

2009 ANNUAL REPORT

FENS RESEARCH FACILITY WETLAND BANK II

REPORT COVERS

**Mn/DOT Agreement Number 86250
&
BWSR Easement Number 69-01-07-05**

Reporting Period:

January 1, 2009 through December 31, 2009

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REPORT PURPOSE

This is the fifth annual report of the Fens Research Facility Wetland Bank II project. Its purpose is to meet the responsibility of the University of Minnesota (UM), Natural Resources Research Institute (NRRI), to submit an annual report that summarizes activities carried out under the terms of two agreements. The agreements are: 1) AGREEMENT BETWEEN UNIVERSITY OF MINNESOTA AND STATE OF MINNESOTA DEPARTMENT OF TRANSPORTATION (Mn/DOT Agreement Number 86250) and 2) AGREEMENT BETWEEN UNIVERSITY OF MINNESOTA AND STATE OF MINNESOTA BOARD OF WATER AND SOIL RESOURCES (BWSR Easement Number 69-01-07-05). The first agreement is hereafter referred to as the “Mn/DOT Agreement” and the second agreement is hereafter referred to as the “BWSR Agreement.”

The details of the UM responsibilities for both the Mn/DOT Agreement and the BWSR Agreement are contained in the FINAL WETLAND BANK PLAN: UNIVERSITY OF MINNESOTA FENS RESEARCH FACILITY WETLAND BANK II (approved March 29, 2005). The BANK PLAN is hereafter referred to as the “Bank Plan” or “Plan.” The UM land in which the wetland banking activity is taking place is formally referred to as the Fens Research Facility Wetland Bank II, but, for reporting purposes, it is hereafter referred to as the “Bank Site” or the “Site.”

NOTES & CLARIFICATION

Before continuing, the following notes and clarifications are important:

- 1) The Bank Plan covers both the Mn/DOT Agreement and the BWSR Agreement.
- 2) The Bank Plan provides the reporting structure of this report.
- 3) The Mn/DOT Agreement covers the wetland bank area being established under the Mn/DOT Agreement, and it is referred to as the Wetland Bank II Site within the agreement.
- 4) The BWSR Agreement covers the wetland bank area being established under the BWSR Agreement, and it is referred to as the Wetland Bank III Site within the agreement.
- 5) For construction purposes, the project is being carried out in two phases; hereafter referred to as “Phase 1 Area” and “Phase 2 Area.”
- 6) The Phase 1 Area contains 152.9 acres of the 172.9 acres approved for new wetland credit under the Mn/DOT Agreement.
- 7) The Phase 2 Area contains 20.0 acres of the 172.9 acres approved for new wetland credit under the Mn/DOT Agreement and the full 60.0 acres approved for new wetland credit under the BWSR Agreement.
- 8) Sheet 1 shows bank sites and agreement areas at the Fens Research Facility where the wetland banks are being established.
- 9) The Bank Site is part of the Fens Research Facility, hereafter referred to as the “Fens” (Sheet 1), that is managed by NRRI.

TIMEFRAME

The timeframe of this fifth annual report is January 1, 2009 through December 31, 2009. In order to maintain reporting context, selected portions of the: 1) Bank Plan (March 29, 2005), 2) 2005 ANNUAL REPORT (January 1, 2005 through December 31, 2005), 3) 2006 ANNUAL REPORT (January 1, 2006 through December 31, 2006), 4) 2007 ANNUAL REPORT (January 1, 2007 through December 31, 2007) and 5) 2008 ANNUAL REPORT (January 1, 2008 through December 31, 2008) will be repeated in this report. Future reports will be submitted annually, at the end of each calendar year.

APPROVAL AND DEPOSIT OF WETLAND CREDITS

In May 2009, the Technical Evaluation Panel (TEP) recommended approval for the deposit of 25% (58.2 acres) of the Bank Site into the BWSR Road Program Bank. In August, the BWSR Wetland Bank Administrator gathered, completed, and submitted the required documents for deposit. The remaining 25% will be deposited when the agreement is completed.

REPORTING STRUCTURE

The UM responsibilities contained in both the Mn/DOT Agreement and the BWSR Agreement are identical. The responsibilities are given as principal headings (1 through 7) below. Subheadings (e.g. 4A or 4D1) are given under principal headings where more detail was added in the Bank Plan. This list of responsibilities provides the reporting structure for the remaining part of this report. The status of each responsibility will be given. Some of the information contained in this report was also given in the Bank Plan.

U of M AGREEMENT RESPONSIBILITIES

- 1. An accurate definition of the boundary of existing (pre-project) jurisdictional wetlands.**
- 2. A topographic survey of the site with one-foot contours, at a minimum.**
- 3. A legal boundary survey of the Bank Site showing key land features such as ditches, roads, and ponds.**
- 4. A restoration plan showing proposed areas of excavation, filling, land leveling, grading, inundation, and water control structures.**
 - 4A. Large Woody Vegetation Removal**
 - 4B. Existing Vegetation and Invasive Species Control**
 - 4C. Pre-leveling Surface Preparation**
 - 4D. Grading, Ditch Plugs and Culverts**
 - 4D1. Grade Six Areas**
 - 4D2. Area Along North-South County Ditch**
 - 4D3. Ditch Plugs**
 - 4D4. Culverts**

5. A proposed vegetation establishment and management plan defining areas of planting, areas of seed harvest, areas of tree removal, methods of harvest and planting.
 - 5A. Bank Site Field Preparation
 - 5B. Donor Site
 - 5C. Bank Site Vegetation Establishment
 - 5D. Bank Site Management
6. A monitoring plan to confirm the establishment of wetland plants and groundwater hydrology consistent with that which is expected for the classification of the Type 7 and Type 8 wetlands.
 - 6A. Hydrology Measurements.
 - 6B. Vegetation Map.
 - 6C. Photographs.
 - 6D. Annual Report.
7. A project timetable/schedule

STATUS U of M BANK PLAN RESPONSIBILITIES

1. **An accurate definition of the boundary of existing (pre-project) jurisdictional wetlands.**

No new activities were conducted in 2009 related to this responsibility. See 2005 ANNUAL REPORT for activities that met this responsibility.

2. **A topographic survey of the site with one-foot contours, at a minimum.**

No new activities were conducted in 2009 related to this responsibility. See 2005 ANNUAL REPORT for activities that met this responsibility.

3. **A legal boundary survey of the Bank Site showing key land features such as ditches, roads, and ponds.**

No new activities were conducted in 2009 related to this responsibility. See 2005 ANNUAL REPORT for activities that met this responsibility.

4. **A restoration plan showing proposed areas of excavation, filling, land leveling, grading, inundation, and water control structures.**

No new activities were conducted in 2009 related to this responsibility. For activities that met the U of M responsibility for the Phase 1 Area (Sheet 1), see the 2005 ANNUAL REPORT. For activities that met the U of M responsibility for the Phase 2 Area (Sheet 1), see the 2006 ANNUAL REPORT.

4A. Large Woody Vegetation Removal

No new activities were conducted in 2009 related to this responsibility. See 2005 and 2006 ANNUAL REPORTs for activities that met this responsibility.

4B. Existing Vegetation and Invasive Species Control

In addition to the activities reported in the 2005, 2006, 2007 and 2008 ANNUAL REPORTs, in mid- and late-summer 2008 the Bank Site was inspected for invasive plant species. Although greatly reduced in abundance, there were still numerous areas where reed canary grass occurred in small, scattered clumps, even though it was clear that the 2005 wick applied (contact) herbicide and 2006 and 2007 spot applied (sprayed) herbicide was effective in killing much reed canary on the Site. Inevitably, some of the invasive species were missed in earlier applications. A plausible explanation for some new growth is that existing seeds germinated. In an attempt to spray all of the reed canary, the entire Site was traversed and spot sprayed in late-August and early-September. As in previous years, an all-terrain vehicle, with a sprayer mounted on it, was used. One person drove the vehicle while a second person spot sprayed. An aquatic approved herbicide (active ingredient: glyphosate) was used. As a commitment to the ongoing management of the Site, reed-canary grass and other invasive species that appear in future years will be sprayed.

4C. Pre-leveling Surface Preparation

All pre-leveling surface preparation was done in 2005 and 2006. For activities related to the Phase I Area (Sheet 1), see the 2005 ANNUAL REPORT. For activities related to the Phase II Area (Sheet 1), see the 2006 ANNUAL REPORT.

4D. Grading and Ditch Filling, Control Structure and Culvert

No new activities were conducted in 2009 related to this responsibility. See 2005 and 2006 Annual Reports for the majority of activities related to this responsibility. Minor activities were reported in the 2007 Annual Report.

4D1. Grading and Ditch Filling

No new activities were conducted in 2009 related to this responsibility. See 2005 and 2006 Annual Reports for the majority of activities related to this responsibility. Minor activities were reported in the 2007 Annual Report.

4D2. Grading Along North-South County Ditch

No new activities were conducted in 2009 related to this responsibility. See 2006 ANNUAL REPORT for activities that met this responsibility.

4D3. Control Structure

No new activities were conducted in 2009 related to this responsibility. See 2007 ANNUAL REPORT for activities that met this responsibility.

4D4. Culvert

No new activities were conducted in 2009 related to this responsibility. See 2005 and 2006 ANNUAL REPORTs for activities that met this responsibility.

5. A proposed vegetation establishment and management plan defining areas of planting, areas of seed harvest, areas of tree removal, methods of harvest and planting.

No new activities were conducted in 2009 related to this responsibility. See 2005, 2006 and 2007 ANNUAL REPORTs for activities that met this responsibility.

5A. Bank Site Field Preparation

No new activities were conducted in 2009 related to this responsibility. See the 2005, 2006 and 2007 ANNUAL REPORTs for activities that met this responsibility.

5B. Donor Site

No new activities were conducted in 2009 related to this responsibility. See the 2005, 2006 and 2007 ANNUAL REPORTs for activities that met this responsibility.

5C. Bank Site Vegetation Establishment

No new activities were conducted in 2009 related to this responsibility. See the 2005, 2006 and 2007 ANNUAL REPORTs for activities that met this responsibility.

5D. Bank Site Management

Except for control of invasive species (see **4B.** above), Bank Site management was minimal after the plant remains and mulch were applied in 2005 and 2007. Conditions of level topography, impermeable subsoil, and a climate in which precipitation exceeds evapotranspiration all lend themselves to establishing the vegetation and for the maintenance of high water levels in the soil.

6. A monitoring plan to confirm the establishment of wetland plants and groundwater hydrology consistent with that which is expected for the classification of the Type 7 and Type 8 wetlands.

Monitoring the entire Bank Site began in early-May and continued into late fall.

6A. Hydrology Measurements

Monitoring well installation was described in the 2006 and 2007 Annual Reports. No new wells have been installed since at the Bank Site. However, as discussed in the 2007 Annual Report, the COE Project Manager requested that three monitoring wells be installed on nearby wetlands outside of the Bank Site. These could then be used for comparing Bank Site water table levels with water table levels of nearby wetlands.

Before discussing the three new wells, activity related to the existing monitoring wells will be described. At the 24 wells within the Site, coincident with 24 vegetation monitoring sites, water table measurements were made fifteen times, beginning on May 15, 2008 and ending on November 2, 2009. The method of measuring the water table was reported in the 2006 and 2007 Annual Reports. The monitoring well locations are shown on Sheet 2. The 2006, 2007, 2008 and 2009 water table levels, at each well location, are graphically presented on Sheets 3 and 4.

As discussed in the 2007 Annual Report, graphs of water table levels at the Bank Site monitoring wells were reviewed for the year of 2006. It was clear the drought experienced during this year was also reflected in low growing season water table levels. The COE Project Manager requested that three monitoring wells be installed on nearby wetlands outside of the Bank Site. These could then be used for comparing Bank Site water table levels with water table levels of nearby wetlands. The three new monitoring wells were installed in the same manner as those installed throughout the rest of the wetland banks at the Fens. The well locations are shown on Sheet 5. The 2007, 2008 and 2009 water table levels, at each well location, are graphically presented on Sheet 5.

6B. Vegetation Map

At twenty-four sites (Sheet 2), baseline vegetation information was gathered on July 1, 2009 and August 13, 2009. These sites coincide with the vegetation monitoring sites and the groundwater well monitoring sites that were monitored in 2006, 2007, 2008 and 2009. The monitoring sites are five-meter by five-meter plots. Corners of the plots were re-established by locating plastic pipes that had been driven into the soil during the 2006 and 2007 vegetation monitoring. Gary Walton, a Northeast Minnesota botanist and wetland delineator, identified the vascular plants and estimated the percent cover of each using the relevé method. His 2009 report is given in Appendix 1. The report gives: 1) a summary of the observations at the Site, 2) plot-by-plot species identification and percent cover and 3) a list of all species present in Wetland Bank II, which includes whether or not they are native and their wetland rating. A vegetation map was not made because the Site consists of a mosaic of many small plant communities that could not be readily differentiated on a map.

6C. Photographs

Photographs were taken at five photo reference points at the Bank Site (Sheets 2 & 6). Many other photographs have been taken of the project. They are on file in the LGU file.

6D. Annual Reports

This is the fifth annual report. It summarizes activities from January 1, 2009 through December 31, 2009.

7. A project timetable/schedule.

A project timetable/schedule is given on Sheet 7. All tasks are either on schedule or ahead of schedule.

APPENDIX 1. 2009 Vegetation Monitoring Report.

FENS RESEARCH FACILITY WETLANDS BANK II

Gary B. Walton

December 1, 2009

Date of Study

July 1, 2009 and August 13, 2009

Methods

Estimates of percent coverage were made in plots using the relevé method. Results of the relevés are presented in spreadsheet format in Appendix A.

Observations

This area of the Fens Research is now in its third year of growth since being "seeded" with live sphagnum moss and associated species consisting of vascular plants typically found in sphagnum bogs and moss fens.

Site visits were made in July 1, 2009 and August 13, 2009. *Agrostis hyemalis* (ticklegrass), a native perennial grass species that was prevalent in 2006 and 2007, has declined across the site. Another *Agrostis* species, *A. stolonifera* (creeping bent) a non- native species is still common across the site. *Calamagrostis canadensis* (Canada bluejoint grass) is present across the site but not very common at this time. Where Canada bluejoint grass has been observed outside of plots, it is facing competition from *Phalaris arundinacea* (canary grass) a non-native grass with rampant growth.

Scirpus cyperinus (woolgrass) and member of the sedge family and not a true grass is also becoming abundant. Other sedges noted are *Carex tenera*, which is somewhat common, *C. vulpinoidea*, *C. lasiocarpa*, and *C. stipata* all of which are relatively scarce.

Forb species occur across the site and are somewhat common. Species observed include goldenrods (*Solidago gigantea*, *S. uliginosa*, *Euthamia graminifolia*), mints (*Mentha arvensis*, *Lycopus uniflorus*) and asters (*Aster lanceolatus*, *A. modestus*). Some weedy forbs are still present but in lower numbers than previous years. Where they have been noted to be abundant where vegetation has been killed by herbicide spot treatment for canary grass.

Woody vegetation consists of seedling willows (*Salix bebbiana*, *S. discolor*, *S. petiolaris*) and some quaking aspen (*Populus tremuloides*). Willows are now beginning to grow above the grasses with some between 2 and 3 feet tall. Bog birch (*Betula pumila*) observed in a few places in 2008 is also becoming common and some plants are about 2 feet tall. Another woody shrub noted is *Spiraea alba* (meadowsweet).

Peat mosses, other mosses, bog plants, and ferns noted in previous years are still scarce but some small patches of sphagnum moss were seen in the area around Plots 20 to 24.

During this year's control efforts *Phragmites communis* (reed grass), an invasive species, was found on the site. The two clumps were small and were sprayed with herbicide. *Phragmites communis* occurs nearby the Fens Research Facility on the county road.

Summary

Native wetland plants in particular *Scirpus cyperinus* (woolgrass) are becoming well established. Woody plants (willows, bog birch, meadowsweet) from seedling size to about two feet tall were noted in and outside of plots

Some non-native grass species such as bentgrass continue to persist on the site. Over much of the site bentgrass often occurs mixed with native wetland plant species control herbicide treatment would probably set them back and allow other plants including non-natives to grow in the newly opened areas.

Phalaris arundinacea (canary grass) is being controlled with spot treatment with glyphosate herbicide. Small founding populations of another invasive grass, *Phragmites communis* (reed grass) were also sprayed with glyphosate.

Species and Percent Cover For Plots at Fens Research Facility Wetland Bank I

Site 1 (E1-4)	<u>Date: 7/1/09</u>	COVER %	Site 1 (E1-4)	<u>Date: 8/13/09</u>	COVER %
	SPECIES			SPECIES	
	<u>Shrub Layer</u>			<u>Shrub Layer</u>	
	No shrubs observed			No shrubs observed	
	<u>Herbaceous Layer</u>			<u>Herbaceous Layer</u>	
	Scirpus cyperinus	30		Agrostis stolonifera	90
	Agrostis stolonifera	30		Scirpus cyperinus	40
	Grass seedlings	10		Calamagrostis canadensis	5
	Juncus effusus	2		Juncus effusus	2
	Sparganium (?) seedling	0.1		Polygonum pensylvanicus	1
	Rumex sp. (sterile)	0.1		Poa sp.	1
	Polygonum sp. seedlings	0.1		Agrostis hyemalis	1
Site 2 (E4-7)	SPECIES	COVER %	Site 2 (E4-7)	SPECIES	COVER %
	<u>Shrub Layer</u>			<u>Shrub Layer</u>	
	No shrubs observed			No shrubs observed	
	<u>Herbaceous Layer</u>			<u>Herbaceous Layer</u>	
	Scirpus cyperinus	60		Scirpus cyperinus	80
	Calamagrostis canadensis	25		Agrostis hyemalis	20
	Agrostis stolonifera	15		Calamagrostis canadensis	10
	Glyceria sp. (sterile)	5		Agrostis stolonifera	5
	Agrostis hyemalis	5		Phleum pratense	2
	Carex tenera	2		Triadenum fraseri	1
	Lysimachia sp. (sterile)	1		Lysimachia terrestris	1
	Juncus effusus	1		Lycopus uniflorus	1
	Carex canescens	1		Glyceria grandis	1
	Stellaria longifolia	0.1		Carex vulpinoidea	1
	Polygonum sagittatum	0.1		Carex tenera	1
	Phleum pratense	0.1			
	Lycopus uniflorus	0.1			
Site 3 (E6-2)	SPECIES	COVER %	Site 3 (E6-2)	SPECIES	COVER %
	<u>Shrub Layer</u>			<u>Shrub Layer</u>	
	No shrubs observed			No shrubs observed	
	<u>Herbaceous Layer</u>			<u>Herbaceous Layer</u>	
	Scirpus cyperinus	50		Agrostis hyemalis	45
	Grass seedlings	30		Scirpus cyperinus	40
	Agrostis stolonifera	15		Agrostis stolonifera	15
	Carex tenera	10		Solidago uliginosa	2
	Viola sp. (sterile)	5		Populus tremuloides	2
	Polygonum sp. (seedlings)	5		Phalaris arundinacea	2
	Solidago uliginosa	2		Carex tenera	2
	Ranunculus pensylvanicus	2		Viola pallens	1
	Potentilla norvegica	2		Salix petiolaris	1
	Populus tremuloides	2		Salix bebbiana	1
	Carex canescens	2		Potentilla norvegica	1
	Salix petiolaris	1		Polygonum persicaria	1
	Salix bebbiana	1		Polygonum pensylvanicus	1
	Plantago major	1		Eupatorium maculatum	1
	Phalaris arundinacea	1		Carex tenera	1
	Betula pumila	1		Betula pumila	1
	Stellaria longifolia	0.1		Geum allepicum	0.1
	Phleum pratense	0.1		Calamagrostis canadensis	0.1

Site 3 (E6-2) continued; Date 7/1/09

SPECIES	COVER %
<u>Herbaceous Layer</u>	
Geum allepicum	0.1
Cerastium vulgatum	0.1

Site 3 (E6-2) continued; Date 8/13/09

SPECIES	COVER %
<u>Herbaceous Layer</u>	
Spiraea alba	1

Site 4 (E7-6) Date: 7/1/09

SPECIES	COVER %
<u>Shrub Layer (>2ft)</u>	
Spiraea alba	5
<u>Herbaceous Layer</u>	
Calamagrostis canadensis	50
Scirpus cyperinus	20
Agrostis stolonifera	10
Stellaria longifolia	5
Solidago gigantea	2
Viola sp. (sterile)	1
Urtica dioica	1
Polygonum sagittatum	1
Eupatorium maculatum	1
Carex tenera	1
Rubus strigosus	0.1
Rubus setosus	0.1
Populus tremuloides	0.1
Dryopteris cristata	0.1
Aster sp. (seedling)	0.1
Phalaris arundinacea	

Site 4 (E7-6) Date: 8/13/09

SPECIES	COVER %
<u>Shrub Layer (>2ft)</u>	
Spiraea alba	0.1
<u>Herbaceous Layer</u>	
Calamagrostis canadensis	40
Galeopsis tetrahit	20
Agrostis hyemalis	20
Scirpus cyperinus	10
Polygonum hydropiper	10
Agrostis stolonifera	5
Solidago uliginosus	2
Polygonum sagittatum	2
Aster modestus	2
Veronia fasciculata	1
Urtica dioica	1
Rubus strigosus	1
Eupatorium maculatum	1
Carex tenera	1
Triadenum fraseri	0.1
Potentilla norvegica	0.1

Site 5 (E9-8) Date: 7/1/09

SPECIES	COVER %
<u>Shrub Layer (>2ft)</u>	
Spiraea alba	1
<u>Herbaceous Layer</u>	
Scirpus cyperinus	70
Carex tenera	15
Calamagrostis canadensis	15
Agrostis stolonifera	10
Polygonum sagittatum	1
Mentha arvensis	1
Grass seedlings	1
Dicot seedlings	1
Carex canescens	1
Thelypteris palustris	0.1
Stellaria longifolia	0.1
Dryopteris cristata	0.1

Site 5 (E9-8) Date: 8/13/09

SPECIES	COVER %
<u>Shrub Layer (>2ft)</u>	
Spiraea alba	2
<u>Herbaceous Layer</u>	
Scirpus cyperinus	45
Agrostis stolonifera	40
Agrostis hyemalis	25
Calamagrostis canadensis	15
Carex tenera	5
Ranunculus pensylvanicus	2
Mentha arvensis	2
Lycopus uniflorus	2
Aster lanceolatus	2
Phalaris arundinacea	1
Glyceria grandis	1
Euthamia graminifolia	1
Salix bebbiana	0.1
Cicuta bulbifera	0.1

Site 6 (E7-11) Date: 7/1/09

SPECIES	COVER %
<u>Shrub Layer (>2ft)</u>	
Spiraea alba	5
Populus tremuloides	1
<u>Herbaceous Layer</u>	
Agrostis stolonifera	30

Site 6 (E7-11) Date: 8/13/09

SPECIES	COVER %
<u>Shrub Layer (>2ft)</u>	
Spiraea alba	2
Betula pumila	1
Populus tremuloides	0.1
<u>Herbaceous Layer</u>	
Agrostis stolonifera	40

Site 6 (E7-11) continued; Date 7/1/09

SPECIES	COVER %
<u>Herbaceous Layer</u>	
Calamagrostis canadensis	20
Solidago gigantea	10
Scirpus cyperinus	5
Geum allepicum	5
Poa pratense	2
Mentha arvensis	2
Carex tenera	2
Phalaris arundinacea	1
Eupatorium maculatum	1
Viola sp. (sterile)	0.1
Triadenum fraseri	0.1
Stellaria longifolia	0.1
Polygonum aviculare	0.1
Galeopsis tetrahit	0.1
Dryopteris cristata	0.1

Site 6 (E7-11) continued; Date 7/1/09

SPECIES	COVER %
<u>Herbaceous Layer</u>	
Agrostis hyemalis	25
Scirpus cyperinus	10
Calamagrostis canadensis	10
Mentha arvensis	2
Geum allepicum	2
Carex tenera	2
Aster modestus	2
Solidago uliginosa	1
Solidago gigantea	1
Phleum pratense	1
Lycopus uniflorus	1
Glyceria grandis	1
Eupatorium maculatum	1
Carex vulpinoidea	0.1
Aster lanceolatus	0.1

Site 7 (E8-15) SPECIES COVER %

SPECIES	COVER %
<u>Shrub Layer (>2ft)</u>	
No shrubs observed	
<u>Herbaceous Layer</u>	
Calamagrostis canadensis	40
Scirpus cyperinus	20
Agrostis stolonifera	20
Viola sp. (sterile)	5
Carex tenera	5
Carex canescens	2
Solidago gigantea	1
Lysimachia sp. (sterile)	1
Geum allepicum	1
Stellaria longifolia	0.1
Salix petiolaris (seedling)	0.1
Salix discolor (seedling)	0.1
Potentilla norvegica	0.1
Euthamia graminifolia	0.1
Eupatorium maculatum	0.1
Betula pumila	0.1
Aster sp. (sterile)	0.1

Site 7 (E8-15) SPECIES COVER %

SPECIES	COVER %
<u>Shrub Layer (>2ft)</u>	
Betula pumila	0.1
Spiraea alba	1
<u>Herbaceous Layer</u>	
Scirpus cyperinus	90
Agrostis stolonifera	10
Carex tenera	5
Calamagrostis canadensis	30
Rubus setosus	1
Geum allepicum	1
Euthamia graminifolia	1
Viola pallens	0.1
Epilobium sticta	0.1

Site 8 (E4-15) Date: 7/1/09 SPECIES COVER %

SPECIES	COVER %
<u>Shrub Layer (>2ft)</u>	
Salix discolor (seedlings)	1
Salix bebbiana (seedlings)	1
Populus tremuloides (seedlings)	1
<u>Herbaceous Layer</u>	
Scirpus cyperinus	50
Calamagrostis canadensis	40
Grass seedlings	10
Scirpus atrovirens	5
Agrostis stolonifera	5
Cirsium arvense	2

Site 8 (E4-15) Date: 8/13/09 SPECIES COVER %

SPECIES	COVER %
<u>Shrub Layer (>2ft)</u>	
Salix bebbiana	2
Salix petiolaris	1
<u>Herbaceous Layer</u>	
Scirpus cyperinus	100
Calamagrostis canadensis	30
Agrostis stolonifera	5
Solidago uliginosa	1
Polygonum sagittatum	1
Galium tinctorium	1
Typha latifolia	0.1

Site 8 (E4-15) continued; Date 7/1/09

SPECIES	COVER %
<u>Herbaceous Layer</u>	
Viola sp. (sterile)	1
Spiraea alba	1
Euthamia graminifolia	1
Carex spp. (Ovales)	1
Aster lanceolatus	1
Stellaria longifolia	0.1
Solidago uliginosa	0.1
Populus tremuloides	0.1
Poa pratense	0.1
Lycopus uniflorus	0.1
Geum allepicum	0.1
Epilobium leptophyllum	0.1
Epilobium ciliatum	0.1

Site 8 (E4-15) continued; Date 7/1/09

SPECIES	COVER %
<u>Herbaceous Layer</u>	
Galeopsis tetrahit	0.1
Epilobium leptophyllum	0.1
Epilobium ciliatum	0.1
Cirsium arvense	0.1
Aster modestus	0.1
Agrostis hyemalis	0.1

Site 9 (E1-13) SPECIES COVER %

SPECIES	COVER %
<u>Shrub Layer (>2ft)</u>	
Salix petiolaris	2
Salix discolor	2
Salix planifolia	2
<u>Herbaceous Layer</u>	
Scirpus cyperinus	25
Agrostis stolonifera	20
Glyceria grandis	10
Scirpus atrovirens	5
Galium tinctorum	5
Carex tenera	5
Calamagrostis canadensis	5
Geum allepicum	2
Stellaria longifolia	1
Viola sp. (sterile)	0.1
Rumex sp. (sterile)	0.1
Ranunculus pensylvanicus	0.1
Polygonum sagittatum	0.1
Poa pratensis	0.1
Phleum pratense	0.1
Epilobium coloratum	0.1
Carex stipata	0.1
Bidens cernua	0.1

Site 9 (E1-13) SPECIES COVER %

SPECIES	COVER %
<u>Shrub Layer (>2ft)</u>	
Salix petiolaris	2
Salix discolor	2
<u>Herbaceous Layer</u>	
Agrostis stolonifera	35
Agrostis hyemalis	35
Scirpus cyperinus	15
Carex tenera	10
Potentilla sp. (seedlings)	5
Phleum pratense	5
Glyceria grandis	5
Polygonum persicaria	2
Polygonum pensylvanicus	2
Scirpus atrovirens	1
Phalaris arundinacea	0.1
Euthamia graminifolia	0.1
Calamagrostis canadensis	0.1

Site 10 (E3-11) Date: 7/1/09 SPECIES COVER %

SPECIES	COVER %
<u>Shrub Layer (>2ft)</u>	
No shrub layer observed	
<u>Herbaceous Layer</u>	
Agrostis stolonifera	40
Agrostis hyemalis	20
Euthamia graminifolia	15
Scirpus cyperinus	10
Calamagrostis canadensis	5
Carex tenera	5
Poa pratensis	5
Cirsium arvense	2

Site 10 (E3-11) Date: 8/13/09 SPECIES COVER %

SPECIES	COVER %
<u>Shrub Layer (>2ft)</u>	
No shrub layer observed	
<u>Herbaceous Layer</u>	
Agrostis stolonifera	40
Agrostis hyemalis	30
Calamagrostis canadensis	20
Scirpus cyperinus	15
Mentha arvensis	5
Solidago gigantea	2
Rubus setosus	2
Poa pratensis	1

Site 10 (E3-11) continued; Date 7/1/09

SPECIES	COVER %
<u>Herbaceous Layer</u>	
Mentha arvensis	2
Carex canescens	1
Galeopsis tetrahit	1
Geum allepicum	1
Solidago gigantea	1
Spiraea alba	1
Stellaria longifolia	1
Agropyron repens	0.1
Agrostis gigantea	0.1
Cerastium vulgatum	0.1
Dryopteris cristata	0.1
Rumex patientia	0.1
Urtica dioica	0.1
Viola sp. (sterile)	0.1

Site 10 (E3-11) continued; Date 7/1/09

SPECIES	COVER %
<u>Herbaceous Layer</u>	
Lysimachia terrestris	1
Geum allepicum	1
Euthamia graminifolia	1

Site 11 (E1-9)	SPECIES	COVER %	Site 11 (E1-9)	SPECIES	COVER %
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Shrub Layer (>2ft)
No shrub layer observed

SPECIES	COVER %
<u>Herbaceous Layer</u>	
Poa pratense	30
Calamagrostis canadensis	20
Agrostis stolonifera	20
Carex tenera	10
Scirpus cyperinus	5
Agrostis hyemalis	5
Urtica dioica	0.1
Stellaria longifolia	0.1
Galeopsis tetrahit	0.1
Aster lanceolatus	0.1

Shrub Layer (>2ft)
No shrub layer observed

SPECIES	COVER %
<u>Herbaceous Layer</u>	
Calamagrostis canadensis	40
Agrostis stolonifera	40
Scirpus cyperinus	30
Agrostis hyemalis	10
Carex tenera	5

Site 12 (W5-9)	SPECIES	COVER %	Site 12 (W5-9)	SPECIES	COVER %
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Shrub Layer (>2ft)
No shrub layer observed

SPECIES	COVER %
<u>Herbaceous Layer</u>	
Scirpus sp. (sterile)	25
Agrostis stolonifera	25
Euthamia graminifolia	10
Carex tenera	10
Calamagrostis canadensis	10
Juncus effusus	5
Aster lanceolatus	5
Viola sp. (sterile)	1
Urtica dioica	1
Stellaria longifolia	1
Solidago uliginosa	1
Ranunculus pennsylvanicus	1
Polygonum spp. seedlings	1
Lycopus americanus	1
Cerastium vulgatum	0.1

Shrub Layer (>2ft)
No shrub layer observed

SPECIES	COVER %
<u>Herbaceous Layer</u>	
Agrostis hyemalis	40
Scirpus cyperinus	35
Calamagrostis canadensis	35
Aster lanceolatus	20
Juncus effusus	15
Carex tenera	15
Viola pallens	5
Agrostis stolonifera	5
Lycopus uniflorus	2
Solidago gigantea	1
Polygonum sagittatum	0.1
Solidago uliginosa	0.1
Aster modestus	1
Urtica dioica	1
Ranunculus pennsylvanicus	1
Poa pratense	1
Spiraea alba	1
Rubus setosus	0.1

Site 13 (W3-11)	SPECIES	COVER %	Site 13 (W3-11)	SPECIES	COVER %
	<u>Shrub Layer (>2ft)</u>			<u>Shrub Layer (>2ft)</u>	
	No shrub layer observed			No shrub layer observed	
	<u>Herbaceous Layer</u>			<u>Herbaceous Layer</u>	
	Carex tenera	30		Scirpus cyperinus	50
	Scirpus sp. (sterile)	15		Agrostis hyemalis	40
	Juncus effusus	15		Phalaris arundinacea	25
	Calamagrostis canadensis	15		Bidens cernua	25
	Agrostis sp. (sterile hyemalis?)	5		Agrostis stolonifera	20
	Rubus sp.	2		Glyceria grandis	10
	Stellaria longifolia	1		Carex tenera	5
	Spiraea alba	1		Calamagrostis canadensis	5
	Potentilla norvegica	1		Typha latifolia	2
	Mentha arvensis	1		Polygonum hydropiper	2
	Geum allepicum	1		Juncus effusus	2
	Carex stipata	1		Galium tinctorium	2
	Viola sp. (sterile)	0.1		Ranunculus pensylvanicus	1
	Solidago sp. (sterile uliginosa?)	0.1		Epilobium leptophyllum	1
	Euthamia graminifolia	0.1		Cicuta bulbifera	0.1
Site 14 (W3-16)	SPECIES	COVER %	Site 14 (W3-16)	SPECIES	COVER %
	<u>Shrub Layer (>2ft)</u>			<u>Shrub Layer (>2ft)</u>	
	No shrub layer observed			No shrub layer observed	
	<u>Herbaceous Layer</u>			<u>Herbaceous Layer</u>	
	Scirpus cyperinus	50		Calamagrostis canadensis	30
	Phalaris arundinacea	20		Agrostis hyemalis	30
	Agrostis stolonifera	20		Scirpus cyperinus	25
	Glyceria sp. (sterile grandis?)	5		Carex tenera	10
	Juncus effusus	2		Juncus effusus	5
	Grass seedlings	2		Solidago uliginosa	2
	Bidens cernua	2		Solidago gigantea	2
	Typha latifolia	1		Geum allepicum	1
	Ranunculus pensylvanicus	1		Aster lanceolatus	1
	Polygonum sagittatum	1		Potentilla norvegica	0.1
	Galium tinctorium	1			
	Galeopsis tetrahit	1			
	Epilobium coloratum	1			
	Rorripa islandica	0.1			
Site 15 (W7-14)	SPECIES	COVER %	Site 15 (W7-14)	SPECIES	COVER %
	<u>Shrub Layer (>2ft)</u>			<u>Shrub Layer (>2ft)</u>	
	No shrub layer observed			No shrub layer observed	
	<u>Herbaceous Layer</u>			<u>Herbaceous Layer</u>	
	Scirpus cyperinus	40		Scirpus cyperinus	60
	Calamagrostis canadensis	25		Agrostis hyemalis	25
	Agrostis stolonifera	15		Calamagrostis canadensis	20
	Grass seedlings	5		Carex tenera	10
	Carex tenera	5		Euthamia graminifolia	5
	Polygonum sagittatum	2		Polygonum persicaria	2
	Phalaris arundinacea	2		Galeopsis tetrahit	2
	Galeopsis tetrahit	2		Aster lanceolatus	2
	Euthamia graminifolia	1		Phalaris arundinacea	1
	Aster lanceolatus	1		Agrostis stolonifera	1

Site 16 (W11-10)	SPECIES	COVER %	Site 16 (W11-10)	SPECIES	COVER %
	<u>Shrub Layer (>2ft)</u>			<u>Shrub Layer (>2ft)</u>	
	No shrub layer observed			No shrub layer observed	
	<u>Herbaceous Layer</u>			<u>Herbaceous Layer</u>	
	Scirpus cyperinus	75		Scirpus cyperinus	90
	Euthamia graminifolia	20		Agrostis hyemalis	20
	Mentha arvensis	10		Euthamia graminifolia	10
	Carex tenera	10		Agrostis stolonifera	10
	Agrostis stolonifera	10		Typha latifolia	2
	Viola sp. (sterile)	2		Carex tenera	2
	Solidago gigantea	2		Aster lanceolatus	2
	Typha latifolia	1		Solidago gigantea	1
	Salix petiolaris	1		Lycopus uniflorus	1
	Cirsium arvense	1		Calamagrostis canadensis	5
	Aster lanceolatus	1		Aster modestus	1
	Urtica dioica	0.1		Eupatorium maculatum	1
	Solidago uliginosa	0.1		Epilobium ciliatum	1
	Salix bebbiana	0.1		Urtica dioica	1
	Eupatorium perfoliatum	0.1		Ranunculus pensylvanicus	1
	Eupatorium maculatum	0.1		Spiraea alba	1

Site 17 (W9-7)	SPECIES	COVER %	Site 17 (W9-7)	SPECIES	COVER %
	<u>Shrub Layer (>2ft)</u>			<u>Shrub Layer (>2ft)</u>	
	No shrub layer observed			No shrub layer observed	
	<u>Herbaceous Layer</u>			<u>Herbaceous Layer</u>	
	Carex tenera	50		Agrostis stolonifera	40
	Agrostis stolonifera	30		Scirpus cyperinus	25
	Glyceria sp. (sterile)	15		Polygonum sagittatum	25
	Scirpus cyperinus	5		Glyceria grandis	25
	Bidens cernua	5		Carex tenera	25
	Dicot seedlings	2		Glyceria canadense	5
	Stellaria longifolia	1		Agrostis hyemalis	5
	Polygonum sagittatum	1		Euthamia graminifolia	2
	Poa pratensis	1		Cerastium vulgare	2
	Phleum pratense	1		Calamagrostis canadensis	2
	Grass seedlings	1		Bidens cernua	2
	Euthamia graminifolia	1		Agropyron repens	2
	Calamagrostis canadensis	1		Solidago gigantea	1
	Galeopsis tetrahit	0.1		Polygonum hydropiper	1
				Juncus brevicaudatus	1
				Aster lanceolatus	1

Site 18 (W6-5)	SPECIES	COVER %	SPECIES	COVER %
	<u>Shrub Layer (>2ft)</u>		<u>Shrub Layer (>2ft)</u>	
	No shrub layer observed		No shrub layer observed	
	<u>Herbaceous Layer</u>		<u>Herbaceous Layer</u>	
	Galeopsis tetrahit	0.1	Carex tenera	50
	Urtica dioica	0.1	Agrostis stolonifera	30
	Poa pratensis	1	Agrostis hyemalis	25
	Polygonum sagittatum	1	Calamagrostis canadensis	10
	Potentilla norvegica	1	Scirpus cyperinus	2
	Stellaria longifolia	1	Polygonum persicaria	2
	Agropyron repens	2	Polygonum hydropiper	2
	Agrostis hyemalis	2	Phalaris arundinacea	2
	Phalaris arundinacea	2	Spiraea alba	1

Site 18 (W6-5) continued; Date 7/1/09

SPECIES	COVER %
<u>Herbaceous Layer</u>	
Calamagrostis canadensis	5
Agrostis stolonifera	10
Carex tenera	50

Site 18 (W6-5) continued; Date 7/1/09

SPECIES	COVER %
<u>Herbaceous Layer</u>	
Solidago gigantea	1
Ranunculus pensylvanicus	1
Potentilla norvegica	1
Cerastium vulgatum	1
Bromus ciliatus	1

Site 19 (W3-6) SPECIES COVER %

SPECIES	COVER %
<u>Shrub Layer (>2ft)</u>	
No shrub layer observed	
<u>Herbaceous Layer</u>	
Agrostis stolonifera	25
Carex tenera	15
Geum allepicum	10
Polygonum sagittatum	5
Grass seedlings	5
Galeopsis tetrahit	5
Phalaris arundinacea	2
Cerastium vulgatum	2
Beckmannia syzigachne	2
Polygonum spp. seedlings	1
Agropyron repens	1
Potentilla norvegica	0.1

Site 19 (W3-6) SPECIES COVER %

SPECIES	COVER %
<u>Shrub Layer (>2ft)</u>	
No shrub layer observed	
<u>Herbaceous Layer</u>	
Agrostis hyemalis	70
Agrostis stolonifera	30
Carex tenera	25
Scirpus cyperinus	10
Polygonum sagittatum	10
Trifolium hybridum	5
Calamagrostis canadensis	5
Phalaris arundinacea	2
Cerastium vulgare	2
Agropyron repens	2
Urtica dioica	1
Rumex crispus	1
Geum allepicum	1
Bromus ciliatus	1

Site 20 SPECIES COVER %

SPECIES	COVER %
<u>Shrub Layer (>2ft)</u>	
No shrub layer observed	
<u>Herbaceous Layer</u>	
Carex tenera	60
Scirpus sp. (sterile)	10
Urtica dioica	5
Geum allepicum	5
Epilobium coloratum (seedlings)	5
Epilobium coloratum (mature plants)	5
Agrostis stolonifera	5
Aster lanceolatus	2
Stellaria longifolia	1
Calamagrostis canadensis	1
Trifolium hybridum	0.1
Rumex sp. (sterile)	0.1
Epilobium leptophyllum	0.1

Site 20 SPECIES COVER %

SPECIES	COVER %
<u>Shrub Layer (>2ft)</u>	
No shrub layer observed	
<u>Herbaceous Layer</u>	
Agrostis hyemalis	80
Bidens cernua	15
Cirsium vulgare	0.1
Ranunculus pensylvanicus	0.1
Carex spp. (Ovales)	25
Urtica dioica	5
Epilobium leptophyllum	1
Scirpus (?) sp. (sterile)	2
Lactuca sp.	0.1
Trifolium hybridum	1
Agropyron repens	1
Epilobium ciliatum	5
Polygonum hydropiper	5
Potentilla norvegica	1
Cerastium vulgatum	1
Aster lanceolatus	1

Site 21 SPECIES COVER %

SPECIES	COVER %
<u>Shrub Layer (>2ft)</u>	
No shrub layer observed	
<u>Herbaceous Layer</u>	
Carex tenera	50
Agrostis stolonifera	25

Site 21 SPECIES COVER %

SPECIES	COVER %
<u>Shrub Layer (>2ft)</u>	
No shrub layer observed	
<u>Herbaceous Layer</u>	
Agrostis hyemalis	80
Carex spp. (Ovales)	50

Site 21 continued; Date 7/1/09

SPECIES	COVER %
<u>Herbaceous Layer</u>	
Viola sp. (sterile)	20
Euthamia graminifolia	10
Calamagrostis canadensis	10
Stellaria longifolia	2
Glyceria sp. (sterile)	2
Agrostis hyemalis	2
Solidago gigantea	1
Polygonum spp. (seedlings)	1
Epilobium coloratum	1
Aster lanceolatus	1
Lysimachia sp. (sterile)	0.1

Site 21 continued; Date 7/1/09

SPECIES	COVER %
<u>Herbaceous Layer</u>	
Epilobium ciliatum	5
Trifloium hybridum	1
Agropyron repens	1
Potentilla norvegica	1
Ranunculus pensylvanicus	1
Polygonum hydropiper	5
Bromus ciliatus (? , sterile)	0.1
Calamagrostis canadensis	1

Site 22	SPECIES	COVER %
	<u>Shrub Layer (>2ft)</u>	
	No shrub layer observed	
	<u>Herbaceous Layer</u>	
	Scirpus sp. (sterile)	45
	Carex tenera	5
	Calamagrostis canadensis	5
	Carex lasiocarpa (?)	2
	Viola sp. (sterile)	1
	Stellaria longifolia	1
	Solidago gigantea	1
	Ranunculus pensylvanicus	0.1
	Poa pratensis	0.1
	Lycopus americanus	0.1
	Juncus brevicaudatus	0.1
	Aster lanceolatus	0.1

Site 22	SPECIES	COVER %
	<u>Shrub Layer (>2ft)</u>	
	No shrub layer observed	
	<u>Herbaceous Layer</u>	
	Agrostis hyemalis	80
	Carex spp. (Ovales)	60
	Juncus brevicaudatus	15
	Calamagrostis canadensis	1
	Agropyron repens	1
	Solidago gigantea	0.1
	Epilobium ciliatum	0.1

Site 23	SPECIES	COVER %
	<u>Shrub Layer (>2ft)</u>	
	No shrub layer observed	
	<u>Herbaceous Layer</u>	
	Carex tenera	20
	Scirpus sp. (sterile)	5
	Agrostis stolonifera	5
	Galeopsis tetrahit	1
	Calamagrostis canadensis	1
	Panicum sp. (sterile)	0.1
	Juncus sp. (sterile)	0.1
	Euthamia graminifolia	0.1

Site 23	SPECIES	COVER %
	<u>Shrub Layer (>2ft)</u>	
	No shrub layer observed	
	<u>Herbaceous Layer</u>	
	Agrostis hyemalis	60
	Carex tenera	15
	Panicum lanuginosum	15
	Potentilla norvegica	1
	Hypericum canadense	2
	Euthamia graminifolia	1
	Galeopsis tetrahit	2
	Polygonum sagittatum	2
	Fragaria virginiana	1
	Rubus setosus	2
	Scirpus cyperinus	30

Site 24	SPECIES	COVER %
	<u>Shrub Layer (>2ft)</u>	
	No shrub layer observed	
	<u>Herbaceous Layer</u>	
	Agrostis stolonifera	90
	Carex tenera	5
	Galeopsis tetrahit	2

Site 24	SPECIES	COVER %
	<u>Shrub Layer (>2ft)</u>	
	No shrub layer observed	
	<u>Herbaceous Layer</u>	
	Agrostis stolonifera	90
	Agrostis hyemalis	10
	Potentilla norvegica	1

Site 24 continued; Date 7/1/09

SPECIES

Herbaceous Layer

Stellaria longifolia
Potentilla norvegica

COVER %

1
1

Site 24 continued; Date 7/1/09

SPECIES

Herbaceous Layer

Carex tenera
Galeopsis tetrahit
Calamagrostis canadensis
Polygonum sagittatum
Viola sp. (sterile)

COVER %

10
1
5
5
1

Species Present in Wetland Bank II: Native: Yes or No & Wetland Rating

<u>Species</u>	<u>Native:</u> <u>Yes or No</u>	<u>Wetland</u> <u>Rating</u>	<u>Species</u>	<u>Native:</u> <u>Yes or No</u>	<u>Wetland</u> <u>Rating</u>
Agropyron repens	No	FACU	Lycopsis uniflorus	Yes	OBL
Agrostis gigantea	Yes	NI	Lysimachia terrestris	Yes	OBL
Agrostis hyemalis	Yes	FAC-	Mentha arvensis	Yes	FACW
Agrostis stolonifera	No	FACW	Panicum lanuginosa	Yes	N/A
Aster lanceolatus	Yes	FACW	Phalaris arundinacea	No	FACW+
Aster modestus	Yes	FAC+	Phleum pratense	No	FACU
Beckmannia syzigachne	Yes	OBL	Plantago major	No	FAC+
Betula pumila	Yes	OBL	Poa pratensis	No	FAC-
Bidens cernua	Yes	OBL	Polygonum aviculare	No	FAC-
Bromus ciliatus	Yes	FACW	Polygonum hydropiper	No	OBL
Calamagrostis canadensis	Yes	OBL	Polygonum pensylvanicum	Yes	FACW+
Carex canescens	Yes	OBL	Polygonum persicaria	No	FACW
Carex lasiocarpa (?)	Yes	OBL	Polygonum sagittatum	Yes	OBL
Carex stipata	Yes	OBL	Populus tremuloides	Yes	N/A
Carex tenera	Yes	FAC+	Potentilla norvegica	Yes	FAC
Carex vulpinoidea	Yes	OBL	Ranunculus pensylvanicus	Yes	OBL
Cerastium fontana	No	FACU	Rubus setosus	Yes	FACW-
Cicuta bulbifera	Yes	OBL	Rubus strigosus	Yes	FACW-
Cirsium arvense	No	FACU	Rumex crispus	No	FAC+
Cirsium vulgare	No	FACU-	Rumex patientia	No	N/A
Dryopteris cristata	Yes	OBL	Salix bebbiana	Yes	FACW+
Epilobium ciliatum	Yes	FACU	Salix discolor	Yes	FACW
Epilobium coloratum	Yes	OBL	Salix petiolaris	Yes	FACW+
Epilobium leptophyllum	Yes	OBL	Salix planifolia	Yes	OBL
Eupatorium maculatum	Yes	OBL	Scirpus atrovirens	Yes	OBL
Eupatorium perfoliatum	Yes	FACW+	Scirpus cyperinus	Yes	OBL
Euthamia graminifolia	Yes	FACW-	Solidago gigantea	Yes	FACW
Fragaria virginiana	Yes	FAC-	Solidago uliginosa	Yes	OBL
Galeopsis tetrahit	No	N/A	Spiraea alba	Yes	FACW+
Galium tinctorium	Yes	OBL	Stellaria longifolia	Yes	FACW+
Geum allepicum	Yes	FAC+	Thelypteris palustris	Yes	FACW+
Glyceria canadense	Yes	OBL	Triadenum fraseri	Yes	OBL
Glyceria grandis	Yes	OBL	Trifolium hybridum	No	FAC-
Hypericum canadense	Yes	FACW	Typha latifolia	Yes	OBL
Juncus brevicaudatus	Yes	OBL	Urtica dioica	Yes	FAC+
Juncus effusus	Yes	OBL	Veronica fasciculata	Yes	FACW
Lactuca sp.	N/A	N/A	Viola pallens	Yes	OBL
Lycopus americanus	Yes	OBL			

LOCATION OF BANK SITES & AGREEMENTS

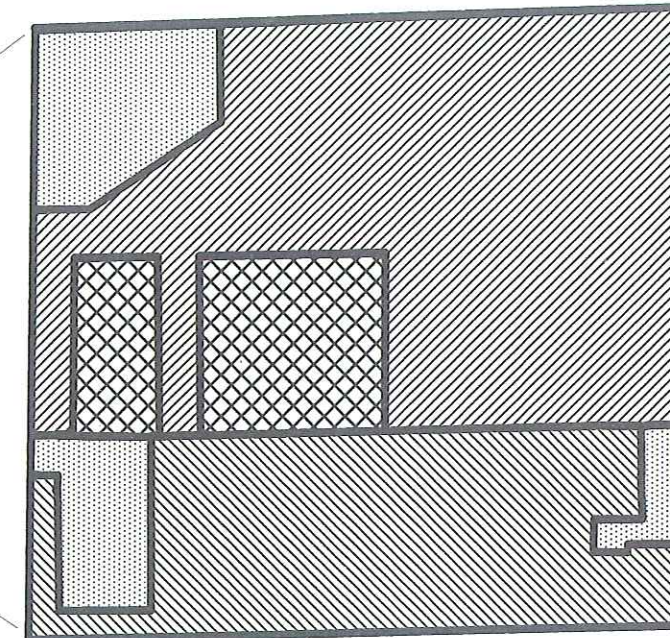
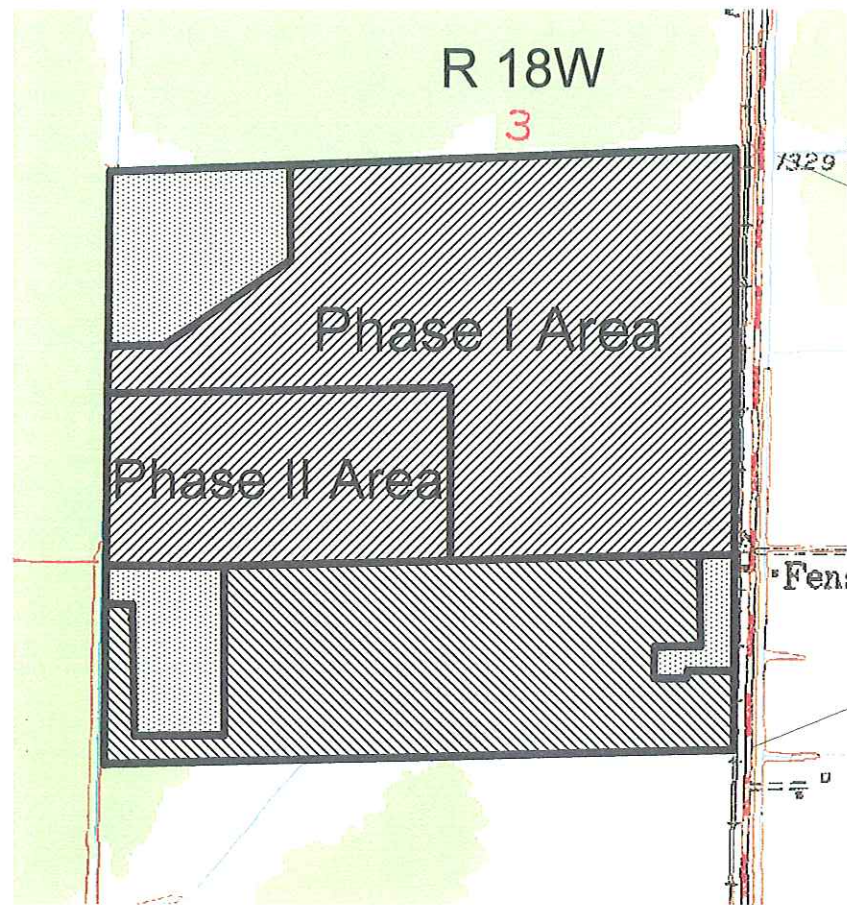
Fens Research Facility Wetland Banks




Portion of S1/2 of Section 3 & Portion of N1/2 of N1/2, Sec 10





T55N, R18W, St. Louis County, Minnesota

BANK SITES

AGREEMENTS



-  Fens Research Facility Wetland Bank I (BWSR)
-  Fens Research Facility Wetland Bank II (MnDOT & BWSR)
-  Building Site, Adjacent and Non-Bank Area

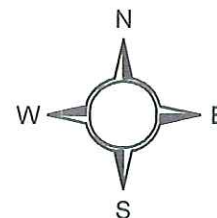
-  BWSR Easement No. 69-01-02-05
-  MNDOT Agreement No. 86250
-  BWSR Easement No. 69-01-07-05
-  Building Site, Adjacent and Non-Bank Area

0.5 0 0.5 Miles



Base Map Sources:

- 1) USGS 1:24,000 Quadrangle Map, Zim, Minnesota (1969)
- 2) USGS 1:24,000 Quadrangle Map, Casco, Minnesota (1969)



Scale: 1 : 15,840
4" = 1 mile

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Signature: *Thomas J. Malterer*

Date: 12 / 31 / 2007 License# 30396

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BANK SITE LOCATION

FENS RESEARCH FACILITY
WETLAND BANK II

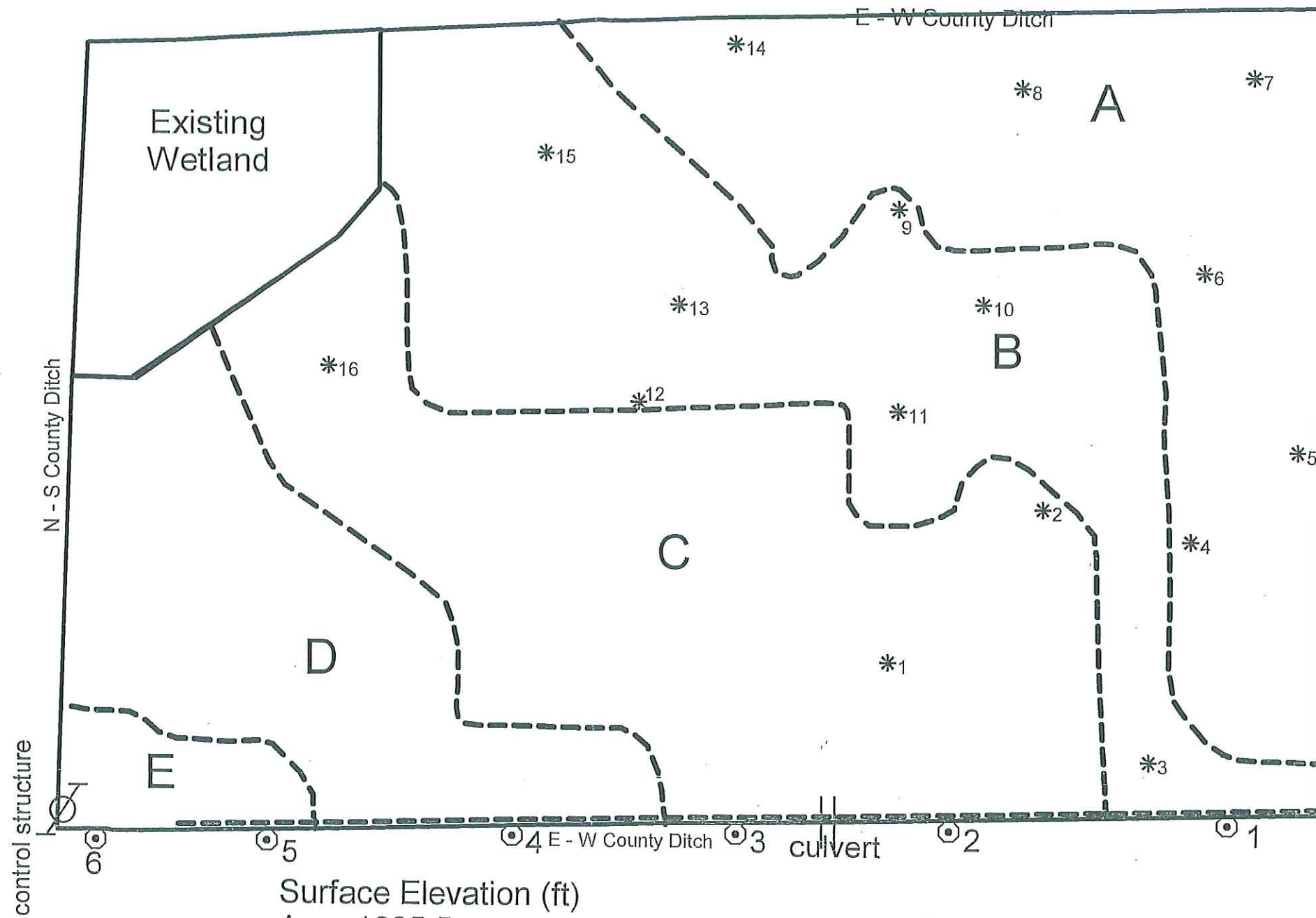
St. Louis County, near Zim, Sections 3 & 10, T55N, R18W

Arcview File Name: fens.apr

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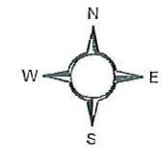


BERMS & MONITORING



Surface Elevation (ft)
 A > 1325.5
 B 1324.0 - 1325.5
 C 1322.5 - 1324.0
 D 1321.5 - 1322.5
 E < 1321.5

- Permanent Berm
- Photo Reference Point
- Vegetation Monitoring Plot and Monitoring Well



2009 ANNUAL REPORT
 FENS RESEARCH FACILITY WETLAND BANK II
 December 31, 2009

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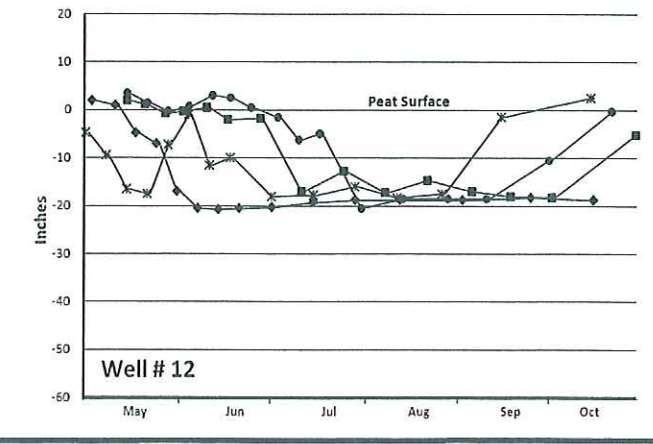
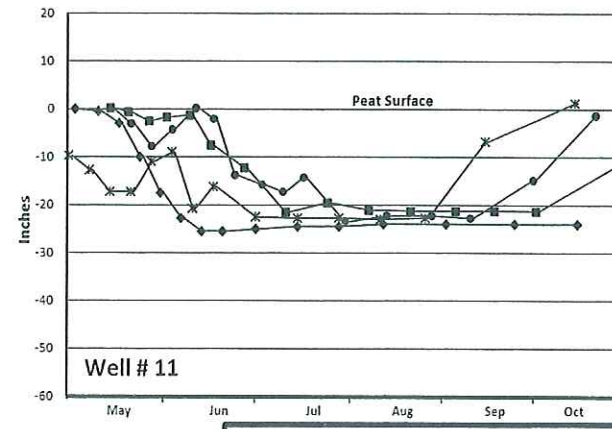
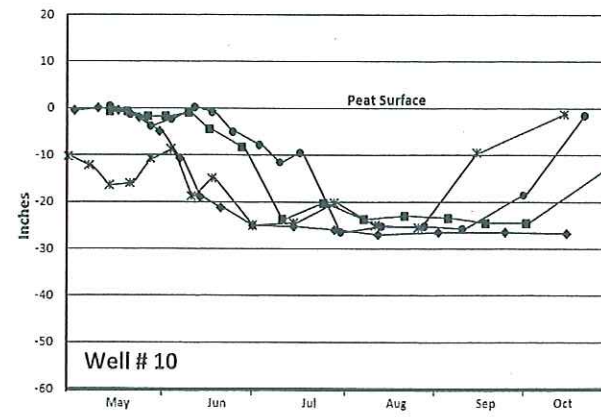
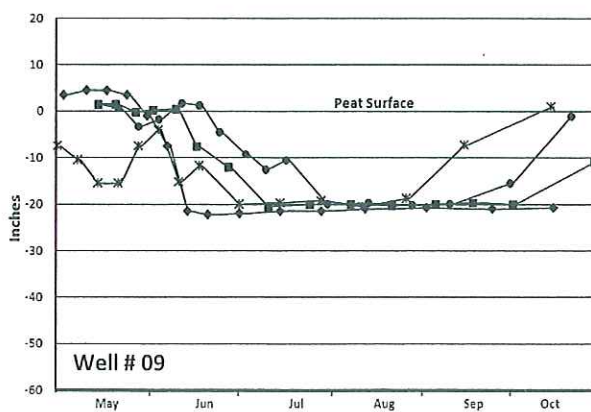
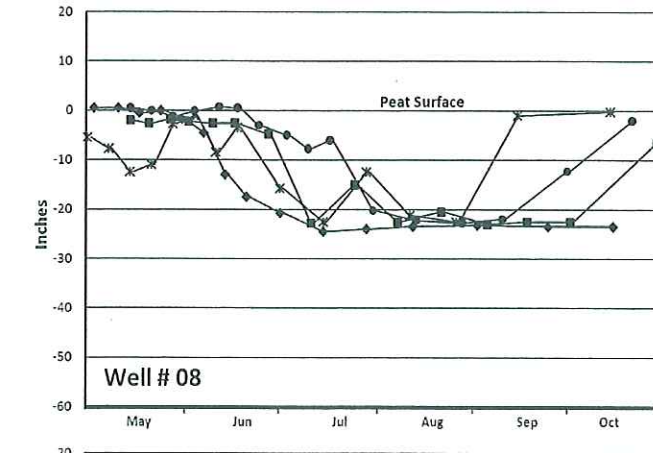
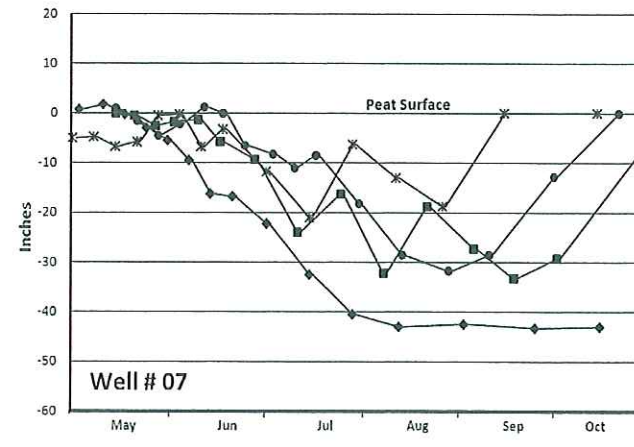
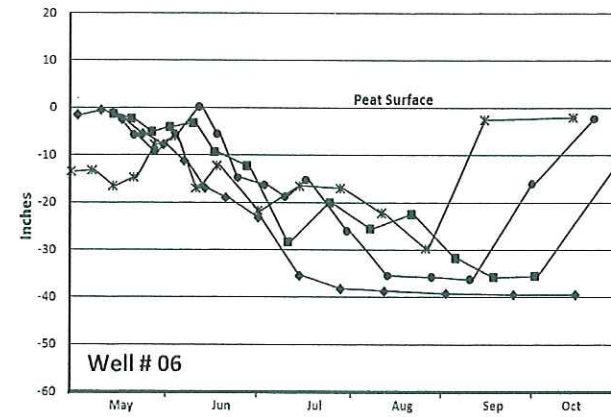
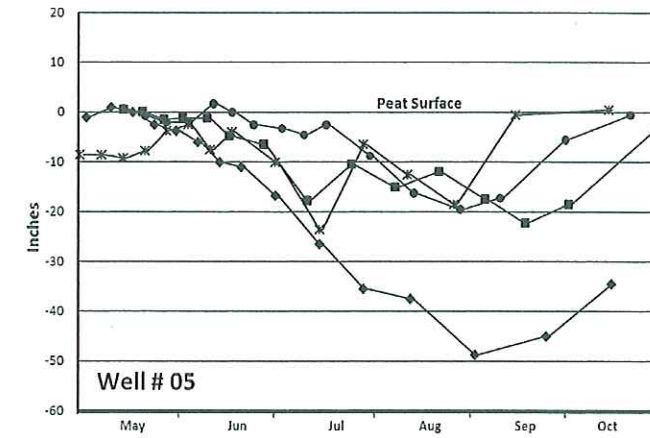
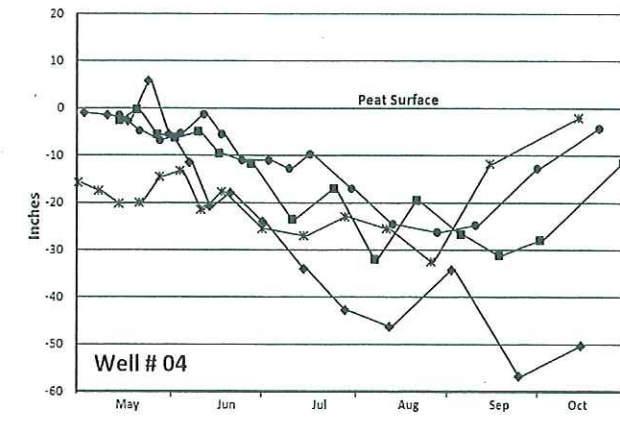
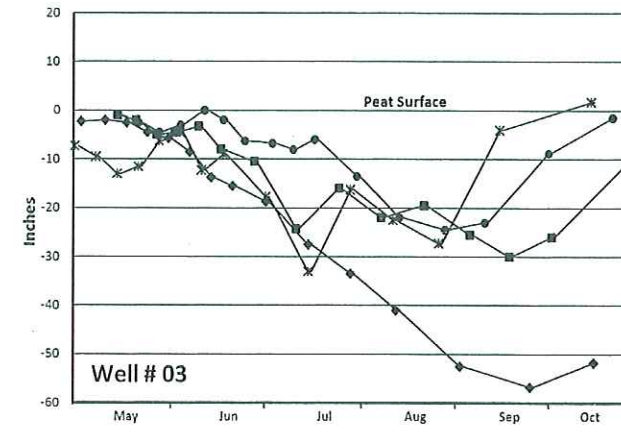
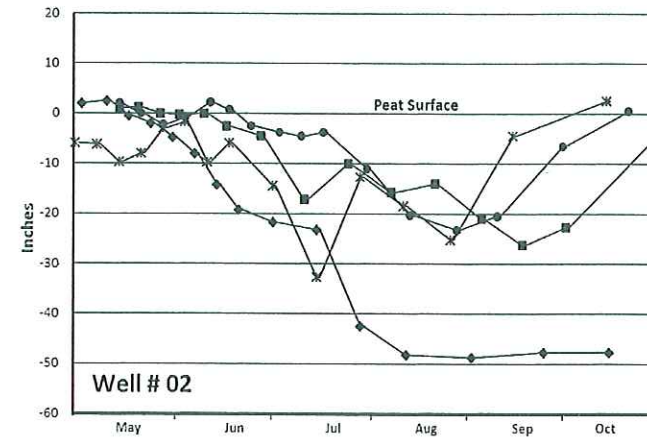
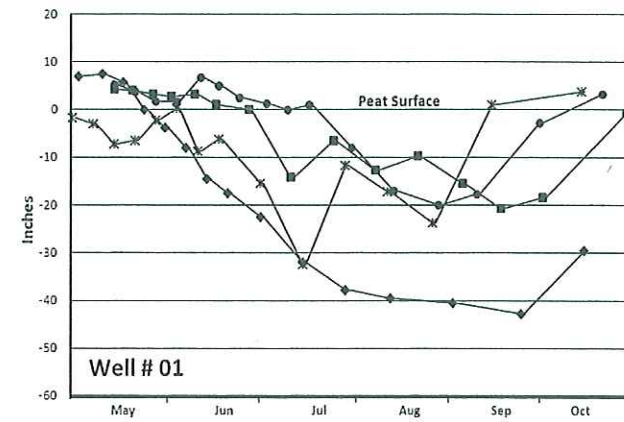
Natural Resources Research Institute
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BERMS & MONITORING
 FENS RESEARCH FACILITY
 WETLAND BANK II
 St. Louis County, near Zim, Secs. 3 & 10, T55N, R18W
 Arcview File Name: fens.apr



WATER TABLE LEVELS

Fens Research Facility Wetland Bank II

Portion of S1/2 of Section 3, T55N, R18W, St. Louis County, Minnesota



Water Table Levels

- ◆ 2006
- * 2007
- 2008
- 2009

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WATER TABLE LEVELS

FENS RESEARCH FACILITY
WETLAND BANK II

St. Louis County, near Zim, Section 10 T55N, R18W

Arcview File Name: fens.apr

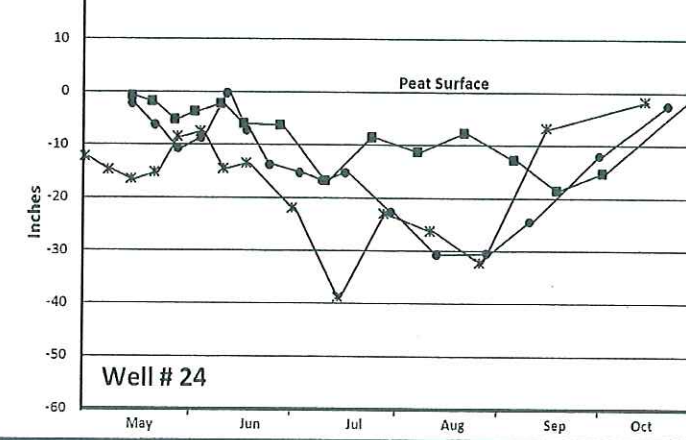
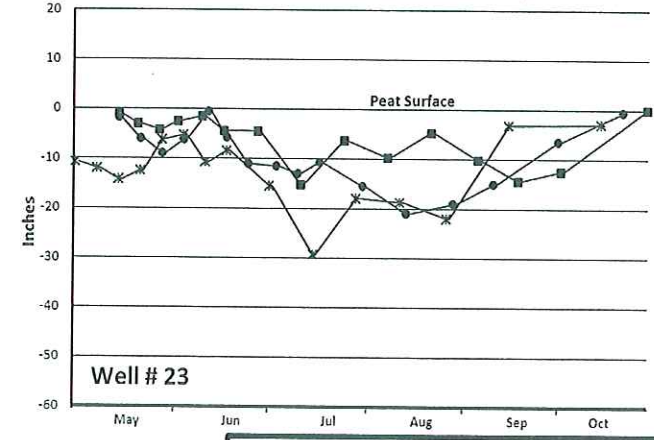
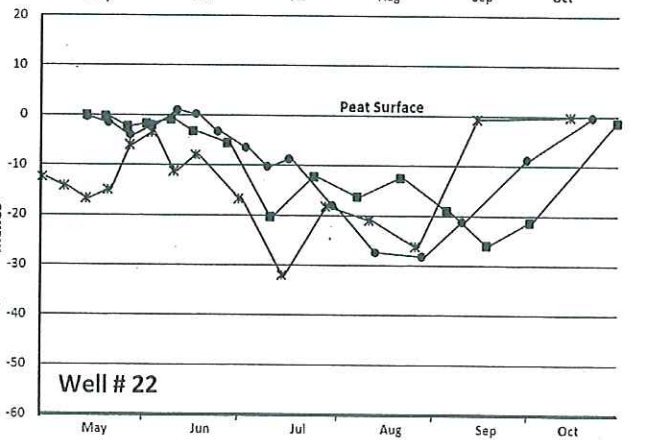
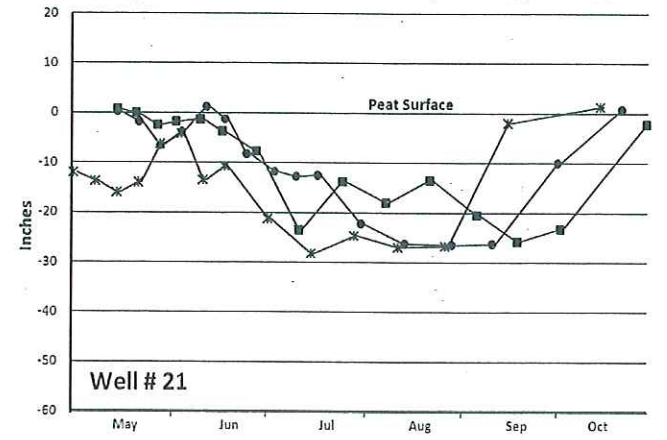
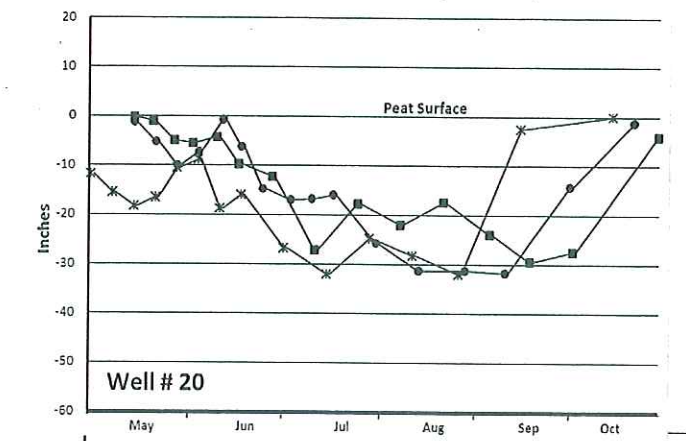
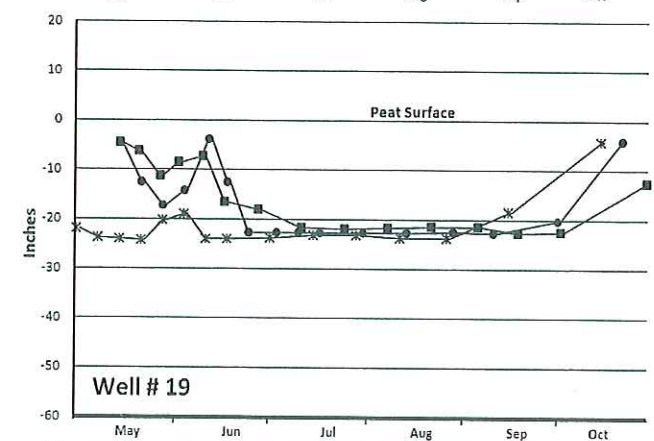
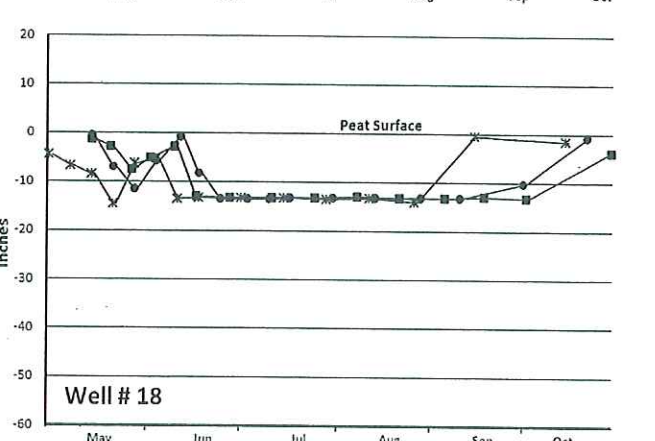
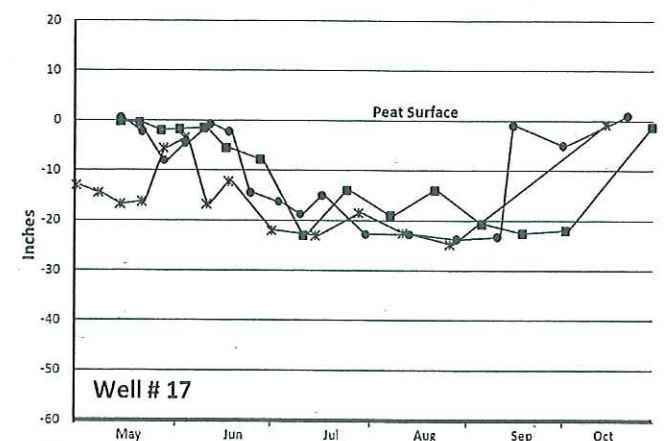
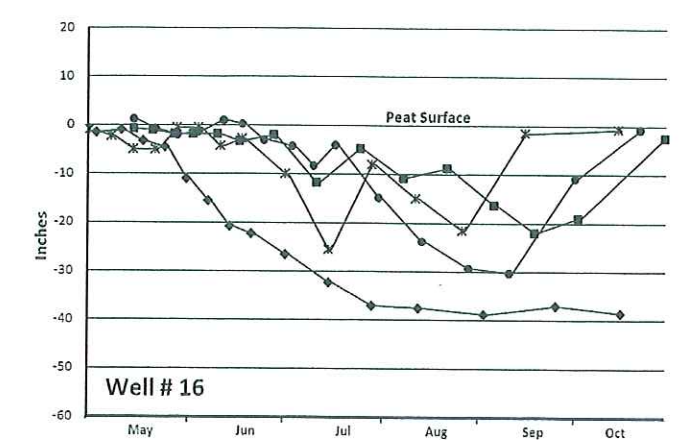
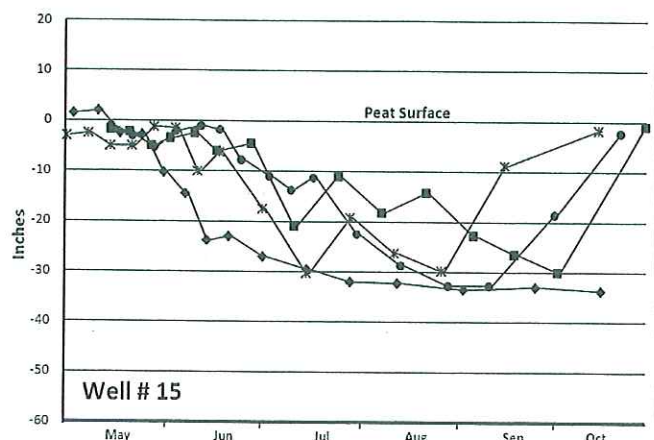
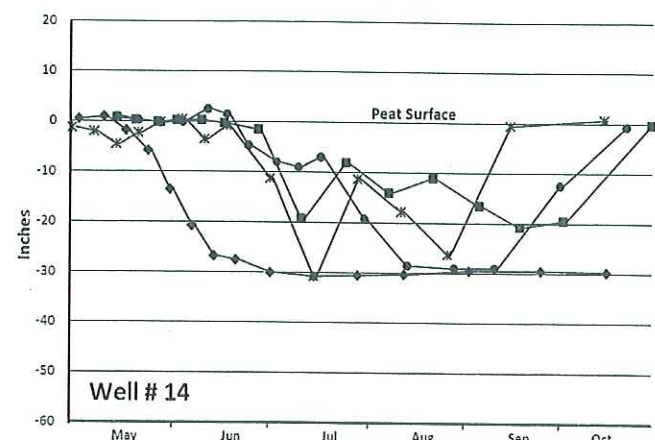
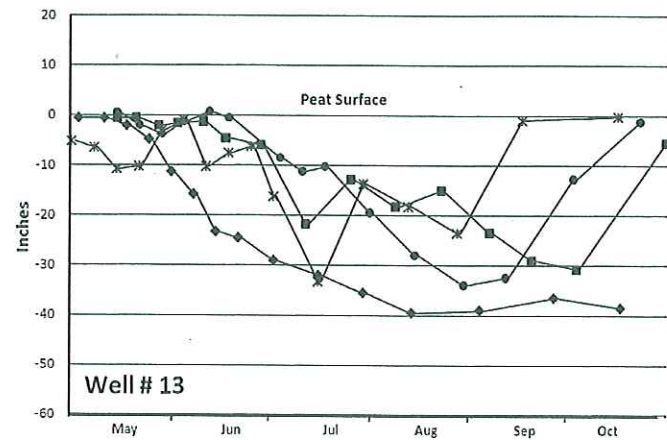
Sheet 3



WATER TABLE LEVELS

Fens Research Facility Wetland Bank II

Portion of S1/2 of Section 3 T55N, R18W, St. Louis County, Minnesota



Water Table Levels

- ◆ 2006
- * 2007
- 2008
- 2009

2009 ANNUAL REPORT
FENS RESEARCH FACILITY WETLAND BANK II
DECEMBER 31, 2009

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WATER TABLE LEVELS

FENS RESEARCH FACILITY
WETLAND BANK II

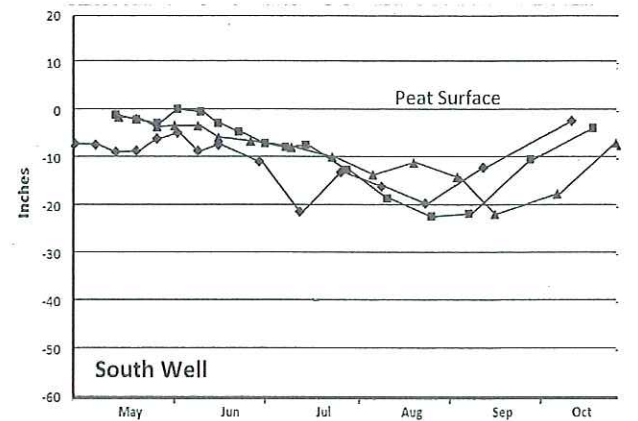
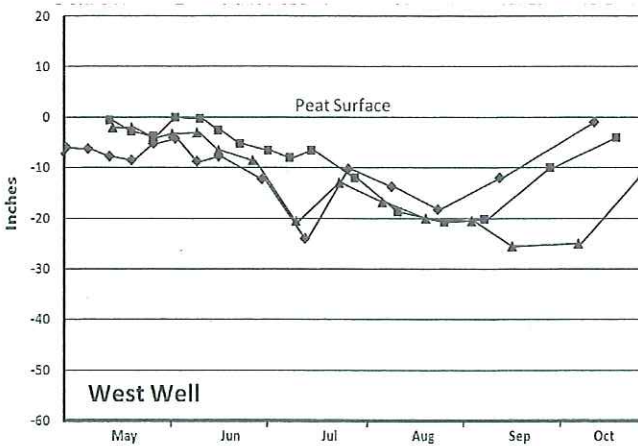
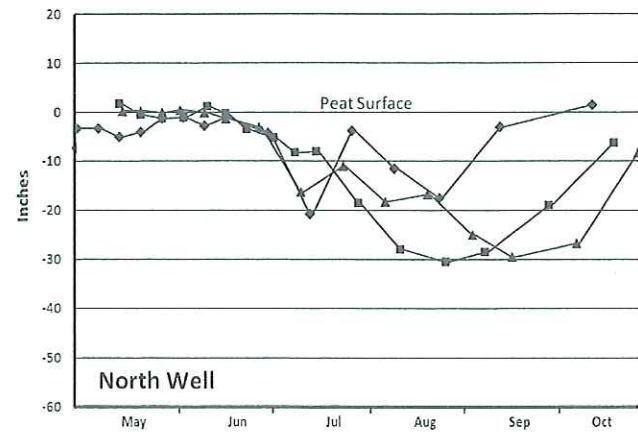
St. Louis County, near Zim, Section 3, T55N, R18W

Arcview File Name: fens.apr

Sheet 4



NEARBY WELL MONITORING SITES



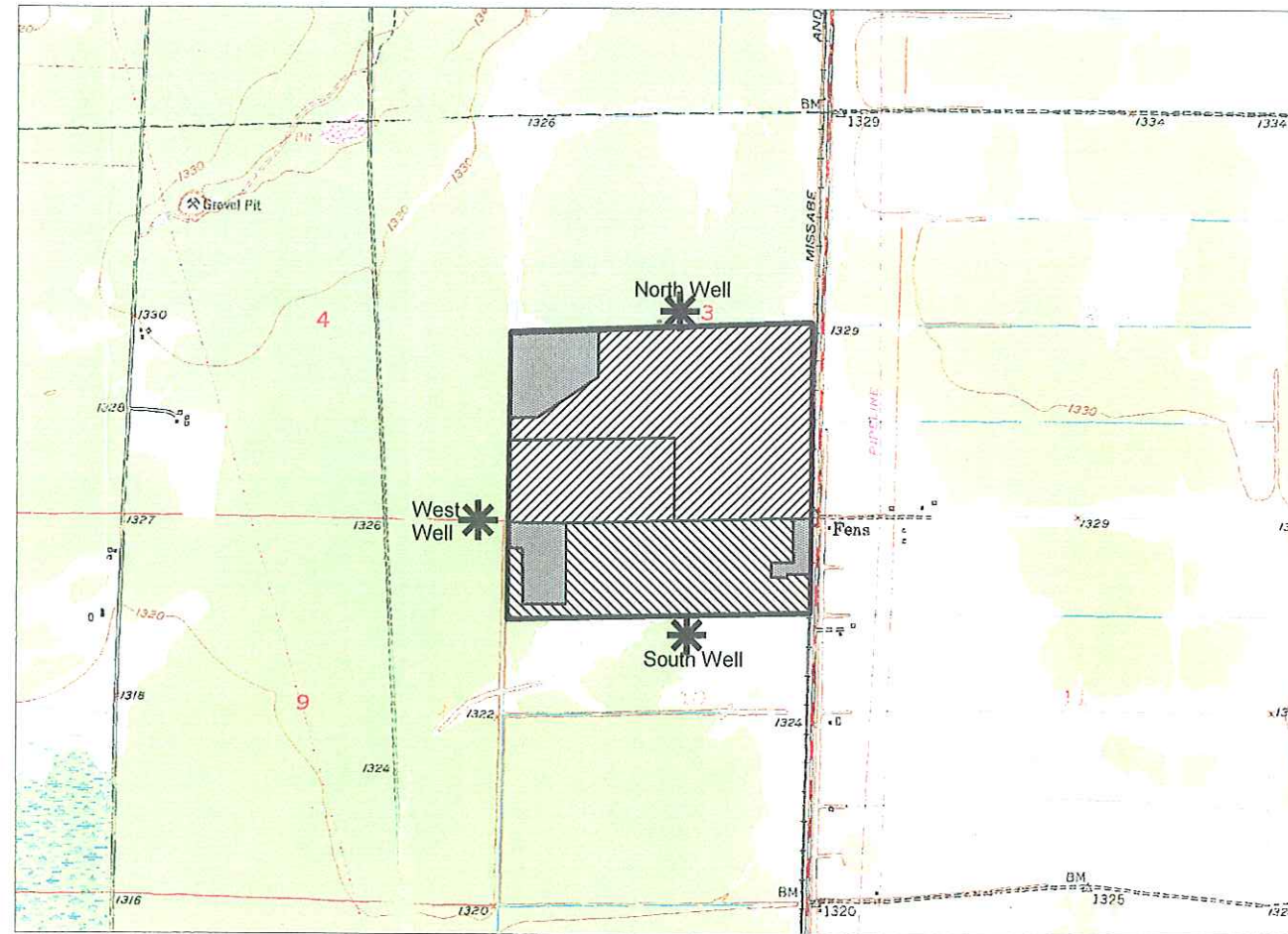
Water Table Levels

◆ 2007

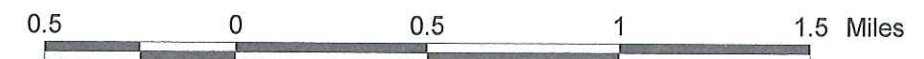
■ 2008

▲ 2009

✱ Well Locations






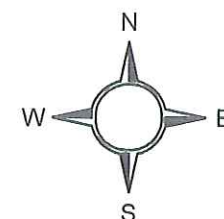
Scale: 1 : 31,680
2" = 1 mile



Base Map Sources:

- 1) USGS 1:24,000 Quadrangle Map, Zim, Minnesota (1969)
- 2) USGS 1:24,000 Quadrangle Map, Casco, Minnesota (1969)

-  Fens Research Facility Wetland Bank I
-  Fens Research Facility Wetland Bank II
-  Building Site, Adjacent and Non-Bank Area



2009 ANNUAL REPORT
FENS RESEARCH FACILITY WETLAND BANKS
DECEMBER 31, 2009

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BANK SITE LOCATION

FENS RESEARCH FACILITY
WETLAND BANKS

St. Louis County, near Zim, Sections 3 & 10, T55N, R18W

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Sheet 5



PHOTO REFERENCES

Fens Research Facility Wetland Bank II
 Portion of S1/2 of Sec 3 T55N, R18W; St. Louis County, Minnesota
 2009 Annual Report Photo Reference Points



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PHOTO REFERENCES

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 WETLAND BANK II

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Sheet 6



