2007 Wetland Health Evaluation Program Report
Dakota County, MN

Coordinated By:

Dakota County

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Report
Prepared by:

FORTIN CONSULTING, INC.
serving the environment

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the 2007 Wetland Health Evaluation Program

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Dakota County
City of Apple Valley
City of Burnsville
City of Eagan
City of Farmington
City of Hastings
City of Lakeville
City of Mendota Heights
City of Rosemount

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
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URS –some of the report text was used from previous reports prepared by URS

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

For more information on the Dakota County Wetland Health Evaluation Program or for a copy of this report, please contact the Dakota County Water Resources Department or visit ***www.mnwhep.org.***

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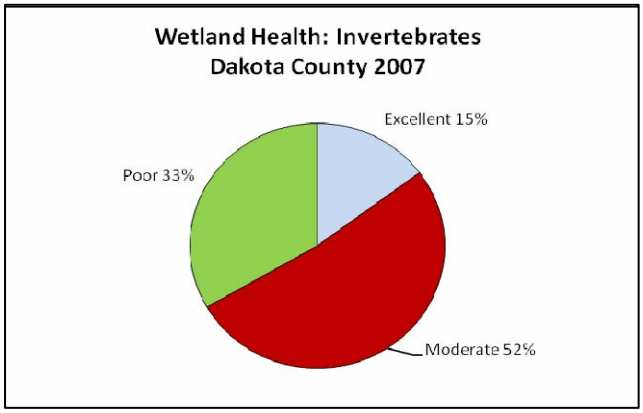
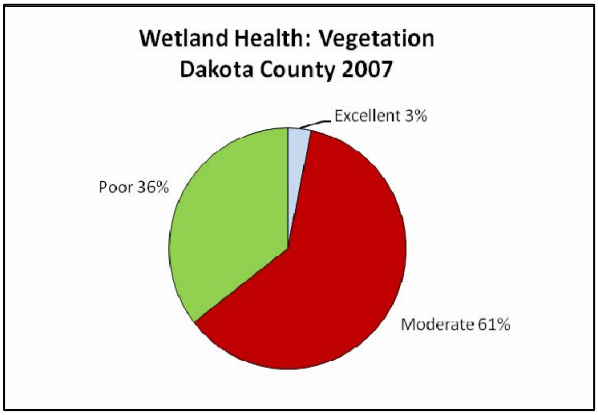
Executive Summary
Dakota County Wetland Health Evaluation Program 2007

Dakota County began sponsoring the Wetland Health Evaluation Program (WHEP) in 1997. Since then, 122 wetlands have been monitored by many volunteers across the County. In 2007, eight cities participated in WHEP, monitoring 31 different wetlands. 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 2007 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. More wetlands rated in the excellent category for invertebrates than for vegetation.

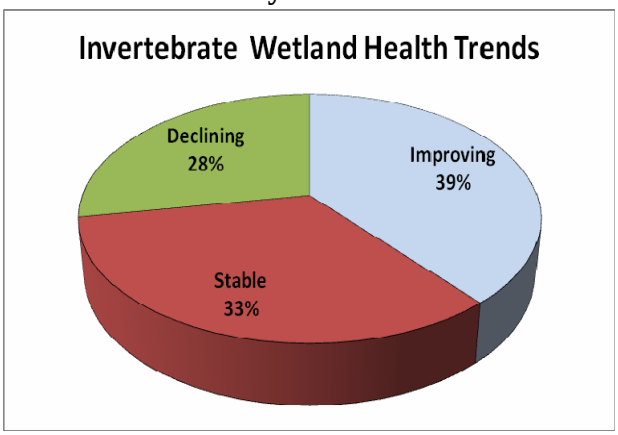


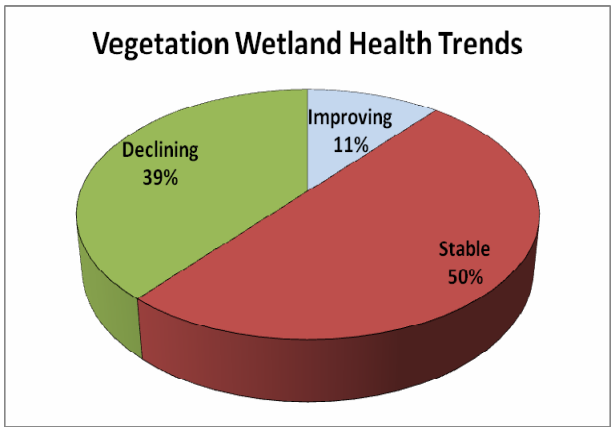


The City of Burnsville wetlands rated the highest, with an excellent and two moderate ratings for invertebrates and all moderate ratings for vegetation. The four Farmington wetlands rated the lowest in terms of wetland health. All four wetlands rated poor for vegetation and two of the four rated poor for invertebrates. The other two could not be sample due to low water levels. Most wetlands were rated as moderate in both invertebrate and vegetation health.

A trend analysis was conducted for all of the wetlands monitored in 2007 with the exception of 13 of the 31 wetlands that lacked enough data to analyze trends. For invertebrates, there was a good distribution between wetlands that are improving, declining and remaining fairly stable. For vegetation, only 11 percent of the wetlands showed improved wetland health. The majority of the wetlands with enough data to analyze trends remained fairly stable in terms of vegetation health.

2007 Dakota County Wetland Health Trends*





*excludes 13 of the 31 wetlands, those that did not have adequate data for trend analysis

Low water level was a problem in 2007, in some cases preventing collection of invertebrate samples. Some wetlands were not sampled at all because of low water and were replaced by others.

WHEP volunteers donated hundreds of 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, 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 species richness for both vegetation and invertebrate analyses. 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 (IBIs) to measure wetland health using grants from the US Environmental Protection Agency (US EPA) at the MPCA. Mark's biological index was based on wetland plants, Judy's on invertebrates. Developing chemical standards for measuring pollution in wetlands seemed impossible then, so they pushed for the biological approach, as did US EPA.

Judy Helgen, Program co-founder

Wetlands are generally not viewed as having the same status as streams and lakes. The Wetland Conservation Act helps maintain the number and acreage of wetlands in Minnesota, but often the quality of the wetlands is not protected. MPCA staff recognized that they could teach citizens how to evaluate wetlands and they could convince their local governments to protect the water quality as reflected by the diversity of organisms and plants that thrive in healthy wetlands.

Mark Gernes, Program co-founder

In 1996, the MPCA partnered with Minnesota Audubon, forming a large contract with them (with EPA funds) to help us 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.

Eventually, WHEP took on a life of its own, under the leadership of Charolette 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 are handled by the counties and communities.

Wetland sampling efforts began in 1997 in Dakota County. During 1998-2000, the program continued under the management of the Dakota Environmental Education Program. During these years, the project was funded by various sources, including the USEPA grant, Minnesota Legislature (LCMR grant) and participating cities. 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 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 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.

Citizen volunteers have been contributing to WHEP in Dakota County since 1997. 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 wetland 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

With 24,501 acres of wetlands, wetlands make up about 6.5 percent 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 totals, 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 covered with water periodically with usually 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; while deciduous swamps contain duckweed and smartweed.

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, Dakota County WHEP Coordinator, says that "WHEP serves as a model for citizen wetland monitoring around the country. It is extremely successful not only at providing a unique educational experience for volunteers but also producing quality data because of the program's protocol design and training. Minnesota Pollution Control Agency (MPCA) staff train volunteers in field sampling techniques and laboratory identification of macroinvertebrates and plants. Cities involved with WHEP may use volunteer-collected data for making decisions about water resource and city planning. In turn, these cities support the costs for team leader stipends, sampling equipment, and professional-level quality analysis."

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. Even if participants have little science background or have physical limitations, there are roles for them on a team. All of them are 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. One of the most interesting examples is the use of boards for navigating over deep muck in these recent dry years! 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. Currently, he helps collect required equipment, and he reviews/corrects data sheets 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."

Each participating city team collects data on up to four wetlands. Over the 11 years of the project, 122 wetlands have been evaluated in Dakota County. Data for all of the years of monitoring of Dakota County wetlands is provided in Appendices D and E. The results of the data collection efforts have been documented in annual summary reports and presented to City staff and citizen teams at annual appreciation dinners.

2.0 Methods

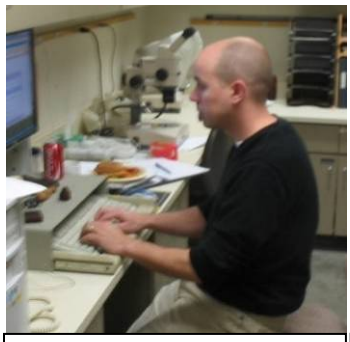
2.1 Training

N. Simmit and J.Koehler participate in lab 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 detail explanation of the methods used in WHEP, visit www.mnwhep.org.

Mark Gernes

Michael Bourdaghs



Joel Chirhart

John Genet

Vegetation and Invertebrate Experts

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 invertebrate training and technical assistance.

Mark says, "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.

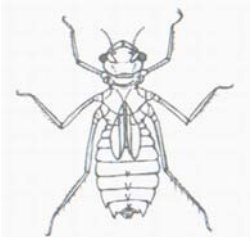
Vegetation Index of Biological Integrity (IBI)

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 (Appendix A). The scoring criteria were adjusted slightly to better represent vegetation diversity. Previous changes in methodology have been documented in earlier summary reports.

Invertebrate IBI

Macroinvertebrates (small aquatic animals with no backbone) are analyzed by collecting samples using six bottle traps and one dip netting effort. 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 (Appendix B).



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.

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) conducts spot checks of the field data collection. The coordinator provided advice regarding proper sampling methods and proper site selection. In addition, the Coordinator with help from Chris Kline (co-coordinator) provides Quality Control (QC) review of the completed data sheets. This review identifies and corrects errors in scoring or data analysis.

Sarah Bhimani, Carolyn Dindorf, Connie Fortin, Kseniya Arsenyeva, Katie Schonhorst, Roman Rowan

Fortin Consulting (FCI), the technical expert, provides quality assurance and report preparation. This is the first year FCI is working with Dakota County on the WHEP program. The technical expert conducts QC checks on 10 percent of the wetlands sampled. The technical expert reviews the vegetation sample plot that was selected and evaluated by the citizen team, and for the invertebrate IBI, the technical expert reviews the insects collected by the citizen team. Thus, the QC is not a second sample of the same wetland site; rather it is a review of the sample collected and evaluated by the citizen team.

Over the duration of the project, each citizen team has been reviewed on a rotational basis. This season, Fortin Consulting cross checked three wetlands, one in Rosemount, Eagan and Hastings: R-1, E-7, and H-6. 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 graphs in Section 4.0 include the corrected data from both the scoring checks and the technical quality control checks.

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 – 24	Moderate	46 – 71%
23 – 30	Excellent	>76%	25 – 35	Excellent	>71%

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 minimal species richness (number of species) and diversity and a large number of them would likely not be pollution sensitive. 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 IBI (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 2007 Sampling Season Results

During the 2007 sampling, eight citizen teams monitored 31 wetlands in nine cities (Apple Valley, Burnsville, Eagan, Farmington, Hastings, Lakeville, Mendota Heights, Rosemount, and West St. Paul) in Dakota County. Eight of these wetlands were sampled twice through citizen spot checks. Three wetland samples were checked for accuracy through the Fortin Consulting quality control check.

Figure 3.1.1 Dakota County Wetland Ratings

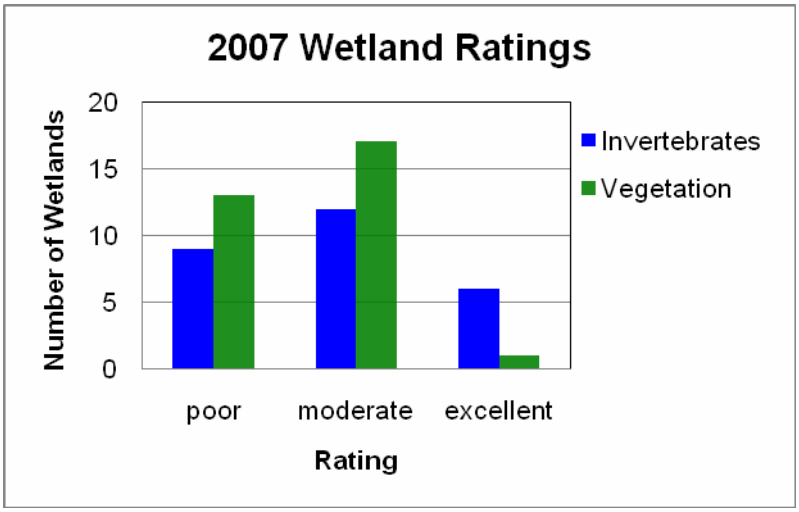


Figure 3.1.1 shows the vegetation and invertebrate ratings for all of the wetlands assessed during the 2007 sampling season. More than half (17) of the wetlands were rated moderate based on vegetation. This is consistent with previous years. Eleven wetlands were rated poor. Only one wetland, DNR 393 (L-8) in Lakeland, was rated excellent and it was borderline excellent. This wetland has rated excellent in five of the past six years of monitoring. Vegetation scores ranged from 9 to 25 out of a maximum of 35 points.

The invertebrate analysis resulted in nine wetlands rating poor, fourteen rating moderate and four excellent. Some wetlands could not be sampled due to dry conditions. Invertebrate scores ranged from 6 to 26 out of a maximum of 30 points. The wetlands rated excellent included, AV-11, B-1, L-8, and MH-2. Farquar Lift Station (AV-11) was sampled for the first time in 2007. L-8, and MH-2 have rated excellent in the majority of the samples while Crystal Lake West (B-1) has oscillated between moderate and excellent.

Table 3.1 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)	2/2	1/2	1/0
Burnsville (BV)	0/0	2/3	1/0
Eagan (E)	1/1	3/3	0/0
Farmington (F)	2/4	0/0	0/0
Hastings (H)	2/2	2/2	0/0
Lakeville (L)	1/0	1/3	1/1
Mendota Heights (MH)	1/0	0/2	1/0
Rosemount (R)	0/2	4/3	0/0
West Saint Paul (MH)	0/0	1/1	0/0

Figures 3.1.2 and 3.1.3 show wetland health ratings for each 2007 site. The majority of the sites rated moderate. Many of the sites showed different ratings for vegetation versus invertebrates. There are different factors that may be influencing the plant and invertebrate communities in each wetland.

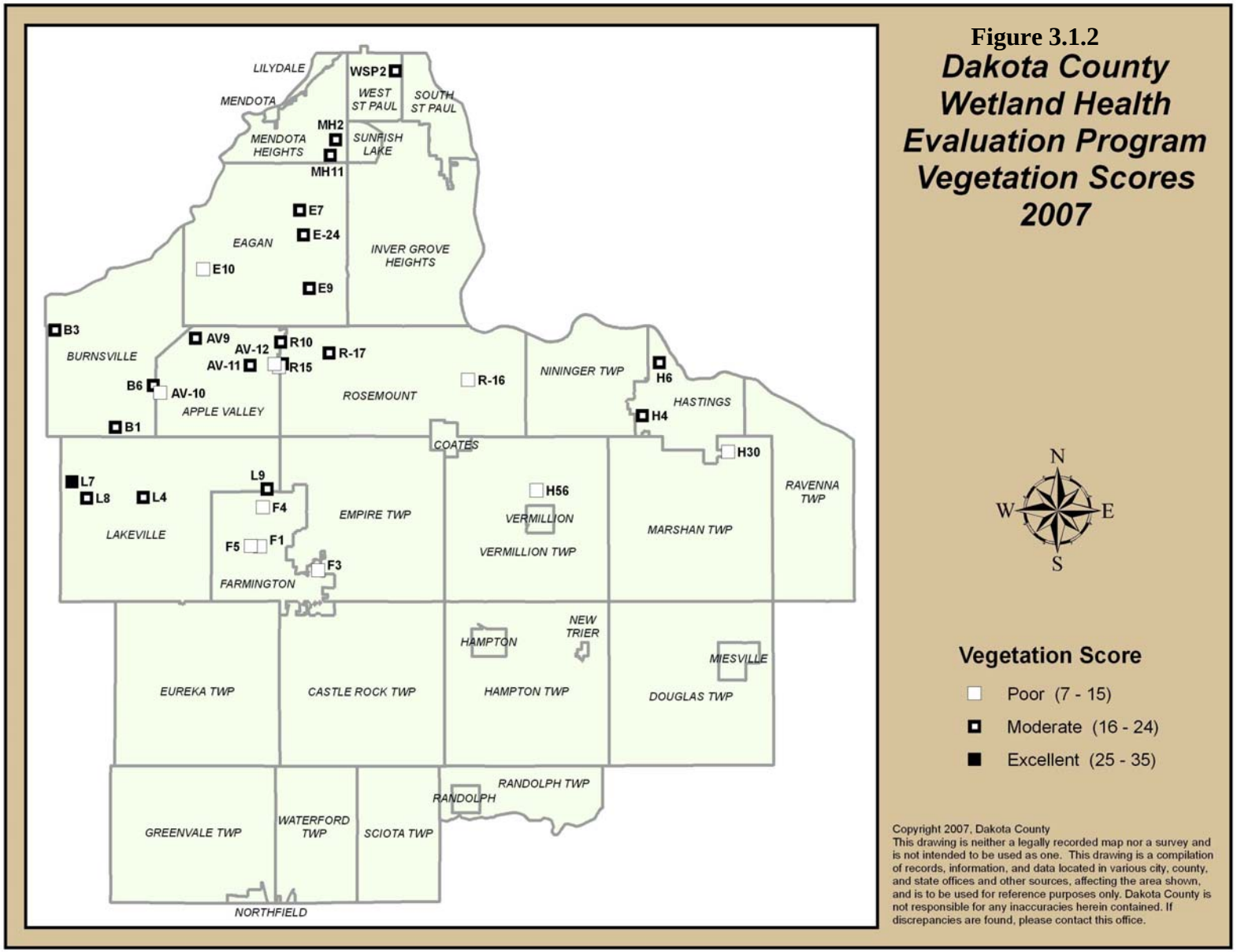


Figure 3.1.2

Dakota County Wetland Health Evaluation Program Vegetation Scores 2007

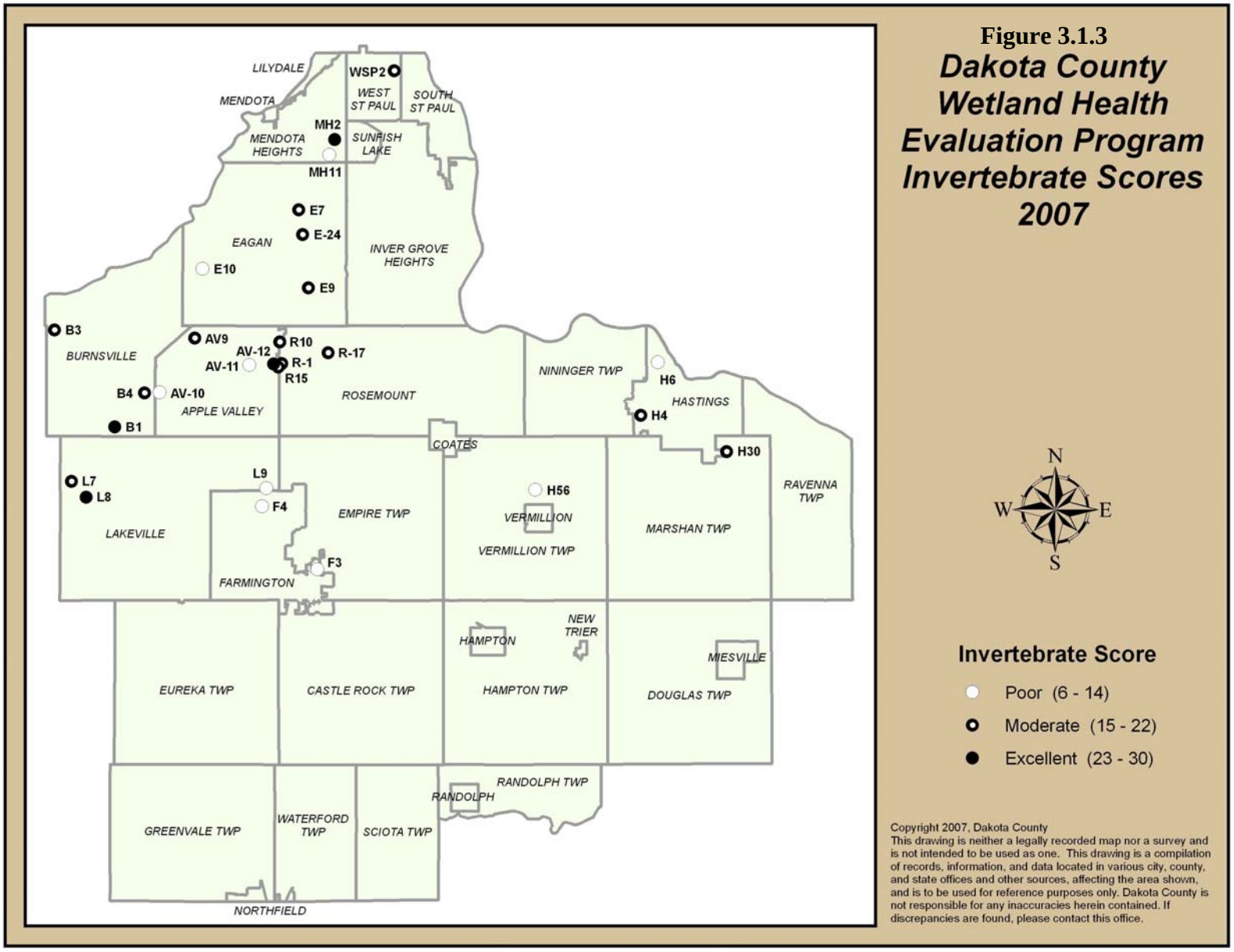


Figure 3.1.3
Dakota County Wetland Health Evaluation Program Invertebrate Scores 2007
LILYDALE
MENDOTA
MENDOTA HEIGHTS
WEST ST PAUL
SOUTH ST PAUL
SUNFISH LAKE
WSP2
MH2
MH11
E7
E-24
E10
E9
EAGAN
INVER GROVE HEIGHTS
B3
BURNSVILLE
AV9
AV-12
AV-11
R10
R-1
R15
R-17
B4
AV-10
APPLE VALLEY
B1
ROSEMOUNT
NININGER TWP
H6
HASTINGS
H4
COATES
H30
L7
L8
L9
F4
F3
FARMINGTON
LAKEVILLE
EMPIRE TWP
H56
VERMILLION
VERMILLION TWP
MARSHAN TWP
RAVENNA TWP
NEW TRIER
HAMPTON
MIESVILLE
EUREKA TWP
CASTLE ROCK TWP
HAMPTON TWP
DOUGLAS TWP
RANDOLPH TWP
RANDOLPH
GREENVALE TWP
WATERFORD TWP
SCIOTA TWP
NORTHFIELD
N
W
E
S
Invertebrate Score
Poor (6 - 14)
Moderate (15 - 22)
Excellent (23 - 30)
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This drawing is neither a legally recorded map nor a survey and is not intended to be used as one. This drawing is a compilation of records, information, and data located in various city, county, and state offices and other sources, affecting the area shown, and is to be used for reference purposes only. Dakota County is not responsible for any inaccuracies herein contained. If discrepancies are found, please contact this office.

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.

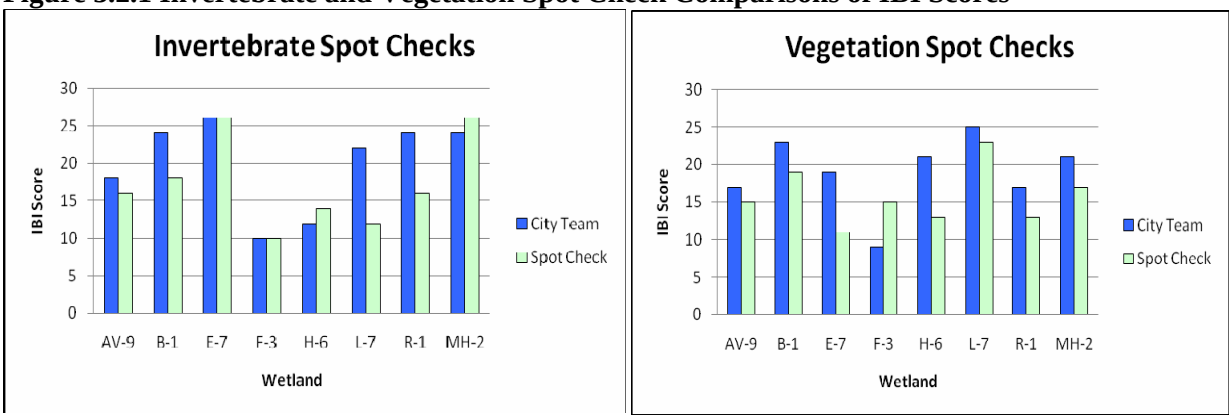
3.2.1 2007 Spot Checks

Each city team was responsible for evaluating one wetland in another city (Table 3.2). 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 majority of the samples are consistent. Two of the sites were not consistent for vegetation and two for invertebrates. It is not known exactly why the samples were not consistent for those sites. It may indicate a difference in sampling technique, a change in conditions between sample dates, differences in identification accuracy, or some other cause. The H-6 vegetation cross check may be explained by differences in the sample plots. The City team used a 10 meter square plot while the spot check team used a 5 meter by 20 meter plot, located to the east of the original plot. The 5 by 20 meter plot is generally used only when there is a very narrow emergent vegetation fringe. Data collected by the original city team is used for the individual wetland analysis in Section 4.0 of this report.

Table 3.2 Citizen spot checks (those considered not consistent 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	Lakeville	Watrud Pond (AV-9)	18	16	17	15
Burnsville	Hastings	Crystal West (B-1)	24	18	23	19
Eagan	Farmington	Discovery (E-7)	26	26	**19**	**11**
Farmington	Eagan	Kral Pond (F-3)	10	10	9	15
Hastings	Burnsville	Lake Rebecca (H-6)	12	14	**21**	**13**
Lakeville	Apple Valley	DNR 387 (L-7)	**22**	**12**	25	23
Rosemount	Mendota Heights	Kelly Marsh (R-1)	**24**	**16**	17	13
Mendota Heights	Rosemount	Copperfield (MH-2)	24	26	21	17

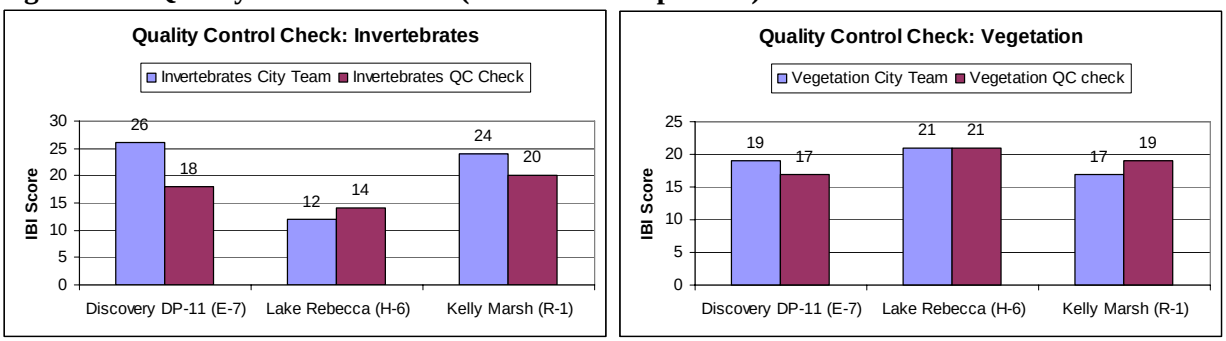
Figure 3.2.1 Invertebrate and Vegetation Spot Check Comparisons of IBI Scores



3.2.2 2007 Quality Control Checks

Quality control checks were conducted at three sites in 2007 (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 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 3.3.2 Quality Control Checks (IBI Score Comparison)



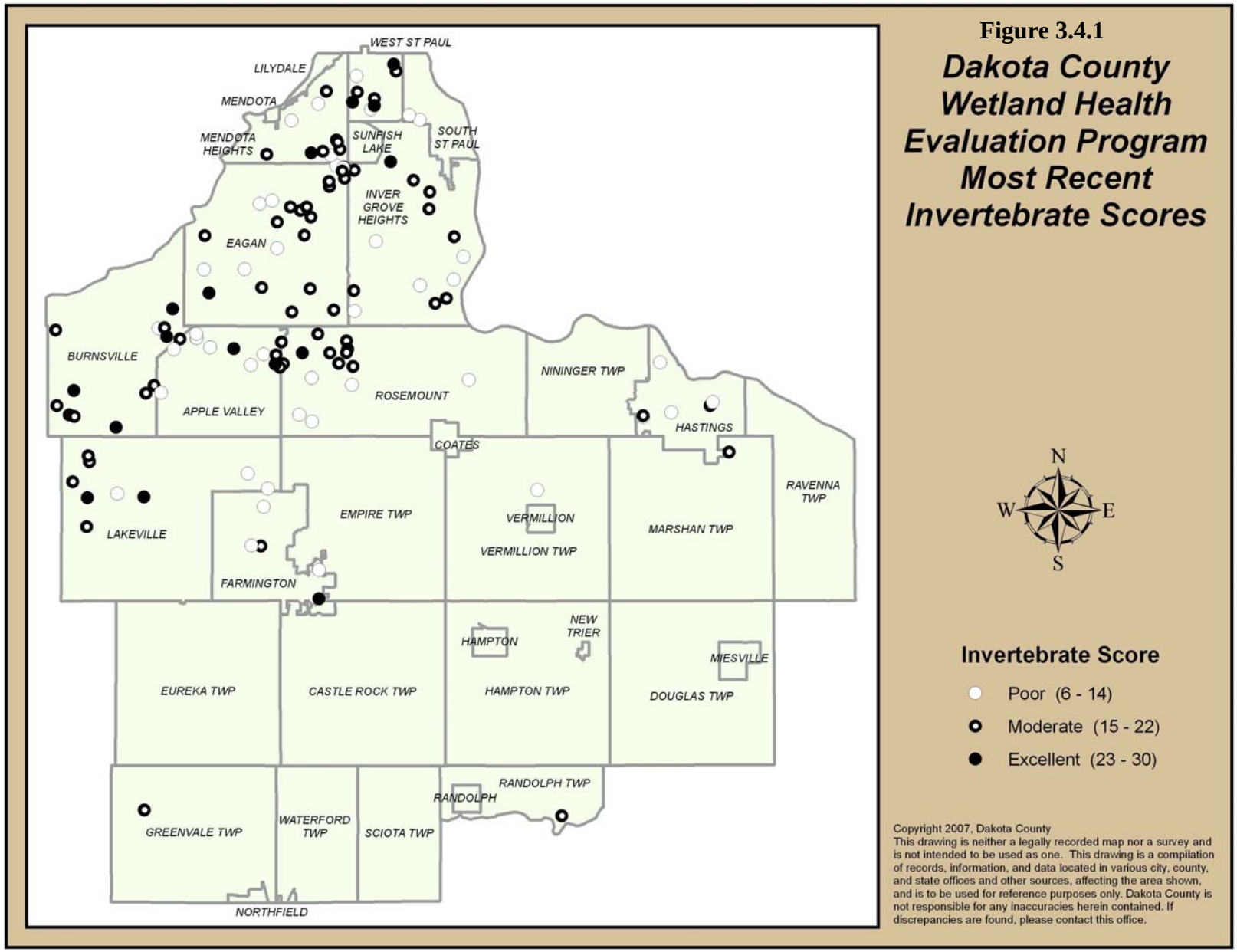
Most of the scores were found to be consistent with the quality control checks. Only one site, (E-7) differed by more than six points. The City team found an invertebrate score that led to an excellent rating, while the quality control check corrected it down to moderate rating.

WHEP also provides checks of the scoring and data transfer. These checks are conducted by Chris Kline. Most of the errors found were in data transfer. There were 13 data transfer errors in the vegetation sampling and only one math error in the scoring total. Nine of the errors were with metric number six. All of the errors resulted in a change in score, positive or negative, of only two points. For the invertebrates, there was only one error, a data transfer error, resulting in a two point difference in score. The quality control checks are working well. Errors are identified and corrections are made.

3.3 WHEP Historical Data

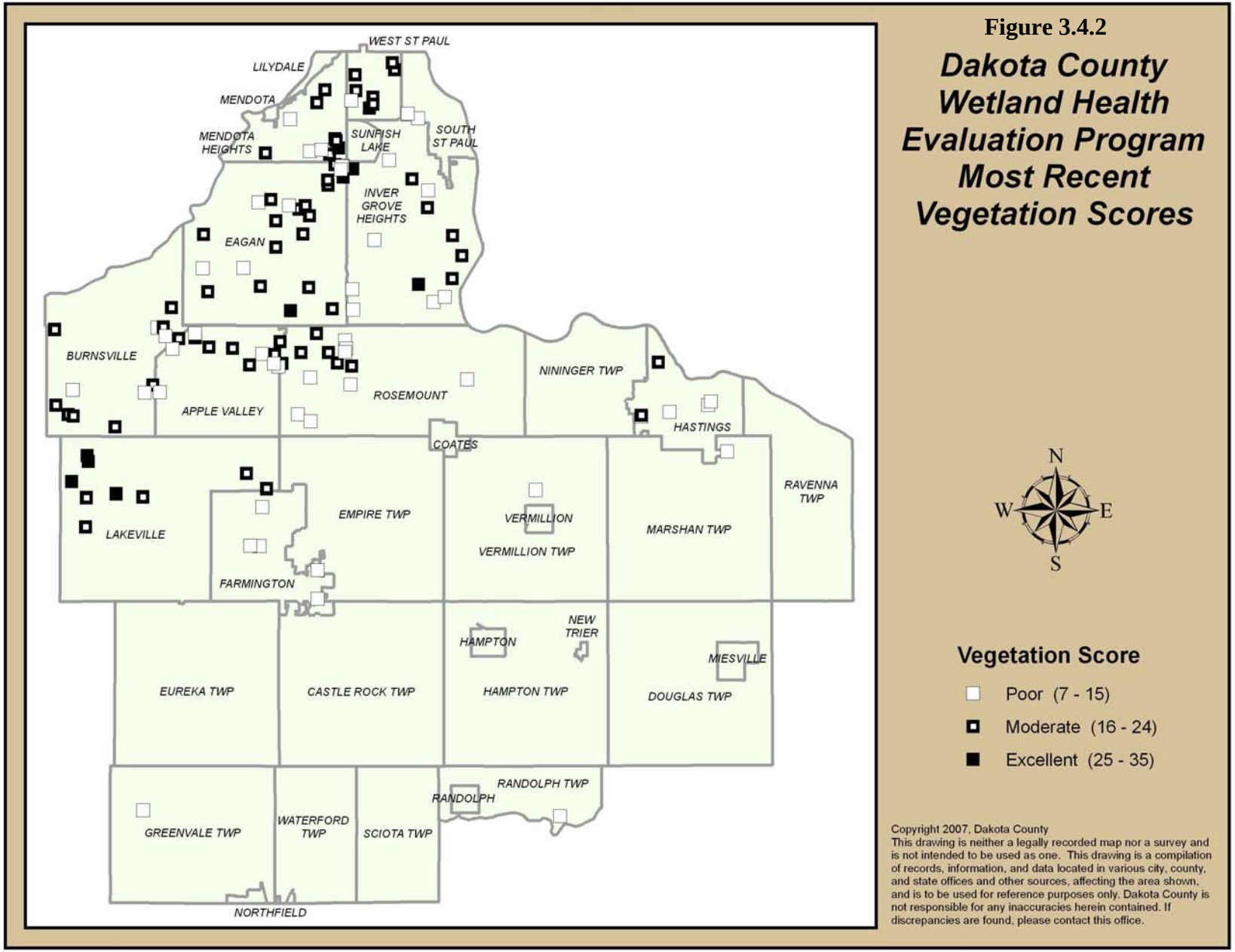
Since WHEP began in 1998, 122 wetlands have been sampled. Figures 3.4.1 and 3.4.2 provide an overall picture of wetland health in Dakota County based on the most recent sample collected for each wetland.

Figure 3.4.1



Dakota County Wetland Health Evaluation Program Most Recent Invertebrate Scores

Figure 3.4.2


Dakota County Wetland Health Evaluation Program Most Recent Vegetation Scores
WEST ST PAUL
LILYDALE
MENDOTA
MENDOTA HEIGHTS
SUNFISH LAKE
SOUTH ST PAUL
INVER GROVE HEIGHTS
EAGAN
BURNSVILLE
APPLE VALLEY
ROSEMOUNT
NININGER TWP
HASTINGS
COATES
RAVENNA TWP
LAKEVILLE
EMPIRE TWP
VERMILLION
VERMILLION TWP
MARSHAN TWP
FARMINGTON
NEW TRIER
HAMPTON
MIESVILLE
EUREKA TWP
CASTLE ROCK TWP
HAMPTON TWP
DOUGLAS TWP
RANDOLPH TWP
RANDOLPH
GREENVALE TWP
WATERFORD TWP
SCIOTA TWP
NORTHFIELD
N
W
E
S
Vegetation Score
Poor (7 - 15)
Moderate (16 - 24)
Excellent (25 - 35)
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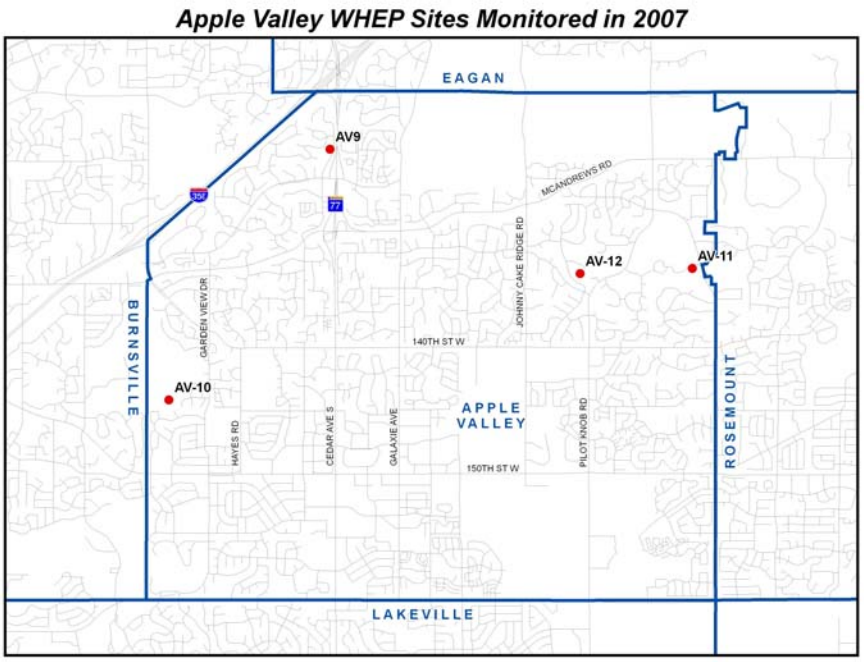
4.0 Wetland Evaluations

4.1 Apple Valley Wetlands

Four wetlands were monitored within the City of Apple Valley in 2007. Many team members have been monitoring since the start of WHEP.



Team Leader: Dan Bale
Team Members: Andrea Brownlow, Colin Brownlow, Duncan Brownlow, Jane Byron, Peg Challgren, Melanie Chaput, Brian Flagg, Devin Flagg, Helen Goeden, Jeff Korpik, Mary Olander, Jeff Sluiter, Caelyn Swendiman, and Sharon Worts.
Training Only: Umar Amis, Larua Durenberger, Deborah Gee-Tritschler, Christine Miller, Cindy Person, Lynette Person, Alexander Smith, Brian Stoen, and Serena Tritschler.

Dan Bale has been involved in WHEP since its inception over ten years ago as a pilot project of the Pollution Control Agency in Scott County. He says, "I have enjoyed all my work and have learned much about water issues in that time. Last summer was my final season, but I have not ruled out coming back as a volunteer or working in some other related area." Dan would like to recognize Helen and Colin Goeden's family of five who has been active in WHEP for many years. Their eldest daughter, Andrea, will be continuing her study of environmental studies in college.

Apple Valley Team Members in the lab

This is the tenth year the City has participated in WHEP. Jeff Kehrer is the Natural Resources Coordinator at the City of Apple Valley and has been the city contact for WHEP since 2002. His main role has been to get information out to past volunteers and recruit new volunteers through articles in the city newsletter, city website, and phone conversations. City staff also sends out letters from the team leader announcing training dates and times. The team leader is in charge of the program, and each year city staff members have participated in data collection and/or lab identification sessions.

"I feel WHEP provides a great hands-on opportunity for volunteers and city staff to take a close look at a variety of wetlands, and allow each to see what is really out there. It is really interesting to see the wildlife, and plant communities associated with different wetland areas. WHEP sampling can provide sound data for measuring the effectiveness of BMP's. In Apple Valley we have sampled 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. 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."

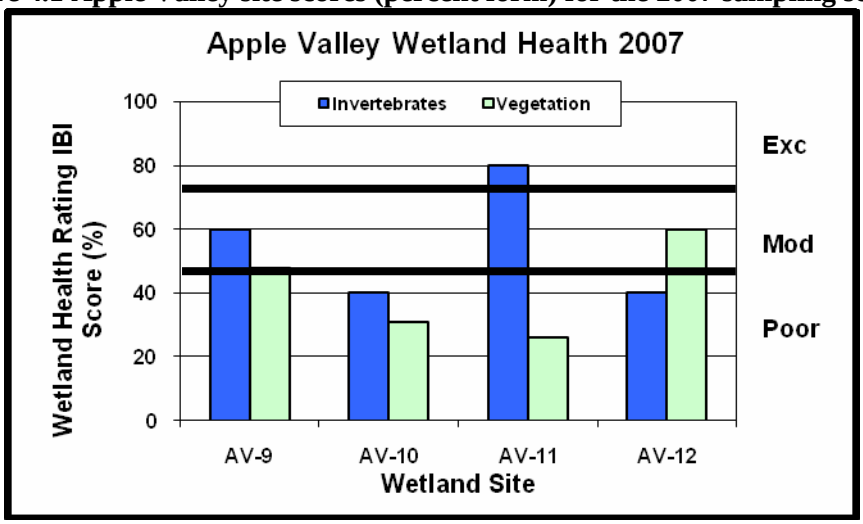
Jane Byron

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, "not only does WHEP provide our residents with an important educational experience, but it also provides the City with valuable information. The information gathered by WHEP volunteers can help the City evaluate the impacts of conservation projects or development within the contributing watershed."

Apple Valley General Wetland Health

Figure 4.1 presents an overall view of wetland health for all of the 2007 monitoring sites in Apple Valley based on the 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. The Apple Valley wetlands exhibited poor to moderate wetland health, with the exception of AV-11 which had a high invertebrate score, leading to an excellent rating. These can be compared to the reference wetland AV-1 which was not monitored in 2007, but generally exhibits moderate to excellent wetland health.

Figure 4.1 Apple Valley site scores (percent form) for the 2007 sampling season



4.1.1 Watrud Pond (AV-9)

Watrud Pond (AV-9) is a 0.3 acre Type 4 open water wetland within a 45-acre subwatershed within the Vermillion River watershed. The subwatershed has approximately 25 percent impervious surface after development. Prior to construction of an apartment building nearby, Watrud Pond was a high quality wetland. It now has a pre-treatment pond that treats the stormwater from the apartment prior to discharging it to the wetland. The apartment building was completed in 2003, and no future development

is expected within the subwatershed at this time. This wetland has a 36" inlet in the southwest corner and a 12" outlet pipe in the southeast corner. The City does have a stormwater management plan, and is currently working on a wetland management plan. The wetland is surrounded by steep slopes with mature oak forest habitat surrounding 95 percent of the shoreline, and an un-mowed native grass shoreline completing the remaining portion. The Lakeville team conducted a spot check on this wetland. This is the third year that this site has been surveyed.

Wetland Health

Site Observations: The Apple Valley team noted that there was no near shore vegetation in the wetland. The pond was shaded due to the surrounding trees. The Lakeville team stated that submersed vegetation was sparse. A Green Heron was observed.

Table 4.1.1 Watrud Pond (AV-9) Wetland Health based on Index of Biotic Integrity (IBI)

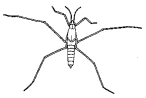
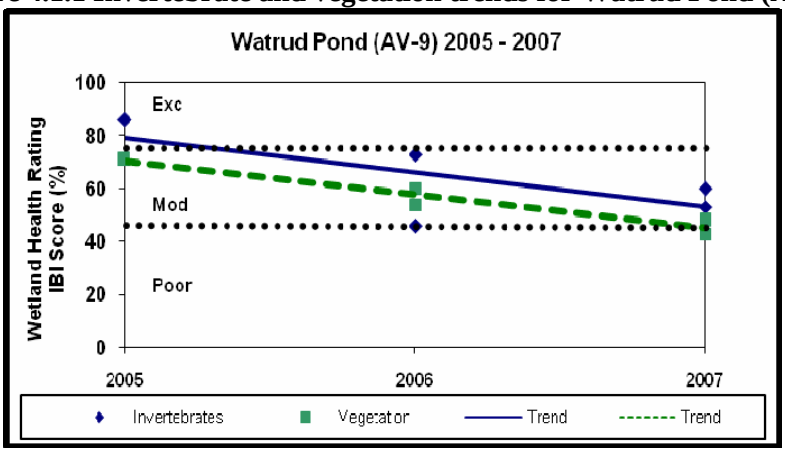
2007 Data (AV-9)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (18)	Moderate (17)
Spot Check Rating (IBI score)	Moderate (16)	Poor (15)
Trend 1998-2007	Declining	Declining

Figure 4.1.1 Invertebrate and vegetation trends for Watrud Pond (AV-9)



Site Summary: Watrud Pond was found to have moderate to poor wetland health in 2007. Based on the three years of monitoring, the data indicate declining wetland health. However, since only three years of data is available, additional monitoring is recommended to verify if this trend continues.

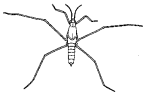
4.1.2 Alimagnet Park Ridgeview Drive Parking Lot Wetland (AV-10)

Alimagnet Park Wetland is a 0.5 acre type 5 wetland located in the subwatershed of Alimagnet Lake and part of the larger Vermillion River Watershed. The drainage area is estimated as 5 acres with less than 5 percent impervious area. The wetland is surrounded by wooded parkland. The City of Apple Valley plans to manage this wetland to maintain its existing condition unless the WHEP monitoring indicates problems. The wetland is not included in the City's wetland management plan.

Wetland Health

Site Observations: Watrud Pond (AV-9) is a small open water wetland surrounded by steep wooded slopes. The Citizen team noted existence of a storm drain outfall near the sampling site. The wetland has a steep drop-off and many branches in the water. Submergent vegetation was sparse.

Table 4.1.2 Alimagnet Park (AV-10) Wetland Health based on Index of Biotic Integrity (IBI)

2007 Data (AV-10)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Poor (12)	Poor (11)
Trend 2007	Not enough data	Not enough data

Site Summary: This is the first year the Alimagnet Park Wetland has been monitored. It is somewhat surprising that the wetland exhibited poor wetland health through the vegetation IBI, considering it is surrounded by wooded parkland and has very low imperviousness in the subwatershed.

4.1.3 Farquar Lift Station (AV-11)

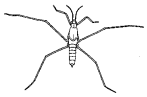
The Farquar Lift Station Wetland (AV-11) is a 2.2 acre type 5 wetland located in the Vermillion River Watershed. This wetland has a large drainage area at 373 acres with 7 acres of direct drainage. The surrounding area is residential and is almost built-out. The wetland has a fairly natural shoreline but a narrow upland buffer. The watershed area is 25 percent impervious. There are two storm drain outfalls into the wetland. The wetland outlet is through the lift station. This wetland is included in the city's wetland management plan. The wetland is located within the area covered under the Farquar and Long Lake Total Maximum Daily Load (TMDL). TMDL is a calculation of the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards. Future work is planned in the watershed to improve the lake water quality. This may include removal of sediment from the wetland and some watershed projects. The City

wanted to monitor the wetland to gather baseline data and track any changes when the TMDL plan is implemented.

Wetland Health

Site Observations: The City team noted that the wetland bottom was very mucky. The wetland is surrounded by a row of trees.

Table 4.1.3 Farquar Lift Station (AV-11) Wetland Health based on Index of Biotic Integrity

2007 Data (AV-11)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Excellent (24)	Poor (9)
Trend 2007	Not enough data	Not enough data

Site summary: The two indexes are not consistent in this first year of sampling of Farquar Lift Station Wetland. Something appears to be impacting the vegetation more than the invertebrate population. However, since this is the first year of sampling, more data is needed to determine the health of this wetland as well as any trends.

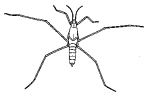
4.1.4 EVR-P12 (AV-12)

EVR-P12 (AV-12) is also known as DNR public water wetland 19-225W. It is a 5.7 acre type 5 wetland located within the Vermillion River Watershed. The wetland subwatershed is 571 acres with 61 acres of direct drainage. The subwatershed area is 25 percent impervious. The wetland has two inlets and two outlets. The surrounding area is primarily residential with about 50 percent of the shoreline having a wooded buffer area and the rest mowed lawn. This wetland is located within the Farquar and Long Lake TMDL area. As part of the TMDL plan implementation, it is likely that sediment removal and biomanipulation will occur within the next 10 years. This is a significant source of phosphorus (68 percent of the total external load) to Long Lake. The City wanted to monitor this wetland to collect baseline data and follow changes as the TMDL projects are implemented.

Wetland Health

Site Observations: The wetland had a very mucky bottom. The monitoring site is located adjacent to the inlets. The wetland is surrounded by trees with residential lawns sloping down to the wetland.

Table 4.1.4 Wetland EVR-P12 (AV-12) Wetland Health based on Index of Biotic Integrity

2007 Data (AV-12)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Poor (12)	Moderate (21)
Trend 2007	Not enough data	Not enough data

Site summary: This is the first year of monitoring for EVR-P12. The two indexes are not consistent for this site. It is in an area that is almost built out and receives a lot of stormwater runoff as well as contributes phosphorus to Farquar Lake. It has a large watershed with high imperviousness. The high imperviousness is not conducive to maintaining good wetland health. Since this wetland catches water prior to entering Farquar Lake, it is being considered as a potential source of treatment for the lake. The City plans to continue monitoring the wetland over time to determine changes as the TMDL plan is implemented.

4.2 Burnsville Wetlands

Three wetlands were monitored within the City of Burnsville in 2007. Burnsville has monitored 12 wetlands through WHEP since 1997. Dry conditions prevented monitoring of the Alimagnet East Wetland (B-6) in 2007. Many of the wetlands exhibited very dry conditions.

Team Leader: Amy Bruner
Team Members: Emily Bruner, Kristen Bruner, Elizabeth Hall, Rose Kampmann, Sheridan Kampmann, Robin Tomson, Tom Ward, and Jeff Zilka.

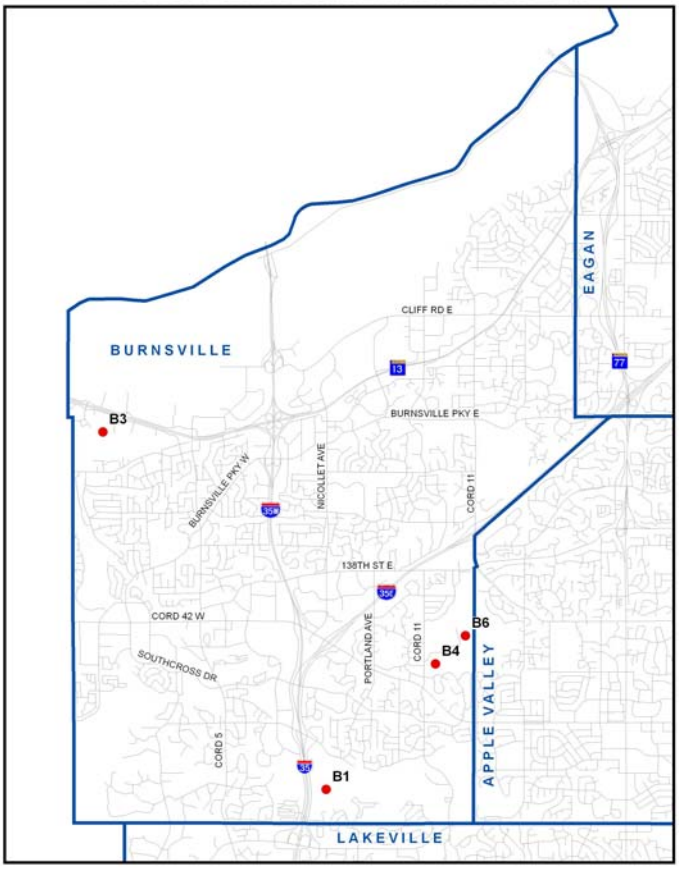
Amy Bruner

This is Amy Bruner's first year as team leader, but she has been a WHEP team member for several years.

Angela Hanson

Angela Hanson is the coordinator for the City of Burnsville. Her role with WHEP is to select the wetlands to be evaluated, volunteer recruitment, and team support and volunteering. Angela believes, "this program provides the City with great information on water bodies that we do not have the time and resources to study intensively and individually. It is also valuable for the City to utilize this program as an educational tool for citizens since having a concerned, well-informed citizen base will help the City garner support for and achieve its natural resources goals."

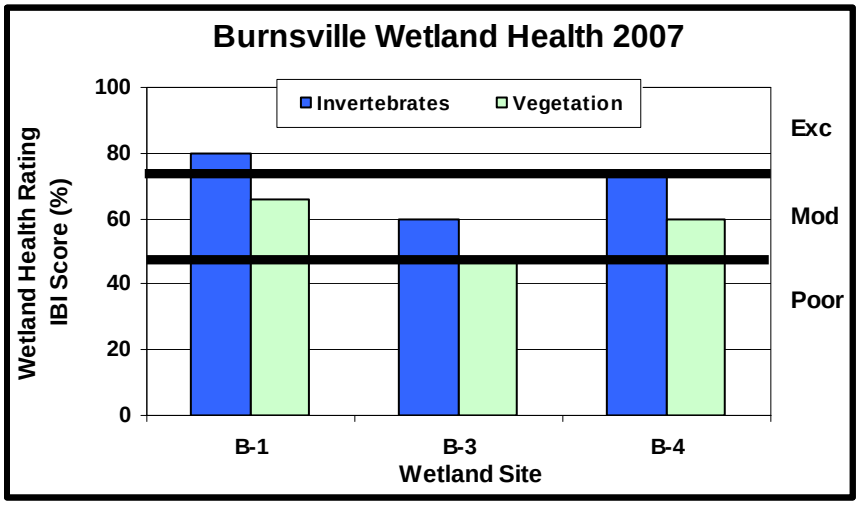
Burnsville WHEP Sites Monitored in 2007



Burnsville General Wetland Health

Figure 4.2 presents an overall view of wetland health for all of the 2007 monitoring sites in Burnsville based on the scores for invertebrates and vegetation presented as a percent. For 2007, the wetlands showed moderate to excellent wetland health, with most indexes in the moderate category. The vegetation scores were lower than the invertebrate scores, indicating differing impacts on the vegetation than the invertebrates. As expected, the reference wetland, B-1, had the highest IBI scores of all the wetlands tested in 2007. B-4 scores were slightly lower than B-1, while B-3had significantly lower scores and appears to be more impacted than the reference site.

Figure 4.2 Burnsville site scores (percent form) for the 2007 sampling season



4.2.1 Crystal West (B-1)

B-1, also known as Crystal West is a 0.92 acre type 3 wetland located in a wooded area within the Black Dog Watershed, adjacent to Crystal Lake. The wetland drainage area is 550 acres, none of which is impervious. A short to tall grass (Reed Canary Grass) buffer and deciduous trees, including Maple and Aspen, surround the wetland. A walking path is located along the west edge behind the trees. The wetland is designated as "improvement" in the City wetland management plan. It serves as a recreation spot, and an area for education and science.

Wetland Health

Site Observations: The monitoring team noted a lot of submerged vegetation, as well as extensive covereage of water lilies. Wildlife observations included Red Wing Blackbird and dragonflies. Frogs calls were heard on the southwest edge of the wetland. The Hastings cross check team noted that the wetland was so dry that many aquatic plants were not visible in the mud that they had seen during the invertebrate monitoring.

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

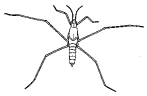
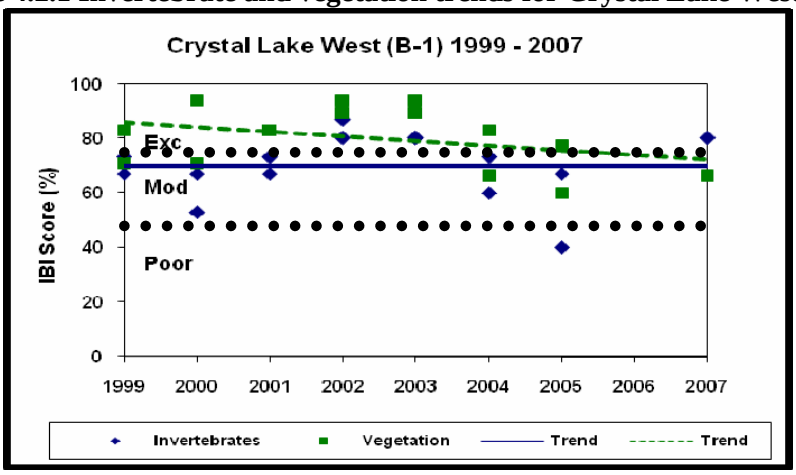
2007 Data (B-1)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Excellent (24)	Moderate (23)
Spot Check Rating (IBI score)	Moderate (18)	Moderate (19)
Trend 1999-2007	Stable	Slight decline

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



Site summary: Crystal Lake West, a reference wetland, has been monitored eight times through WHEP. It continues to exhibit moderate to excellent wetland health, although, the vegetation analysis indicates a slight downward trend, moving from the excellent category into the moderate in 2007.

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 550 acres, and is approximately 50 percent impervious. Land use in the watershed is mainly residential and industrial.

The upland buffer has been restored to prairie and some stormwater ponds are in place to protect the wetland. It is a protected wetland and is a migratory bird habitat. Invasive species are cause for concern. The wetland management goal is to protect the wetland, maintain flood protection, sediment control, and nutrient removal.

Wetland Health

Site Observations: The monitoring team noted that the wetland was choked with cattails.

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

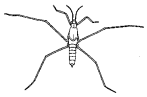
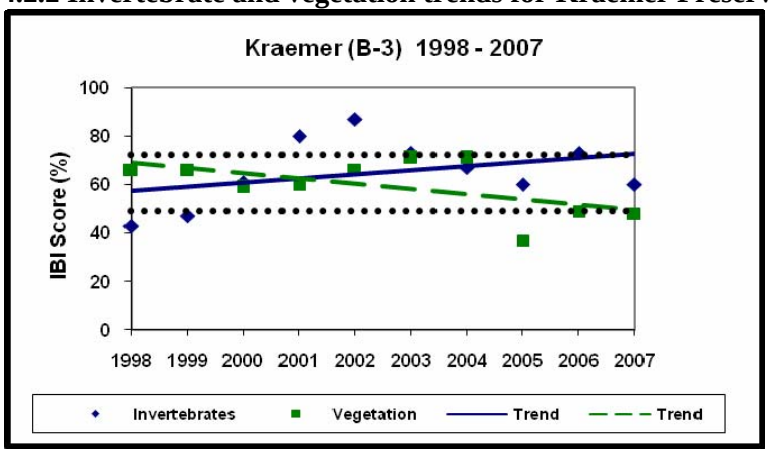
2007 Data (B-3)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (18)	Moderate (17)
Trend 1998-2007	Possible improvement	Declining

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



Site summary: This is the tenth year of sampling for Kraemer Preserve (B-3). The invertebrate and vegetation indexes both indicate moderate conditions. However, the trend lines show opposite trends. This wetland has maintained moderate conditions over most of the 10 years of sampling. The vegetation index remained stable until 2005, when it dropped into the poor range and has remained low.

4.2.3 Alimagnet (B-4)

B-4, also known as Alimagnet, is a 0.9 acre type 3 wetland located within the Lake Alimagnet subwatershed and Vermillion River Watershed. The wetland drainage area is 701 acres, and is approximately 20 percent impervious. The wetland has no inlets or outlets and is designated by the City as a "protected" wetland. It is considered a valuable area for its open space and aesthetics. It is used for recreation, education, and science.

Wetland Health

Site Observations: The monitoring team noted there was open water with emergent vegetation including Arrowhead all over. In July, when the vegetation survey was conducted, there was no standing water, and therefore no submergent species observed. The bottom consisted of deep muck. A Red Wing Blackbird and dragonfly was observed.

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

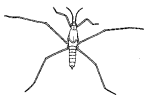
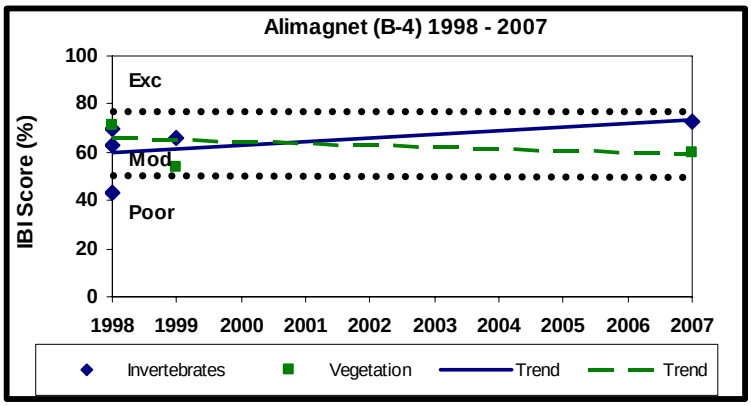
2007 Data (B-4)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (22)	Moderate (21)
Trend 2000-2007	Not enough data	Not enough data

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

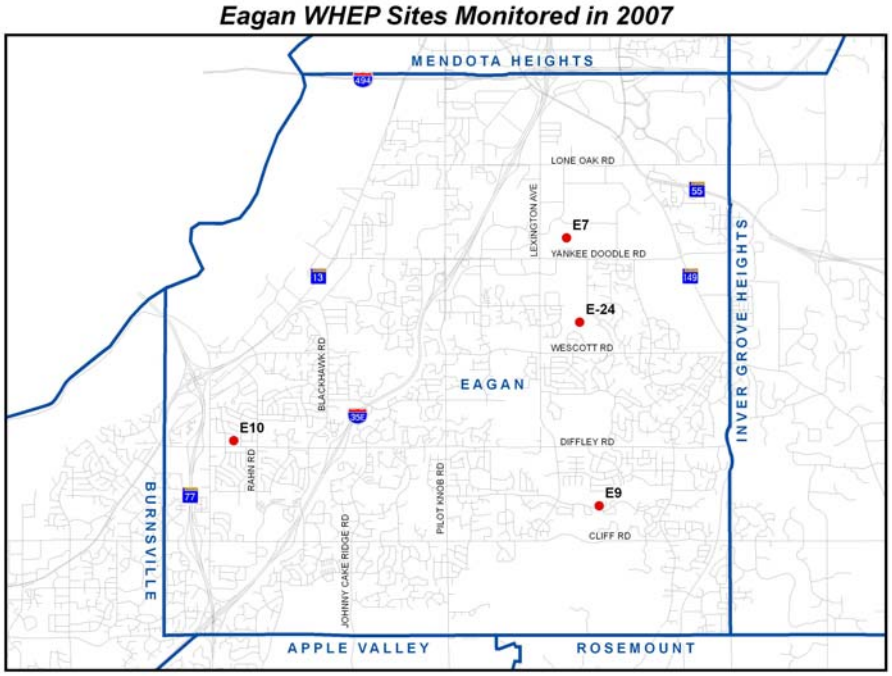


Site summary: Only three years of data have been collected for Alimagnet and the last two are eight years apart. There is not enough data to determine if a trend exists. Both sets of samples place Alimagnet in the moderate wetland health category. Additional monitoring is recommended.

4.3 Eagan Wetlands

The Eagan team monitored four wetlands in 2007. Since WHEP began in 1997, Eagan has monitored 24 wetlands.

Team Leaders: Jane Tunseth and Tom Goodwin
Team Members: Becky Broillard, Steve Briggs, Amy Jo Forslund, Dean Franke, Vivianne Hanke, Michael Jurgens, Marianne McKeon, Anna Munson, Christine Nelson, Lora Nelson, Nancy Simmet, Anne Swanson, Devin Tunseth, Derek Vincent, Bobby Weinberger, and Stephen Williams.
Training Only: Lane Braaten, Jacque Braemer, LaDonna James, Andres Lopez-Pideda, Angela Smith, Jerry Walerak, and Kathy Weinberger.




Jane Tunseth and Tom Goodwin

The success and growth of the WHEP program is obvious in Eagan. Team Eagan was a large group of more than twenty volunteers this year. Tom Goodwin said, "[the] volunteers were enthusiastic and formed a close knit group." The fall sampling season went well despite the dry conditions.

Tom enjoys being a team leader and says, "As an environmental studies and biology teacher, this project was a wonderful opportunity to learn about wetland and pond organism diversity and identification. It is also a nice way to educate and involve the public about the inherent value of wetlands and, hopefully, their preservation."


S.Williams, D.Tunseth, J.Tunseth ,D.Franke, V.Hanke

Jane Tunseth, co- team leader for Eagan, is a teacher at the School of Environmental Studies at the Minnesota Zoo. This is her 11th 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."

Jessie Koehle

Jessie Koehle is the Water Resources Assistant for the City of Eagan. She helped Team Eagan prepare for the fall 2007 sampling sessions, identify invertebrates, and pull together an end-of-season cookout.

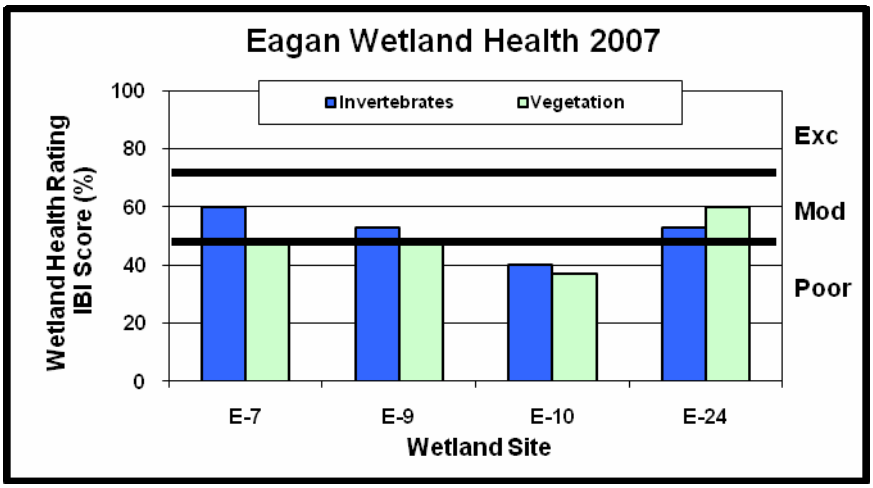
"I think that WHEP is valuable most of all because it gives the general public an opportunity to learn more about their local surroundings. Also, the City of Eagan can use the extra help to closely examine the health of specific wetlands in order to make best possible management decisions.

"I am incredibly proud of how many volunteers participated this year for Eagan's WHEP team! I hope that everyone comes back, plus more." Jessie hopes to take an even more active role in 2008. "I look forward to many more tromps through the mud with our fantastic volunteers."

Eagan General Wetland Health

Figure 4.3 presents an overall view of wetland health for all of the 2007 monitoring sites in Eagan based on the scores for invertebrates and vegetation presented as a percent. Four wetlands were monitored in the City of Eagan in 2007. They exhibited moderate to poor wetland health based on the invertebrate and vegetation indexes. Eagan's reference wetland is E-9. When it was originally monitored in 1999 it received better ratings (moderate to excellent) than it is currently showing. Wetlands E-7 and E-24 are similar to the reference wetland, while E-10 shows poorer wetland health.

Figure 4.3 Eagan site scores (percent form) for the 2007 sampling season



4.32.1 Discovery DP-11 (E-7)

E-7, also known as DP-11, is 3.4 acre type 4 wetland located in the Gun Club Lake Watershed. The wetland drainage area is 13.1 acres, and is 1 percent impervious. The wetland has two inlets and one outlet. The surrounding area is primarily private. Its shoreline is 50 percent grassland and 50 percent woodland. This buffer is 100-200 feet wide. The wetland is designated as a storm water wetland. An industrial park is a cause of disturbance in the area. Maintaining water quality and excellent invertebrate

levels is a constant challenge. The wetland management goal is to protect the water quality of the wetland from development.

Wetland Health

Site Observations: Discovery Wetland (E-7) is located in a small basin surrounded by a school and an industrial park. A 100 – 200 foot vegetated buffer surrounds the wetland, including trees and open fields. The monitoring team observed egrets, heron, ducks and geese. The arrowhead was almost all grazed off, likely from waterfowl. Reed Canary Grass was noted. The team noted that this wetland seemed the most diverse and of the highest quality compared to the others monitored.

Table 4.3.1 Discovery DP-11 (E-7) Wetland Health Based on Index of Biotic Integrity

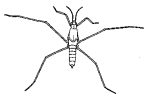
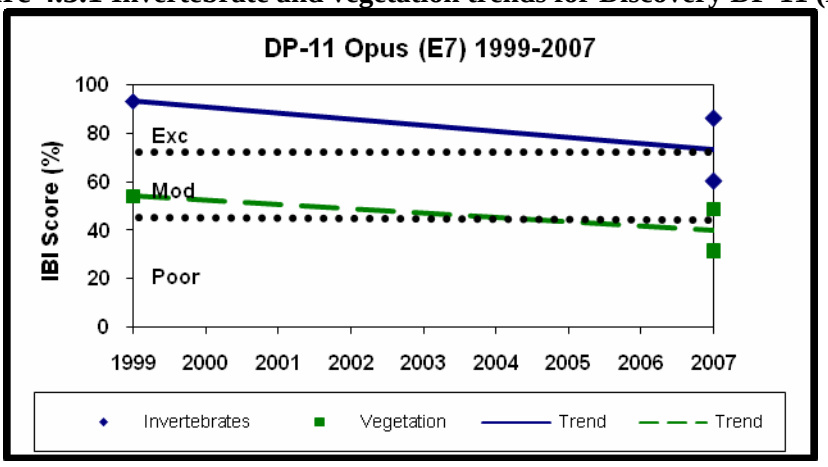
2007 Data (E-7)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (18)	Moderate (17)
Spot Check Rating (IBI score)	Excellent (26)	Poor (11)
Trend 1999-2007	Not enough data	Not enough data

Figure 4.3.1 Invertebrate and vegetation trends for Discovery DP-11 (E-7)



Site summary: This site has been sampled only twice, and with 8 years between samples. It is difficult to determine if any trend exists based on the limited data. Both the invertebrate and vegetation spot checks categorized the wetland differently than the City team. More data is needed to determine any trend in wetland conditions.

4.3.2 Wilderness Run (E-9)

E-9, also known as LP-50, is a 0.8 acre type 3 wetland located in the Gun Club Lake Watershed. The wetland drainage area is approximately 5 acres, and is 15 percent impervious. The wetland has one inlet and one outlet and is designated as a Class VI – Sediment Basin. The surrounding area is privately and publicly owned. There is an existing 2.5 acre multi-family development and a city park in the area. The

immediate shoreline is hilly woodland. The wetland management goal is to protect the wetland from stormwater impacts.

Wetland Health

Site Observations: There was very little standing water and a lot of vegetation in the wetland. The low water conditions made dip net sampling difficult. The monitoring team observed several wildlife species including tree frogs, grasshoppers ,and butterflies.

Table 4.3.2 Wilderness Run (E-9) Wetland Health based on Index of Biotic Integrity

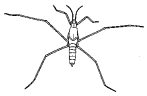
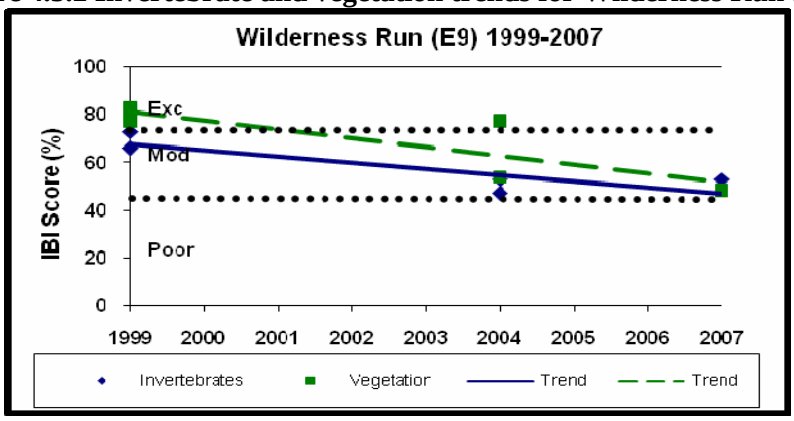
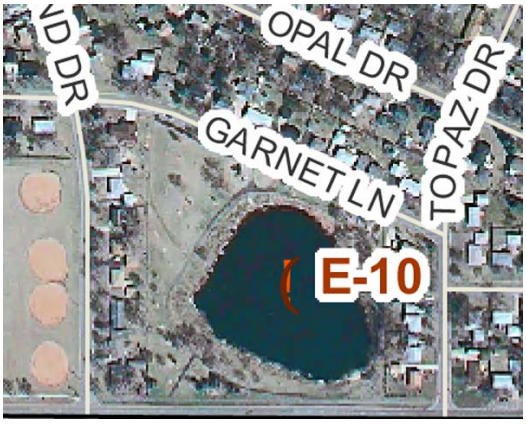
2007 Data (E-9)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (16)	Moderate (17)
Trend 1999-2007	Declining	Declining

Figure 4.3.2 Invertebrate and vegetation trends for Wilderness Run (E-9)



Site summary: This wetland has only three sample sets between 1999 and 2007. Based on limited data, both the invertebrate and vegetation indexes show declining wetland health. Additional sampling is recommended to verify this trend.

4.3.3 Cedar Pond (E-10)



E-10 (AP-3), also known as Cedar Pond, is a 3.1 acre type 4 wetland located within the Gun Club Lake Watershed. The wetland drainage area is approximately 212 acres, and is approximately 22 percent impervious. The wetland has two inlets and one outlet. Ninety percent of the immediate shoreline has been naturalized. There is a native prairie buffer strip and three rainwater gardens. The wetland is designated as a Class II – Scenic Recreation area. However, it is a stormwater pond, collecting water from the surrounding residential areas. The surrounding area is

98 percent single-family residential and 2 percent open undeveloped land. The wetland management goal is to naturalize the shoreline and improve the water quality. The shoreline was restored in 2001 and has maintained good diversity.

Wetland Health

Site Observations: The wetland is surrounded by gentle slopes. Reed Canary Grass was noted as was Curly-leaf pondweed. The team noted the presence of a lot of emergents compared to other wetlands they monitored. There were many bird's nests in the surrounding vegetation as well as many ducks and birds observed.

Table 4.3.3 Cedar Pond (E-10) Wetland Health based on Index of Biotic Integrity

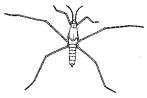
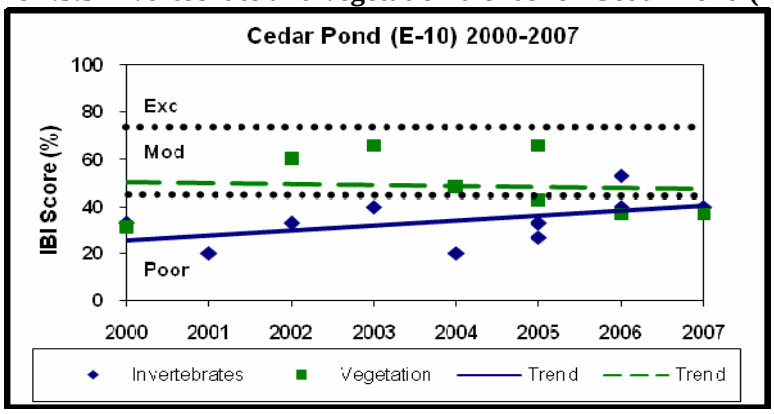
2007 Data (E-10)	**Invertebrates** 	**Vegetation** 
Wetland Health Rating (IBI score)	Poor (12)	Poor (13)
Trend 2000-2007	Improving	Stable

Figure 4.3.3 Invertebrate and vegetation trends for Cedar Pond (E-10)



Site summary: Eight years of data has been collected for Cedar Pond. The invertebrate index indicates improving conditions, while the vegetation index indicates stable conditions. Both indexes place the wetland in the poor category, but borderline moderate for 2007. Reed Canary Grass, an invasive species, was found by the monitoring team in 2007. This was the first time it was noted. It should be controlled if possible, before it takes over.

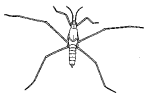
4.3.4 JP-42 (E-24)

E-24, also known as JP-42, is a 2.2 acre type 5 wetland located in the Gun Club Lake Watershed. The wetland drainage area is 6.6 acres, none of which is impervious. It is designated as a protected wetland. There are no inlets and no outlets. The immediate shoreline is buffered by 50 percent grassland and 50 percent woodland. It is currently surrounded by a golf course (60 percent) and open-undeveloped (40 percent) land. Multi-family homes may be developed in the area in the future. The wetland management goal is to protect the water quality of the wetland from proposed future development.

Wetland Health

Site Observations: The monitoring team described the wetland as a mud flat. Some water lilies were noted on one edge, and in the middle. Wildlife observed included, Egret, Swallows, Red-tailed Hawk, Duck and a Monarch caterpillar.

Table 4.3.4 JP-42 (E-24) Wetland Health based on Index of Biotic Integrity

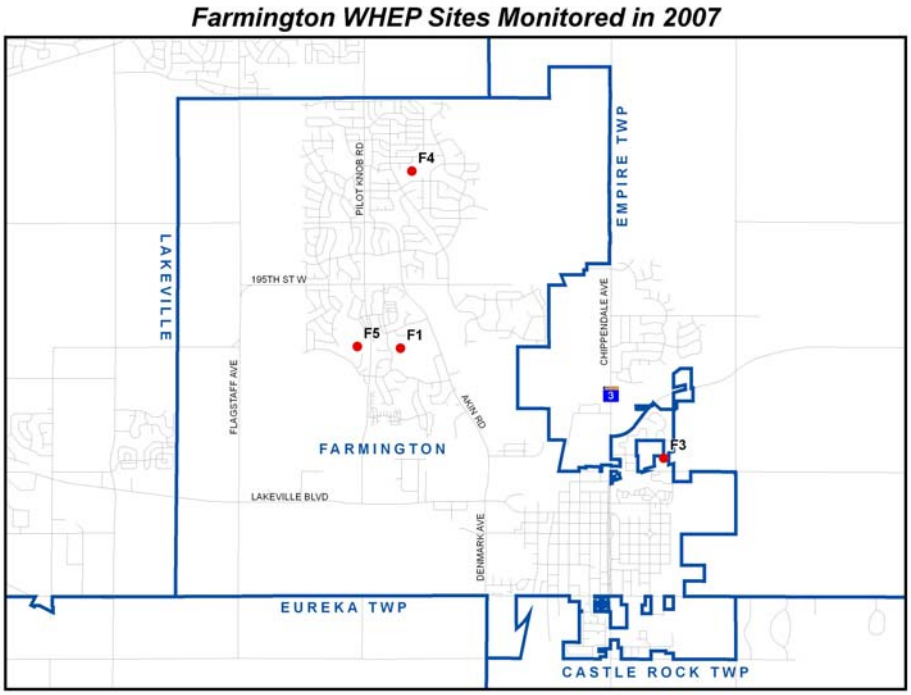
2007 Data (E-24)	**Invertebrates** 	**Vegetation** 
Wetland Health Rating (IBI score)	Moderate (16)	Moderate (21)
Trend 2007	Not enough data	Not enough data

Site summary: This is the first year of sampling for JP-42 (E-24). Based on the IBI, the wetland health is moderate. It will be interesting to continue the monitoring in the future to determine if low water levels affected the results.

4.4 Farmington Wetlands

The Farmington team sampled four wetlands in 2007. The City has been monitoring five wetlands through the WHEP program since 1997.

Team Leader: Katie Koch-Laveen
Team Members: John and Julie Mulligan, Richard Tucker, Rollie Greeno, and Marcia Richter



Team Farmington had another good season even though "two of our wetlands had no water and one wetland had a shoreline that had retreated 12-15 feet," said Katie Koch-Laveen. Through the years Team Farmington has identified the strengths of each team member and can meet any challenge.


Katie Koch-Laveen

Katie Koch-Laveen got involved with WHEP after a long involvement in 4-H. She enjoys interacting with others and has learned to be an effective team leader. She comments, "I continue to enjoy the training, the science, and the people very much."


Jennifer Collova

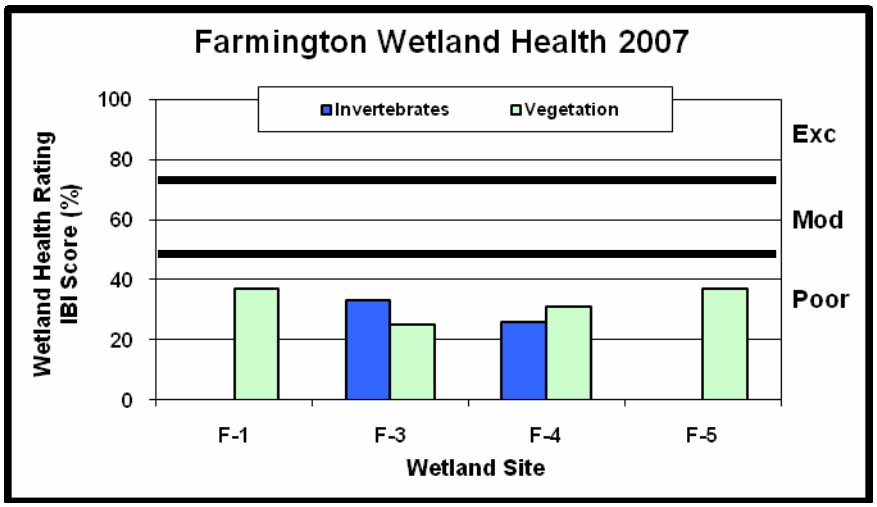
Jennifer Collova administers the WHEP program for the City of Farmington. She determines the wetlands to be monitored each year, provides site maps and any directional needs, and reviews the collected data. She says, "Data is compared to past data to see changes that are occurring within the wetland system as development increases in Farmington. The City has been monitoring the health of wetlands within the City since 1998 and over time, we hope to be able to see trends in the data." Jennifer agrees, "The WHEP program is a great opportunity for residents interested in wetlands, ecology and the environment. Volunteers learn how their actions directly affect water quality. Hopefully the information they gain is shared with their family, friends and neighbors. Individuals will see connectivity between natural and manmade systems and learn to think bigger than their neighborhood."

Farmington General Wetland Health

Figure 4.4 presents an overall view of wetland health for all of the 2007 monitoring sites in Farmington based on the scores for invertebrates and vegetation presented as a percent. Sites F-1(Pine Knoll) and F-5

(Pilot Knob) were dry during part of 2007, preventing the completion of invertebrate sampling. All of the wetlands sampled in 2007 were found to be in poor wetland health. This may be in part due to dry conditions experienced in 2007. Farmington had the most wetlands in the poor wetland health category of all the wetlands monitored in 2007. 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. F-5 had ratings similar to the reference wetlands.

Figure 4.4 Farmington site scores (percent form) for the 2007 sampling season



4.4.1 Pine Knoll Pond (F-1)

Pine Knoll Pond (F-1) is a 35 acre wetland with a drainage area of 190 acres. There is development surround 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 City team noted that they had to change the location of the 2003 sampling site 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.

Wetland Health

Site Observations: The wetland was dry during part of the sampling period.

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

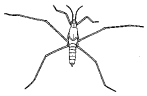
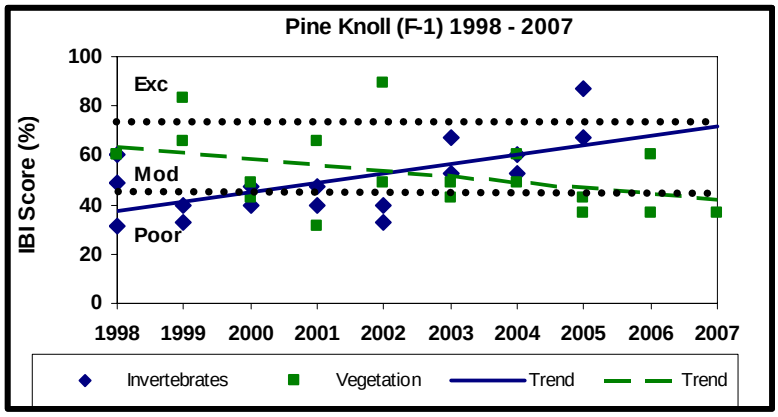
2007 Data (F-1)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Not sampled due to dry conditions	Poor (13)
Trend 1998-2007	Improving	Declining

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



Site summary: This is the tenth year of sampling Pine Knoll Pond, although invertebrates were not sampled due to dry conditions. The two IBIs are not consistent, with the invertebrate index showing moderate wetland health and the vegetation index showing poor health. The long term trends are also not consistent. The invertebrate data indicate improving wetland health, while the vegetation data indicate declining wetland health. However, the vegetation data has a lot of variability.

4.4.2 Kral Pond (F-3)

F-3, also known as Kral Pond, is a 10 acre wetland with a drainage area of 1,000 acres with about 30 percent impervious. The wetland is located within the Vermillion River Watershed. There are two inlets and one outlet. Kral Pond is designated as "Manage 2" in the City wetland management plan. There is development to the north and west, and wetland buffers are in place. The wetland management goal is to document wetland health as development occurs.

Wetland Health

Site Observations: The monitoring team noted the wetland had a muck bottom and good water level related to the shoreline. Less than 80 percent of the vegetation plot was in the water. The team felt this limited the amount of vegetation found. The team ovserved a Blue Heron and Curly-leaf pondweed.

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

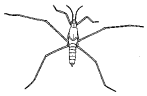
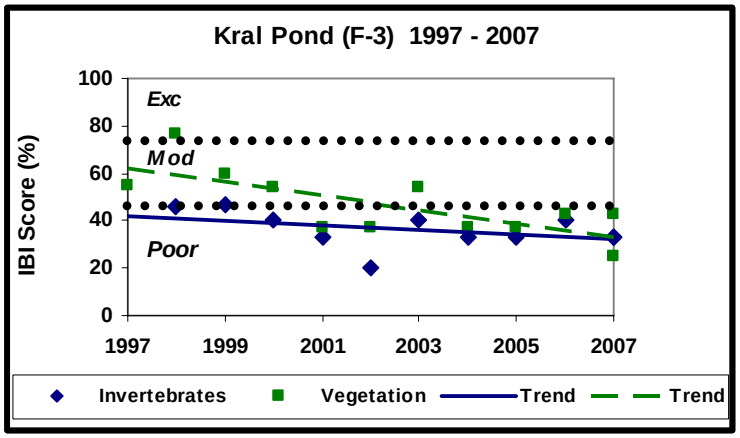
2007 Data (F-3)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Poor (10)	Poor (9)
Spot Check Rating (IBI score)	Poor (10)	Poor (15)
Trend 1997-2007	Stable to slight decline	Declining

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



Site summary: Kral Pond has been monitored 11 years. Recent monitoring indicates poor wetland health. The long term trend shows a decline in wetland health moving it from moderate to poor based on the vegetation index. The two indexes have been consistent with each other for most of the past 9 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 ten acre open water wetland within the Vermillion River Watershed. The wetland drainage area is 440 acres. It is designated as "Manage 1" in the City wetland management plan. There is development to the east and wetland buffers are in place. 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: Water levels were down. The team noted that there was about 18 to 20 feet of shoreline exposed. There was no vegetation within 12 to 15 feet of the water. The dipnet sampling was unsuccessful, no organisms were found.

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

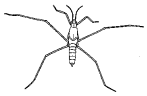
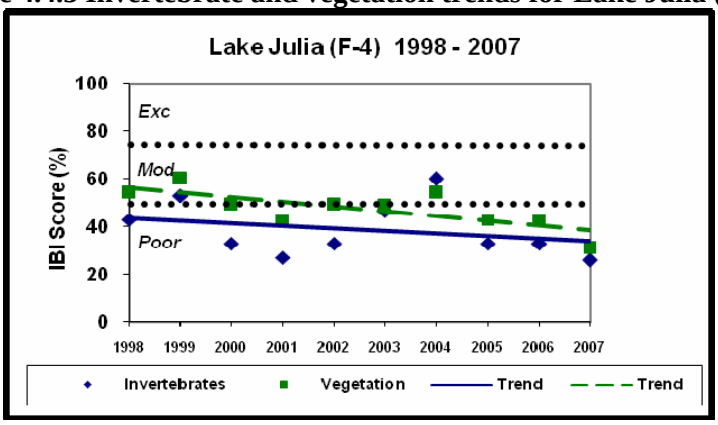
2007 Data (F-4)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Poor (8)	Poor (11)
Trend 1997-2007	Possibly Declining	Declining

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



Site Summary: Lake Julia has 10 years of data. The vegetation data indicate declining wetland health, from moderate down to poor. This may have been influenced by the low water levels during the vegetation sampling. The invertebrate data shows a decline, but not as clear as the vegetation data. The invertebrate index has indicated poor conditions since the first sample in 1998.

4.4.4 Pilot Knob Pond (F-5)

F-5, also known as Pilot Knob Pond, is a 15.5 acre wetland located within the Vermillion River watershed. The wetland drainage area is 3,000 acres. There is one inlet at the northwest corner of the pond, and no outlets. There is development to the south and west, and wetland buffers are in place. There is cropland surrounding the wetland to the east and west. Pilot Knob Pond is designated as "Manage 2" in the City wetland management plan. The wetland management goal is to document wetland health as development occurs.

Wetland Health

Site Observations: The monitoring team reported "no water" on their June 19, 2007 visit. They also noted that there had been no water all spring and in several previous years. They were not able to collect invertebrate samples. Cattails dominated the emegent vegetation. There was very little floating or submergent vegetation. The bottom substrate was clay. Wildlife observed included a Mallard duck, Marsh Wren, Red-winged Blackbird and Kill-deer.

Table 4.4.4 Pilot Knob Pond (F-5) Wetland Health based on Index of Biotic Integrity

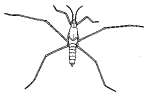
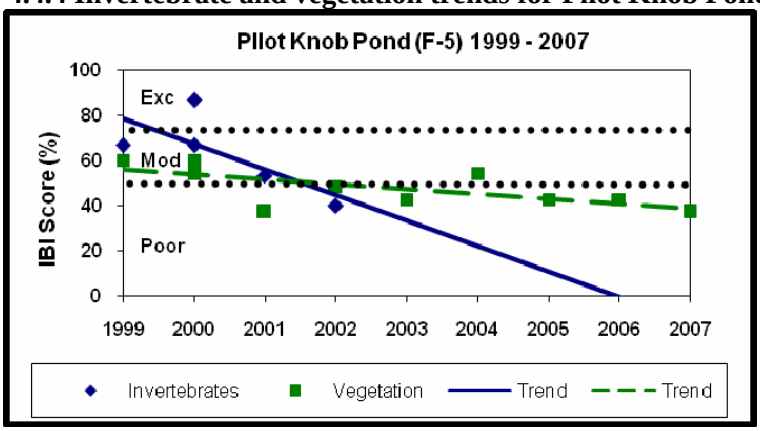
2007 Data (F-5)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Not sampled due to dry conditions	Poor (13)
Trend 1999-2007	Not enough data	Not enough data

Figure 4.4.4 Invertebrate and vegetation trends for Pilot Knob Pond (F-5)

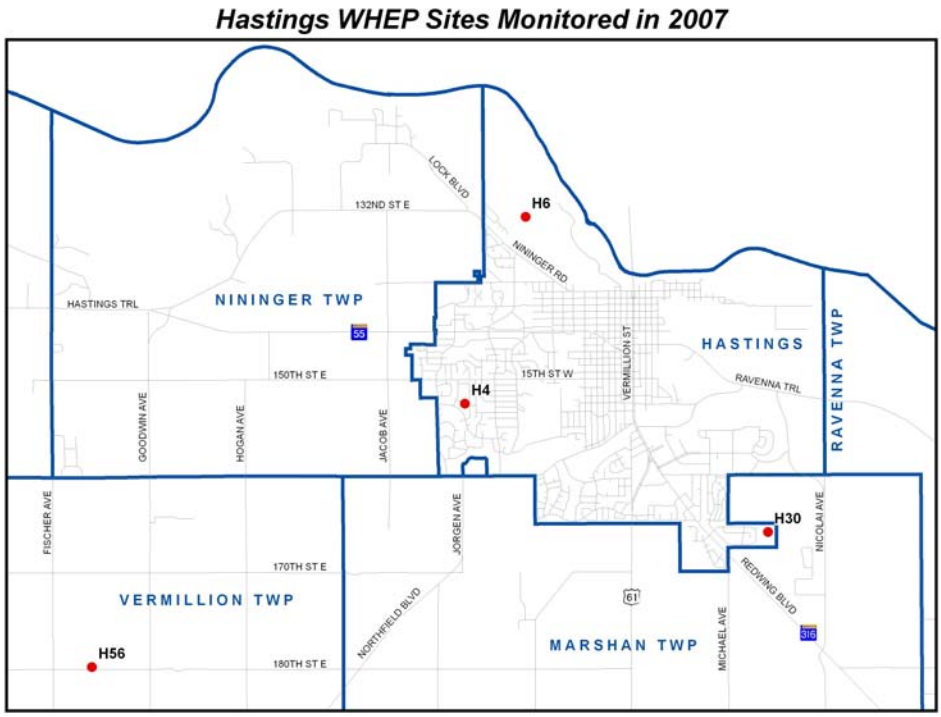


Site summary: This is the ninth year of sampling for Pilot Knob Pond. However, invertebrates were only sampled up until 2002 due to dry conditions. The trend line for invertebrates is skewed due to the lack of data in later years. However a downward trend was indicated, possibly due to changing water levels. The vegetation data indicate a downward trend, changing from moderate to poor wetland health. Both of these indexes could be affected by water levels.

4.5 Hastings Wetlands

Four wetlands were monitored in Hastings in 2007. Eight wetlands have been sampled in the City of Hastings through the WHEP program.

Team Leader: Joe Beattie
Team Members: Summer Hendrickson, Brian Huberty, Jerry Klebs, Kimberly Lynch, Jan Mainz, Jennifer Oknich, Kelly Pechous, Kevin Smith, Bonnie St. James, and Phillip Veith.

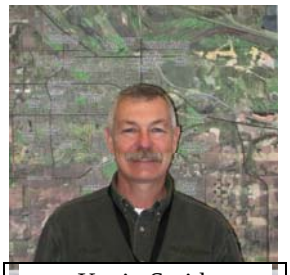


Joe Beattie

Joe Beattie became a team leader to enrich his knowledge of wetlands. Through his time with the program he has enjoyed "the interaction with diverse people and getting outdoors on a regular basis."

S. Hendrickson, B. St. James, K. Pechous

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. "We have a team of very devoted people who want to do a nice job and take things pretty seriously", states team leader Joe Beattie.



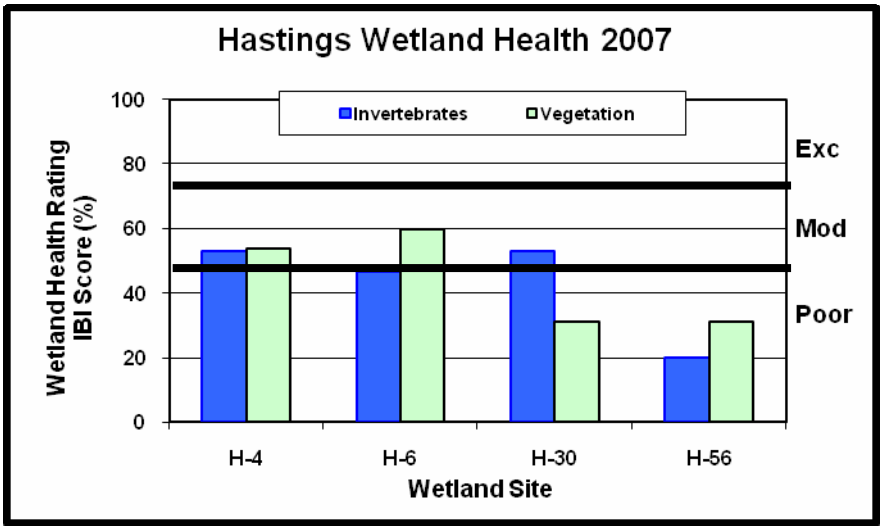
Kevin Smith

Kevin Smith administers WHEP for the City of Hastings. He believes that WHEP is a very valuable program. So much so that he dedicates as much of his own time as possible to volunteering. He says, "I've seen the team really grow, and the team leader is top-notch and really motivates the team. They collect good data that we can use at the city."

Hastings General Wetland Health

Figure 4.5 presents an overall view of wetland health for all of the 2007 monitoring sites in Hastings based on the scores for invertebrates and vegetation presented as a percent. All of the wetlands showed poor to moderate wetland health in 2007, with H-56 rating the lowest of the four. The reference wetland for Hastings is Lake Rebecca (H-6). The invertebrate score for H-4 and H-30 were similar to those of the reference site. However, the vegetation score for H-30 and H-56 were significantly lower than the reference condition, indicating some disturbances to the plant communities in those wetlands.

Figure 4.5 Hastings site scores (percent form) for the 2007 sampling season



4.5.1 Stonegate Treated Wetland (H-4)

H-4, also known as Stonegate Treated, is the second cell of a two-celled stormwater management system created to treat runoff from surrounding residential development. It is a 1 acre type 4 wetland located within the Vermillion River watershed. The wetland drainage area is 9 to 10 acres, and is 30-40 percent impervious. The wetland has one inlet and one outlet. 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: The monitoring team noted a perimeter of cattails and restored vegetation. They also noted that fewer corixid beetles were found compared to previous years. Wildlife observed included, a

Red-winged Blackbird, Canada goose and song sparrow. Although vegetated buffers exist on part of the shoreline, the team noted as a threat, perfect lawns and over-zealous mowers as well as future dredging.

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

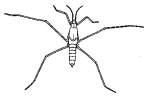
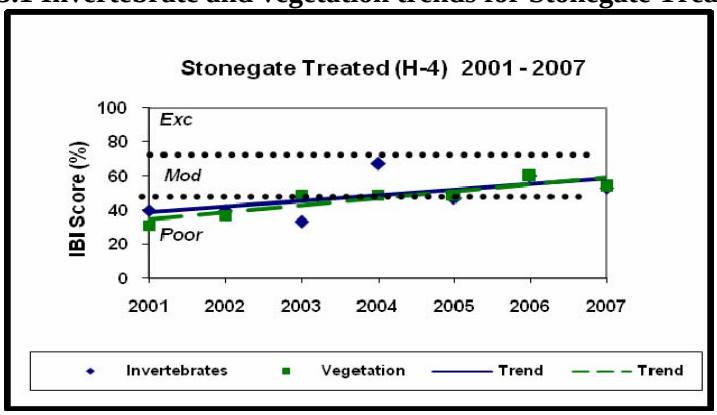
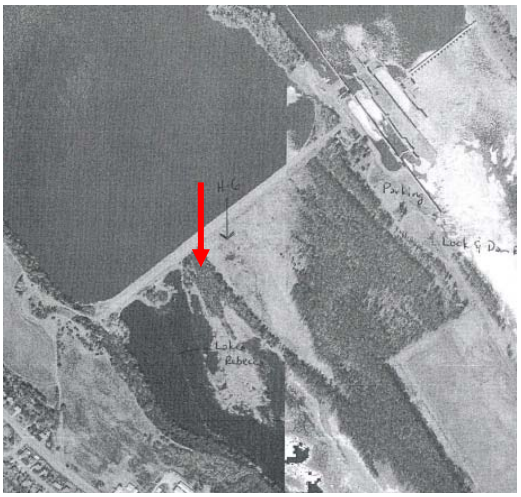
2007 Data (H-4)	**Invertebrates** 	**Vegetation** 
Wetland Health Rating (IBI score)	Moderate (16)	Moderate (19)
Trend 2001-2007	Improving	Improving

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



Site summary: The seven years of data indicate that wetland health, based on both indexes, is improving. It has moved from the poor range in 2001 through 2003 up to the moderate range. Restoring the native vegetation around the pond may have helped improve the 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 storm water inlets and one controlled outlet. The Mississippi River Flats Natural Resource Management & Restoration Plan was adopted in December 2002.

The wetland is an emergent marsh and shoreline/floodplain forest. Diversion of storm water 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. There is very little emergent vegetation. The monitoring team stated they observed an Eagle's nest and a Bald Eagle, Chickadee and Killdeer.

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

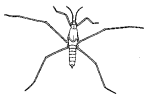
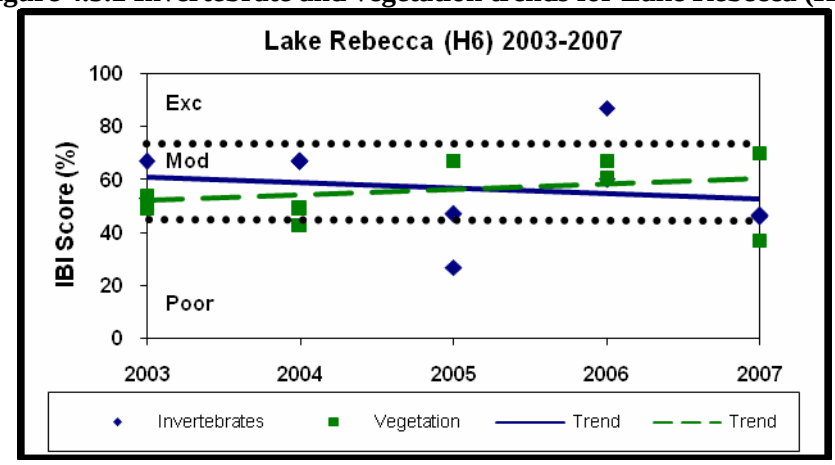
2007 Data (H-6)	**Invertebrates** 	**Vegetation** 
Wetland Health Rating (IBI score)	Poor (14)	Moderate (21)
Spot Check Rating (IBI score)	Poor (14)	Poor (13)
Trend 2003-2007	Stable	Stable

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



Site summary: This is the fifth 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.

4.5.3 Sand Coulee Pond (H-30)

H-30, also known as Sand Coulee Pond is a 0.92 acre storm water 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 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 monitoring team noted that there was a large infestation of spotted knapweed outsie of the pond. The assessment did not match their impressions. They observed a turkey drinking from the pond. They also noted that litter and four-wheelers are a threat to this pond.

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

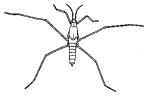
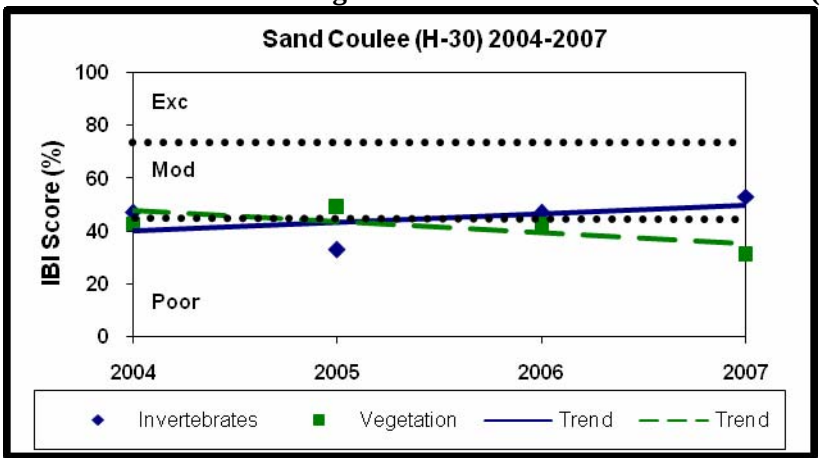
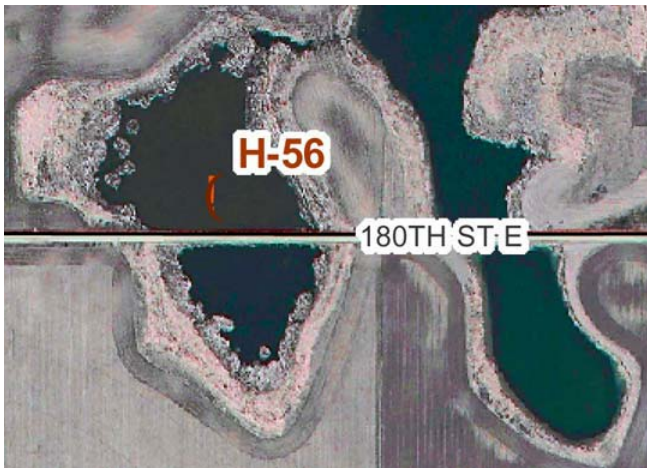
2007 Data (H-30)	**Invertebrates** 	**Vegetation** 
Wetland Health Rating (IBI score)	Moderate (16)	Poor (11)
Trend 2004-2007	Stable	Stable

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



Site summary: Four years of data is available for Sand Coulee wetland. Both the vegetation and invertebrate indexes have remained on the boundary between poor and moderate health.

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 less than 1 percent impervious. The wetland has one inlet and one outlet. The pond 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 for enhancing wildlife and its habitat.

Wetland Health

Site Observations: The near shore area is dominated by River Bulrush and Reed Canary Grass. The team noted the presence of several invasive species in the upland area, including Honeysuckle, Spotted Knapweed and Buckthorn.

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

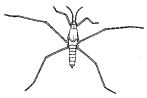
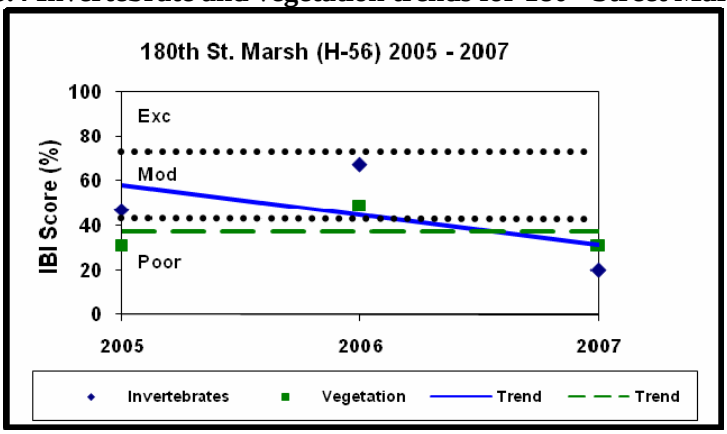
2007 Data (H-56)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Poor (6)	Poor (11)
Trend 2005-2007	Declining	Stable

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



Site summary: Three consecutive years of data has been collected for the 180th Street Marsh. The data indicate moderate to poor wetland health. Preliminary trends indicate declining invertebrate health and stable vegetation health. Additional monitoring is recommended to verify trends and conditions.

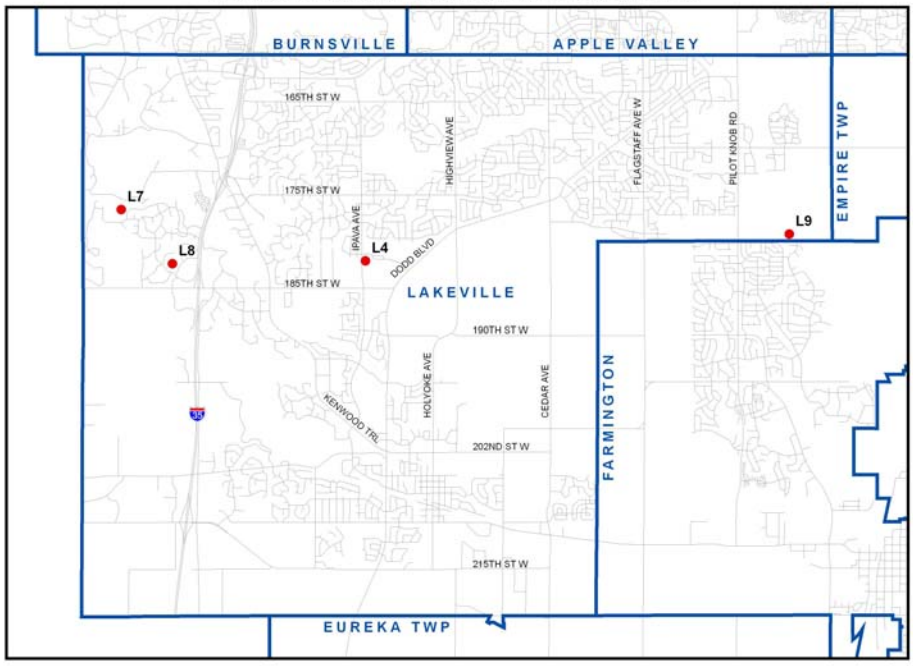
4.6 Lakeville Wetlands

Four wetlands were monitored in 2007 within the City of Lakeville. A total of nine wetlands have been monitored since the inception of WHEP.

Team Leader: Steve Weston
Team Members: Wendi Anderson, Bob Broberg, Kathy Carrier, Janet Erdman, Jean Kent, Shannon Ward, Bill Wilson, and Laura Wolf.
Training Only: Dave Moran

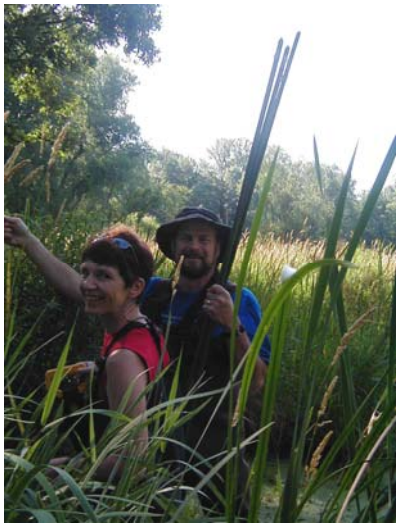
Steve Weston

Lakeville WHEP Sites Monitored in 2007



Steve Weston describes himself as a naturalist. "I am best known for my bird observations, but people who join me on field trips realize that I am really interested in all components of the environment. I was asked by the director of WHEP to give a talk on wetland birds. After the talk, I asked about WHEP, and said, 'That sounds neat. Can I do it?' I have been having fun ever since."

Steve Weston explains that "dry conditions during the collection of macroinvertebrates interfered with monitoring in one wetland and reduced the quality in two of the others. Only the fourth wetland DNR-393 showed no impact from the drought and continued to have good scores. Vegetative scores continued to reflect previous years' surveys although lower in the two excessively dry wetlands."



Ann Messerschmidt

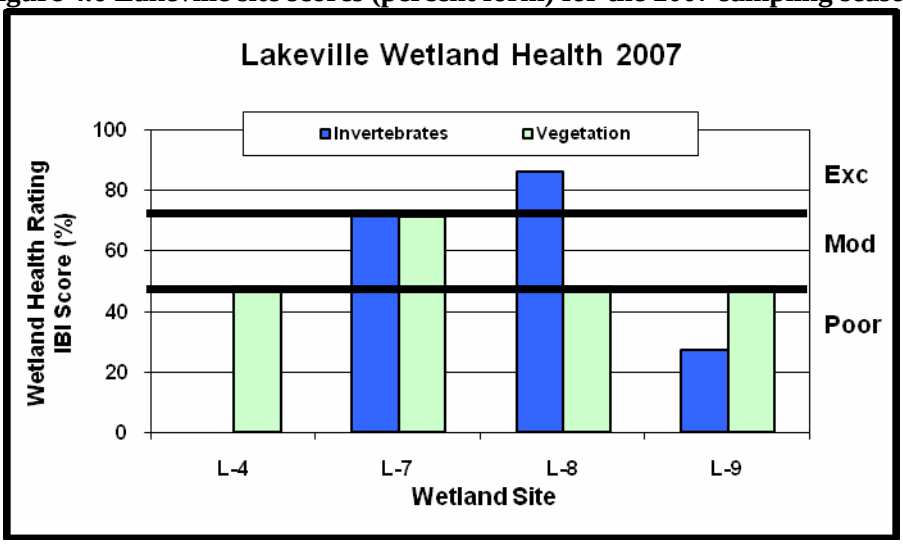
Ann Messerschmidt is the WHEP contact at the City of Lakeville. Her role is to determine which wetlands should be monitored by WHEP volunteers as well as review the collected data. She uses the data to compare to past years data and see what changes are occurring with the wetlands. She says, "Over time,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

environment to its inhabitants and how that reflects the overall health of the system. This helps residents of our community learn how their actions can directly affect water quality."

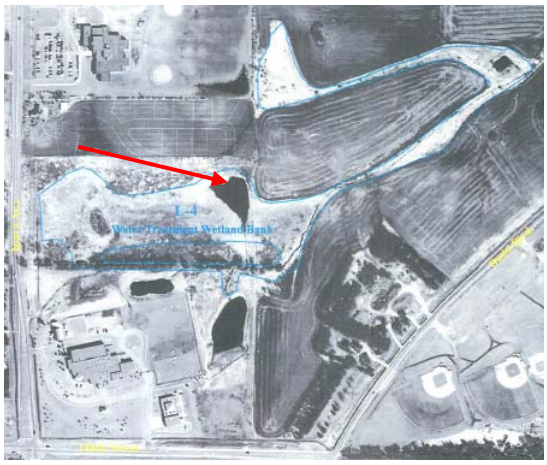
Lakeville General Wetland Health

Figure 4.6 presents an overall view of wetland health for all the 2007 monitoring sites in Lakeville based on the 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 invertebrate data for the four wetlands sampled ranged from poor to excellent wetland health, while the vegetation data indicate poor to moderate wetland health. Invertebrates were not sampled in L-4 due to low water levels. When compared to the reference wetland, L-4 and L-9 appear to be more impacted, while L-8 had a very high invertebrate score, but the vegetation score was lower than reference conditions.

Figure 4.6 Lakeville site scores (percent form) for the 2007 sampling season



4.6.4 Water Treatment Wetland Bank (L-4)



L-4, also known as Water Treatment Wetland Bank, is a 22.85 acre type 4 wetland located within the Vermillion River Watershed. 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.

Wetland Health

Site Observations: According to team leader, Steve Weston, "For the second year in a row the Water Treatment Wetland Bank wetland was completely dry. It is possible that nearby construction has altered the hydrology of the wetland, which was created to

mitigate the loss of a wetland when the water treatment facility was constructed. While this wetland may not be in condition to be monitored, the more serious implication it that the considerable expense to construct the wetland may have been compromised."

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

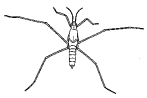
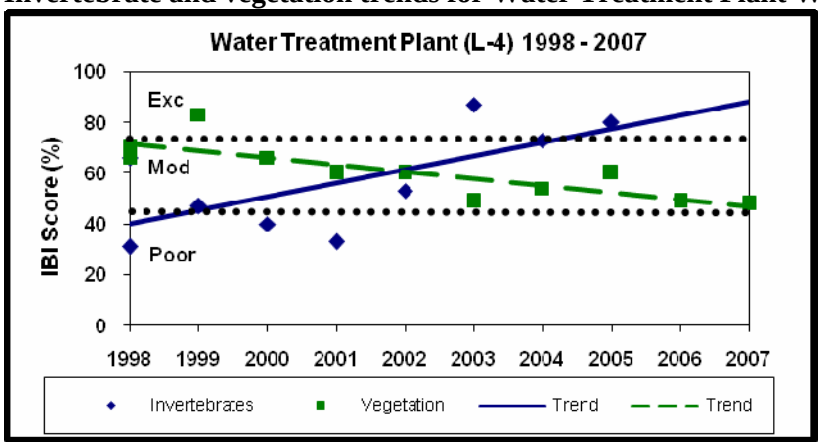
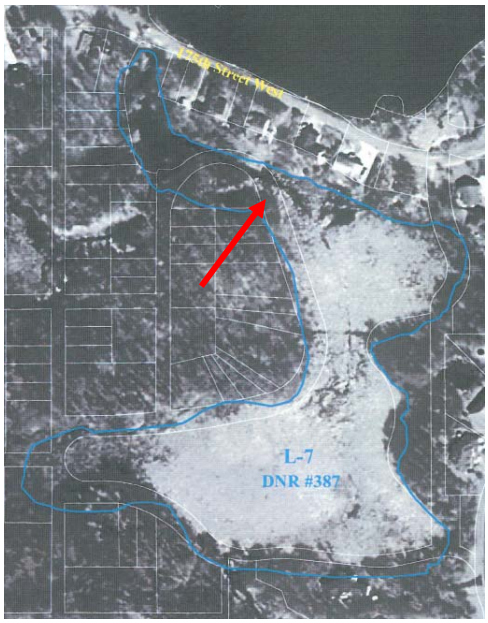
2007 Data (L-4)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Not sampled due to dry conditions	Poor (13)
Trend 1999-2007	Not enough data	Not enough data

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



Site summary: There is ten years of data for this wetland. The data indicate moderate wetland health, while the invertebrate data indicates moderate to excellent health. However, invertebrate data is not available for the past two years. The trend analysis shows trends in the opposite direction for each index, with vegetation health declining and invertebrate health improving. This is a mitigation wetland. Dry conditions in the past two years have likely impacted this 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 wetland drainage area is 2,087 acres. It is 21 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.

A road was constructed for a new subdivision north of the pond. The pond is surrounded by suburban development.

Wetland Health

Site Observations: The near shore area is thick vegetation with hummocks from controlled purple loosestrife. According to team leader Steve Weston, "DNR-387 (which we call Orchard Lake Wetland for its proximity to the lake) was suffering from low water levels, which lowered its usual high scores." A stream was flowing through the thick vegetation. Many birds were observed, including Virginia Rails.

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

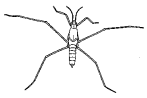
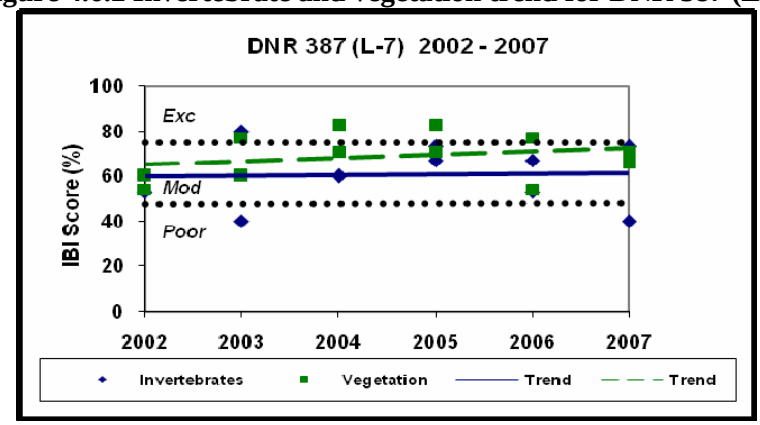
2007 Data (L-7)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (22)	Excellent (25)
Spot Check Rating (IBI score)	Poor (12)	Moderate (23)
Trend 2002-2007	Improving through 2006	Improving

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



Site summary: Dry conditions may have altered the invertebrate scores for this site, which appeared to be improving since a low score was recorded in 2003. The vegetation health is showing some improvement over time.

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 2,987 acres. It is 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.

Wetland Health

Site Observations: The near shore area of this wetland includes grassy areas as well as oaks. The wetland is nearly full of tall grasses and bulrushes.

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

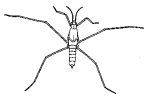
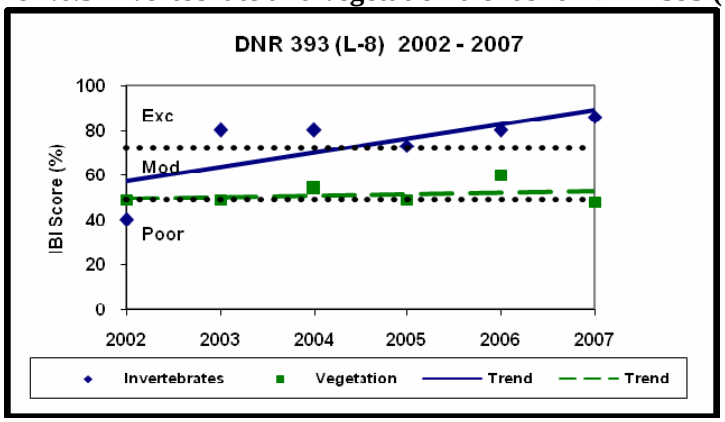
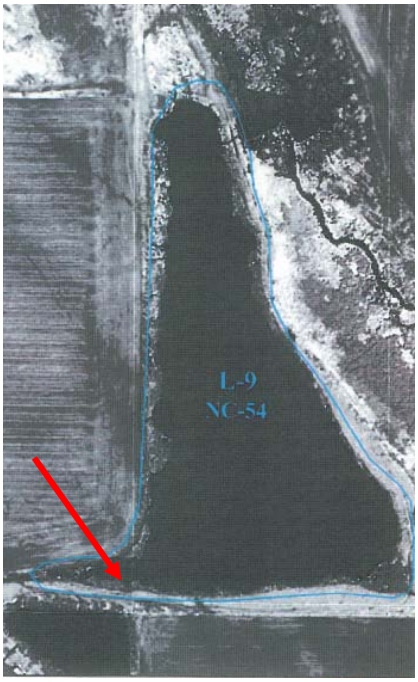
2007 Data (L-8)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Excellent (26)	Moderate (17)
Trend 2002-2007	Improving	Stable

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



Site summary: DNR wetland 393 (L-8) has six years of monitoring data. The trend analysis indicates improved invertebrate wetland health, but stable vegetation health. There are some factors, such as shoreline development, that are influencing the two areas differently.

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 near the City of Lakeville. The wetland drainage area is 183 acres. 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" and the management goal is to maintain the existing functions and values of the wetland.

Wetland Health

Site Observations: This site, L-9, (also known as NC54) is a mitigation wetland. The Lakeville team noted that the wetland was eutrophic (nutrient rich), with considerable fish die-off. With the very low water levels, there was a lot of exposed soils surrounding the open water area. Team leader, Steve Weston stated, "The sight of NC-54 was a total shock. Water levels were down about four feet. The low levels were apparently the temporary impact of a lowering of the ground water level as a result of the construction of ponds in a new subdivision nearby. This artificial wetland typically scores low, so its low scores were not unprecedented."

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

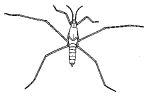
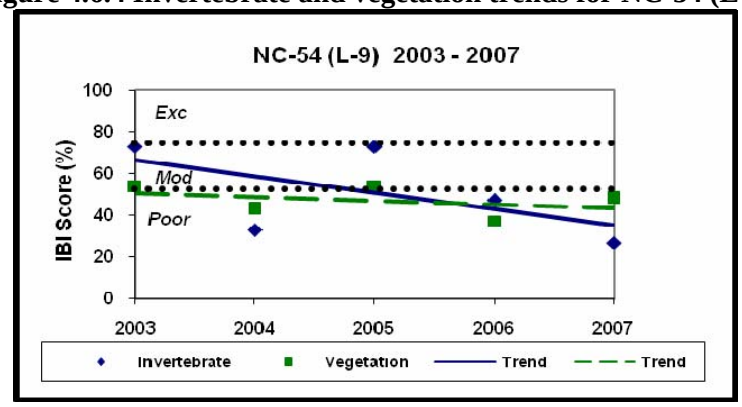
2007 Data (L-9)	**Invertebrates** 	**Vegetation** 
Wetland Health Rating (IBI score)	Poor (8)	Moderate (17)
Trend 2003-2007	Declining	Stable

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



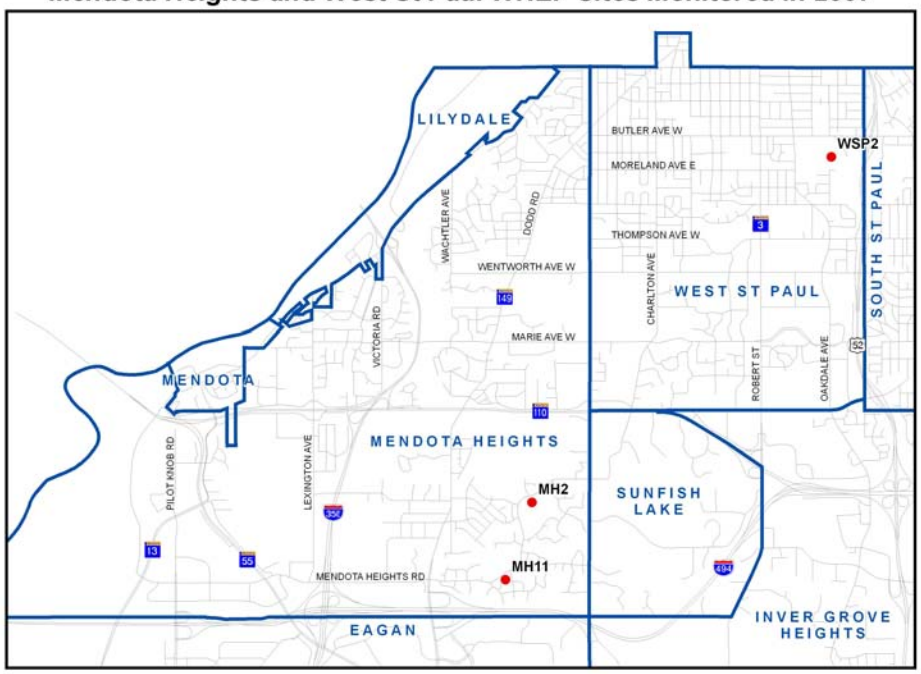
Site summary: Very low water levels were a likely cause of the lowest invertebrate IBI on record for this wetland. Vegetation scores remained poor, but stable. This is a mitigation wetland that appears to be maintaining poor wetland health. If nearby construction temporary altered water levels, additional monitoring in the future may reflect improvements in the quality of this wetland.

4.7 Mendota Heights and West St. Paul Wetlands

Two wetlands were monitored in Mendota Heights and one in West St. Paul in 2007 by the Mendota Heights team. The West St. Paul site is located in a Dakota County Park. Ten wetlands have been monitored in Mendota Heights and eight in West St. Paul since the start of the WHEP program.

Team Leader: Darcy Tatham
Team Members: Brian Ashman, Rhett Buttleman, Ross Buttleman, Terri Buttleman, Jim Chastek, Elizabeth Ekholm, Peter Ekhom, Dennis Forsberg, Eric Herrera, Andrew Kueppers, Michelle Larson, Jim Neuharth, Ann Schwichtenberg, Barb Spears, Mary Stade, Annaliese Tatham, Brian Walter, and Ella Wassweiler.
Training Only: Dennis Schaeffer, Laura Schaeffer

Mendota Heights and West St Paul WHEP Sites Monitored in 2007



Darcy Tatham

There were many new volunteers on the Mendota Heights team this year as well as several seasoned veterans. Darcy would also like to recognize the Inver Hills Community College and their Biology lab for allowing the use of their facilities and equipment for macro-invertebrate identification. She said, "Anita Schneider helped the most this past summer as she managed the biology prep lab area in the evenings. IHCC has allowed us to use their space for many years and it is highly appreciated!"

Mendota Heights also faced low water conditions later in the season. Darcy commented, "We saw our reference pond become a pond of muck with little standing water for the first time since I've been involved in the program."

Darcy became a team leader after volunteering one summer after the former team leader moved away. She said, "instead of seeing the team fold, and because I already thought that there was some merit and worth behind the program, I decided to try being the leader, even though I knew nothing about wetlands." She has been with the program for seven years. She believes, "when you have the opportunity to get close up to a wetland and discover how unique they all are, even in the same area, and how they can be beautiful in their

Mendota Heights team members

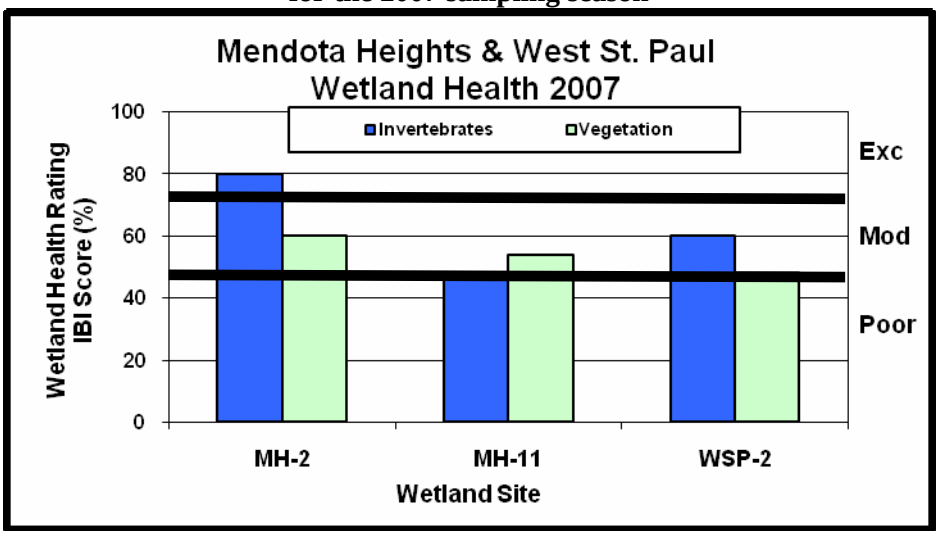
own way, that is when you start to understand the value and importance they play in our lives. It is exposing people to this in their own neighborhoods and continually learning about our inter-dependence with nature that has brought me back year after year. I enjoy the members on my team and I count many of them as my friends as we try to have fun together being outdoors learning about the wetlands. I also have the added value of having a 10 year old daughter who has literally grown up in this program and I can only hope that she is learning that there is value to volunteering and hands on learning about the world we live in."

Sue McDermott with the City of Mendota Heights helped the Mendota Heights team coordinate wetlands for monitoring in 2007. In the past they have been involved with sampling and the identification process of the sampling. She believes that WHEP is a valuable program for community involvement and wetland health evaluation.

Mendota Heights and West St. Paul General Wetland Health

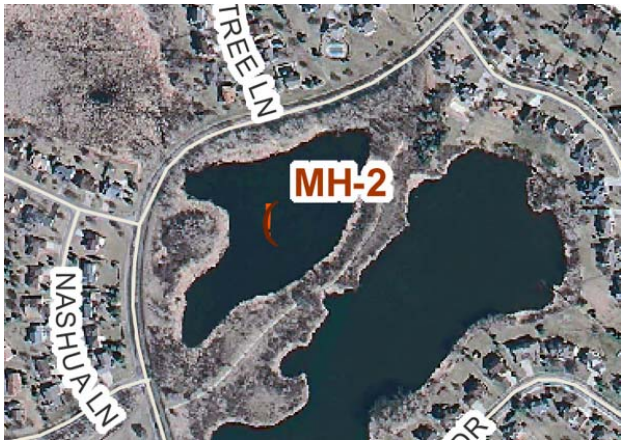
Figure 4.5 presents an overall view of wetland health for all of the 2007 monitoring sites in Mendota Heights and West St. Paul based on the scores for invertebrates and vegetation presented as a percent. Two sites were monitored in Mendota Heights and one in West St. Paul. The reference wetland, MH-2, ranked as excellent for invertebrates. The other sites ranked poor to moderate for both invertebrates and vegetation. The scores were fairly consistent between vegetation and invertebrates.

Figure 4.5 Mendota Heights & West St. Paul site scores (percent form) for the 2007 sampling season



Both Mendota Heights and West St. Paul have wetland management plans. In West St. Paul, wetlands are classified into categories I – V, consistent with the Lower Mississippi River Watershed Plan. With the exception of Thompson Lake and Marthaler Pond which are Category II wetlands, all wetlands in the city are Category III wetlands. Wetland protection is dependent upon wetland type.

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. 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. The site was spot checked by the Rosemount team. This is the ninth year of sampling.

Wetland Health

Site Observations: The Mendota Heights monitoring team noted that in July the site was drier than they had ever observed. Many of the plants were in mud flats rather than in the water. Water levels were closer to normal in June when the invertebrate monitoring was conducted. The team observed several species of wildlife including, ducks, toads, crickets, frog and raccoon (tracks). Reed Canary Grass surrounds a band of arrowhead found by the water's edge. There were water lilies in the mud flats, growing in little to no water.

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

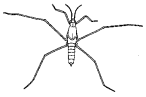
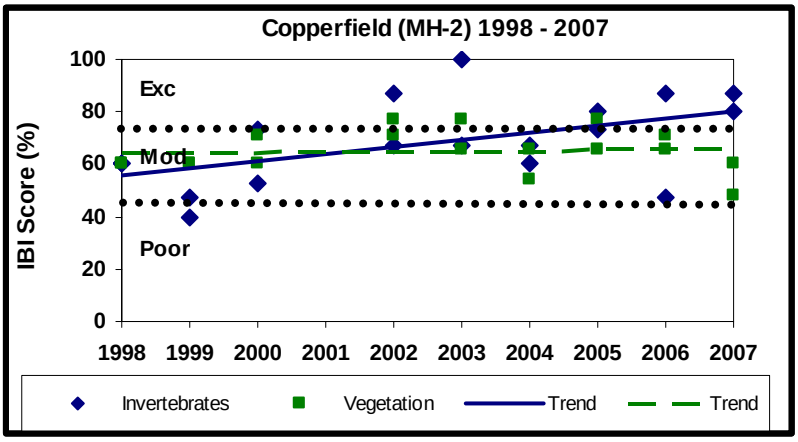
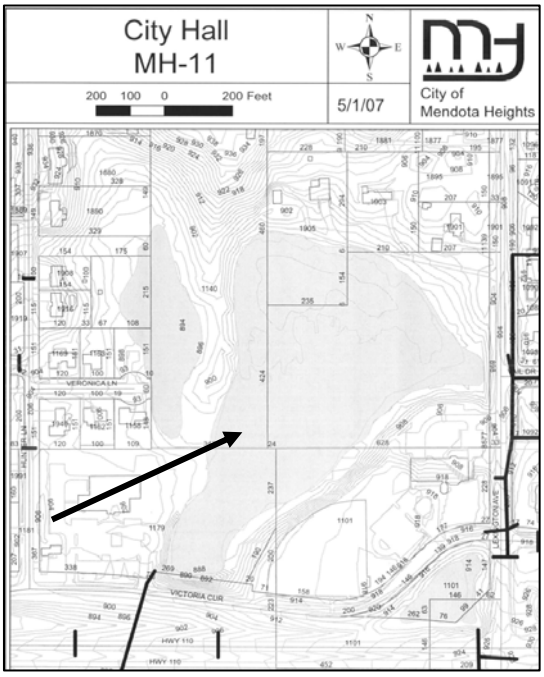
2007 Data (MH-2)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Excellent (24)	Moderate (21)
Spot Check Rating (IBI score)	Excellent (26)	Moderate (17)
Trend 1998-2007	Improving	Stable

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



Site Summary: Copperfield (MH-2) showed excellent invertebrate health and moderate vegetation health in 2007. The long-term trend based on nine years of data shows improving invertebrate health and stable vegetation health.

4.7.2 Lockwood Pond - City Hall (MH-11)



Lockwood Pond, also known as City Hall wetland (MH-11) is a 10 acre type 4 wetland located within the Lower Mississippi River watershed. The watershed is approximately 40 percent impervious. The wetland has two inlets on the east side and the outlet is located on the south side. The Mendota Heights City Hall is located on the east side. MH-11 is included in both the City wetland and stormwater management plans. The City's goals are to manage the wetland for aesthetics and monitor for impacts to the wetland from development. There are buffer strips in place. The edge of the pond is wooded, including some Buckthorn.

Wetland Health

Site Observations: The monitoring team found Purple Loosestrife within the releve plot, but noted that there was a lot more outside of the plot. Some team members stated that there is less now than in the past due to the release of beetles for biological control. Team members also noted that the site was a former dump site. The water level was very low in July. The pond was totally covered by duckweed and Wolffia.

Table 4.7.2 Lockwood Pond – City Hall (MH-11) Wetland Health based on Index of Biotic Integrity

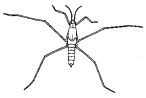
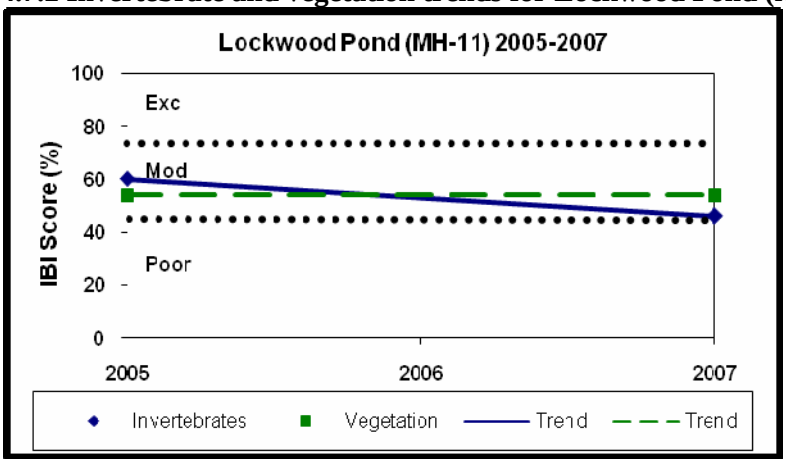
2007 Data (MH-11)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Poor (14)	Moderate (19)
Trend 2005 - 2007	Not enough data	Not enough data

Figure 4.7.2 Invertebrate and vegetation trends for Lockwood Pond (MH-11)



Site summary: Lockwood Pond- City Hall (MH-11) has been monitored only two times in the past three years. Monitoring results for invertebrates places the wetland in the upper poor category while the vegetation results place the wetland in the moderate health category. There is not enough data to determine any trends.

4.7.3 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 drainage area for this basin is about 14 square miles of Simon's Ravine watershed in West St. Paul which is part of the Lower Minnesota River Watershed. The percent impervious surface in the watershed is approximately 50 percent. 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 old lodge building has created disturbances to this lake. Also, a current plan is being evaluated to provide a water quality pond at the lake inlet. This is the fifth 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 maybe still, pumps 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. The monitoring team felt the pond seemed healthier than last year.

Table 4.7.3 Thompson Lake (WSP-2) Wetland Health based on Index of Biotic Integrity

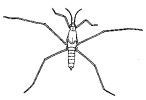
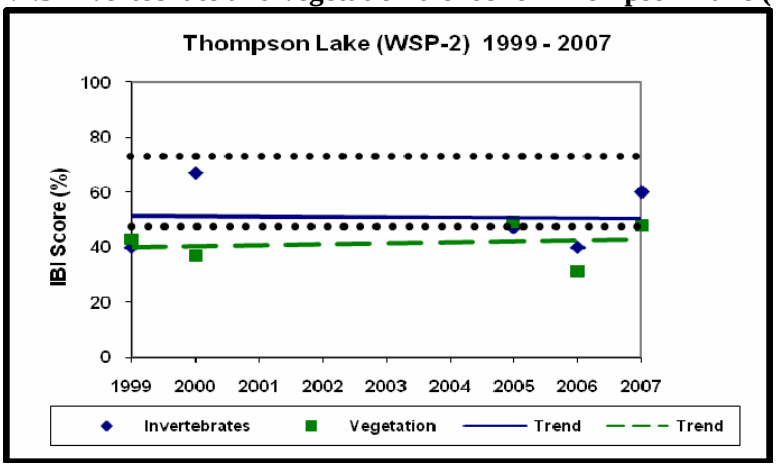
2007 Data (WSP-2)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (18)	Moderate (17)
Trend 1999-2007	Stable	Stable

Figure 4.7.3 Invertebrate and vegetation trends for Thompson Lake (WSP-2)

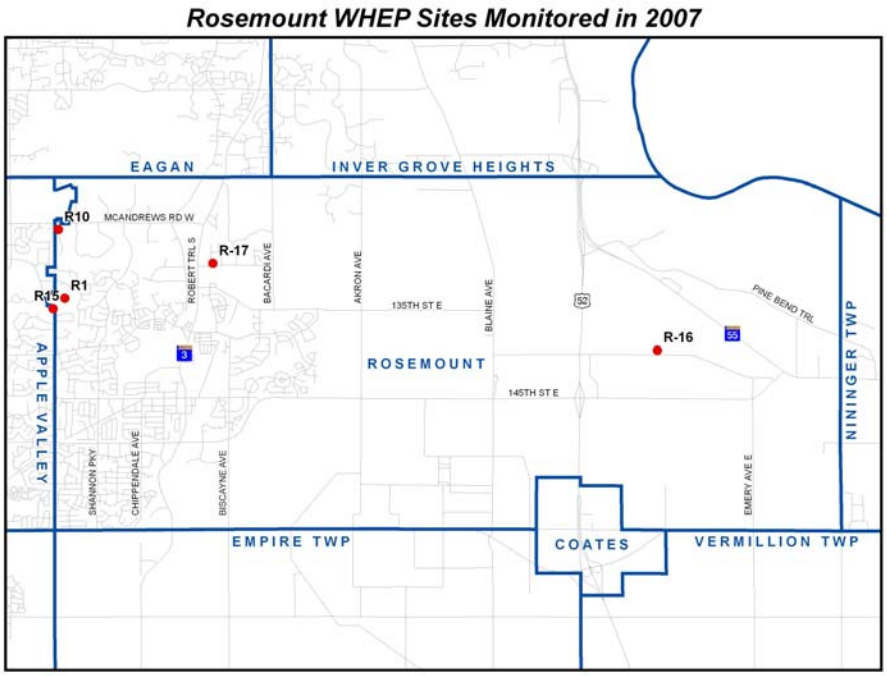


Site summary: WSP-2 has been sampled five times since 1999, but there was a four year period between samples in 2000 to 2005. The data indicate that the wetland conditions have remained fairly stable with ratings in the poor to low moderate wetland health categories. The wetland has a large watershed with a high impervious area, despite its location in a county park.

4.8 Rosemount Wetlands

Five wetlands were monitored in the City of Rosemount in 2007. Sixteen wetlands have been monitored in Rosemount since the start of WHEP.

Team Leaders: Jane Porterfield, Terry Pearson
Team Members: Brian Berggren, Barbara Berggren, Janell Miersch, Jillian Pearson, Emily Rekstad, Denise Wilkens, Tom Wilkens, and Paul Wright.
Training Only: Devin McKenomy



Since becoming part of the WHEP program, Jane and Terry have seen involvement among the community increase and healthy stewardship of surrounding wetlands become a high priority. They both agree that their team is fun to work with and keep them motivated to continue in the program. They enjoy experiencing the changes of the wetlands each season and hope the program remains active so they can continue to volunteer in the future.

Jane Porterfield and Terry Pearson

Christine Watson and Ryan Ruzak of the City of Rosemount help select the wetlands to be monitored, recruit, coordinate and support the team, and occasionally volunteer. They believe that the WHEP program will provide valuable insight about the health of the area wetlands, and will provide helpful documentation for keeping the waters protected.

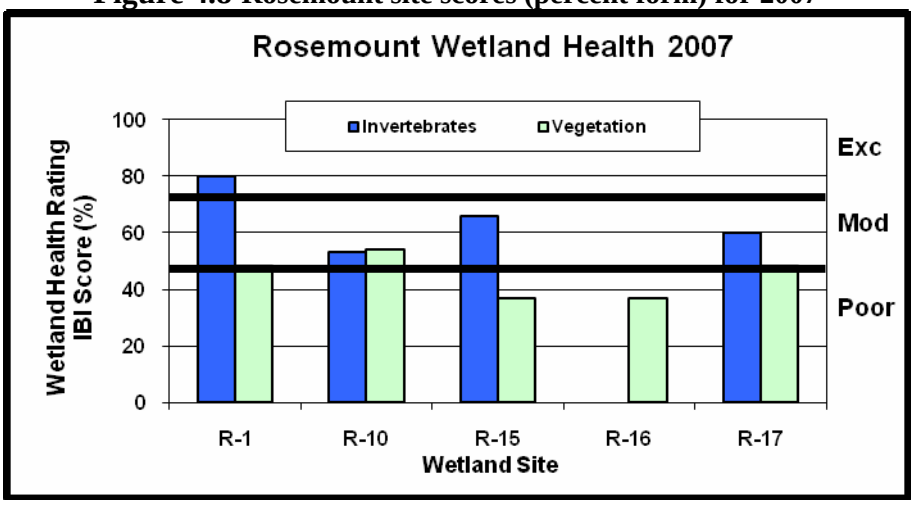
Rosemount General Wetland Health

Figure 4.8.2 presents an overall view of wetland health for all the 2007 monitoring sites in Rosemount based on the scores for invertebrates and vegetation presented as a percent. Figure 4.8.2 also illustrates the consistency of the wetland site scores. Scores that differ by less than 10 percent are considered consistent. The R-10 wetland has consistent vegetation and invertebrate scores. However, R-1, R-15 and R-17 show inconsistent scores between the vegetation and

Rosemount team members in action

invertebrates. The invertebrate data indicate moderate to excellent wetland health for most wetlands, while the vegetation data indicate poor to moderate wetland health. The invertebrate scores for R-15 and R-17 are similar to the reference wetland, R-1. Vegetation scores for R-15 and R-17 are lower than the reference wetland, while R-10 is slightly higher.

Figure 4.8 Rosemount site scores (percent form) for 2007



The City of Rosemount has a wetland management plan which includes four different categories of protection. Vegetated buffers are required around wetlands in new developments, with the buffer size determined by the wetland protection designation.

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

4.8.1 Kelly Marsh/Derryglen Court (R-1)

Kelly Marsh (R-1) is a one-acre type 4/5 wetland within a 12.5 acre watershed that drains to the Vermillion River. The City stormwater management plan and wetland management plan designate R-1 as "protect". The City's goals are to protect the functionality of the wetland and to avoid impacts. The wetland has steep slopes and a naturalized buffer. The wetland is surrounded by past development and the concern for this wetland is the impacts of development. There is an inlet on the north side of the wetland and an overflow swale outlet in the southeast. The Rosemount team monitored this wetland and the West St. Paul team provided a quality spot check for this site. This is the fourth year of sampling. The first year's sampling included amphibians.

Wetland Health

Site Observations: The monitoring team noted that the wetland was drying up and the water lilies had increased at the time of the vegetation sampling. The monitoring team also noted that cattails were present behind one townhouse at the top of the hill and raised a concern that they may spread to the pond where Reed Canary Grass, another invasive species, already exists. The team thought the pond looked healthier, and more mature, than their previous visit and noted the presence of birds, frogs and a Blue Darner.

Table 4.8.1 Wetland Health based on Index of Biotic Integrity

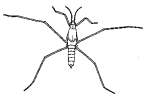
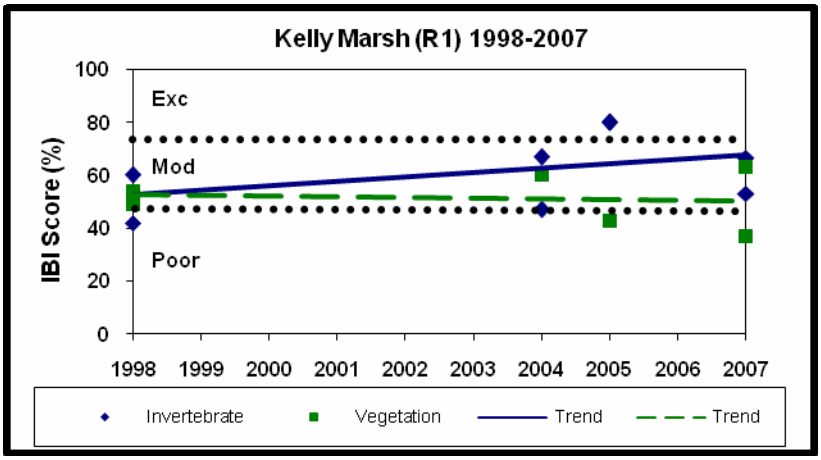
2007 Data (R-1)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Excellent (20)	Moderate (19)
Spot Check Rating (IBI score)	Moderate (16)	Poor (13)
Trend 1998-2007	Improving	Stable

Figure 4.8.1 Invertebrate and vegetation trends for Kelly Marsh (R-1) 1998 to 2007.



Site Summary: The invertebrate trend indicates improved wetland health since it was first tested in 1998. The vegetation analyses for this wetland provided fairly consistent ratings, in the moderate or high poor range, although a slight downward trend may be indicated. This wetland's invertebrate and vegetation scores are not consistent for the 2005 and 2007 data. Something may be affecting the vegetation that is

not affecting the invertebrates in the same way. Continued monitoring is recommended to determine if the trends continue.

4.8.2 Deepwoods Court (R-10)

Deepwoods Court (R-10), also known as WMP 408, is located southwest of the intersection of McAndrews and Deepwoods Court. It is a 1.1 acre type 3/4 wetland with a drainage area of 64 acres. The wetland is part of the Birger Pond subwatershed located within the larger Vermillion River Watershed. The wetland does not have an inlet but there is a connection to an adjacent basin on the other side of Deepwoods Court. It is categorized as a "preserve" wetland in the City wetland management plan.

Site Observations: The weland is primarily cattail with an extremely mucky bottom. The open water area is filling in with cattails, and surrounding area is infested with Buckthorn.

Table 4.8.2 Deepwoods Ct. (R-10) Wetland Health based on Index of Biotic Integrity

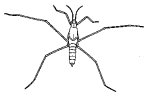
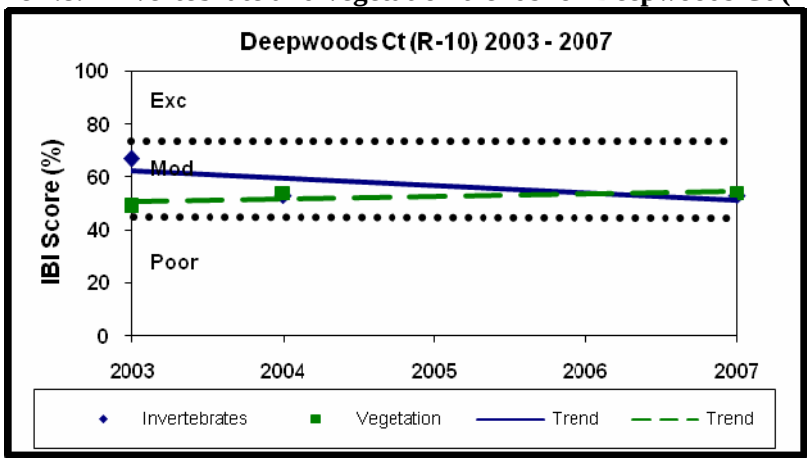
2007 Data (R-10)	**Invertebrates** 	**Vegetation** 
Wetland Health Rating (IBI score)	Moderate (16)	Moderate (19)
Trend 2003-2007	Not enough data	Not enough data

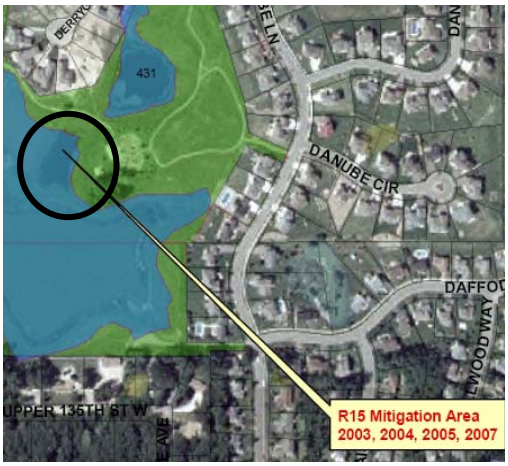
Figure 4.8.2 Invertebrate and vegetation trends for Deepwoods Ct (R-10)



Site summary: Deepwoods Court Wetland (R-10) has been monitored three years. The indexes both have indicated moderate wetland health all three years, with the 2004 and 2007 indexes very consistent. Additional data is needed to determine if any trend in wetland health is occurring.

4.8.3 Birger Pond Mitigation Site (R-15)

Birger Pond Mitigation Site is a shallow type 3 wetland 0.39 acres in size. The 83.7 acre watershed is 20 percent impervious. Birger Pond is located in the Vermillion River Watershed. The goal for this wetland is to provide mitigation for previous wetland impacts. There is a large buffer surrounding the wetland.



Site Observations: There is a 5 to 10 foot ring of cattails around the open water area. The monitoring team expressed concerns over the coverage of cattails and the presence of curly-leaf pondweed, found during the invertebrate survey. The team also commented on the apparent use of fertilizer and herbicides in the adjacent development as a potential threat to the wetland.

Table 4.8.3 Birger Pond (R-15) Wetland Health based on Index of Biotic Integrity

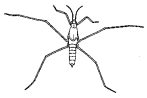
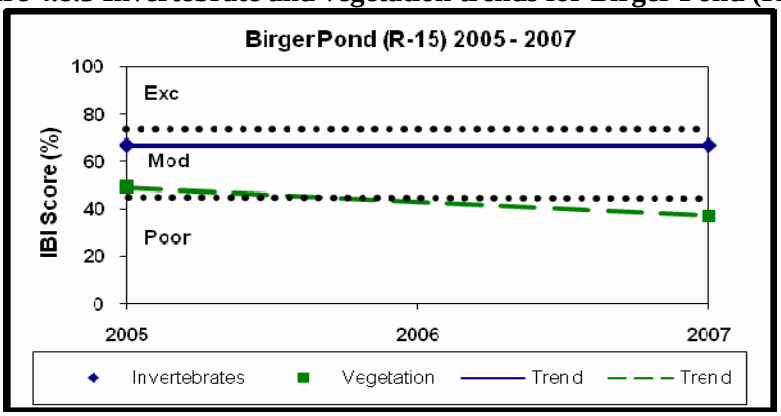
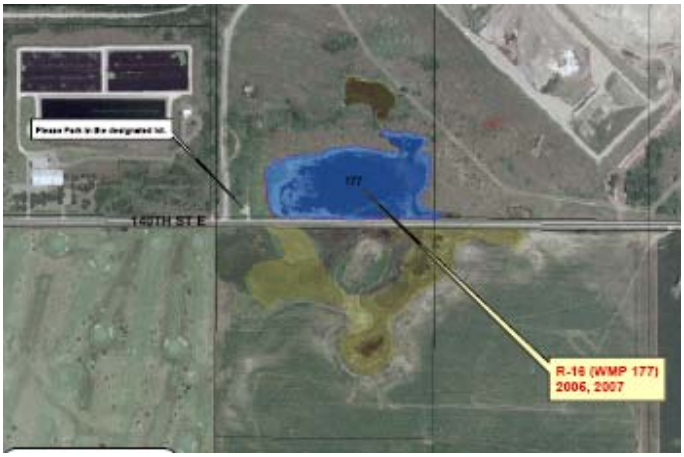
2007 Data (R-15)	Invertebrates 	Vegetation 
Wetland Health Rating (IBI score)	Moderate (20)	Poor (13)
Trend 2005-2007	Not enough data	Not enough data

Figure 4.8.3 Invertebrate and vegetation trends for Birger Pond (R-15)



Site summary: Birger pond mitigation site has been sampled only twice through the WHEP program, although it was monitored for five years as part of the Wetland Conservation Act Requirements for a mitigation site. The indexes show moderate to poor wetland health. However, the two indexes are not consistent.

4.8.4 Unnamed (R-16)

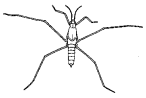


R-16 is an unnamed type 3 depressional wetland surrounded by prairie, located in the East Rich Valley watershed, part of the larger Vermillion River watershed. It is 9.7 acres in size with a 73.6 acre wetland. The wetland is located on private land. There are no defined inlets, but the wetland collects overland flow into the northeast corner. The wetland drains to the south under 140th street East. The wetland is included in the city's stormwater management plan and is designated as "preserve" in the wetland management plan. The goals for the wetland are to maintain the functions and values. It is currently surrounded by prairie buffer up to 970 feet wide. Potential disturbances include future expansion of the SKB Environmental industrial waste and demonlition debris disposal facility which would decrease the buffer and alter the watershed.

Wetland Health

Site Observations: The area was dry except for an approximately 1500 square foot area in the middle that was 6 inches deep. Bottom soils were firm. The monitoring team noted that the area has not come back after dewatering that occured in 2006 for pipe repair. It is now a field of more weedy species, including smart weed, cut grass, cattail and Purple Loosestrife. The team observed Red Wing Blackbirds and Canada Geese and they heard Chorus Frogs, Cardinals and Killdeer.

Table 4.8.4 R-16 Wetland Health based on Index of Biotic Integrity

2007 Data (R-16)	**Invertebrates** 	**Vegetation** 
Wetland Health Rating (IBI score)	Not sampled due to dry conditions	Poor (13)
Trend 2007	not enough data	not enough data

Site summary: This is the first year of monitoring for R-16 and only the vegetation was sampled. R-16 was an extra site that was sampled to document changes for the City. Due to the dry conditions, invertebrate sampling could not be conducted. Additional monitoring will be needed to establish adequate baseline data for this site.

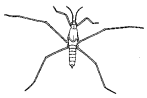
4.8.5 Unnamed- WMP 288 (R-17)

R-17, also known as WMP 288 is a 3.7 acre type 5 wetland with a large open water area. It is located at the northeast corner of 130th Street and Bolivia Ave. The wetland is surrounded by a 75 foot buffer and located within a deciduous wooded area surrounded by an older residential development with low maintenance lawns. The watershed is 26 acres with a 2 to 5 percent impervious area. The inlet is located on the southeast corner and outlet on the southwest corner. R17 is part of the Vermillion River watershed.

Wetland Health

Site Observations: The team noted that there was no emergent/aquatic interface which made siting the releve plot somewhat difficult. Only one emergent plant was found, and it was growing in the mud. The team did not observe any eminent threats.

Table 4.8.5 R-17 Wetland Health based on Index of Biotic Integrity

2007 Data (R-17)	**Invertebrates** 	**Vegetation** 
Wetland Health Rating (IBI score)	Moderate (18)	Poor (17)
Trend 2007	not enough data	not enough data

Site summary: This is the first year of monitoring for R-17. The indexes show poor to moderate wetland health. Additional monitoring is recommended to establish a good baseline and determine future trends.

Appendix A

2007 Vegetation IBI Data Sheets

MN WHEP VEGETATION SURVEY FIELD SHEET: SITE INFORMATION

Site Name:_____	Date/Time:_____
Team Leader/Observer:_____	Team Name:_____
Local Sponsor:	County:

Location Information (UTM coordinates from GPS unit, Township Range Section coordinates, or street directions):

Site Description (Include vegetation, water pathway, and immediate land use descriptions. Note any unique plants or plant communities within the wetland but occurring outside of the releve. Did you observe any wildlife while at this site?):

Site Sketch (Include vegetation zones, water inlets and outlets, point source pollution inputs such as stormwater pipes, immediate land use practices, any landmarks, and the location of the releve in the wetland):

MN WHEP VEGETATION SURVEY FIELD SHEET: RELEVE DATA

Site Name:_____	Date/Time:_____
Team Leader/Observer:_____	Team Name:_____
Local Sponsor:	County:

Releve Dimensions (circle one): **10 m x 10 m** or **5 m x 20 m** = 100 m^2
Is the releve typical of the wetland plant community ? (circle one): **Yes** or **No** (explain below)
Water depth in the plot (meters): Shallowest:_____m Deepest:_____m
Substrate/bottom description:

Comments:

Note: *Numbers in ( ) refer to the metrics where the data are used*

Pres	CC	NONVASCULAR (2, 6)
		Chara (Muskgrass)
		Lichen
		Moss
		Riccia fluitans (Slender Riccia)
		Ricciocarpus natans (Purple-Fringed Riccia)

Pres	CC	LOW VASCULAR (1)
		Equisetum (Horsetail)
		Onoclea sensibilis (Sensitive Fern)
		Osmunda (Osmunda)
		Thelypteris palustris (Marsh-Fern)

Pres	CC	WOODY (1)
		Vines
		Parthenocissus (Virginia Creeper)
		Vitis riparia (Grape)
		Shrubs or Trees with Opposite Leaves
		Acer (Maple, Box Elder)
		Cornus (Dogwood)
		Fraxinus (Ash)
		Rhamnus cathartica (Common Buckthorn)
		Shrubs or Trees with Alternate Leaves
		Alnus (Alder)
		Frangula alnus (Alder-Buckthorn)
		Populus (Aspen, Cottonwood)
		Quercus (Oak)
		Rubus (Raspberry, Dewberry, Blackberry)
		Salix (Willow)
		Spiraea alba (Meadowsweet)
		Ulmus (Elm)

Pres	CC	GRASSLIKE (1, 3, 4, 7)
		Sedges, Bulrushes, Rushes
		Carex (Sedge)
		Cyperus (Flatsedge)
		Dulichium arundinaceum (Three-Way Sedge)
		Eleocharis (Spike-Rush)
		Juncus (Rush)
		Scirpus (Bulrush)
		True Grasses
		Agrostis (Bent Grass)
		Alopecurus (Foxtail)
		Calamagrostis (Reed Grass)
		Echinochloa (Barnyard-Grass)
		Glyceria (Manna-Grass)
		Leersia (Cut Grass)
		Phalaris arundinacea (Reed Canary-Grass)
		Phragmites australis (Giant Reed)
		Poa (Blue Grass)
		Spartina pectinata (Prairie Cord-Grass)
		Zizania aquatica (Wild Rice)

Cover Class (CC)	Percent Cover Range
6	75-100%
5	50-75%
4	25-50%
3	5-25%
2	1-5%
1	0-1%

Fres CC FORBS (1, 5, 6, 7)

Submergent Aquatic Forbs		
		Ceratophyllum (Coontail)
		Elodea (Waterweed)
		Megalodonta beckii (Water Beggar-Ticks)
		Myriophyllum (Water-Milfoil)
		Najas (Water-Nymph)
		Potamogeton (Pondweed)
		Ranunculus (Water-Crowfoot)
		Utricularia (Bladderwort)
		Vallisneria americana (Water-Celery)
		Zannichellia palustris (Horned Pondweed)
Floating Leaved Aquatic Forbs		
		Brasenia schreberi (Water-Shield)
		Lemna (Duckweed)
		Nuphar (Yellow Water-Lily)
		Nymphaea (White Water-Lily)
		Polygonum amphibium (Water-Smartweed)
		Potamogeton (Pondweed)
		Spirodela polyrhiza (Greater Duckweed)
		Wolfia (Water-Meal)
Emergent Forbs with Basal Leaves		
		Acorus (Sweet Flag)
		Alisma (Water-Plantain)
		Calla palustris (Water-Arum)
		Caltha palustris (Marsh-Marigold)
		Iris (Iris, Flag)
		Pontedaria cordata (Pickerelweed)
		Rumex (Dock)
		Sagittaria (Arrowhead)
		Sparganium (Bur-Reed)
		Typha (Cat-Tail)

Additional/Unknown Forbs		

Fres CC FORBS (1, 5, 6, 7)

Emergent Forbs from a Distinct Stem		
		Asclepias incarnata (Swamp-Milkweed)
		Aster (Aster)
		Bidens (Beggar-Ticks)
		Campanula aparinoides (Marsh-Bellflower)
		Cicuta (Water-Hemlock)
		Cirsium (Thistle)
		Epilobium (Willow-Herb)
		Eupatorium (Joe-Pye Weed, Boneset)
		Euthamia (Grass-Leaved Goldenrod)
		Galium (Bedstraw)
		Hypericum (St. John's-Wort)
		Impatiens (Jewelweed)
		Lathyrus (Wild Pea)
		Lycopus (Bugle Weed)
		Lysimachia (Loosestrife)
		Lythrum (Loosestrife)
		Mentha arvensis (Field-Mint)
		Pilea (Clearweed)
		Polygonum (Smartweed)
		Potentilla palustris (Marsh-Cinquefoil)
		Scutellaria (Skullcap)
		Sium suave (Water-Parsnip)
		Solanum dulcamara (Nightshade)
		Solidago (Goldenrod)
		Stachys (Hedge-Nettle
		Triadenum fraseri (Marsh St. John's-Wort)
		Urtica dioica (Stinging Nettle)
		Verbena hastata (Blue Vervain)

Additional Comments:

MN WHEP VEGETATION SURVEY METRIC SCORING SHEET

Site Name:_____ Date Sampled:_____
Team Leader/Observer:_____ Date Scored:_____
Team Name:_____ County:_____
Local Sponsor:

1) Vascular Genera

-Count the number of different genera of low vascular plants (Ferns & Horsetails), woody plants, grasslikes, & forbs observed within the sample plot. Be careful not to count the same genus twice.

a. Number of **Low Vasculars**: _____

b. Number of **Woody Plants**: _____

c. Number of **Grasslikes**: _____

d. Number of **Forbs**: _____

e. **Plot Tally** (sum of a - d): _____

f. **Metric #1 Score**: _____

Comments:

Scoring criteria for Vascular Genera

Plot Tally	Score
≥ 20	5
9 - 19	3
0 - 8	1

2) Nonvascular Taxa

-Count the number of different kinds of nonvascular taxa observed within the sample plot. Do not count slimy filamentous algae, but note in the comments section.

a. **Plot Tally**: _____

b. **Metric #2 Score**: _____

Comments:

Scoring criteria for Nonvascular Taxa

Plot Tally	Score
≥ 2	5
1	3
0	1

MN WHEP VEGETATION SURVEY METRIC SCORING SHEET

Site Name:_____ Team Name:_____ Date Sampled:_____

3) Grasslike Genera

-Count the number of different kinds of grasslike genera observed within the sample plot (refer to metric #1, part c).

a. Plot Tally: _____

b. Metric #3 Score: _____

Comments:

Scoring criteria for Grasslike Genera

Plot Tally	Score
≥ 5	5
2 - 4	3
0 - 1	1

4) *Carex* Cover

-Estimate the percent cover of *Carex* within the sample plot.

a. *Carex* Cover Class Value: _____

b. Metric #4 Score: _____

Comments:

Scoring criteria for *Carex* Cover

CC Value	Percent	Score
3 - 6	≥ 5%	5
2	1 - 5%	3
0 - 1	0 - 1%	1

5) *Utricularia* Presence

a. Was *Utricularia* present in the plot? Yes No

b. Metric #5 Score: _____

Comments:

Scoring criteria for *Utricularia* Presence

Presence/Absence	Score
Present	5
Absent	1

6) Aquatic Guild

-Count the number of different Aquatic Guild genera. This includes the submergent aquatic forbs and floating leaved aquatic forbs listed on the releve data sheet ***and*** *Chara, Riccia fluitans,* and *Ricciocarpus natans*

a. Plot Tally: _____

b. Metric #6 Score: _____

Comments:

Scoring criteria for Aquatic Guild

Plot Tally	Score
≥ 6	5
3 - 5	3
0 - 2	1

MN WHEP VEGETATION SURVEY METRIC SCORING SHEET

Site Name:_____ Team Name:_____ Date Sampled:_____

7) Persistent Litter

-Record the cover class (CC) of each plant taxa listed below that was found in your plot. Determine the midpoint % cover and sum all of the values to score this metric. The midpoint % cover is the middle percentage of the range that a CC represents. Data must be converted from CC to midpoint % before being added together, because the ranges that CC's represent are not equal.

a. Sum of midpoint percent cover:

Plant	CC	Midpoint %
Typha (Cat Tail)	___	_____
Sparganium (Bur-Reed)	___	_____
Lythrum (Loosestrife)	___	_____
Phragmites australis (Giant Reed)	___	_____
Scirpus (Bulrush)	___	_____
Polygonum (Smartweed)	___	_____

Total Midpoint %: _____ (%)

CC	Percent Cover Range	Midpoint %
6	75-100	87
5	50-75	63
4	25-50	38
3	5-25	15
2	1-5	3
1	0-1	0.5

b. Metric #7 Score: _____

Comments:

Scoring criteria for Persistent Litter

Total Midpoint %	Score
≤ 27%	5
28 - 54%	3
≥ 54%	1

IBI Summary

-Tally your results from the seven metrics and add them together to arrive at a wetland vegetation IBI score and condition assessment for the site.

Metric	Score
1) Vascular Genera	_____
2) Nonvascular Taxa	_____
3) Grasslike Genera	_____
4) *Carex* Cover	_____
5) *Utricularia* Presence	_____
6) Aquatic Guild	_____
7) Persistent Litter	_____
Total:	_____

Wetland Condition Assessment:_____

Site Score Interpretation

IBI Score	Wetland assessment
26 - 35	Excellent
16 -25	Moderate
7 - 15	Poor

MN WHEP VEGETATION SURVEY METRIC SCORING SHEET

Site Name:_____ Team Name:_____ Date Sampled:_____

Additional Site Remarks

-Please provide any additional information about this site and/or the vegetation survey. Do you think the methods for evaluating the vegetation are adequate for this site? Does the condition assessment reflect your impressions of the site? Are there any potential threats to the site (e.g. new developments, stormwater inputs, roads, etc)?

Appendix B

2007 Invertebrate IBI Data Sheets

Field Data Sheet Wetland Invertebrate Sampling. Site data and site sketch.

Site Name **Town** **County**

Sample name (if coded differently from site name)

Location description: DO SKETCH OF SITE ON BACK OF PAGE, show roads, compass directions. Write out road names/#'s, directions, name of park, private owner name, whatever is necessary to tell a stranger how to get to your wetland.

Date dipnet samples were collected: **Water temperature:**

Samples collected by: Collector's name/Phone #
Team Name:

Near shore area: describe vegetation (or lack of it) where you sampled (e.g. little or no veg, choked with cattails, lots of submerged vegetation, lots of duckweed).

Slope into wetland in the water near edge: gentle or steep?

Describe bottom of wetland: (e.g. solid or very mucky?)

BOTTLETRAPS (BT). You will collect 3 pairs of BTs, 6 total traps (see protocol sheet).

1 Sample codes if different from site name:

2 Date/Time BTs were set out:

3 Number of BTs deployed:

4 BTs set out by (name, phone #)

5 Locations where BTs set out (indicate on site sketch on back)

6 Date/Time BTs were collected

7 Number of BTs collected successfully

8 Number of jars which contain the BT samples:

9 Indicate if the following were present in bottletraps:

	Tadpoles	Salamander adults	Fish
	Frog adults	Salamander larvae	Other

DIPNETTING (DN). One sample consists of **two dipnetting efforts** (see protocol sheet).

1 Sample code if different from site name:

2 Date/Time DN sample was taken:

3 Locations where the 2 DN efforts were done (indicate on site sketch on back)

4 Were 2 dipnetting efforts done? (see protocol)

5 Describe approximate water depths where you sampled:

NOTES:

INVERTEBRATE LAB DATA SHEET PAGE 1 ENTER DATA HERE FIRST

Site Name	Site Number	# of DN samples taken:			
Date analyzed	Date sampled	# of BT traps set:		# BT sample jars:	
LEECH TAXA METRIC		Put 1 where the taxon was seen in any sample			
NOTE: each row represents a **DIFFERENT taxon** or kind		DN	BT 1	BT 2	BT 3	Taxon Presence (put 1)
Glossiphonidae (describe or name the different taxa)						
Large, mottled leeches						
Macrobdella decora						
Other kinds(describe or name them)						

Record total leech taxa at far right (add the Taxon Presence column)	Total # of Leech Taxa:

CORIXID PROPORTION METRIC (BOTTLETRAPS ONLY)		Record counts of individuals here BT 1	BT 2	BT 3	Total Count by row for all BTs
a. Corixid bugs (count juveniles and adults)					
b. Bugs that are not corixids					
c. Beetle larvae					
d. Adult beetles					
e. Record total count of bugs and beetles at far right		Sum Total Count (add a, b, c, d):			
f. Compute the ratio of Corixid bugs (a.) to the Total Count (e.) at far right			Corixid Ratio (a/e):		

INVERTEBRATE LAB DATA SHEET PAGE 2 ENTER DATA HERE FIRST

Site Name	**Site Number**	**# of DN** samples taken:			
Date analyzed	Date sampled	**# of BT traps** set:		**# BT sample jars:**	

DRAGONFLY-DAMSELFLY TAXA METRIC (Odonata Taxa)	**Put 1 where the taxon was seen in any sample**				
NOTE: each row represents a **DIFFERENT taxon** or kind	**DN**	**BT 1**	**BT 2**	**BT 3**	**Taxon Presence (put 1)**
Dragonflies Aeshnidae family (list different types you see)					
Dragonflies Corduliidae family					
Dragonflies Gomphidae					
Dragonflies Libellulidae family (list different types you see)					
Damselflies Lestidae					
Damselflies Coenagrionidae					
Damselflies Other					
Record total # of dragonfly and damselfly at far right (add Presence column)			**Total # of Odonata Taxa:**		

MAYFLY-CADDISFLY TAXA FOR ETSD METRIC	**Put 1 where the taxon was seen in any sample**				
Mayflies (describe each different type you see, or give names)	**DN**	**BT 1**	**BT 2**	**BT 3**	**Taxon Presence (put 1)**
Caddisflies (describe each type you see, or give names)					
Record total # of mayfly and caddisfly taxa at far right (add Presence)		**Total # of Mayfly and Caddisfly Taxa:**			

INVERTEBRATE LAB DATA SHEET PAGE 3 — ENTER DATA HERE FIRST

Site Name	Site Number	# of DN samples taken:	
Date analyzed	Date sampled	# of BT traps set:	# BT sample jars:

SNAIL TAXA METRIC		Put 1 where the taxon was seen in any sample				
NOTE: **each row** represents a **DIFFERENT taxon** or kind		DN	BT 1	BT 2	BT 3	Taxon Presence (put 1)
Planar snail	Helisoma (do you see one or two types?)					
Planar snail	Gyraulus					
Planar snail	Planorbula					
Planar snail	Promenetus					
Planar snail	Other					
Spired snail	Aplexa					
Spired snail	Acella					
Spired snail	Fossaria					
Spired snail	Lymnaea stagnalis					
Spired snail	Stagnicola elodes					
Spired snail	Stagnicola reflexa					
Spired snail	Physa					
Spired snail	Other					
Record total # of snail taxa at far right (add Presence column)				**Total # of Snail Taxa:**		

OTHER TAXA TO INCLUDE IN THE TOTAL TAXA METRIC		DN	BT 1	BT 2	BT 3	Taxon Presence (put 1)
FINGERNAIL CLAMS	(used also in the ETSD metric)					
Dipterans:	Chaoborus					
Dipterans:	Mosquito larvae					
Dipterans:	Ceratopogonidae (biting midges)					
Dipterans:	Chironomidae (midges)					
Dipterans:	Odontomyia					
Dipterans:	Other					
Crustaceans:	Amphipods					
Crustaceans:	Clam shrimp					
Crustaceans:	Crayfish					
Crustaceans:	Fairy shrimp					
Crustaceans:	Isopods (Asellus)					
Crustaceans:	Other (don't count ostracods, Daphnia)					
Total up these taxa to add to total for total taxa metric. Add up Presence column.				**Total of other taxa for taxa metric:**		

Appendix C. Site Identification Form

Dakota County Wetland Health Evaluation Program

2007 Site Identification Form
please use a different form for each wetland

City: Contact:

Email: Phone:

Wetland number: Wetland name:

Please initials of city + 1, 2, 3, or 4, i.e., AV-1. #1 should be your best/reference site. Use a name that means something locally, like a street, subdivision, park, etc. Do not change numbers from one year to the next. Just add a new number for a new wetland, i.e., AV-6 without using numbers from earlier years. Do not change name from year to year.

Size of wetland: _____ acres Longitude: _____ Latitude: _____

Wetland type (3, 4, or 5): _____ Reference site: _____ yes _____ no

Monitored before: ____ no ____ yes in: ____1997 ____1998 ____1999 ____2000
____2001 ____2002 ____2003 ____2004
____2005 ____2006

Watershed size: _____ Percent impervious surface in watershed: _____

Ownership: _____: _____ private _____ public

Inlet locations: _____

Outlet locations:
_____

Is wetland included in the city's storm water management plan? _____ yes _____ no

Does the city have a wetland management plan? ? _____ yes _____ no

If yes, how is this wetland designated: _____

Wetland management goal:

Types of disturbance (current or future land use impacts):

Physical characteristics (landscape, habitat, significant features, etc.):

BMPs in place:

Concerns of note:

Please return this form, aerial map, and directions to the site by May 1 to:

Paula Liepold, Dakota County Water Resources Office
14955 Galaxie Avenue, Apple Valley, MN 55124
phone: 952-891-7117
paula.liepold@co.dakota.mn.us

Appendix D. Dakota County Wetland Sites

Vegetation Sampling History

No data available

Multiple values in a cell indicate quality control spot checks

KEY:	☐ Poor	◘ Moderate	■ Excellent
Range:	7 - 15	16 - 24	25 - 35
Percent:	< 46%	46- 71%	> 71%

Site ID	Site Name	1997	1998*	1999	2000	2001	2002	2003	2004	2005	2006	2007
AV-1	Hidden Valley		21/23	15	23/23	21/25	19/17	23/25/21	25/21	27/19	21	
AV-2	Kelley Property		17/27	23/27	23/17	25	23					
AV-3	Palomino		29/25									
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	
AV-9	Watrud Pond									25	19/21	17/15
AV-10	Alimagnet											11
AV-11	Farquar Lift Station											9
AV-12	EVR-P12											21
B-0	Terrace Oaks											
B-1	Crystal Lake West			29/25	33/25	29/29	31/33	29/33	29/23	27/21		23
B-2	Cam Ram		21/13	21							17	
B-3	Kraemer		23/21	23	21	21	23	25	25	13	17	17
B-4	Alimagnet											
B-5	Judicial Park North				23							
B-6	Alimagnet East				21/21		13			13		21
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	
E-1	Thompson Lake Park		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

Appendix D. Vegetation Sampling History (Continued)												
Site ID	**Site Name**	**1997**	**1998***	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**
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
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 Shepherd						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	
E-22	FP-11.6										15	
E-23	FP-4.2										11	
E-24	JP-42											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
F-2	Muskrat		15/15									
F-3	Kral Pond		25/29	21	19	13	13	19	13	13	15	9
F-4	Lake Julia		19/15	21	17	15	17	17	19	15	15	11
F-5	Pilot Knob			21	19/21	13	17	15	19	15	15	13
H-1	Louis Lane			15/15	11/11	11						
H-2	Bullfrog Pond			17	9							
H-3	Stonegate Untreated					9	15					
H-4	Stonegate Treated					11	13	17	17	17	21	19
H-5	Lower Vets						11/23					
H-6	Lake Rebecca							19/17	15/17	21/23	23/21	21/13
H-30	Sand Coulee								15	17	15	11
H-56	180th Street Marsh									11	17	11
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								

Appendix D. Vegetation Sampling History (Continued)												
Site ID	**Site Name**	**1997**	**1998***	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**
IGH-3	BP-21		17/15	19								
IGH-4	EP-18		15/19	21								
IGH-5	CP-6		13/11									
IGH-6	MP-67				25							
IGH-7	LP-2				15							
IGH-8	HP-1				15/15							
IGH-9	QP-1				29	25						
IGH-10	NP-15					15	15					
IGH-11	NP-12					13						
IGH-12	NP-13						15					
IGH-13	NP-10						23/25					
IGH-14	DC 2 or Ordway							23				
L-1	Ritter Farm Park		23/21/17	23/23/21								
L-2	Orchard		29/21									
L-3	Raven Lake		23/21	29	17	25	27/15					
L-4	Water Treatment Wetland Bank		23/25	29	23	21	21	17	19	21	17	17
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
L-8	DNR 393						17	17	19	17	21	17
L-9	NC 54							19	15	19	17	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
MH-3	Visitation		15/17	13								
MH-4	Industrial Park		17/15	17	17	17						
MH-5	Pagel Pond			15	17	15						
MH-6	City Hall				11	15						
MH-7	Copperfield II					23/25/25						
MH-9	Hagstrom-King						23	21	25			
MH-10	Wentworth Park										17	
MH-11	Lockwood Pond									19		19
R-1	Kelly Marsh - Derryglen Ct in 2004		17/19/17						21/21	15/15		17/13
R-2	White Lake		13/23								15	
R-3	O'Leary		17/11			19	15				11	
R-4	Schwartz Pond			13	11							
R-5	Wilde Lake					15/15	19					

Appendix D. Vegetation Sampling History (Continued)												
Site ID	**Site Name**	**1997**	**1998***	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**
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		
R-15	Birger Pond									17		13
R-16	Unnamed											13
R-17	Unnamed											17
SSP-1	Anderson Pond					11						
SSP-2	Seidl's Lake						13/13	11				
WSP-1	Mud Lake			15/13/13	17/13							
WSP-2	Thompson Lake 48W			15	13					17	11	17
WSP-3	Duck Pond			17	21							
WSP-4	Weshke Pond (aka Pond 1)				21	23						
WSP-5	Lilly Lake					17	17					
WSP-6	Marthaler Park					21	21	23				
WSP-7	Vivian Pond					19/19						
WSP-8	DNC Prairie Pond							15				

* Note 1998 spot checks conducted by URS, some with more than one sample

Appendix E. Dakota County Wetland Sites

Invertebrate Sampling History

KEY:	○ Poor	◎ Moderate	● Excellent
Range:	6 - 14	15 - 22	23 - 30
Percent:	< 50%	50- 76%	> 76%

No data available

Multiple values in a cell indicate quality control spot checks

Site ID	Site Name	1997	1998*	1999	2000	2001	2002	2003	2004	2005	2006	2007
AV-1	Hidden Valley		19/21	10	8/8	24/14	14/16	14/12/24	16/12	22/20	26	
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	
AV-9	Watrud Pond									26	22/14	18/16
AV-10	Alimagnet Park											12
AV-11	Farquar Lift Station											24
AV-12	EVR-P12											12
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
B-2	Cam Ram		17/13/17	18							16	
B-3	Kraemer		15/13/19	14	18	24	26	22	20	18	22	18
B-4	Alimagnet		19/21/13	20								
B-5	Judicial Park North				16							
B-6	Alimagnet East				16/12		22			20		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	
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									

Appendix E. Invertebrate Sampling History (Continued)												
Site ID	**Site Name**	**1997**	**1998***	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**
E-6	DP-13 Northwoods			18								
E-7	DP-11 Opus			28								26
E-8	AP 52.1 Trapp Farm			18								
E-9	LP-5- Wilderness Run			20/22					14/16			16
E-10	AP-3 Cedar Pond				10	6	10	12	6	8/10	12/16	12
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	
E-22	FP-11.6										10	
E-23	FP-4.2										16	
E-24	JP-42											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		
F-2	Muskrat		25/17									
F-3	Kral Pond		21/11	14	12	10	6	12	10	10	12	10
F-4	Lake Julia		15	16	10	8	10	14	18	10	10	8
F-5	Pilot Knob			20	20/26	16	12					
H-1	Louis Lane			10/10	6/16	8						
H-2	Bullfrog Pond			14	10							
H-3	Stonegate Untreated					8	14					
H-4	Stonegate Treated					12	12	10	20	14	18	16
H-5	Lower Vets						18/18					
H-6	Lake Rebecca							20/16	20/20	14/8	18/26	12/.14
H-30	Sand Coulee								14	10	14	16
H-56	180th Street Marsh									14	20	6
T-1	Lake Byllesby				10	16						
T-2	Northfield				18							

Appendix E. Invertebrate Sampling History (Continued)												
Site ID	**Site Name**	**1997**	**1998***	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**
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		
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/š12
L-8	DNR 393						12	24	24	22	24	26
L-9	NC 54							22	10	22	14	8
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
MH-3	Visitation		19/23	24								
MH-4	Industrial Park		27/19	16	18	18						
MH-5	Pagel Pond				12	22						
MH-6	City Hall				10	14						
MH-7	Copperfield II					22/24/22						
MH-9	Hagstrom-King						22	24	18			
MH-10	Wentworth Park										18	
MH-11	Lockwood Pond									18		14
R-1	Kelly Marsh		15/21						20/14	24/24		24/16
R-2	White Lake		15/17								22	

Appendix E. Invertebrate Sampling History (Continued)												
Site ID	**Site Name**	**1997**	**1998***	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**
R-3	O'Leary					16	10				6	
R-4	Schwartz Pond		21/13/25	18	14							
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		
R-15	Birger Pond									20		20
R-17	Unnamed											18
SSP-1	Anderson Pond					6						
SSP-2	Seidl's Lake						10/10	10				
WSP-1	Mud Lake			12/10/20	10/10							
WSP-2	Thompson Lake 48W			12	20					14	12	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				
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