHEP team is a truly special group of people, and I look forward to enjoying many more WHEP field seasons to come. Thank you everyone for all your hard work! See you in 2010!”

Eagan General Wetland Health

Figure 4.3 presents an overall view of wetland health for all of the 2009 monitoring sites in Eagan based on the IBI scores for invertebrates and vegetation presented as a percent. Three wetlands were monitored in the City of Eagan in 2009. Two wetlands rated moderate and one wetland rated poor health based on the invertebrate and vegetation indexes. The vegetation and invertebrate health ratings were consistent for each of the wetlands. Eagan’s reference wetland, E-9, was not monitored in 2009.

Figure 4.3 Eagan site scores (percent form) for the 2009 sampling season



4.3.1 DP-6.2 (E-26)

E-26 (DP-6.2), also known as Northwoods Business Park, a.k.a. Home Depot Wetland, is a 3.2 acre, type 3 wetland. The wetland drainage area is approximately 25 acres, and is approximately 44 percent impervious. Water enters this wetland at the north where drainage from another stormwater pond receiving direct runoff from the Home Depot development (including rooftop, parking lot and a short section of Denmark Avenue) overflows. There is one outlet in the southeastern corner of the entire wetland area.



E-26 is impacted by parking lot and street runoff. The wetland lies at the bottom of a steep hill below the Home Depot parking lot. This wetland is part of the City’s stormwater management plan. The City also

has a wetland management plan. The City of Eagan is interested in this wetland’s health because one piece of the wetland was built as a wetland banking area, but wetland bank monitoring wasn’t completed when development occurred many years ago.

Wetland Health

Site Observations: The City of Eagan noted that dead trees are present in the wetland which likely occurred when the area flooded due to expansion from more runoff. The Eagan team observed swallows, mourning doves, a muskrat lodge, and ducks. Floating bogs of reed canary grass are present. The water level was twice as high during the vegetation survey than the invertebrate survey. They noted the presence of huge dirt mounds, a potential source of sediment from erosion.

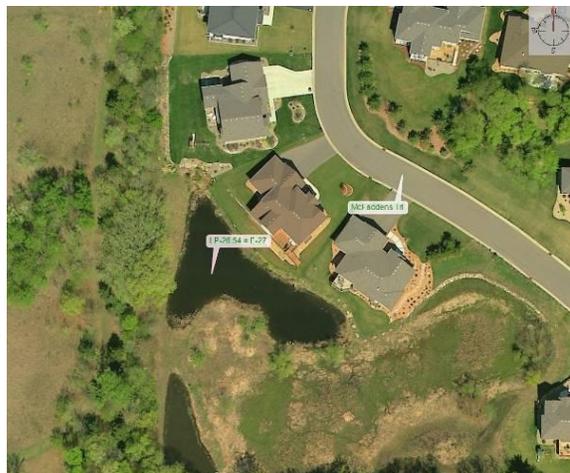
Table 4.3.1 DP-6.2 (E-26) Wetland Health based on Index of Biotic Integrity

	Invertebrates 	Vegetation 
2009 Data (E-26)		
Wetland Health Rating (IBI score)	Poor (14)	Poor (15)
Trend 2009	Not enough data	Not enough data

Site summary: This is the first year that E-26 was monitored.

4.3.2 LP-26.54 (E-27)

LP-26.54 (E-27), also known as Thomas Woods Site or McFadden’s Trail Pond, is a 0.2 acre, type 4 wetland. The wetland watershed is approximately 5.3 acres and is 29 percent impervious. This wetland receives runoff directly from a residential neighborhood. There is an inlet in the north corner and an inlet from McFadden’s Trail on the northeast side. There are no outlets, but water overflows from this pond into another pond to the east. One area of the wetland was expanded to create a wetland bank when development occurred.



E-27 is part of the City's stormwater management plan. The City also has a wetland management plan which includes wetland health monitoring as a goal. Residents are interested in staying informed on the health of the wetland each year. Residents placed barley bales around the pond in 2009 because of prolific duckweed (*Lemna* sp.) growth.

Wetland Health

Site Observations: The lawns of private homes border the wetland, which is surrounded by a narrow band of cattails. The team commented that there was a lot of duckweed on the surface of the wetland. There were very few submergent species, but more upland species. However, there were only a few individual plants of each. The upland area and edge were dominated by cattails, goldenrod and willow.

Table 4.3.2 LP-26.54 (E-27) Wetland Health based on Index of Biotic Integrity

	Invertebrates 	Vegetation 
2009 Data (E-27)		
Wetland Health Rating (IBI score)	Moderate (18)	Moderate (21)
Spot Check Rating (IBI score)	Excellent (24)	Moderate (23)
Trend 2009	Not enough data	Not enough data

Site summary: This is the first year of monitoring for E-27. The wetland appears to be in moderate to good condition. There was a difference in ratings for invertebrates from the City team vs. spot check.

4.3.3 HDP-1 (E-28)

HDP-1 (E-28), also known as Kennerick Addition Site, is a 0.8 acre, type 3 wetland. Its watershed is 39 acres and 18 percent impervious. It is part of the City's stormwater management plan, and is designated as a "contributing wetland." The City's goal for this wetland is to continue treatment of stormwater while maintaining a natural wetland state. There is ongoing development in nearby residential area, but no direct drainage into the wetland. A wetland just to the southeast was constructed to treat stormwater, and to be a wetland banking site. The constructed wetland cut the watershed in half for E-28. The City of Eagan would like to gain better understanding of the current state of the wetland site as it has been more than five years since the area was developed and the neighboring wetland was constructed.



E-28 has one inlet on the east side of the wetland, and water enters over a berm from another wetland to the south. One outlet exists in the northwest corner. Steep slopes and lawns surround the wetland from neighboring homes. This wetland receives runoff directly from a residential neighborhood, then discharges to HP-11 (which then discharges into a gully, flowing towards the Minnesota River).

Wetland Health

Site Observations: The monitoring team observed many tadpoles in bottletraps. The pond was very shallow and dominated by duckweed (*Lemna* sp.) and other emergent vegetation. reed canary grass is along the shore.

Table 4.3.3 HDP-1 (E-28) Wetland Health based on Index of Biotic Integrity

	Invertebrates 	Vegetation 
2009 Data (E-28)		
Wetland Health Rating (IBI score)	Moderate (16)	Moderate (21)
Trend 2009	Not enough data	Not enough data

Site summary: This is the first year that E-28 has been monitored. The wetland exhibited moderate wetland health.

4.4 Farmington Wetlands

The Farmington team sampled three wetlands in 2009. The City has been monitoring wetlands through the WHEP program since 1997, and has many years of data for each of their five wetland sites.

Team Leader:

Katie Koch-Laveen

Team Members:

Rollie Greeno, Paul Kewitsch, John Mulligan, Julie Mulligan, Marcia Richter, Richard Tucker, and Pam Tucker



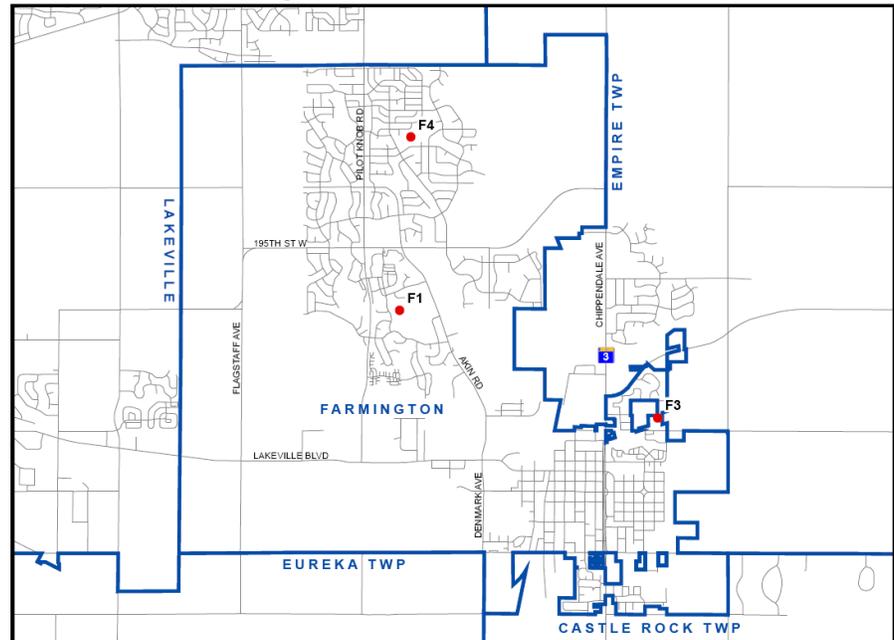
Katie Koch-Laveen



Jennifer Dullum

a much higher level than it would be without their assistance."

Farmington WHEP Sites Monitored in 2009



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."

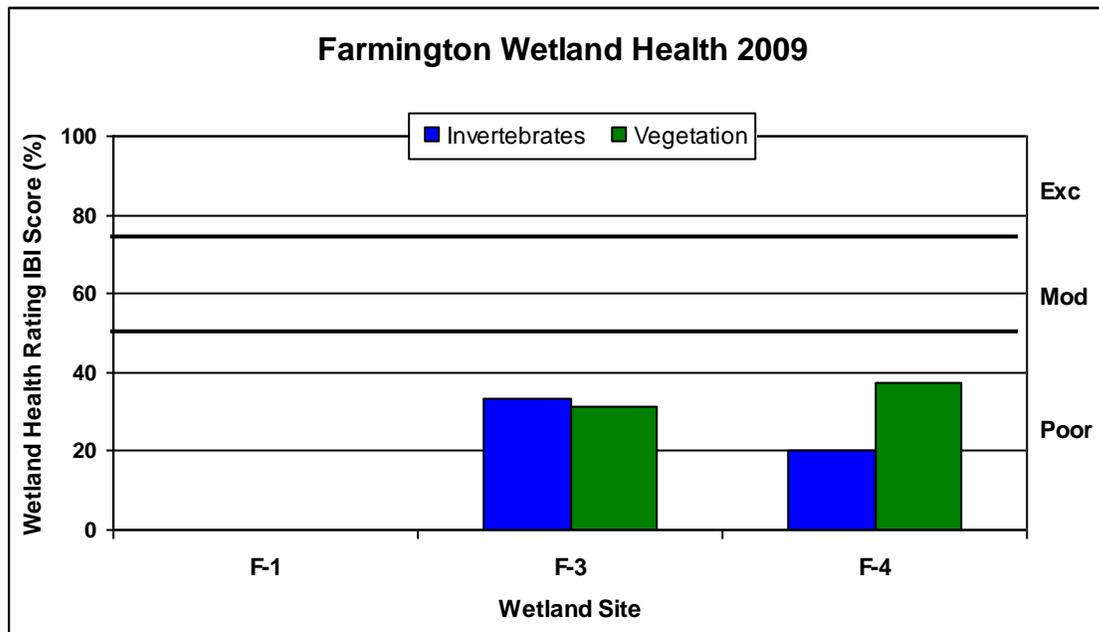
Katie remembers an interesting day in the wetland. "It started to rain when we arrived on site, but we were hopeful and just stood under our umbrellas. Soon the hail started. As we were returning to our car, a work-from-home neighbor noticed us, wet and foolish looking. She invited us inside out of the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

Jennifer Dullum 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. The City has been monitoring the health of wetlands since 1998. 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

Farmington General Wetland Health

Figure 4.4 presents an overall view of wetland health for all of the 2009 monitoring sites in Farmington based on the IBI scores for invertebrates and vegetation presented as a percent. Site F-1 (Pine Knoll) was dry in 2009, and therefore not sampled this year. Both of the wetlands sampled in 2009 were found to be in poor wetland health. Farmington has designated F1, F-3 and F-4 as reference wetlands. None of these wetlands appears to show ideal reference conditions, i.e. minimally impacted. Monitoring results for F-1 and F-3 in the earlier years of WHEP showed better conditions than in recent years. The data indicate these wetlands are likely impacted. All of Farmington is within the Vermillion River Watershed.

Figure 4.4 Farmington site scores (percent) for the 2009 sampling season



4.4.1 Pine Knoll Pond (F-1)

F-1 was not sampled in 2009. It was completely dry.

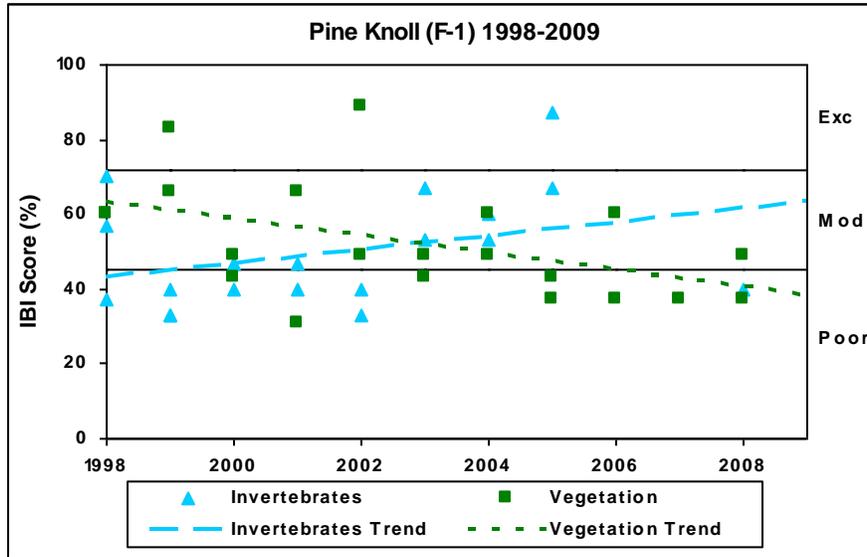
Pine Knoll Pond (F-1) is a 35 acre wetland with a drainage area of 107.5 acres which is 16 percent impervious. There is development surrounding much of the wetland, and wetland buffers are in place. It is designated as “Protect” in the City’s wetland management plan. The wetland management goal is to document the wetland health as development occurs. The monitoring site location was moved in 2004 due to construction activities. This new location has stayed consistent since 2004. The site chosen is within an existing residential area, to the northeast of the previous sampling site. The team noted that this site is more connected to the larger wetland basin.



Table 4.4.1 Pine Knoll Pond (F-1) Wetland Health based on Index of Biotic Integrity

	Invertebrates 	Vegetation 
2009 Data (F-1)		
Wetland Health Rating (IBI score)	Not sampled due to dry conditions	Not sampled due to dry conditions
Trend 1998-2009	Improving	Declining

Figure 4.4.1 Invertebrate and vegetation trends for Pine Knoll (F-1)



Site summary: This would have been the twelfth year of sampling Pine Knoll Pond. The vegetation index showed poor to moderate health in 2008. It is difficult to assess the wetland based on invertebrates since they have not been sampled since 2005 due to dry conditions. The long term IBI trends are not consistent. The invertebrate data indicates improving wetland health, while the vegetation data indicates declining wetland health. However, there is a lot of variability in the data and no recent invertebrate data. Changes in the watershed may have impacted the water levels which appear to be consistently low in mid-summer over the past several years.

4.4.2 Kral Pond (F-3)

F-3, also known as Kral Pond, is a 10 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 “Manage 2” in the City wetland management plan. 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.



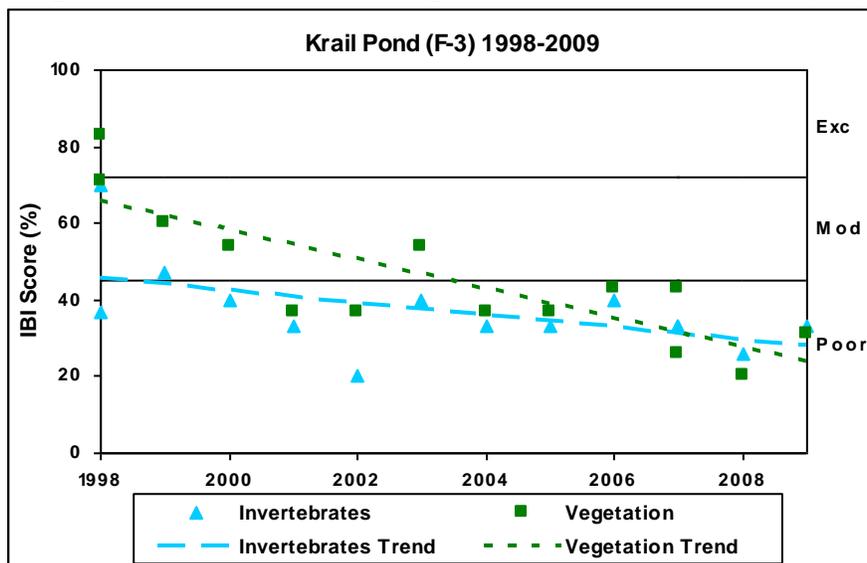
Wetland Health

Site Observations: The monitoring team noted that the cattail stands are significant in coverage near the collection site areas. Some reed grasses are of relative abundance as well. There is a fairly steep slope into the wetland which has a fairly firm bottom (not sandy). The water was low in 2009, and dropped approximately 0.5 meter between invertebrate collection in June and the vegetation survey in July.

Table 4.4.2 Kral Pond (F-3) Wetland Health based on Index of Biotic Integrity

	Invertebrates 	Vegetation 
2009 Data (F-3)		
Wetland Health Rating (IBI score)	Poor (10)	Poor (11)
Trend 1997-2008	Declining	Declining

Figure 4.4.2 Invertebrate and vegetation trends for Kral Pond (F-3)



Site summary: Kral Pond has been monitored for twelve years. Recent monitoring indicates poor wetland health. The long term trend shows a continuing and significant decline in wetland health based on both indexes, although the 2009 data showed higher scores than found in 2008. The two indexes have been consistent with each other for most of the past ten years. The City’s goal for this site was to monitor the impacts of development. It appears that the wetland is being impacted from changes in the watershed, including the development that has occurred.

4.4.3 Lake Julia (F-4)

F-4, also known as Lake Julia, is a 10 acre open water wetland within the Vermillion River Watershed. The wetland drainage area is 233 acres which is 43 percent impervious. It is designated as “Manage 1” in the City wetland management plan. This is a man-made lake constructed to hold stormwater runoff and relieve down stream flows to the Vermillion River. There is



development to the north and west, and Lake Julia Park to the south and east. The immediate area is mowed turf up to a natural grass buffer along the lake edge. The wetland management goal is to document wetland health as development occurs, and to monitor long term effects of development on manmade lakes.

Wetland Health

Site Observations: The wetland has a sandy bottom. Some algae was present. Many ducks were observed. The locals say that this pond is good for fishing. The shoreline is mostly cattail and willow. The cross-check team felt that the score for vegetation was higher than it should be based on their observations and experience.

Table 4.4.3 Lake Julia (F-4) Wetland Health based on Index of Biotic Integrity

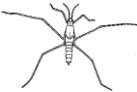
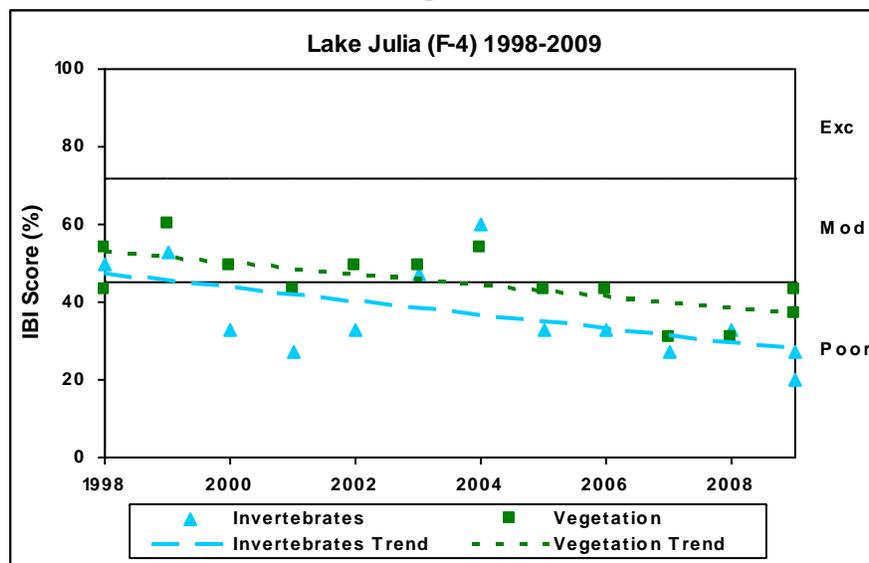
	Invertebrates 	Vegetation 
2009 Data (F-4)		
Wetland Health Rating (IBI score)	Poor (6)	Poor (13)
Spot Check Rating (IBI score)	Poor (8)	Poor (15)
Trend 1998-2009	Declining	Declining

Table 4.4.3 Invertebrate and vegetation trends for Lake Julia (F-4)



Site Summary: Lake Julia has twelve years of data. The invertebrate and vegetation data indicate declining wetland health, from moderate down to poor. Low water levels in the wetland the past few years may have influenced the IBI scores. The trend analysis for both vegetation and invertebrates shows a gradual decline, although the vegetation scores were higher in 2009. The invertebrate scores have been more variable, but continue to decline since a high in 2004. The low scores are not surprising for a constructed wetland designed to receive stormwater flows. Fluctuating water levels can severely limit the type and amount of vegetation present as well as the related invertebrate community.

4.5 Hastings Wetlands

Four wetlands were monitored in Hastings in 2009. Eight wetlands have been sampled in the City of Hastings through the WHEP program since 1999.

Team Leader: Joe Beattie

Team Members: Alicia Beattie, Barbara Crist, Alesha Crist, Brian Huberty, John Kelly, Matt Loyas, Maggie Lundell, Natalie Lundell, Betsy Oehlke, Kelly Pechous, Dwight Smith, Kevin Smith, Philip Vieth, and Rachel Ward.



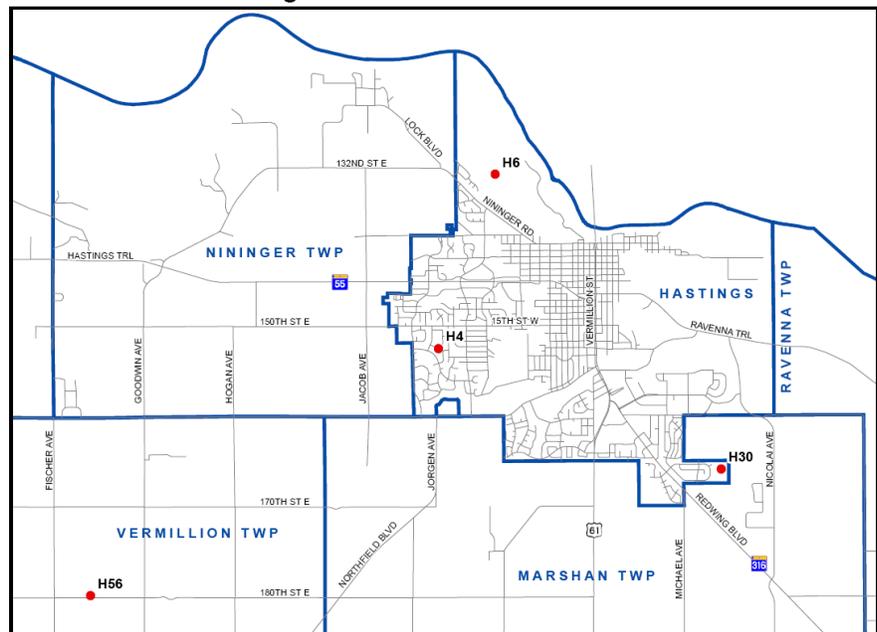
Joe Beattie



Kevin Smith

future development projects occur. WHEP is a vital tool that we want to continue to use and appreciate."

Hastings WHEP Sites Monitored in 2009



Joe Beattie became a WHEP team leader to enrich his knowledge of wetlands. He says, "I love doing WHEP. It's a great chance to get outside, stay current on bug and plant ID, and interact with great people." Joe was selected by the Dakota County Soil and Water Conservation District for the Outstanding Conservation Award for 2009.

Team Hastings' wetland sites are unique. They include stormwater detention ponds, a farmland pond, and a wetland adjacent to a backwater lake. Team Hastings has just as diverse of a group of volunteers ranging from high school students to professional biologists. Joe admits, "We have a great group of volunteers that are passionate about their work with wetlands".

Kevin Smith administers WHEP for the City of Hastings. He says, "Stewardship of our resources is a long-term priority for us in Hastings and monitoring is a key component we have to measure our progress. I see my role as a city contact to be the primary communication link. Working with partners to manage the land and be a part of the monitoring and outreach WHEP does is enjoyable. Without the many hours of dedicated service provided by volunteers this important job would likely not get done. I see an increased awareness for the "Best Management Practices" by city staff and a move towards specifications requiring use of native plants when future development projects occur. WHEP is a vital tool that we want to continue to use and appreciate."

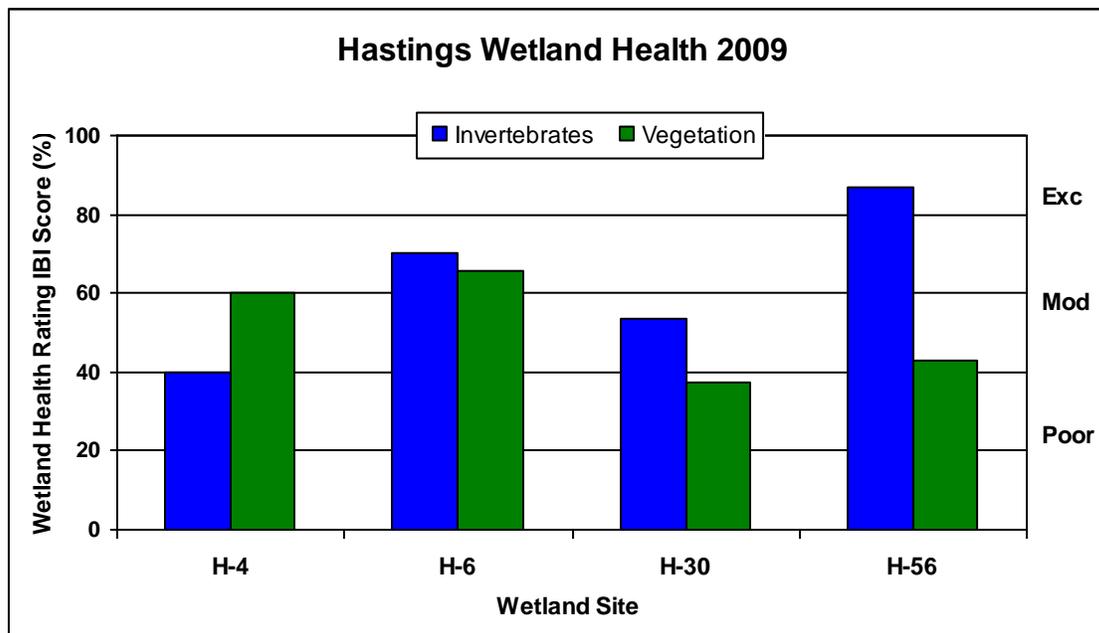
Hastings General Wetland Health

Figure 4.5 presents an overall view of wetland health for all of the 2009 monitoring sites in Hastings based on the IBI scores for invertebrates and vegetation presented as a percent. All of the wetlands showed poor to excellent wetland health in 2009, with the reference site, H-6, having invertebrate and vegetation scores of near excellent. H-56 scored excellent for invertebrates, but the vegetation score showed inconsistency with its poor rating.



Philip Vieth and Alicia Beattie

Figure 4.5 Hastings site scores (percent) for the 2009 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 one acre, type 4 wetland located within the Vermillion River watershed. The wetland drainage area is 9 to 10 acres, and is 30 to 40 percent impervious. The wetland has one inlet in the southeast corner and one outlet on the north end. The watershed is primarily residential with private property on three sides and a public trail along the south side of the wetland. The residents maintain a vegetated buffer along the south shore and at least one lot on the north side. Native plant restoration was conducted in 2003-2004 through the Neighborhood Wilds program. Several homeowners still mow 100 percent of the shoreline by their property. The wetland management goal is for storm water management, to enhance the water quality before the waters reach the Vermillion River.



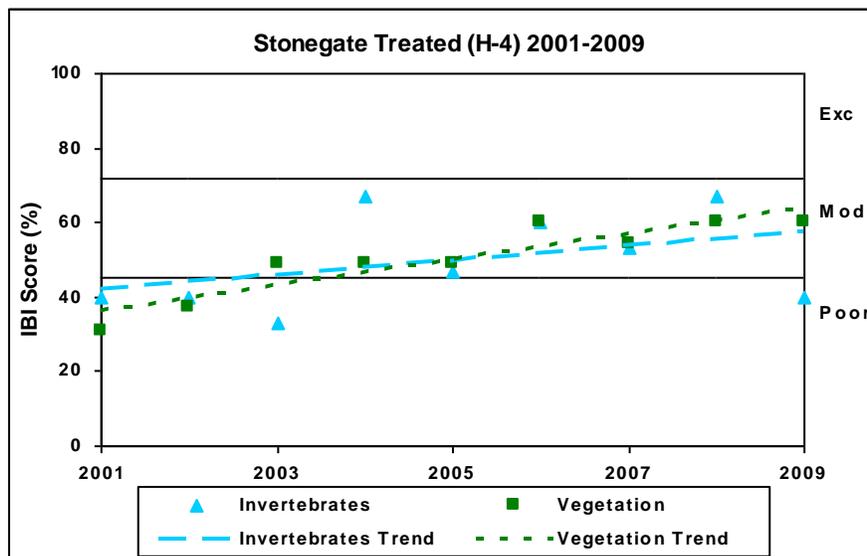
Wetland Health

Site Observations: This is a restoration area with sedges, willows, dogwood, and cattails. The wetland bottom is sandy beneath muck.

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

	Invertebrates 	Vegetation 
2009 Data (H-4)		
Wetland Health Rating (IBI score)	Poor (12)	Moderate (21)
Trend 2001-2009	Improving	Improving

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



Site summary: Both the invertebrate and vegetation IBI scores indicated moderate wetland health. A trend analysis on the nine years of data indicates that wetland health is gradually improving. Although the scores for 2009 dropped from 2008, the trend is still positive. 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 4 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 and one controlled outlet. The Mississippi River Flats Natural Resource Management and Restoration Plan was adopted in December 2002.



The wetland is an emergent marsh and

shoreline/floodplain forest. Diversion of stormwater into the lake from development and invasive species, including purple loosestrife, are of growing concern. The wetland is being monitored to better maintain a shoreline buffer along most of the lake, and to manage for wildlife habitat and recreation.

Wetland Health

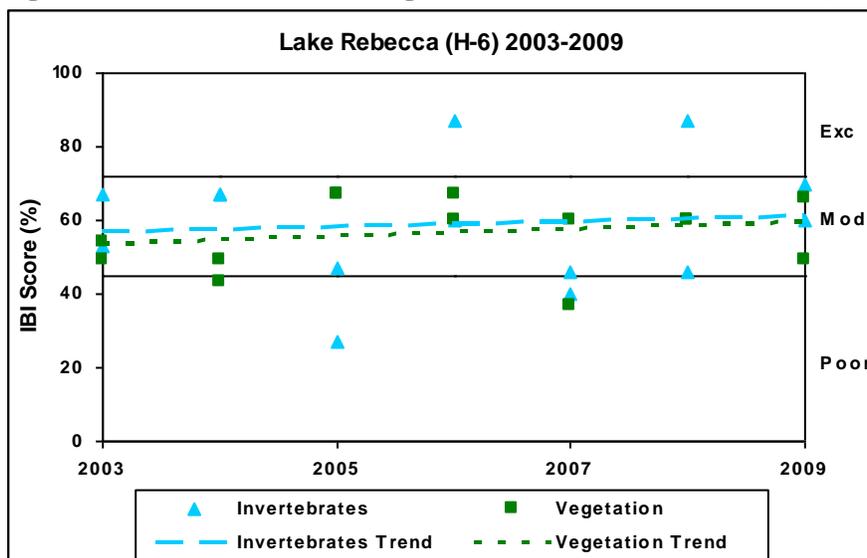
Site Observations: Lake Rebecca wetland (H-6) is adjacent to Spring Lake and the Mississippi River. A tall levy with walking/biking trail is located on the north side of the wetland. It is a large open water wetland surrounded by trees. There are several snags in the water which provide good habitat for invertebrates. The bottom is mucky and there is very little emergent vegetation. In 2009, the Hastings team noticed purple loosestrife and smartweed spreading.



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

	Invertebrates 	Vegetation 
2009 Data (H-6)		
Wetland Health Rating (IBI score)	Moderate (22)	Moderate (23)
Spot Check Rating (IBI score)	Moderate (18)	Moderate (17)
Trend 2003-2009	Stable	Stable

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



Site summary: This is the seventh 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. There was a significant difference in the data between the cross-check team and City team for the vegetation scores with the City team score at the upper end of moderate while the cross-check team

found a low moderate. The City team identified more forbs species than the cross-check team which resulted in a higher vegetation score for the City team.

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 and one outlet. 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. Some shoreline restoration efforts are underway at this site. The wetland management goal is for this wetland to function as a sediment pond, and then enhance water quality and wildlife habitat.



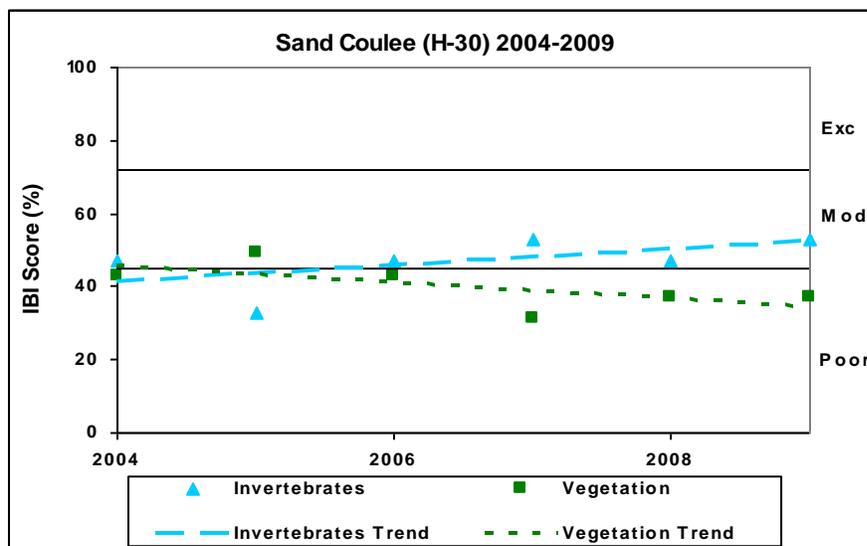
Wetland Health

Site Observations: The releve was placed half way between a native restoration area and an unrestored area. The results were good, but may have been quite different if the plot site had been placed fully in either the restoration area or the unrestored area. Plantain, arrowhead, and bulrush had been planted around the wetland perimeter. The City team noted “very reduced water levels” and lots of algae.

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

	Invertebrates 	Vegetation 
2009 Data (H-30)		
Wetland Health Rating (IBI score)	Moderate (16)	Poor (13)
Trend 2004-2009	Stable	Stable

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



Site summary: Sand Coulee wetland has been monitored each year for the past six 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). The location of the releve plot for vegetation sampling likely highly influences the vegetation results since part of the vegetation has been restored to native species. In order to compare years, it should be placed in a similar location each year.

4.5.4 180th Street Marsh (H-56)

H-56, also known as 180th Street Marsh, is a 20 acre 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 runs south to the Vermillion River from a culvert under 180th Street. The wetland is a part of several natural ponds in the immediate area. There is agricultural use on the surrounding land which is expected to continue. There is growing concern of the ponds going dry and being taken over by agriculture which is already occurring. The wetland management goal is for agriculture to continue on the surrounding land, and wildlife habitat management to be practiced in the wetland areas. The landowner has expressed interest in enhancing wildlife and its habitat. Kevin Smith added that this site is, "expected to take on increased significance as the land owner makes application for the wetland to become a part of the County Farmland & Natural Areas Program."



Wetland Health

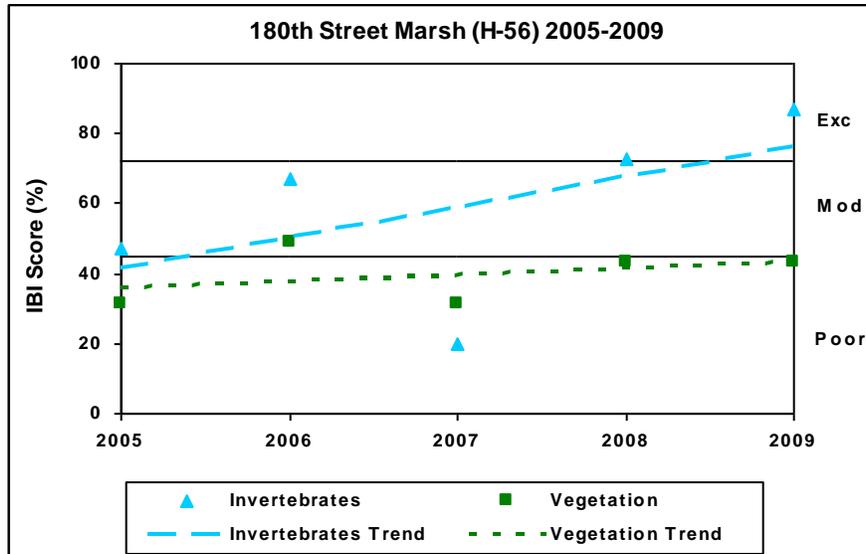
Site Observations: River bulrush, arrowhead, and giant bur-reed grow along the shore. In 2007, the team noted the presence of several invasive species in the upland area, including honeysuckle, spotted knapweed and buckthorn. In 2008, reed canary grass was observed. The City team noted that the wetland bottom was very mucky. The wetland is impacted by surrounding row crops.



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

	Invertebrates 	Vegetation 
2009 Data (H-56)		
Wetland Health Rating (IBI score)	Excellent (26)	Poor (15)
Trend 2005-2009	Improving	Stable to possibly improving

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

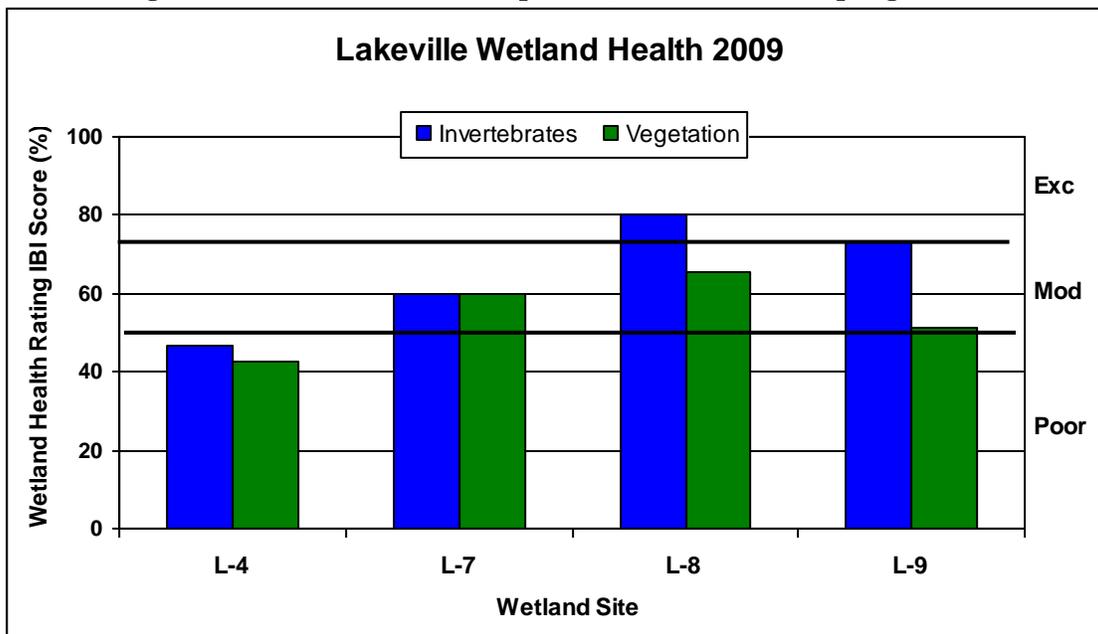


Site summary: Five consecutive years of data have been collected for the 180th Street Marsh. The data are variable between the invertebrates and vegetation, ranging from excellent to poor wetland health. The 2009 scores were higher than those found in most previous years, especially the invertebrate score which was well into the excellent range. It appears there may be a positive trend in the indexes. The vegetation index may be impacted by invasive species.

Lakeville General Wetland Health

Figure 4.6 presents an overall view of wetland health for all the 2009 monitoring sites in Lakeville based on the IBI scores for invertebrates and vegetation presented as a percent. Figure 4.6 also illustrates the consistency of the wetland site scores. The reference wetland, L-7, had very consistent vegetation and invertebrate scores. The vegetation data for the four wetlands sampled ranged from poor to moderate, with most in the moderate wetland health category. The invertebrate scores ranged from poor to excellent. When compared to the reference wetland, L-4 appears to be more impacted, and L-8 less impacted. L-9 had a higher invertebrate score, but the vegetation score was slightly lower than reference conditions.

Figure 4.6 Lakeville site scores (percent) for the 2009 sampling season



4.6.1 Water Treatment Wetland Bank (L-4)

L-4, also known as Water Treatment Wetland Bank, is a 22.85 acre, type 3, wetland located within the Vermillion River Watershed. The watershed is 99.8 acres and 20 percent impervious. There are two inlets and one outlet. The wetland is publicly owned, and has a designation of "restore." The wetland management goal is to undertake projects/actions that will restore the wetland. The City will provide incentives to developers to promote restoration. Less water may be making its way to this site due to ponding in an unfinished development to the west of the site. Once the development is finished, water levels should not be affected by the constructed pond.



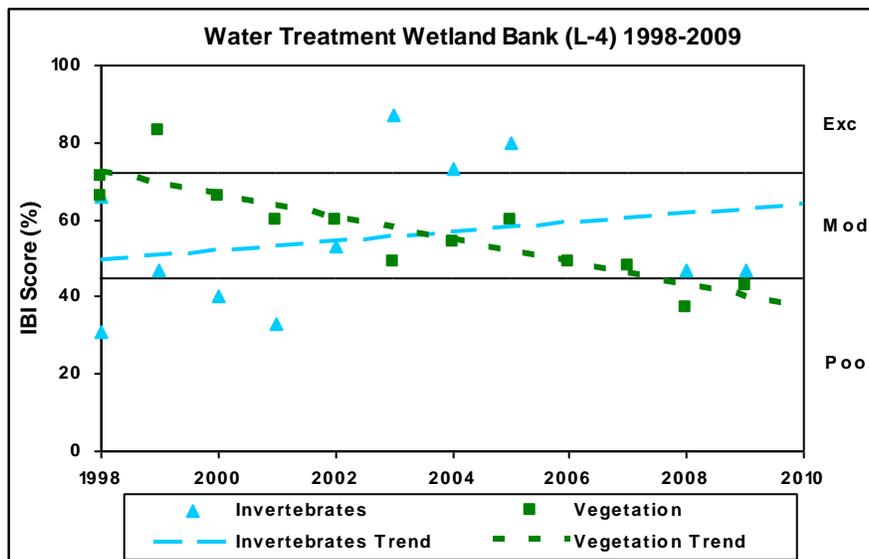
Wetland Health

Site Observations: The team noted that the near-shore area consisted of disturbed grassland containing reed canary grass, nettles, and willow. Tree swallows, red-winged blackbirds, grackle, song sparrow, and chorus frogs were observed by the Lakeville team.

Table 4.6.1 Water Treatment Wetland (L-4) Health based on Index of Biotic Integrity

	Invertebrates 	Vegetation 
2009 Data (L-4)		
Wetland Health Rating (IBI score)	Poor (14)	Poor (15)
Trend 1998-2009	Variable	Declining

Figure 4.6.1 Invertebrate and vegetation trends for Water Treatment Plant Wetland (L-4)



Site summary: There are twelve years of data for this wetland. The trend analysis shows trends in the opposite direction for each index, with vegetation health declining and invertebrate health improving. However, invertebrate data is missing for 2006 and 2007 due to the wetland being dry, and there is a lot of variability in the data, with scores ranging from poor to excellent. The invertebrate score in 2009 was poor to borderline moderate and was lower than in 2003-2005. Scores have been declining since 2005. This is a mitigation wetland. Dry conditions in the past few years have likely impacted this wetland. Extensive stands of reed canary grass were observed in 2008. Invasive species will lower the vegetation diversity in a wetland.

4.6.2 DNR Wetland #387 (L-7)

L-7, also known as DNR #387, is a 10 acre, type 4 wetland located in the Black Dog Watershed. The subwatershed is 506.6 acres with 105.5 acres of direct drainage. It is 29 percent impervious. It is mostly privately owned. It has one inlet and two outlets. The wetland has a designation of "preserve." The wetland management goal is to actively protect and preserve the functions and values of the wetland as much as possible. There is some housing on the north and southeast side of the wetland. Most of the surrounding area is wooded.



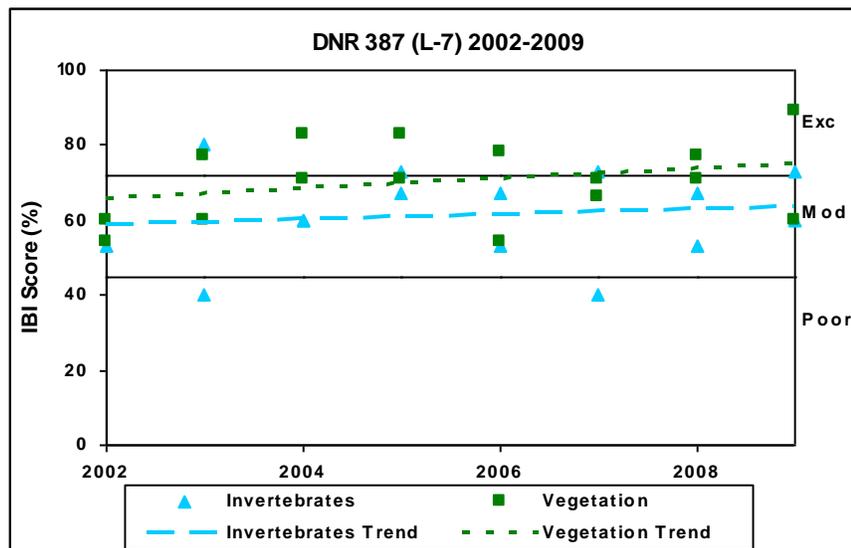
Wetland Health

Site Observations: The Lakeville team observed warbling vireo, green heron, red-winged blackbird, and caddisfly adults. The cross-check team described this wetland as a great wildlife area and noted that a large emergent wetland complex is located upstream of this site. The near-shore area is densely vegetated with some hummocks likely from sedges. Reed canary grass was a dominant species and purple loosestrife is common, though the site used to be infested with purple loosestrife until biological controls were introduced. Now the purple loosestrife is better controlled with some cyclical variation in control effectiveness.

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

	Invertebrates 	Vegetation 
2009 Data (L-7)		
Wetland Health Rating (IBI score)	Moderate (18)	Moderate (21)
Spot Check Rating (IBI score)	Moderate (22)	Excellent (31)
Trend 2002-2009	Stable	Improving slightly

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



Site summary: Eight years of data is available for DNR 387 (L-7). Dry conditions may have altered the invertebrate scores for this site in the past. The 2009 scores indicate moderate to excellent conditions for this reference wetland. There has been a lot of variation in the invertebrate scores. A trend analysis indicates slight improvement in the vegetation community health over time with variable conditions for the invertebrates. The spot check team got a very high score for vegetation. The cross-check team identified a lot more woody plants, forbs and grass-like plant species, resulting in a higher score.

4.6.3 DNR #393 (L-8)

L-8, also known as DNR #393, is a 9.6 acre, type 5 wetland located in the Vermillion River Watershed. The wetland drainage area is 74.7 acres, and 17 percent impervious. It is a publicly owned wetland with no inlets or outlets to date. The wetland has a designation of "Preserve." The wetland management plan is to actively protect and preserve the function and values of the wetland as much as possible.



The surrounding land use is residential and the development around the lake is about three years old. A conservation easement of varying size exists along all sides of this wetland. The buffer includes trees and shrubs.

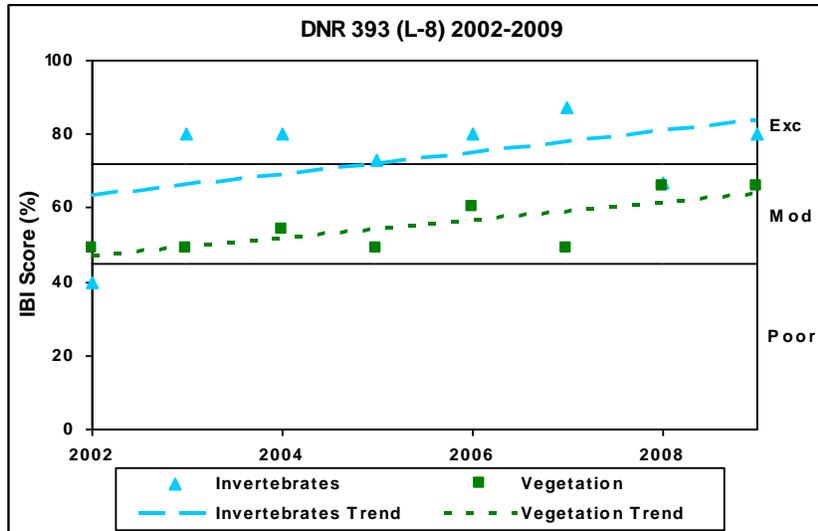
Wetland Health

Site Observations: In 2008, the Lakeville team noted that the willow trees were starting to take over. *Sagittaria* was found in the vegetation plot in 2009. (It was commented that the *Sagittaria* population that had been observed in the past was not found in 2008). This wetland is well buffered by natural vegetation against the recent suburban development, except along Karrville Trail. Wildlife observed: tree swallows, and red-winged blackbird.

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

	Invertebrates 	Vegetation 
2009 Data (L-8)		
Wetland Health Rating (IBI score)	Excellent (24)	Moderate (23)
Trend 2002-2008	Improving	Improving

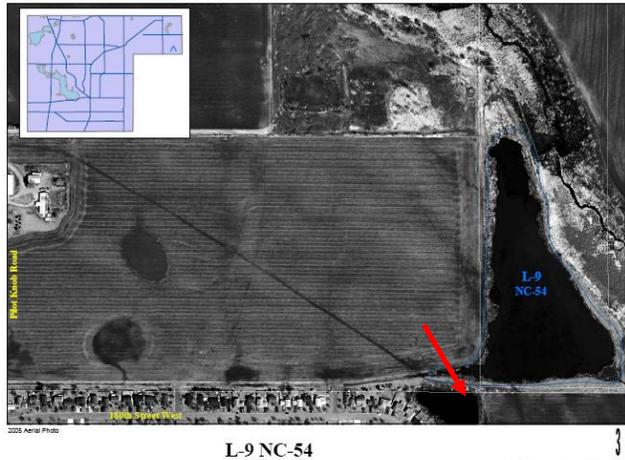
Figure 4.6.3 Invertebrate and vegetation trends for DNR 393 (L-8)



Site summary: DNR wetland 393 (L-8) has eight years of monitoring data. The trend analysis indicates improving wetland health based on both invertebrates and vegetation. There are some factors, such as shoreline development, that are influencing the two areas differently. The buffer surrounding this wetland and lack of inlets is likely helping preserve and improve this wetland.

4.6.4 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 has a designation of "manage 1" with a goal to maintain the existing wetland functions and values.



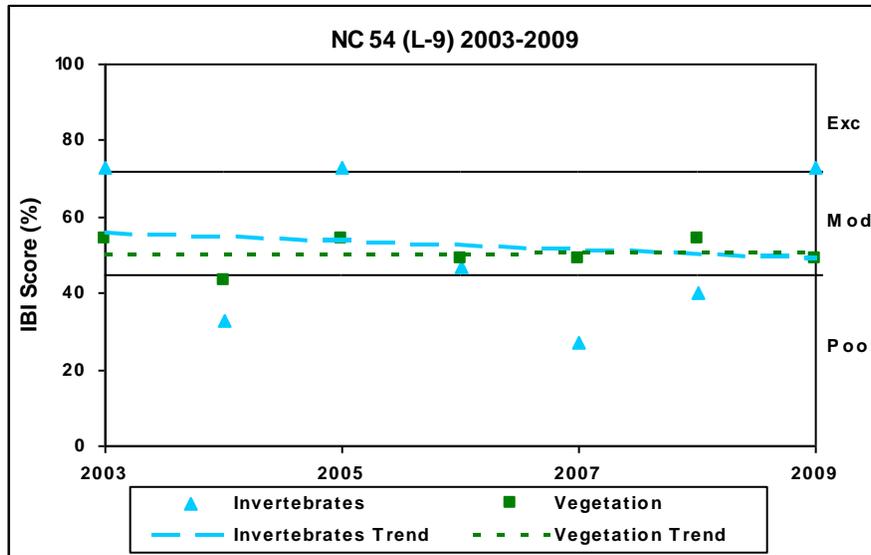
Wetland Health

Site Observations: This site, L-9 is a "Dakota County Wetland Bank" wetland. There is agriculture to the west of the wetland which is slated for future development. The area to the northeast is marshy/wooded area. There is a tree-linked berm to the south with separates the wetland from another pond. The wetland is surrounded by a willow-thicket. In 2007, the Lakeville team noted that the wetland was eutrophic (nutrient rich), with considerable fish die-off. Wildlife observed: red-winged blackbird, killdeer, grackle, mourning dove, tree swallow, willow flycatcher, yellowthroat, pigeon, song sparrow.

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

	Invertebrates 	Vegetation 
2009 Data (L-9)		
Wetland Health Rating (IBI score)	Moderate (22)	Moderate (17)
Trend 2003-2008	Variable	Stable

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



Site summary: Seven years of data exists for NC54 (L-9). The vegetation score for 2009 indicates moderate conditions, while the invertebrate score is borderline excellent. The invertebrate score is quite high compared to 2008. A trend analysis indicates that vegetation scores have remained fairly stable over time, while the invertebrate scores appeared to be declining until the high score found this year.

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

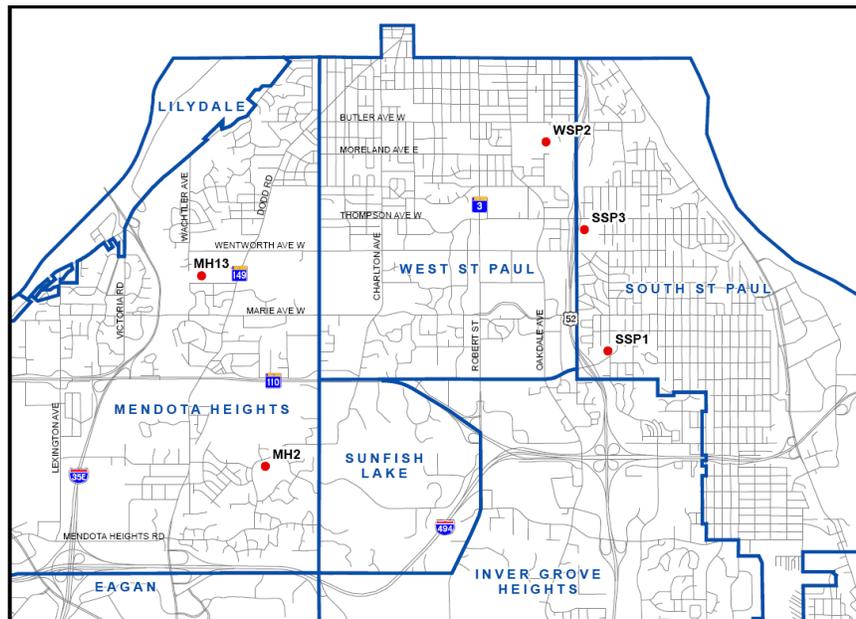
Two wetlands were monitored in Mendota Heights, two in South St. Paul, and one in West St. Paul in 2009 by the Mendota Heights team. The West St. Paul site is located in a Dakota County Park. Eleven wetlands have been monitored in Mendota Heights, three in South St. Paul, and eight in West St. Paul since the start of the WHEP program.

Team Leader:
Darcy Tatham

Team Members:

Brian Ashman, Laura Bandt, Kathy Bellrichard, Caryn Benish, Nicolas Benish, Terri Buttleman, Jess Buttleman, Rhett Buttleman, Ross Buttleman, James Chastek, Dennis Forsberg, Twyla Hill, Jessica Huntington, Michelle Larson, Jim Neuharth, Donna Portner, Kevin Senander, Tamara Swanson, Mary Stade, Anneliese Tatham, and Brian Walter.

Mendota Hts, West St Paul, and South St Paul WHEP Sites Monitored in 2009



Darcy Tatham

Mendota Height's team leader, Darcy Tatham, has been part of the program for nine years. She believes, "when you have the opportunity to get up close to a wetland 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 explained, "The 2009 season was challenging and interesting at the same time. The challenge was having 6 wetlands to monitor during the summer, two more than the previous year. The wetlands were very interesting, though. Since we had such a dry summer we were seeing how the wetlands react without all of the storm water influence. They were acting as regular bodies of water.

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 has been the city WHEP contact since 2008. He was hired as the Mendota Heights Public Works Director/City Engineer. He says, "The City of Mendota Heights is committed to the preservation, maintenance, and improvement of 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 Mazzitello

Ryan Ruzak is a civil engineer for the City of Mendota Heights. He helped coordinate wetlands for monitoring during the 2009 season. He has assisted WHEP volunteers in the data collection and analysis of the data and gained valuable knowledge from my involvement. Ryan was a WHEP volunteer in the past.



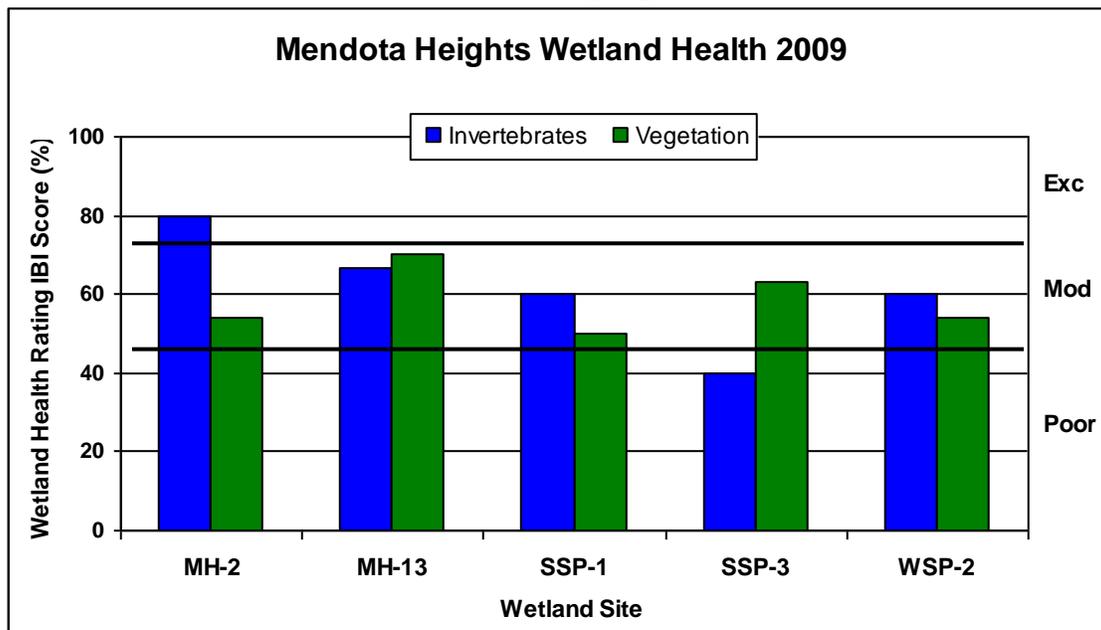
John Sachi

John Sachi is the City Engineer for South St. Paul and the City contact for WHEP. The City has not been involved in WHEP since 2003, and John is responsible for convincing the City Council to be part of the program again. He also located 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

Figure 4.5 presents an overall view of wetland health for all of the 2009 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. Two sites were monitored in Mendota Heights, two in South St. Paul, and one in West St. Paul. The reference wetland, MH-2, ranked as excellent for invertebrates while the other wetlands mostly scored moderate. SSP-3 nearly scored moderate for invertebrates.

Figure 4.7 Mendota Heights, South St. Paul, & West St. Paul site scores (percent) for the 2009 sampling season



4.7.1 Copperfield (MH-2)

Copperfield (MH-2) is a 6-acre, type 4 basin surrounded by grasslands and trees within a residential neighborhood in Mendota Heights. The drainage area for this basin is relatively large (700+ acres) due to its location downstream from many ponds. It is approximately 35 percent impervious. 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 and wetland management plan. The wetland is managed for aesthetics, natural park area and buffer strips. Copperfield is designated as a reference site.



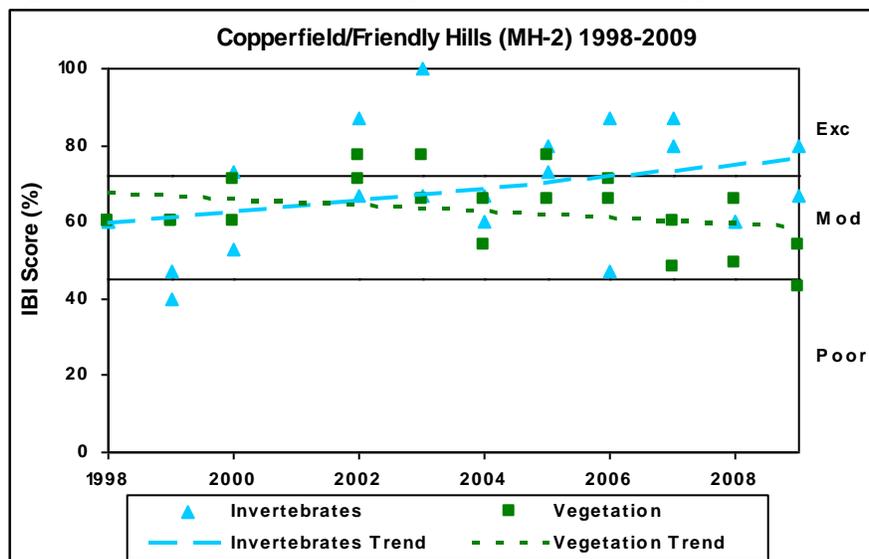
Wetland Health

Site Observations: In 2009, the water level was still low just as in 2007 and 2008. The cross-check team explained that it was very difficult to find water levels deep enough to place bottle traps for invertebrate collection, although the vegetation diversity appeared healthy. Cattails and arrowhead dominate the dry areas. Purple loosestrife and reed canary grass has been observed in the past.

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

2009 Data (MH-2)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Excellent (24)	Moderate (19)
Spot Check Rating (IBI score)	Moderate (20)	Poor (15)
Trend 1998-2009	Improving	Declining

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



Site Summary: The Mendota Heights team found an excellent invertebrate rating and moderate vegetation rating in 2009. Though the invertebrate scores dropped substantially in 2008, they seem to

have recovered in 2009. The long-term trend based on eleven years of data shows improving invertebrate health and declining vegetation health, although there is a lot of variability in the invertebrate data. The cross-check team found lower scores than the City team, enough to bring them into lower categories. The invertebrate cross-check occurred two weeks after the original monitoring, and the vegetation cross-check occurred one week after the original monitoring. The water levels may have dropped lower. Both teams reported the wetland was almost dry. The cross-check did not find any submergent aquatic forbs and only two floating leaved aquatic forbs compared to the City team which found two submergent and four different floating leaved genera. The floating leaved plants that differed were all duckweed or *Wolffia*. The releve plots for the two teams appear to be on opposite ends of the wetland, which could provide different results, especially for the floating-leaved plants that are moved by wind. It is not known which is most representative of the wetland. This is a reference wetland for the City of Mendota Heights.

4.7.2 MH Par 3 (MH-13)

Par 3, also known as MH-13 is a 0.5 acre wetland. The subwatershed is 36 acres with 3 percent impervious surface. The wetland has one inlet in the south east corner, and one outlet at the western edge of the wetland. MH-13 is included in both the City wetland and stormwater management plans. The wetland is designated as "PUBFx" and is managed for aesthetics and water quality. The wetland is located on a golf course which is now managed by the city. Rain gardens and buffer strips are planned for the area.



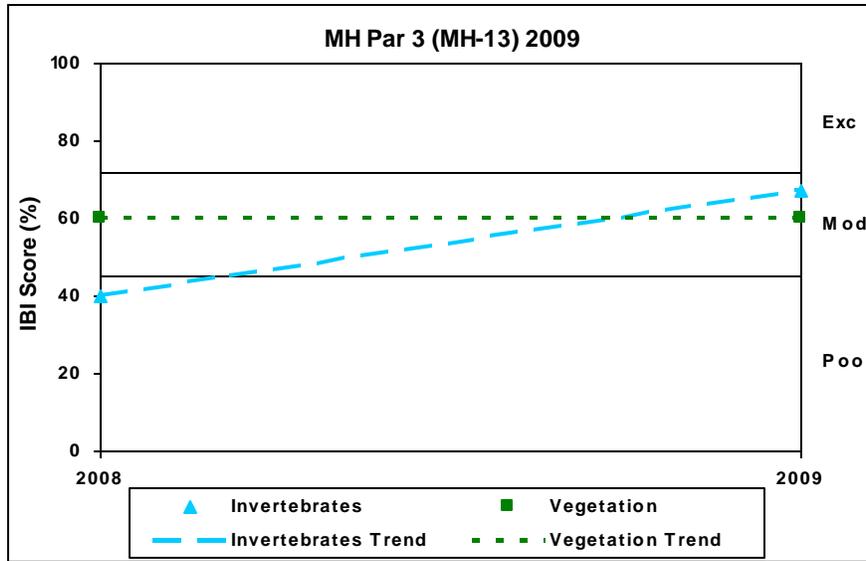
Wetland Health

Site Observations: There is a gentle slope to the wetland which is shallow with a fine silt floor. The water was very low in 2009 and full of vegetation such as pondweed, arrowhead, rushes, cattail, sedge, and algae. A lot of tadpoles were caught in dip nets (and thrown back) during invertebrate collection.

Table 4.7.2 MH Par 3 (MH-13) Wetland Health based on Index of Biotic Integrity

2009 Data (MH-13)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (20)	Moderate (21)
Trend 2008-2009	Not enough data	Not enough data

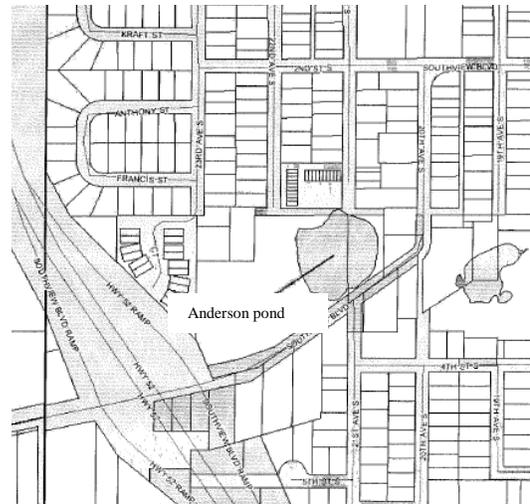
Figure 4.7.2 Invertebrate and vegetation trends for Copperfield (MH-2)



Site summary: This is the second year of monitoring the MH Par 3 (MH-13) site. The invertebrates score increased to high moderate compared to a 2008 score of poor. The vegetation results are remaining steady in the moderate health category. There is not enough data to identify any trends.

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 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.



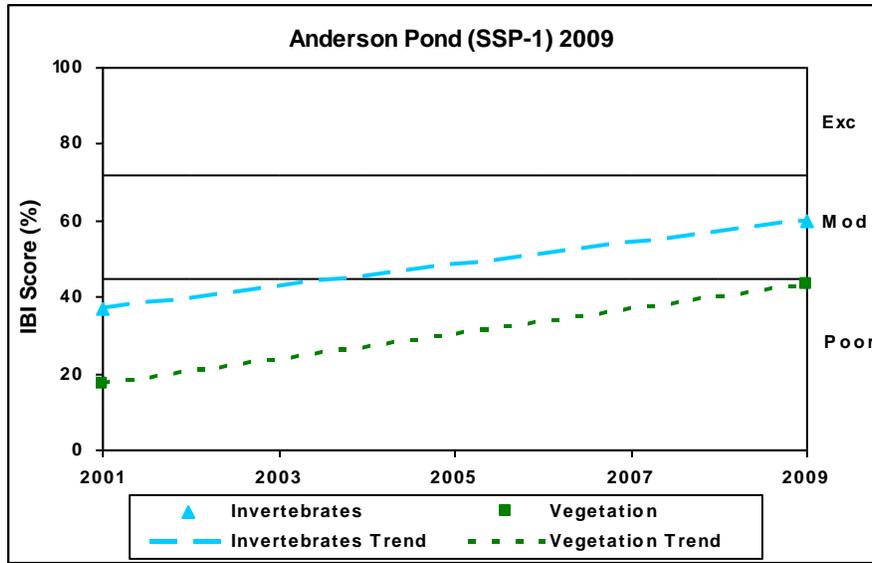
Wetland Health

Site Observations: The pond used to be ringed with cattails which are almost all cut. Some trees overhang the pond. The shoreline is almost exclusively jewelweed. A lot of litter was observed (including Styrofoam, couch cushions, and tennis balls). Anderson pond was dredged last winter and had its shoreline vegetation (i.e. cattails) cut. This was the first time for us to monitor a highly disturbed site.

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

	Invertebrates 	Vegetation 
2009 Data (SSP-1)		
Wetland Health Rating (IBI score)	Moderate (18)	Poor (15)
Trend 2001-2009	Not enough data	Not enough data

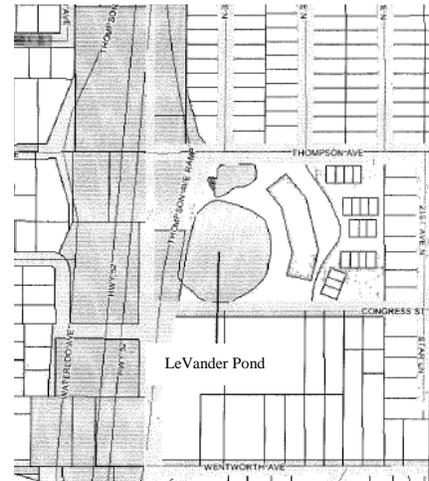
Figure 4.7.3 Invertebrate and vegetation trends for Anderson Pond (SSP-1)



Site Summary: This is the second year that SSP-1 has been monitored. It had not been surveyed since 2001. Based on the observations of a lot of litter and disturbance, it is not surprising to find a poor vegetation score. However, the scores are substantially higher than in 2001, with the invertebrates moving into the moderate range. The wetland receives a substantial amount of stormwater from a developed watershed and is therefore not likely to be of high quality.

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. The City does not currently have a wetland management plan.



Wetland Health

Site Observations: The pond is just west of a new development. reed canary grass, buckthorn, and large cottonwoods surround the pond.

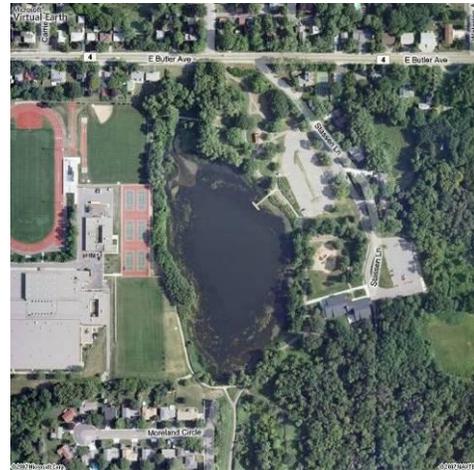
Table 4.7.4 LeVander Pond (SSP-3) Wetland Health based on Index of Biotic Integrity

	Invertebrates 	Vegetation 
2009 Data (SSP-3)		
Wetland Health Rating (IBI score)	Poor (12)	Moderate (19)
Trend 2009	Not enough data	Not enough data

Site summary: This is the first year of monitoring LeVander Pond (SSP-3) site. The initial data indicate poor to moderate wetland health. There is not enough data to conduct a trend analysis. This wetland receives stormwater from the surrounding developed watershed.

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 has a stormwater management plan and wetland management plan. The goals are to improve fisheries, water quality and to stabilize the shoreline. The lake has a naturalized shoreline with rain gardens and has a winter aeration system. The recent expansion of school facilities, construction of a new lodge and removal of an old lodge building has created disturbances to this lake. Also, a current plan is being evaluated to provide a water quality treatment pond at the lake inlet. This is the seventh year of evaluation for this wetland.



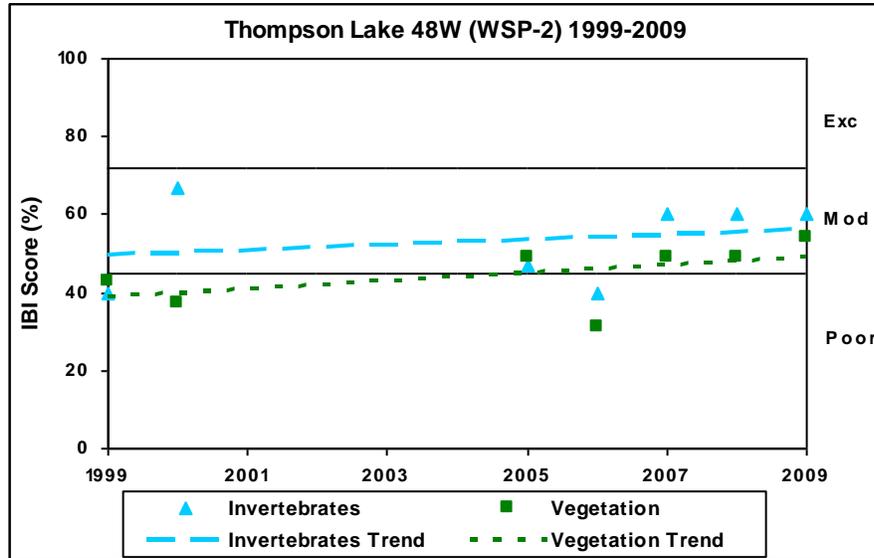
Wetland Health

Site Observations: Lily Lake is located north of the pond across Butler Avenue. The team reported that it flows into Thompson Lake when full. A resident used to, and may continue to pump water into Thompson from Lily. There have been some changes in the watershed in the past few years, including construction of the lodge, playing fields at a nearby school and construction of a rain garden. Several trees have been removed because of Oak wilt.

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

2009 Data (WSP-2)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (18)	Moderate (19)
Trend 1999-2009	Stable	Stable

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



Site summary: WSP-2 has been sampled seven times since 1999, but there was a four year period between samples in 2000 to 2005. The data indicate that the wetland conditions have remained fairly stable with ratings in the poor to low moderate wetland health categories. In 2009, the invertebrate and vegetation plots were sampled across the pond from its usual location. The 2009 data for both invertebrates and vegetation placed the wetland in the moderate category. Although this wetland is located in a park and has received some shoreline plant restoration, it has a large watershed with a high percentage of impervious area contributing water and pollutants.

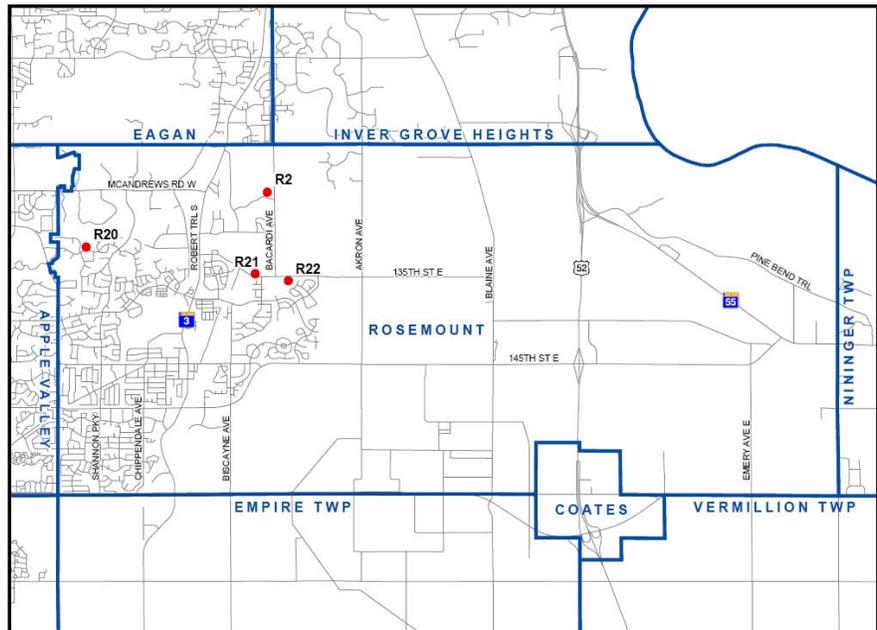
4.8 Rosemount Wetlands

Four wetlands were monitored in the City of Rosemount in 2009. Twenty wetlands have been monitored in Rosemount since the start of WHEP.

Team Leaders: Jane Porterfield, Dan Stinnett

Team Members: Brian Berggren, Barbara Berggren, Brian Demuth, Vanessa Demuth, Shale Demuth, Monique Demuth, Janell Miersch, Terry Pearson, Emily Rekstad, and Denise Wilkins.

Rosemount WHEP Sites Monitored in 2009



Jane Porterfield

Jane and Dan really enjoyed the active participation by Rosemount team members this past summer. They both agree that the field and laboratory expertise of team members is exceptional.

Jane Porterfield, Rosemount co-team leader, found this year's wetland sites particularly interesting due to fairly stable water levels accompanied by a diversity of plant and animal life. She says, "We are always discovering something new and this is a fascinating study to be a part of. As a team leader I enjoy the challenges and pleasures involved in being out in a natural environment."

This is Dan Stinnett's first year at sharing team leader responsibilities and was most impressed with the quality of Rosemount team members.

"Whether it is peering for hours through a dissecting scope or wading through deep wetland muck, this is a highly motivated and dedicated bunch of citizen scientists," he commented. Dan feels the team 'clicks' because they are there to fulfill a mission but to have fun along the way.



Dan Stinnett

They both enjoy experiencing the variety of wetlands they are asked to sample through the WHEP program and hope the program remains active so they can continue to volunteer in the future.

Christine Watson, of the City of Rosemount, helps select the wetlands to be monitored, recruits volunteers, coordinates and supports 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.

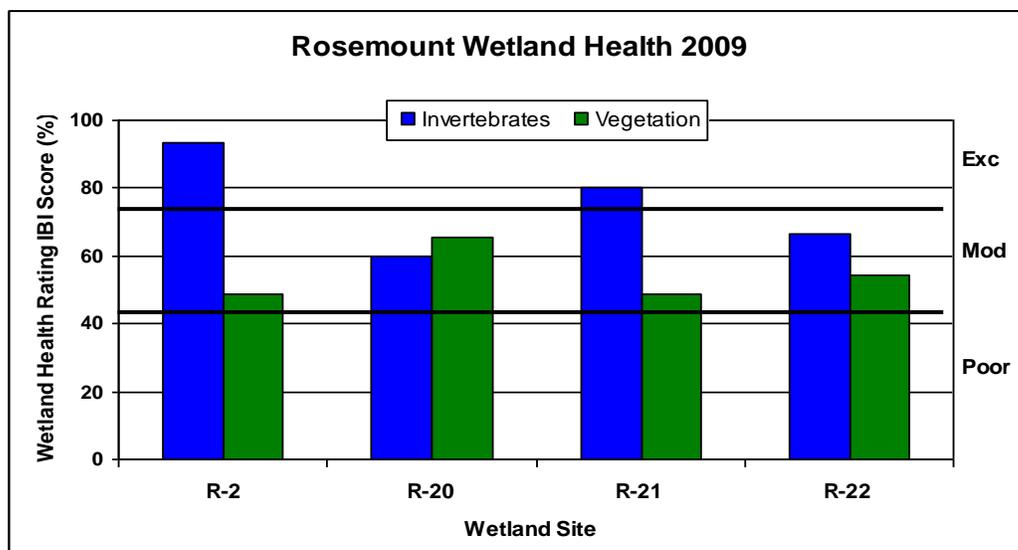
As part of the WHEP program, the city better manages its wetland resources and has additional data to complement the city's Wetland Management Plan. The cumulative data will allow the city to better manage, restore, and maintain its wetland biodiversity in the future.

Rosemount General Wetland Health

Figure 4.8 presents an overall view of wetland health for all the 2009 monitoring sites in Rosemount based on the scores for invertebrates and vegetation presented as a percent. Figure 4.8 also illustrates the consistency of the wetland site scores. Scores that differ by less than 10 percent are considered consistent. The R-14 wetland has consistent vegetation and invertebrate scores. However, R-1, R-4 and R-18 show inconsistent scores between the vegetation and invertebrates. The invertebrate data indicate moderate to excellent wetland health for all wetlands, while the vegetation data indicate poor to moderate wetland health. The scores for R-14 and R-18 indicate better conditions than the reference wetland, R-1.



Figure 4.8 Rosemount site scores (percent) for 2009



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

Preserve Wetlands
 Manage I Wetlands
 Manage II Wetlands
 Utilize Wetlands

Required buffer

75 feet
 50 feet
 30 feet
 15 feet in non-agricultural areas only

4.8.1 White Lake (R-2)

White Lake (R-2), also known as WMP #152 or DNR 008W, is a 33 acre, type 4/5 deeper water wetland. The watershed is 998 acres and 10 percent impervious. There is one inlet on the east side along Bacardi Avenue and one outlet along 126th Street West. It is primarily a deep open water marsh with a shallow marsh and a wet meadow fringe dominated by narrow-leaf cattail and reed canary grass. The wetland is connected to the southern portion of White Lake via a culvert under 126th Street West



White Lake is part of the city's stormwater management plan. The wetland receives stormwater from the adjacent roads and nearby agriculture. The City's wetland management plan lists White Lake in the "preserve" category, with a goal to maintain the wetland without any loss of its function or value. A 75 foot buffer must be maintained between the wetland and any new development. It is a small lake with multiple wetland types.

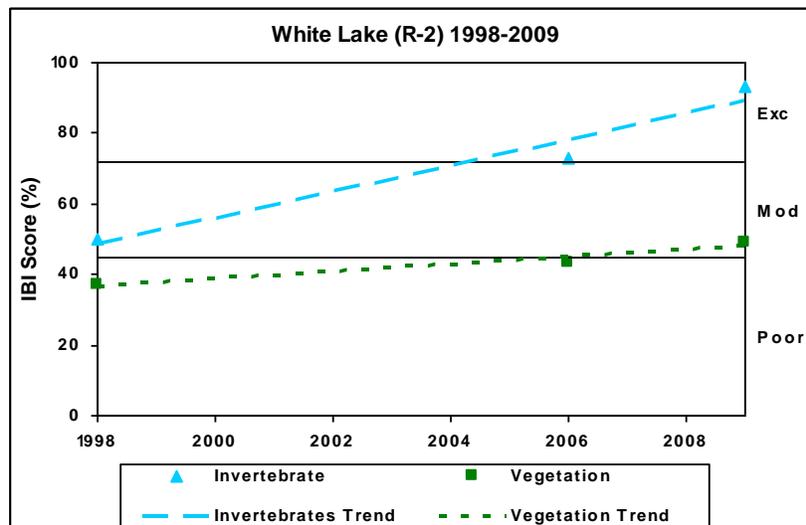
Wetland Health

Site Observations: The Rosemount team noted road and stormwater impacts on the east side of the wetland. Upstream runoff from livestock pasture is collected in a pond on the east side of Bacardi Avenue prior to discharging to White Lake. The water level was low with a mucky bottom.

Table 4.8.1 Wetland Health based on Index of Biotic Integrity

	Invertebrates 	Vegetation 
2009 Data (R-2)		
Wetland Health Rating (IBI score)	Excellent (28)	Moderate (17)
Trend 1998-2009	Improving	Possibly improving

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



Site Summary: White Lake (R-2), a reference wetland, has been sampled three times since 1998. The invertebrate IBI score showed moderate to excellent wetland health, while the vegetation has scored poor to moderate. Conditions seem to be improving for both measures. It is primarily a deep open water marsh with a shallow marsh and a wet meadow fringe dominated by narrow-leaf cattail and reed canary grass.

4.8.2 Unnamed Wetland (R-20)

Unnamed Wetland (R-20), also known as WMP #332, is a 1.0 acre, type 3/4 wetland within the Birger Pond Watershed. It has a drainage area of 897 acres with 30 percent impervious surface. There is one inlet on the east side from a stormwater pond, and one outlet on the south side which flows under Evermoor Parkway. The wetland is designated as a "preserve", and is managed as a maintained wetland without any loss of function or value. It receives runoff from adjacent roads and development, and potentially receives direct nutrient loading from surrounding manicured lawns. It was requested that this site be monitored in 2009. It will be monitored in the future to assess the impact of surrounding development.



Site Observations: The water level was low; the wetland was dry ten feet from the edge of the ring of cattails. Wildlife observed included, Canada geese with goslings, green heron, rabbits, and swallows.

Table 4.8.2 Unnamed Wetland (R-20) Wetland Health based on Index of Biotic Integrity

	Invertebrates 	Vegetation 
2009 Data (R-20)		
Wetland Health Rating (IBI score)	Moderate (18)	Moderate (23)
Spot Check Rating (IBI score)	Moderate (22)	Moderate (21)
Trend 2009	Not enough data	Not enough data

Site summary: This is the first year that the wetland has been monitored. There is not enough data to conduct a trend analysis. It is a depressional, shallow marsh with open water. It is present in aerial photos dating back to the 1930's.

4.8.3 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 does not have any 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 will have a 30 foot buffer. The wetland is located in a basin surrounded by agriculture and a road to the south.



Site Observations: The wetland has a dense cattail border and a very solid bottom with sand beneath silt. The team noted that in previous years, the cattails were in open water. Wildlife observed included, adult dragonfly, water striders, red-wing blackbirds, pheasant, gray tree frogs, American toads, muskrat evidence (cut cattails), and egret. The wetland is almost surrounded with reed canary grass. According to the Rosemount Team, it is a mitigation site and has been seeded with native wetland and prairie vegetation. It is difficult to establish native species with reed canary grass present, and therefore this site will continue to be monitored.

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

	Invertebrates 	Vegetation 
2009 Data (R-21)		
Wetland Health Rating (IBI score)	Excellent (24)	Moderate (17)
Trend 2009	Not enough data	Not enough data

Site summary: This is the first year that this site has been monitored. It appears to be one of the higher quality wetlands, with an invertebrate score of excellent. More data is necessary to provide baseline data and to predict any trends.

4.8.4 Mare Pond South (R-22)

Mare Pond South (R-22), also known as WMP 400 and DNR 012W, is an eight acre, type 3/4 wetland in the White Lake Watershed. The watershed is 998 acres of which 10 percent is impervious surface. The subwatershed is 81 acres. There is one inlet on the southside and one inlet on the eastside. There are no outlets. This wetland is included in the City of Rosemount's Stormwater and Wetland Management Plans. It is designated as a Preserve area with a management goal to maintain the wetland without any loss of its functions or values. There is potential for receiving stormwater from a new development to the south. The wetland is located within a basin with a mitigation area and prairie restoration area to the west.



There is a wooded area uphill and to the south, and an adjacent road to the north. The City requires a 75 foot buffer around the wetland.

Wetland Health

Site Observations: The Rosemount Team described Mare Pond South as an "amazingly large wetland filled with plantain and arrowhead." It was a mud flat when surveyed.

Table 4.8.4 Mare Pond South (R-22) Wetland Health based on Index of Biotic Integrity

	Invertebrates	Vegetation
2009 Data (R-22)		
Wetland Health Rating (IBI score)	Moderate (20)	Moderate (19)
Trend 2009	Not enough data	Not enough data

Site summary: This is the first year of monitoring for R-22. Low water levels in 2009 likely influenced the IBI scores. Additional monitoring will be needed to establish adequate baseline data for this site.

Appendix A
Dakota County Wetland
Sites
Invertebrate Sampling History

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

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

Site ID	Site Name	1997	1998*	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
AV-1	Hidden Valley		19/21	10	8/8	24/14	14/16	14/12/24	16/12	22/20	26		20/24/ 24	20/24/ 20
AV-2	Kelley Property		17/19	16/16	10/8	16	16							
AV-3	Palomino		25/21	12										
AV-4	Elderberry Court		9/7	8	12	6								
AV-5	Cedar Knolls				16	16	18	12						
AV-6	Belmont Pond						18	18	14	18	12			
AV-7	Podojil							8	6					
AV-8	Chaparral Pond								12	14	18			16
AV-9	Watrud Pond									26	22/14	18/16		
AV-10	Alimagnet Park											12		
AV-11	Farquar Lift Station											24		
AV-12	EVR-P12 Public Water											12	16	
AV-13	EVR-P14 Long Lake N.												22	
AV-14	EVR-P43 (East Park)												12	
AV-15	Carrollwood													10
AV-16	Nordic Park													na
B-0	Terrace Oaks	17/15/19	13/21/23							26				
B-1	Crystal Lake West			20/22	16/20	20/22	24/26	24/24	18/22	20/12		24	26/26/ 26	
B-1 Alt.	Crystal Lake West Alt.													15/na
B-2	Cam Ram		17/13/17	18							16		na	
B-3	Kraemer		15/13/19	14	18	24	26	22	20	18	22	18	24	24
B-4	Alimagnet		19/21/13	20										
B-5	Judicial Park North				16									
B-6	Alimagnet East/Dog Park				16/12		22			20		22	22	
B-7	Terrace Oaks North					20								
B-8	Red Oak					26								
B-9	Crosstown West						6							
B-10	Rosemount Aerospace Pond							26	18		24			
B-11	Valley View							14	20	16	24/14			16
B-12	Terrace Oaks by BV Pkwy											??		

Site ID	Site Name	1997	1998*	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
B-13	Sunset Lake													24/22
E-1	Thompson Lake Park		21/17/19											
E-2	Rahn Park		25/21											
E-3	BP- 25 Diffley Pond		15/23		16/16		14							
E-4	Town Center		21/13											
E-6	DP-13 Northwoods			18										
E-7	DP-11 Opus			28								26/26/18		
E-8	AP 52.1 Trapp Farm			18										
E-9	LP-5- Wildemess Run			20/22					14/16			16		
E-10	AP-3 Cedar Pond				10	6	10	12	6	8/10	12/16	12	22/22/20	
E-11	CP-4 Lockheed				24	18/16		10						
E-12	FP 7.5 Lone Oak Drive				18/14									
E-13	FP 7.6 Lone Oak Drive					22								
E14	LP-27 Highway 3					16			18					
E-15	JP-11.2 Wescott						10							
E-16	EP - 3 Faithful Sheperd						26/14	18						
E-17	EP 3.2 Aldrin Rd							14/14/24	16					
E-18	DP 14 Moonshine Park							10						
E-19	FP-4.1									14				
E-20	Shanahan Lake									18				
E-21	FP-11.5										18		22	
E-22	FP-11.6										10		18	
E-23	FP-4.2										16			
E-24	JP-42											16		
E-25	FP-4.5												16	
E-26	DP-6.2, Northwoods Business Park													14
E-27	LP-26.54, Thomas Woods													18/24/18
E-28	HDP-1, Kennerick Add.													16
LH-1	Lilypad Knoll, Lebanon Hills				22									
F-1	Pine Knoll		11/21/17	10/10/12	14/12	14/12	10/12	20/16	18/16	20/26			12/ na	na
F-2	Muskkrat		25/17											
F-3	Kral Pond		21/11	14	12	10	6	12	10	10	12	10/10	8	10
F-4	Lake Julia		15	16	10	8	10	14	18	10	10	8	10	6/8
F-5	Pilot Knob			20	20/26	16	12						na	
H-1	Louis Lane			10/10	6/16	8								

Site ID	Site Name	1997	1998*	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
H-2	Bullfrog Pond			14	10									
H-3	Stonegate Untreated					8	14							
H-4	Stonegate Treated					12	12	10	20	14	18	16	20	12
H-5	Lower Vets						18/18							
H-6	Lake Rebecca							20/16	20/20	14/8	18/26	12/14/14	16/26/14	22/20/22/18
H-30	Sand Coulee								14	10	14	16	14	16
H-56	180th Street Marsh									14	20	6	22	26
T-1	Lake Byllesby				10	16								
T-2	Northfield				18									
IGH-1	KP-9		23/27/23	16/16/26		18/14	24/18							
IGH-2	CP-13			16										
IGH-3	BP-21		23/17	18										
IGH-4	EP-18		23/15	20										
IGH-5	CP-6		19/19											
IGH-6	MP-67				10									
IGH-7	LP-2				18									
IGH-8	HP-1				12									
IGH-9	QP-1				22	18								
IGH-10	NP-15					26	20							
IGH-11	NP-12					20								
IGH-12	NP-13						12							
IGH-13	NP-10						12							
IGH-14	DC 2 or Ordway							12						
L-1	Ritter Farm Park		19/23/29	20/20/22										
L-2	Orchard		19/23											
L-3	Raven Lake		19/13	20	14	18	14/16							
L-4	Water Treatment Wetland Bank		11/23	14	12	10	16	26	22	24			14	14
L-5	Country View Marsh			14	10	6								
L-6	Kingsley Lake				20	18/26								
L-7	DNR 387						16	24/12	18/18	20/22	20/16	22/12	22/16/20	18/22
L-8	DNR 393						12	24	24	22	24	26	20	24
L-9	NC 54							22	10	22	14	8	12	22/22
MH-1	Valley Park		29/27/23	12										
MH-2	Copperfield/Friendly Hills		21/21	12/14	16/22		26/20	30/20	20/18	24/22	26/14	24/26	22/18/18	24/20/24
MH-3	Visitation		19/23	24										
MH-4	Industrial Park		27/19	16	18	18								

Site ID	Site Name	1997	1998*	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
MH-5	Pagel Pond				12	22								
MH-6	City Hall				10	14								
MH-7	Copperfield II					22/24/22								
MH-9	Hagstrom-King						22	24	18					
MH-10	Wentworth Park										18			
MH-11	Lockwood Pond									18		14		
MH-13	MH Par 3												12	20
R-1	Kelly Marsh-Derryglen Ct in 2004		15/21						20/14	24/24		24/16/20	22/24/20	
R-2	White Lake		15/17								22			28
R-3	O'Leary					16	10				6			
R-4	Schwartz Pond		21/13/25	18	14								16	
R-5	Wilde Lake					24/28	18							
R-6	Keegan					16	10/18				22/24			
R-7	Marcotte Pond					12					26			
R-8	Wachter Lake						6							
R-10	Deepwoods Court							20	16			16		
R-11	Bicardi Avenue							12	16					
R-12	Avalon							22/16	12	12				
R-13	130th Way							20						
R-14	WMP #379									20			22	
R-15	Birger Pond									20		20		
R-16	Unnamed													
R-17	Unnamed											18		
R-18	WMP #279												26	
R-20	Unnamed													20/22/18
R-21	CR-38 Mitigation Site 1													24
R-22	Mare Pond, South													20
SSP-1	Anderson Pond					6								18
SSP-2	Seidl's Lake						10/10	10						
SSP-3	LeVander													12
WSP-1	Mud Lake			12/10/20	10/10									
WSP-2	Thompson Lake 48W			12	20					14	12	18	18	18
WSP-3	Duck Pond			18	12									
WSP-4	Weshke Pond				12	20								
WSP-5	Lilly Lake					16	24							
WSP-6	Marthaler Park					26	24	20						

Site ID	Site Name	1997	1998*	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
WSP-7	Vivian Pond					24/24								
WSP-8	DNC Prairie Pond							24						

* Note 1998 spot checks conducted by URS, some with more than one sample, 1998 totals include amphibian metric, "na" indicates no data available

Appendix B
Dakota County Wetland Sites
Vegetation Sampling History

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

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

Site ID	Site Name	1997	1998*	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
AV-1	Hidden Valley		21/23	15	23/23	21/25	19/17	23/25/21	25/21	27/19	21		19/21/21	13/17
AV-2	Kelley Property		17/27	23/27	23/17	25	23							
AV-3	Palomino		29/25	na										
AV-4	Elderberry Court		17/17	13	17	15								
AV-5	Cedar Knolls				17	19	15	21						
AV-6	Belmont Pond						21	17	25	23	15			
AV-7	Podojil							13	13					
AV-8	Chaparral Pond								19	21	19			15/23
AV-9	Watrud Pond									25	19/21	17/15		
AV-10	Alimagnet											11		
AV-11	Farquar Lift Station											9		
AV-12	EVR-P12 Public Water											21	11	
AV-13	EVR-P14 Long Lake N.												13	
AV-14	EVR-P43 East Park												9	
AV-15	Carrollwood													13
AV-16	Nordic Park													17
B-0	Terrace Oaks	19												
B-1	Crystal Lake West			29/25	33/25	29/29	31/33	29/33	29/23	27/21		23	25/19/23	
B-1 Alt.	Crystal Lake West – Alt.													21/21/23
B-2	Cam Ram	17	21/13	21							17		11	
B-3	Kraemer		23/21	23	21	21	23	25	25	13	17	17	17	19
B-4	Alimagnet													
B-5	Judicial Park North				23									
B-6	Alimagnet East/Dog Park				21/21		13			13		21	17	
B-7	Terrace Oaks North					17								
B-8	Red Oak					17								
B-9	Crosstown West						13							
B-10	Rosemount Aerospace Pond							15	13		13			
B-11	Valley View							27	25	21	17/19			13
B-12	Terrace Oaks, by BV Pkwy											na		
B-13	Sunset Lake	na												19
Site ID	Site Name	1997	1998*	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009

E-1	Thompson Lake Park	23	17/21/23											
E-2	Rahn Park		17/15/15											
E-3	BP- 25 Diffley Pond		15/25/23		17/25		13							
E-4	Town Center		21/15											
E-6	DP-13 Northwoods			15										
E-7	DP-11 Opus			19								19/11/17		
E-8	AP 52.1 Trapp Farm			21										
E-9	LP-5- Wilderness Run			29/27					27/19			17		
E-10	AP-3 Cedar Pond				11		21	23	17	23/15	13	13	19/17	
E-11	CP-4 Lockheed				19	21/15		15						
E-12	FP 7.5 Lone Oak Drive				21/19									
E-13	FP 7.6 Lone Oak Drive					21								
E14	LP-27 Highway 3					23				23				
E-15	JP-11.2 Wescott						23							
E-16	EP - 3 Faithful Sheperd						17/15	21						
E-17	EP 3.2 Aldrin Rd							21/21/17	19					
E-18	DP 14 Moonshine Park							23						
E-19	FP-4.1										21			
E-20	Shanahan Lake										25			
E-21	FP-11.5											15	17	
E-22	FP-11.6											15	15	
E-23	FP-4.2											11		
E-24	JP-42												21	
E-25	FP-4.5													19
E-26	DP-6.2, Northwoods Business Park													15/15
E-27	LP-26.54, Thomas Woods													21/23
E-28	HDP-1, Kennerick Add.													21
LH-1	Lilypad Knoll, Lebanon Hills				31		31							
F-1	Pine Knoll		21/21	23/29	17/15	11/23	17/31	17/15	17/21	13/15	13/21	13	13/17	na
F-2	Muskrat		15/15											
F-3	Kral Pond	21	25/29	21	19	13	13	19	13	13	15	9/15	7	11
F-4	Lake Julia		19/15	21	17	15	17	17	19	15	15	11	11	13/15
F-5	Pilot Knob			21	19/21	13	17	15	19	15	15	13	na	
H-1	Louis Lane			15/15	11/11	11								
H-2	Bullfrog Pond			17	9									
Site ID	Site Name	1997	1998*	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009

H-3	Stonegate Untreated					9	15								
H-4	Stonegate Treated					11	13	17	17	17	21	19	21	21	
H-5	Lower Vets						11/23								
H-6	Lake Rebecca							19/17	15/17	21/23	23/21	21/13/21	21/21	23/17	
H-30	Sand Coulee								15	17	15	11	13	13	
H-56	180th Street Marsh									11	17	11	15	15	
T-1	Lake Byllesby					13	13								
T-2	Northfield					15									
IGH-1	KP-9		25/29/27	29/23/23		23/33	15/19								
IGH-2	CP-13			23											
IGH-3	BP-21		17/15	19											
IGH-4	EP-18		15/19	21											
IGH-5	CP-6		13/11												
IGH-6	MP-67					25									
IGH-7	LP-2					15									
IGH-8	HP-1					15/15									
IGH-9	QP-1					29	25								
IGH-10	NP-15					15	15								
IGH-11	NP-12					13									
IGH-12	NP-13							15							
IGH-13	NP-10							23/25							
IGH-14	DC 2 or Ordway							23							
L-1	Ritter Farm Park		23/21/17	23/23/21											
L-2	Orchard		29/21												
L-3	Raven Lake		23/21	29	17	25	27/15								
L-4	Water Treatment		23/25	29	23	21	21	17	19	21	17	17	13	15	
L-5	Country View Marsh			17	15	23									
L-6	Kingsley Lake				27	31									
L-7	DNR 387							19/21	27/21	25/29	29/25	27/19	25/23	25/27	21/31
L-8	DNR 393							17	17	19	17	21	17	23	23
L-9	NC 54								19	15	19	17	17	19	17
MH-1	Valley Park		19/17/23												
MH-2	Copperfield/Friendly Hills		21/21	21/21	21/25		27/25	27/23	23/19	27/23	23/25	21/17	23/17/19	19/15	
MH-3	Visitation		15/17	13											
MH-4	Industrial Park		17/15	17	17	17									
MH-5	Pagel Pond			15	17	15									
MH-6	City Hall				11	15									
Site ID	Site Name	1997	1998*	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	

MH-7	Copperfield II					23/25/25								
MH-9	Hagstrom-King						23	21	25					
MH-10	Wentworth Park										17			
MH-11	Lockwood Pond									19		19		
MH-13	MH Par 3												21	21
R-1	Kelly Marsh- Derryglen Ct in 2004		17/19/17						21/21	15/15		17/13/19	19/17	
R-2	White Lake		13/23								15			17
R-3	O'Leary		17/11			19	15				11			
R-4	Schwartz Pond			13	11								15	
R-5	Wilde Lake					15/15	19							
R-6	Keegan						15/7				17/19			
R-7	Marcotte Pond					19					17			
R-8	Wachter Lake						11							
R-10	Deepwoods Court							17	19			19		
R-11	Bicardi Avenue							27	15					
R-12	Avalon							15/11	17	11				
R-13	130th Way							15						
R-14	WMP #379									23			25	
R-15	Birger Pond									17		13		
R-16	Unnamed											13		
R-17	Unnamed											17		
R-18	WMP #279												19	
R-20	Unnamed													23/21
R-21	CR-38 Mitigation Site 1													17
R-22	Mare Pond, South													19
SSP-1	Anderson Pond					11								15
SSP-2	Seidl's Lake						13/13	11						
SSP-3	LeVander													19
WSP-1	Mud Lake		15/13/13	17/13										
WSP-2	Thompson Lake 48W		15	13						17	11	17	17	19
WSP-3	Duck Pond		17	21										
WSP-4	Weshke Pond (Pond 1)			21	23									
WSP-5	Lilly Lake				17	17								
WSP-6	Marthaler Park				21	21	23							
WSP-7	Vivian Pond				19/19									
WSP-8	DNC Prairie Pond							15						

* Note 1998 spot checks conducted by URS, some with more than one sample, 1998 totals include amphibian metric, "na" indicates no data available