2012 Annual Mitigation Site Monitoring Report

prepared for

METROPOLITAN UTILITIES DISTRICT

Metropolitan Utilities District
Omaha, Nebraska

Project No. 60787

January 2013

2012 Annual Mitigation Site Monitoring Report

for the

Platte West Water Production Facilities Project

METROPOLITAN
UTILITIES DISTRICT

Prepared for:
Metropolitan Utilities District
Omaha, Nebraska

Prepared by:
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Project Number: 60787

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1.0 INTRODUCTION

The Metropolitan Utilities District (District), Omaha, Nebraska, received a Section 404 Individual Permit (Permit) on May 16, 2003, from the U.S. Army Corps of Engineers, Omaha District (Corps), for the Platte West Water Production Facilities Project (Project; U.S. Army Corps of Engineers 2003). The terms and conditions included in the Permit were based to a large degree on the impact analysis and the conceptual mitigation plan included in the Environmental Impact Statement (EIS) completed by the District in 2002 (Burns & McDonnell 2002a and 2002b). As part of the terms and conditions included with the Section 404 Permit, the District has agreed to provide mitigation for both direct and indirect impacts to wetlands and watercourses that may result from the Project. Direct impacts result from the construction of the Project facilities; indirect impacts could occur due to groundwater drawdown during the operation of the Project.

The District, with concurrence from the Corps, decided to pursue wetland mitigation in phases. At least three phases of wetland mitigation were originally planned. Phase I of the mitigation effort provided measures to compensate for upfront construction impacts (direct impacts). Phase II provided mitigation for anticipated indirect impacts to wetlands in the two well fields due to groundwater drawdown. As currently planned, Phase III mitigation will address any impacts or alterations to wetlands that may occur as a result of drawdown outside of the two well fields in the projected Project cones of depression. Groundwater modeling in the 2002 EIS estimated that a drawdown in the groundwater levels of one foot or more would impact most wetlands. Therefore, the potential cones of depression are the areas predicted to experience a one-foot or greater drawdown of the local water table as a result of Project operation. The anticipated boundaries of the potential cones of depression are shown in Figure 1-1.

In the 2002 EIS, wetland impacts in the well fields due to construction and operation of Project facilities were predicted to total 14.6 acres. Approximately 0.3 acre of wetlands would be impacted due to construction, while Project operation was estimated to impact 14.3 acres of wetlands in the two well fields. These 14.6 acres included both direct and indirect impacts that would occur in the well fields (Phases I and II). According to the Section 404 permit conditions, the 14.6 acres predicted to be impacted were to be mitigated at a ratio of 1.5:1.0 (wetlands created to wetlands impacted); this amounts to a total of 21.9 acres of replacement wetlands required. In addition, another 141.6 acres of wetland alteration (conversion to a drier wetland type by drawdown of the water table) were estimated to potentially occur in the cones of depression at some time in the future due to Project operation. Since the issuance of the 2002 EIS, a Mitigation Site Selection Study was prepared and finalized (Burns & McDonnell 2007a). This site selection study evaluated a total of 16 separate potential wetland mitigation sites that

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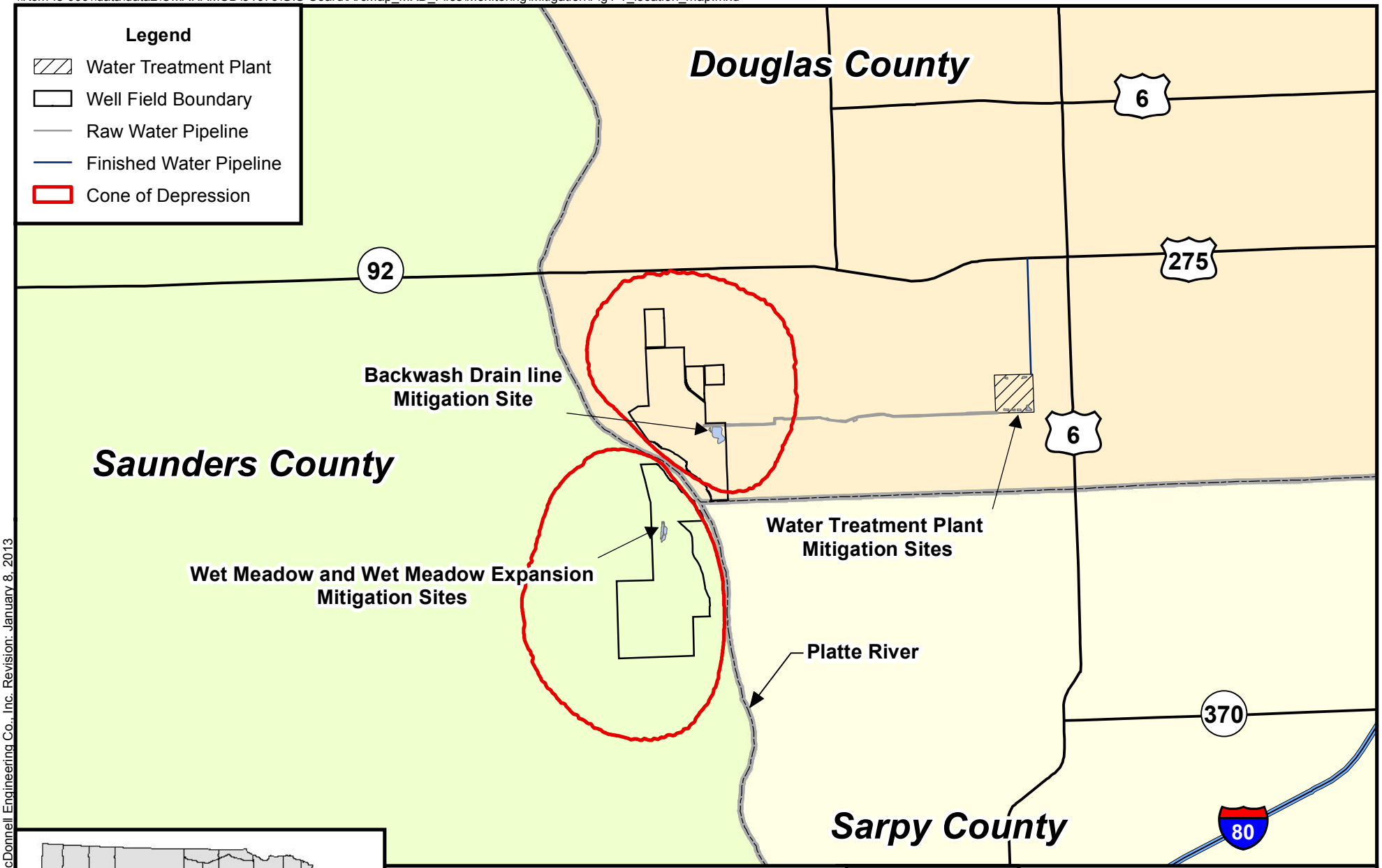

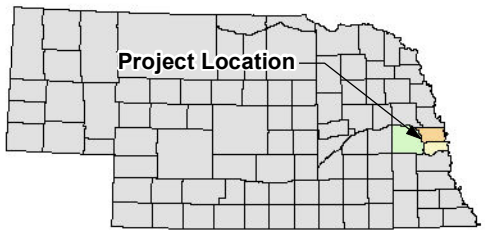

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Source: US Census Bureau, TIGER Data.

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Figure 1-1
Location Map of the Phase I and II Mitigation Sites
Platte West Water Production Facilities Project
Metropolitan Utilities District

could be pursued by the District to provide wetland mitigation to compensate for impacts as a result of Project construction and operation.

1.1 MITIGATION SITES

Phase I and Phase II mitigation have been implemented as described above. Phase I mitigation for direct impacts to wetlands was accomplished in two separate locations – the Wet Meadow Mitigation Site (WM-1) and the Water Treatment Plant Mitigation Sites (WM-4 through WM-9) (Figure 1-1). The *Mitigation Plan for Phase I Impacts* (Phase I Mitigation Plan; Burns & McDonnell 2005c) was approved in 2005 and provides details of the Phase I mitigation efforts.

Phase II mitigation for indirect impacts to wetlands in the well fields was accomplished at two separate locations – the Wet Meadow Expansion Mitigation Site (WM-2) and the Douglas County Backwash Drain Line Mitigation Site (WM-3) (Figure 1-1). As stated above, Phase II mitigation has been implemented to address potential indirect impacts which may occur within the well fields as the result of Project operation. Details of the Phase II mitigation efforts are provided in the *Mitigation Plan for Wetland Impacts* – Phase II (Phase II Mitigation Plan; Burns & McDonnell 2007b), which was approved in 2007.

1.1.1 Wet Meadow Mitigation Site

Phase I mitigation for construction-related impacts from all aspects of the Project, except for the new water treatment plant, was completed in the Saunders County well field near the 95-acre area known as the Wet Meadow (Wet Meadow Mitigation Site, WM-1). A total of 0.3 acre of wetlands was permanently impacted due to the construction of the facilities in the two well fields required for this Project. As described above, these impacts were mitigated at a 1.5:1.0 (created wetlands to impacted wetlands) ratio. As a result, approximately 0.45 acre of wetland was required as mitigation for up-front Project construction-related impacts in the well fields.

In 2005, WM-1 was constructed on approximately 22 acres of cropland owned by the District (Figure 1-2). WM-1 is an approximately 3.6-acre emergent wetland constructed in a formerly farmed wetland. The surrounding upland area was seeded with native vegetation to create an upland buffer. WM-1 provided wetland mitigation in excess of what is required for Phase I construction-related impacts. This excess wetland acreage created was applied to Phase II mitigation for indirect impacts that would occur during Project operation. As mentioned above, construction of WM-1 began late in the summer of 2005; grading of the created wetland and seeding with native vegetation was completed in December 2005. The

As-Built Report for the Wet Meadow Mitigation Site documents the construction of the mitigation site (Burns & McDonnell 2007c).

1.1.2 Wet Meadow Expansion Mitigation Site

The Wet Meadow Expansion Mitigation Site (WM-2) was constructed in the winter of 2007-2008 east of existing WM-1 in the upland buffer area (Figure 1-2). The two wet meadow mitigation sites (WM-1 and WM-2) are hydrologically connected at the north and south ends, but are otherwise separated by a narrow upland buffer. WM-2 consists of an approximately 4.7-acre emergent wetland divided into two separate wetland cells (Figure 1, Section B-1, Appendix I). Upon the completion of the construction of WM-2, approximately 13.7 acres of upland buffer area have been created surrounding the two wet meadow mitigation sites. The *As-Built Report for Phase II Wetland Mitigation Sites* documents the construction of the mitigation site (Burns & McDonnell 2008a).

1.1.3 Douglas County Backwash Drain Line Mitigation Site

The Backwash Drain Line Mitigation Site (WM-3) was constructed in the Douglas County well field as part of the Phase II mitigation effort in the winter of 2007-2008. WM-3 is located at the outlet of the backwash drain line west of the Elkhorn River (Figure 1-3). The drain line outlet was configured to discharge water into the mitigation site. The backwash water is of suitable quality for discharge into the Elkhorn River; therefore, the quality of water is also suitable for the creation and establishment of an emergent wetland for mitigation. WM-3 is located in an 80-acre former crop field in the southeastern portion of the Douglas County well field (Figure 1-3). Based on the as-built survey, 15.42 acres of emergent wetland were created at WM-3. In addition, 2.78 acres of drainage swales at the site are developing into wetland swales and an additional 58.04 acres of upland buffer were developed. The *As-Built Report for Phase II Wetland Mitigation Sites* documents the construction of the mitigation site (Burns & McDonnell 2008a). Modifications occurred at WM-3 in July of 2011. The mitigation site was re-graded to lower the elevation in the center of the site and to improve hydrological connections throughout the site in an effort to increase the wetland acreage. Much of the central portion of the site was lowered one- to two-feet from existing elevations; then a native wetland seed mix was hand-broadcast over the graded areas.

1.1.4 Water Treatment Plant Mitigation Sites

The mitigation for impacts resulting from construction of the District's new water treatment plant in Douglas County has been accomplished on-site at six wetland cells located at the water treatment plant site (Water Treatment Plant mitigation sites, WM-4 through WM-9, Figure 1-4). A total of 3.91 acres of wetlands and 175 feet of intermittent stream were created. Construction of the wetlands and intermittent

stream was completed in May 2009. The *As-Built Report for the Phase I Water Treatment Plant Wetland Mitigation Site* was prepared after construction and planting was completed (Burns & McDonnell 2009).

1.2 MONITORING GOALS

The goal of the wetland mitigation monitoring program is to measure the establishment of the wetland mitigation sites and to observe whether the mitigation sites develop similar functions and values as those wetlands and waters of the United States affected by Project construction and operation. According to the EIS, a total of 21.9 acres of wetland mitigation are necessary as a result of direct and indirect Project impacts. Mitigation efforts will be considered successful at a given site if the following criteria occur:

1. Eighty percent cover of native wetland vegetation will be established in the created emergent wetlands and along the banks of the created stream channel.

2. Positive indicators of hydric soils such as low chroma dominant colors, redoximorphic features, or oxidized rhizospheres are found in the created emergent wetlands.

3. Positive indicators of wetland hydrology such as inundation, saturation in the upper 12 inches of the soil, watermarks, and drift lines are found in the created emergent wetlands.

This report summarizes the 2012 monitoring efforts conducted at the Phase I and Phase II mitigation sites. Monitoring of Phase I mitigation site WM-1 was initiated in September 2006. Monitoring at Phase II mitigation sites WM-2 and WM-3 first took place in the fall of 2008. Finally, monitoring at the Phase I Water Treatment Plant mitigation sites (WM-4 through WM-9) began during the fall sampling period in 2009. Monitoring efforts at the mitigation sites will be conducted twice per year for a period of five years from the initial monitoring effort or until mitigation goals have been met. No Phase III mitigation sites have been developed to date or are planned for development without mutual agreement between the Corps and the District.

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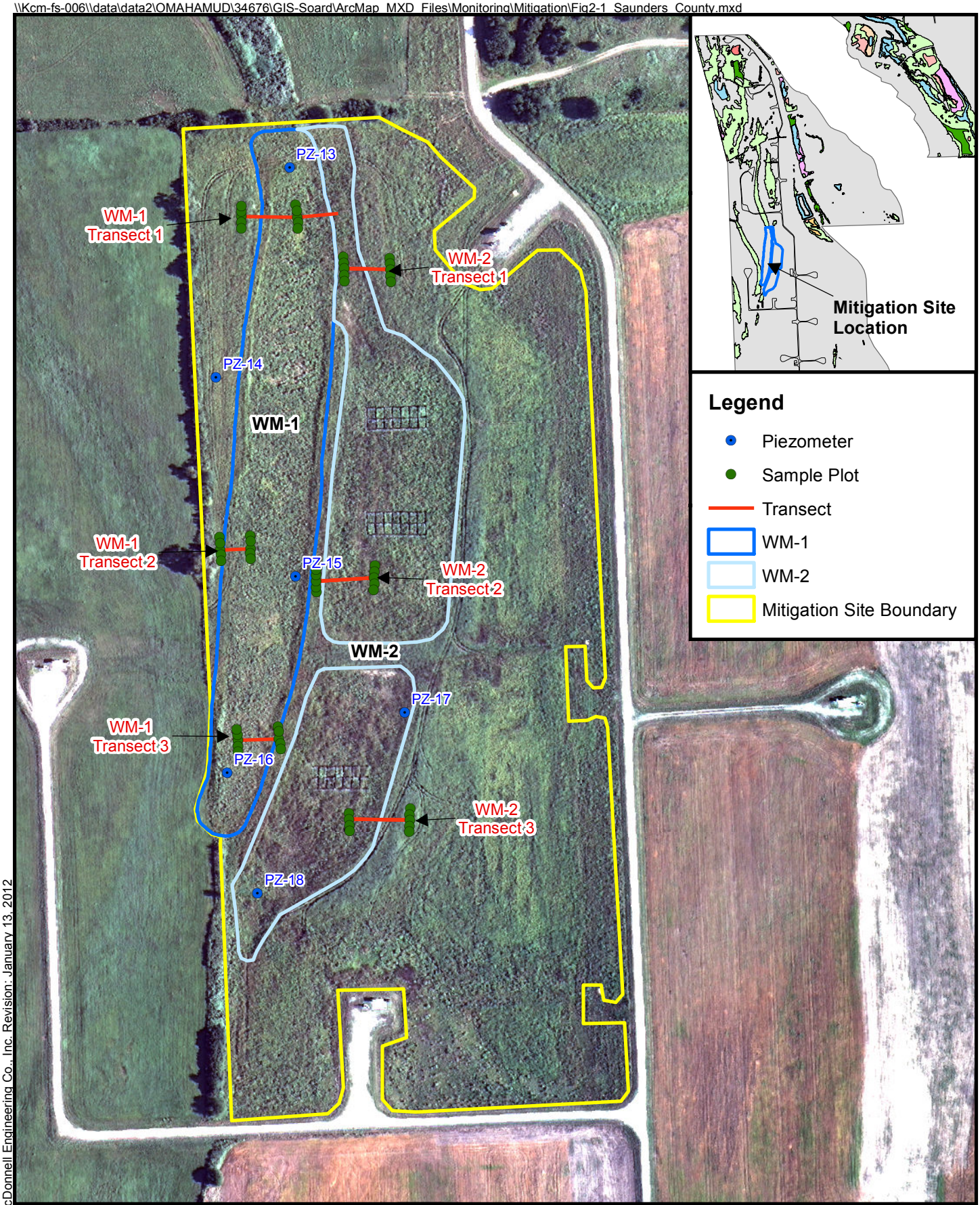

Figure 1-2
Location Map for
WM-1 and WM-2
Saunders County Well Field
Metropolitan Utilities District

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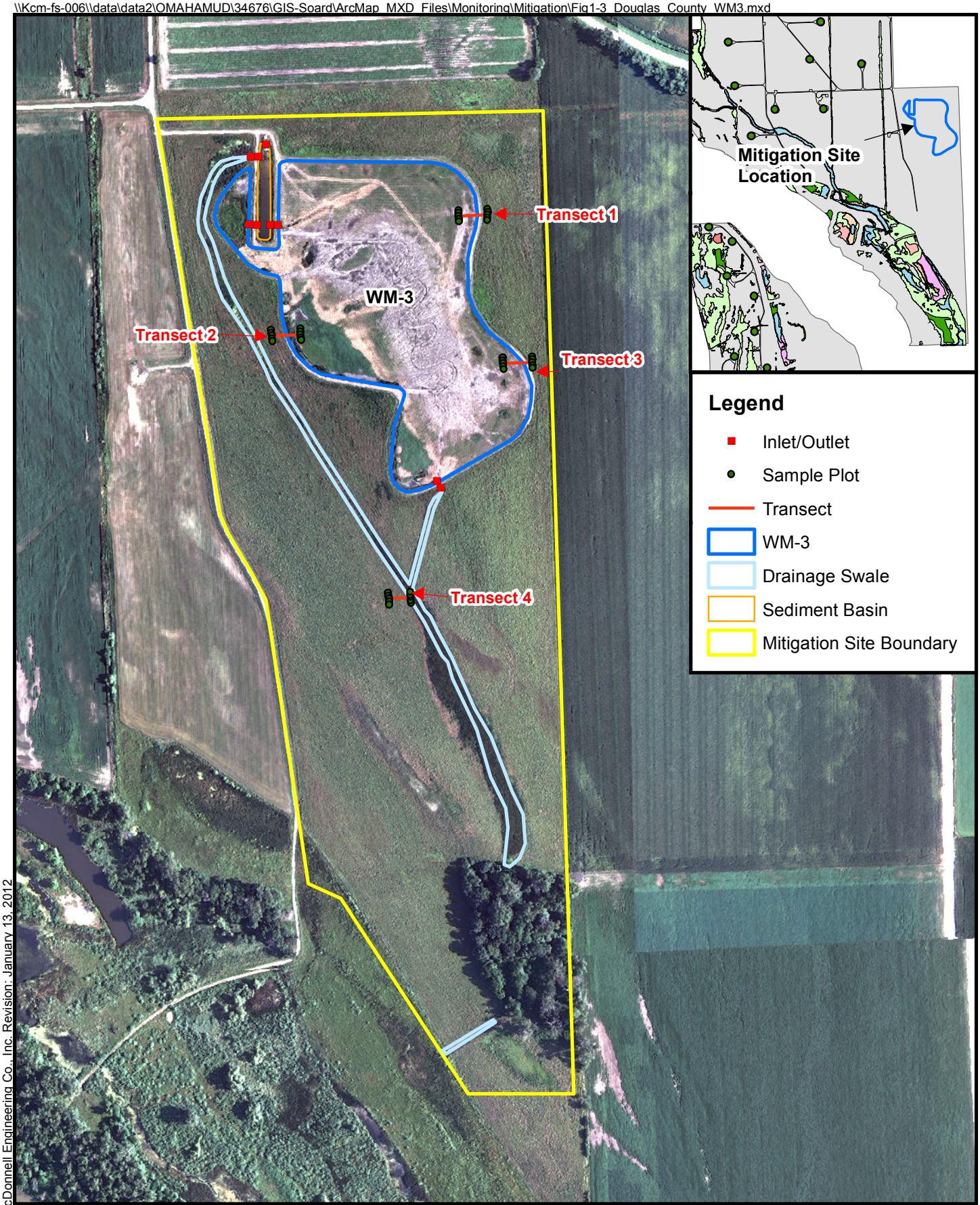

Source: Wilson & Co. 2011 Aerial Photography

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Figure 1-3
Location Map for
WM-3
Douglas County Well Field
Metropolitan Utilities District

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Source: Wilson & Co. 2011 Aerial Photography

Figure 1-4
Location Map of the
Water Treatment Plant Mitigation Sites
Douglas County
Metropolitan Utilities District

2.0 SAMPLING METHODOLOGY

A wetland monitoring approach consisting of a systematic, multi-tiered, vegetation sampling procedure has been developed and implemented based on the methodology outlined in the Phase I Mitigation Plan. In developing this vegetation sampling procedure, numerous literature sources and references were reviewed. Several discussions with personnel from the Corps and the District occurred during the preparation of this plan and the synthesis of the approach. Some of the references and sources used included:

- 1987 Corps and 1989 Federal wetland delineation manuals (Environmental Laboratory 1987 and Federal Interagency Committee for Wetland Delineation 1989)
- performance standards for wetland creation and restoration found in Streever 1999 and Environmental Law Institute 2004
- vegetation sampling methodologies found in U.S. Environmental Protection Agency 2002 and Tiner 1999
- wetland mitigation guidelines found in Taylor and Krueger 1997

Phase I wetland monitoring, as stated above and described in the following paragraphs, began in 2006 at WM-1. In 2008, two Phase II wetland mitigation sites were completed and monitored (WM-2 and WM-3). In 2009, monitoring began at the six wetland mitigation sites located at the water treatment plant (WM-4 through WM-9) as well as the stream mitigation site. Wetland monitoring will continue at these sites for a period of five years from the initial monitoring season or until mitigation goals are met.

2.1 VEGETATION SAMPLING

Herbaceous plant species at the mitigation sites are sampled using gradient-oriented transects, or "gradsects". A gradsect is defined as a transect that is placed perpendicular to the baseline transect along the ecotone gradient. The ecotone is the distinct area where one plant community changes or intergrades into another separate, distinct plant community. Sampling units are located in the center of each vegetation community and at each ecotone. The sampling unit consists of five, three-foot diameter circular sample plots placed along the gradsect.

During the first sampling period at each mitigation site, the placement of each permanent transect, gradsect, and sample plot was established and recorded using a global positioning system (GPS; Trimble® Pro XRS sub-meter GPS unit). The beginning and end of each transect and gradsect were permanently marked using two-foot sections of 3/8- or 1/2-inch rebar, painted orange and flagged. These permanent

markers also serve as photograph stations. A photographic record is maintained for each sampling period at each gradsect and transect. This photographic documentation provides a repetitive visual record that corresponds to the wetland vegetation monitoring during seasons and over years.

Vegetation and plant species data that were collected during the annual wetland vegetation monitoring effort include the identification, to species when possible, of each plant located within the three-foot diameter sample plot. In 2012, the Corps issued an update to the National Wetland Plant List (NWPL; Lichvar and Kartesz 2009) which resulted in changes to some of the wetland indicator statuses and nomenclature. For consistency and because this is at least the third full year of monitoring at the mitigation sites, nomenclature and plant characteristics were again obtained from the USDA PLANTS Database (USDA NRCS 2012). Though the data calculations used for analysis in this report were made using the USDA PLANTS Database wetland indicator statuses, comparisons are included in the Results section of each mitigation site using the updated NWPL statuses to note potential differences in wetness based on these modifications. The percent cover for each plant species occurring in a sample plot was estimated using a modified Daubenmire cover-class method. In this methodology, percent canopy cover is visually estimated for each plant species either rooted within or extending into each three-foot diameter plot. The plant species is placed into one of a series of cover classes using the estimated percent canopy cover. These classes are based on the mid-point of canopy coverage per the modified Daubenmire canopy cover method shown in Table 2-1 (Daubenmire 1959; Bailey and Poulton 1968).

Table 2-1: Modified Daubenmire Cover Class Scale

Cover Class	1	2	3	4	5	6	7
Range (%)	0-1	1-5	5-25	25-50	50-75	75-95	95-100
Midpoint (%)	0.5	3.0	15.0	37.5	62.5	85.0	97.5

A cover class was also estimated for the non-vegetated area in the three-foot diameter plot because sample plots are often not completely vegetated. Non-vegetated areas can include bare soil, rocky surface, open water, or litter. Quantifying the bare areas allows for the determination of the total percent cover of vegetation in the plot by subtracting the percent bare area from 100 percent, the maximum surface area possible in the plot. Even with bare areas in a plot, the total cover of vegetation may be greater than 100 percent, because plants often overlap in a plot. If standing water was present, the water depth was recorded in the center of each plot along a given gradsect.

2.2 HYDROLOGICAL MONITORING

The following sections detail the various types of hydrological data that were collected as part of the monitoring effort.

2.2.1 Piezometers

Four piezometers were installed in the Wet Meadow mitigation site (WM-1) as described in the Phase I Mitigation Plan. The locations of the installed piezometers have been recorded using GPS (Figure 1, Section A-1, Appendix I). Two additional piezometers were installed in WM-2 in 2009. The locations of these piezometers are included in Figure 1, Section B-1, Appendix I.

Each installed piezometer is monitored on a monthly basis during the growing season to assess the seasonal and annual fluctuation in the shallow water table, and the variation between years. For additional information on the installation and monitoring of the piezometers, please refer to the Phase I and Phase II Mitigation Plans.

2.2.2 Other Hydrological Data

Additional hydrological data is also being collected during the annual monitoring effort each year. This additional data includes monthly total precipitation, monthly average ambient air temperature, and stream gauge data for the Platte and Elkhorn rivers.

2.3 SOIL SAMPLING

The presence of hydric soils in the created wetlands is one of the monitoring goals to document the success of the mitigation sites. Mitigation sites that have been monitored for the required five years or that are meeting the other monitoring goals, will be investigated to determine if hydric soil characteristics are present. Sample plots will be established along each transect in the mitigation site near the central or third plot on the wetland gradsect. The soils will be sampled in accordance with the 2010 *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region* (Regional Supplement). Hydric soils indicators and as well as indicators of hydrology will be recorded on Wetland Determination Data Forms from the Regional Supplement (Appendix A, Sections A and B).

3.0 DATA ANALYSIS AND RESULTS

The following sections provide a brief discussion of the data analysis and the results of the 2012 annual wetland monitoring efforts at the mitigation sites.

3.1 VEGETATION SAMPLING DATA ANALYSIS

Vegetation monitoring of the mitigation sites was conducted in June and September 2012 to characterize major wetland and upland plant communities and the variation between them. Vegetation sampling took place in sample plots established along permanent transects and gradsects. Data obtained during the 2012 sampling efforts have been analyzed and the results are discussed below and included in Appendix I. The Omaha region was experiencing extreme drought conditions at the time of the September 2012 monitoring effort, which is reflected in the vegetation data. According to the Palmer Drought Index, the region was assigned a -4.00 and below value indicating an extreme drought.

All of the vegetation data obtained for the sites were input into a Microsoft Access database that has been designed specifically to accommodate seasons and years of data. The database was also designed for the rapid comparative assessment of selected vegetative characteristics. The vegetative characteristics that were analyzed are described below.

During the data collection process in the field, the percent cover for each plant species observed in each sample plot is estimated. As explained in the following paragraphs, this collected vegetative data is used to calculate a mean weighted average (WA_M) for each sampling unit in addition to calculating the percent native species; percent invasive species; the percentage of perennial, biennial, and annual species; species richness; species diversity; the mean coefficient of conservatism (c-value); and the Floristic Quality Index (FQI).

3.1.1 Average Percent Cover

The average percent cover for a given herbaceous species in a given sampling unit (wetland, transect, gradsect, sample plot) equals the sum of the midpoint values (Table 2-1) of that species for that particular sampling unit divided by the total number of wetland sample plots in that sampling unit. The total number of sample plots is used instead of the count of the cover values. The number of sample plots is a constant at the wetland level. There are additional upland sample plots adjacent to the emergent wetlands; however, the data from these plots has not been included in this analysis. It is available should further investigations into the wetland system be necessary.

3.1.2 Percent Native Species

The percent native species value is the count, or number, of all species listed as "native" or "native and introduced" in that wetland during that sampling effort divided by the total count of species recorded in that wetland during that same sampling effort.

3.1.3 Percent Invasive Species

The percent invasive species value is the count of species listed as "invasive" in that wetland during that sampling effort divided by the total count of species recorded in that wetland during that same sampling effort.

3.1.4 Frequency

Frequency is defined as the total number of plots in which a given species occurs for a given sampling effort. The frequency will be a whole number greater than zero.

3.1.5 Species Richness

Species richness is the count of different herbaceous, shrub, and tree species identified in a given community for a given sampling effort. The species richness will be a whole number greater than zero.

3.1.6 Species Diversity (D)

Species diversity is the number of different species in an area (i.e.: species richness) weighted by a measure of abundance. For this analysis, the frequency is the measure of abundance. In general, species diversity increases with increasing heterogeneity; therefore, the higher the species diversity value, the more diverse the plant community.

The methodology for calculating the species diversity is included below. The formula for species diversity follows Simpson (1949):

$$Species\ Diversity\ (D) = \frac{N(N-1)}{\sum n(n-1)}$$

where N = total number of occurrences for all species in all plots.

n = number of occurrences (or frequency) for each individual species. This value combines data from all strata (herbaceous, shrubs, and trees) of the same species into a single value for that species.

3.1.7 Floristic Quality Assessment (FQA)

A Floristic Quality Analysis (FQA) for each mitigation site is also conducted annually. The FQA is comprised of two different calculations: the mean c-value and the Floristic Quality Index (FQI). The mean c-value is the average of the c-values from the plant species identified in the sampling unit. The mean c-value provides a measure of the botanical quality of a site that can be compared from year to year. However, it does not take into account the size of the site or the quality of the surrounding area. Therefore, the FQI is calculated to combine the mean c-value with the total number of species identified in the sampling unit.

Higher mean c-values and FQI numbers correspond to more natural sites that have a higher quality and species diversity. Lower mean c-values and FQI numbers imply a more disturbed or lower quality site.

FQI is calculated using the following formula:

$$Floristic\,Quality\,Index\,(FQI) = \bar{c}\sqrt{n}$$

where $\bar{c}$ = mean or average c-value.

n = count or number of native species in a given area.

3.1.8 Mean Weighted Average (WA_M)

The mean weighted average (WA_M) provides an indication of the wetness of an area and can be used to determine if that area has the hydrophytic vegetation necessary to qualify as a wetland. The calculated WA_M will be a value between zero and five. It should be equal to or less than 3.0 in order for a specific site to meet the criteria for wetland vegetation. In transitional areas, a WA_M may approach 3.5, depending on landscape position, hydrology, and other related features. A WA_M greater than 3.5 is likely an upland area.

The WA_M is calculated using the following formula:

$$\text{Mean Weighted Average}\,(WA_M) = \frac{\sum I\,E}{\sum I}$$

where I = the importance value for the species – for this Project, the importance value is the percent cover for the species in the sample plot.

E = the ecological index for the species – for this Project, the ecological index is a value between one and five that corresponds to the wetland indicator status for the given species. (An

ecological index value of one corresponds to an obligate or wetland plant and a value of five corresponds to an upland plant.)

3.2 SAMPLING RESULTS

The following sections provide some of the data analysis results for the wetland mitigation sites that were sampled during the 2012 monitoring efforts. The complete set of data (figures, summary tables, ground photographs, and raw data sheets) is contained in Appendices I and II.

3.2.1 Wet Meadow Mitigation Site (WM-1)

The Wet Meadow mitigation site, when combined with the adjacent WM-2, consists of approximately 22 acres of former cropland located in the District's Saunders County well field (Figure 1, Appendix I-A). Within the 22 acres, 3.6 acres have been restored to emergent wetland WM-1, 4.7 acres have been converted to emergent wetland WM-2, and the remaining 13.7 acres have been converted to a native prairie upland buffer. The vegetation in WM-1 has been sampled using a total of 3 transects, 6 gradsects, and 30 sample plots. An additional gradsect was added to Transect 1 in spring 2008 because the creation of WM-2 occurred in the former location of an upland gradsect (WM1-1-1); gradsect WM1-1-1 is no longer monitored. This new upland gradsect was established to the west of WM-1 (WM1-1-3). Soil sampling was also completed in 2012 to determine if hydric soils existed at WM-1. The 2012 spring and fall monitoring efforts represented the sixth full year of monitoring at WM-1.

3.2.1.1 Vegetation Results

The dominant species in WM-1 during 2012 were Canada goldenrod (*Solidago canadensis*), field brome (*Bromus arvensis*), and lanceleaf fogfruit (*Phyla lanceolata*). Dominant species in the adjacent upland buffer included big bluestem (*Andropogon gerardii*), prairie cordgrass, Illinois bundleflower (*Desmanthus illinoensis*), and switchgrass (*Panicum virgatum*).

WM-1 (excluding the upland gradsects) had a WA_M of 2.73 in the spring and 2.99 in the fall (Table 3-1); these values indicate slightly hydrophytic to facultative vegetation dominating the site. The wetland contained an average of 104.7 percent cover of native, hydrophytic vegetation. The average FQI for this wetland in 2012 was 18.18, which continued a general upward trend since 2008. The mean c-value at WM-1 was 3.46 in the spring and 3.41 in the fall. This wetland also contained an average of 85.5 percent native species and 41 percent invasive species. The variation in the mean percent cover of native wetland vegetation for WM-1 was graphed over time and is included as Figure 2 in Appendix I-A.

Despite extreme drought conditions in the region according to the Palmer Drought Index, WM-1 showed WA_M values below 3.0 indicating a hydrophytic vegetation-dominated community in 2012. For

Table 3-1: Data Analysis Summary for WM-1 in 2012

	Spring 2012	Fall 2012
Mean Weighted Average (WA_M)	2.73	2.99
Species Richness	36	30
Species Diversity (D)	24.98	19.57
Floristic Quality Index (FQI)	18.64	17.71
Mean c-value	3.46	3.41
Percent Cover of Native Wetland Vegetation	123.38	86.02

comparison, using the newly assigned wetland indicator statuses issued in the 2012 NWPL, the recalculated WA_M values would be 2.87 in the spring in 2.97 in the fall. Species richness and species diversity values remained fairly consistent with recent years, but quality of the species recorded at the site continued an upward trend with an increase in average FQI and c-value compared to previous years.No invasive species control occurred in 2012 as previous controls and drier conditions have eliminated the cattail population at WM-1. Invasive species will continue to be monitored, however, and controlled as necessary in future years. Tables 1 and 2 in Appendix I-A contain a summary of the monitoring data and the complete species list from the 2012 monitoring effort.

3.2.1.2 Soils and Hydrology Results

Three sample plots were established and analyzed in 2012 to assess the soil characteristics and hydrology at WM-1. One sample plot was established at each transect near the central plot on the wetland gradsect (WM1-1-2-3, WM1-2-2-3, and WM1-3-2-3). The soils sampled at each of the sample plots demonstrated hydric soil characteristics. Matrix colors were typically low chroma (10YR 3/1, 10YR 4/2, 10YR 5/2) with prominent, distinct mottling (10YR 5/8, 10YR 4/6, 10YR 5/6). Each sample plot met the conditions for hydric soil indicator F3 Depleted Matrix or F7 Depleted Dark Surface from the 2010 *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region*–(Regional Supplement; Appendix I, Section A). Indicators of hydrology at the sample plots in WM-1 included drainage patterns, the FAC Neutral Test, and geomorphic position.

3.2.2 Wet Meadow Expansion Mitigation Site (WM-2)

The Wet Meadow Expansion mitigation site (WM-2) is an approximately 4.7-acre PEM wetland created adjacent to WM-1 in the District's Saunders County well field (Figure 1, Appendix I-B). A 13.7-acre upland buffer has been established around WM-2 and WM-1. The vegetation in WM-2 was sampled using a total of 3 transects, 6 gradsects, and 30 sample plots. Soil sampling and characterization of

hydrology was also completed in 2012 to determine if the mitigation site is meeting all three wetland criteria (vegetation, soils, and hydrology).

3.2.2.1 Vegetation Results

The dominant species in this wetland in 2012 were Kentucky bluegrass (*Poa pratensis*), sweetclover (*Melilotus officinalis*), Canada goldenrod, and prairie cordgrass (*Spartina pectinata*). The dominant species in the upland buffer adjacent to WM-2 were big bluestem, Illinois bundleflower, switchgrass, and sawtooth sunflower (*Helianthus grosseserratus*).

WM-2 (excluding the upland gradsects) had a WA_M of 3.26 in the spring and 3.55 in the fall (Table 3-2); these values indicate that the mitigation site is supporting facultative and upland vegetation in 2012. For comparison, using the newly assigned NWPL wetland indicator statuses issued in 2012, the recalculated WA_M values would be 3.06 in the spring in 3.26 in the fall, indicating a facultative vegetation community. This wetland also contained an average of 81 percent native species and 31.5 percent invasive species. The average FQI for this wetland in 2012 was 14.78, a slight decrease from 2011. The mean c-value at WM-2 was 2.96 in the spring and 3.27 in the fall. The average percent cover of native wetland vegetation at WM-2 in 2012 was 70.3. The variation in the mean percent cover of native wetland vegetation for WM-2 was graphed over time and is included as Figure 2 in Appendix I-B.

Table 3-2: Data Analysis Summary for WM-2 in 2012

	Spring 2012	Fall 2012
Mean Weighted Average (WA_M)	3.26	3.55
Species Richness	35	22
Species Diversity (D)	19.18	10.57
Floristic Quality Index (FQI)	15.69	13.86
Mean c-value	2.96	3.27
Percent Cover of Native Wetland Vegetation	82.02	58.51

The vegetation community at WM-2 continues to struggle to meet hydrophytic vegetation criteria. The most dominant species recorded in 2012 at WM-2 was Kentucky bluegrass which has a wetland indicator status that was changed from FACU to FAC upon the issuance of the latest NWPL. This is the biggest factor influencing the difference in WA_M values described in the paragraph above bringing the values closer to the 3.0 threshold. In 2011, experimental test plots were established in an attempt to determine a more preferable seed mix and pre-treatment method to improve the prominence of hydrophytic vegetation at the site. After discussion in early 2012 with the Corps and the District, it was decided that further

monitoring of the test plots would be suspended for 2012. It may be necessary to revisit the test plots in 2013 or explore other methods of enhancing the hydrophytic vegetation community in 2013 as WM-2 nears five full years of monitoring. Additionally, snow and rainfall amounts approaching more normal quantities prior to the spring 2013 monitoring, could help support the hydrophytic seed bank expected to exist at the site.

No invasive species control occurred in 2012 as previous controls and drier conditions have eliminated the cattail population at WM-2. Invasive species will continue to be monitored, however, and controlled as necessary in future years. Tables 1 and 2 in Appendix I-B contain a summary of the monitoring data and the complete species list from the 2012 monitoring effort.

3.2.2.2 Soils and Hydrology Results

Three sample plots were established and analyzed in 2012 to assess the soil characteristics at WM-2. One sample plot was established at each transect near the central plot on the wetland gradsect (WM2-1-2-3, WM2-2-2-3, and WM2-3-2-3). The soils sampled at each of the sample plots demonstrated hydric soil characteristics. Matrix colors were typically low chroma (10YR 3/1, 10 YR 5/2, 10YR 4/2) with prominent, distinct mottling (10YR 5/4, 10YR 5/6, 10YR 6/6). Each sample plot met hydric soil indicator F7 Depleted Matrix as indicated in the Regional Supplement (Appendix A, Section B). Indicators of wetland hydrology at the sample plots in WM-2 included geomorphic position, FAC Neutral Test, and drainage patterns.

3.2.3 Backwash Drain Line Mitigation Site (WM-3)

The Backwash Drain Line mitigation site (WM-3) is located on approximately 80 acres of former cropland in the District's Douglas County well field (Figure 1, Appendix I-C). Of the 80 acres, 15.4 acres have been converted to emergent wetland and 64.6 acres to upland buffer. Within the upland buffer, a series of drainage swales were developed to route water around the wetland when necessary. Due to the regularity of water being diverted around WM-3, these drainage swales are developing into wetland swales. If this development of additional wetland acreage appears permanent, these drainage swales will be delineated and their acreage added to the total mitigation acres created.

3.2.3.1 Vegetation Results

The vegetation in WM-3 was sampled using a total of 4 transects, 8 gradsects, and 40 sample plots. The dominant species in this wetland were broadleaf cattail (*Typha latifolia*), prairie fleabane (*Erigeron strigosus*) and wingstem (*Verbesina alternifolia*). The dominant species in the upland buffer adjacent to WM-3 were Kentucky bluegrass and tall fescue (*Schedonorus phoenix*).

WM-3 (excluding the upland gradsects) had a WA_M of 1.88 in the spring and 2.05 in the fall of 2012 (Table 3-3). For comparison, using the newly assigned NWPL wetland indicator statuses issued in 2012, the recalculated WA_M values would be 1.78 in the spring in 2.26 in the fall. This wetland contained an average of 84.5 percent native species and 26 percent invasive species. The average FQI for this wetland in 2012 had a value of 15.95 continuing an upward trend compared to previous years. The mean c-value at WM-3 was 4.06 in the spring and 3.79 in the fall. The mean percent cover of native wetland vegetation in WM-3 in 2011 was 89 percent. The variation in the mean percent cover of native wetland vegetation for WM-3 was graphed over time and is included as Figure 2 in Appendix I-C.

Table 3-3: Data Analysis Summary for WM-3 in 2012

	Spring 2012	Fall 2012
Mean Weighted Average (WA_M)	1.88	2.05
Species Richness	20	19
Species Diversity (D)	12.58	15.54
Floristic Quality Index (FQI)	17.24	14.66
Mean c-value	4.06	3.79
Percent Cover of Native Wetland Vegetation	87.6	90.4

No invasive species control took place at WM-3 in 2012. Invasive species will continue to be monitored and controlled as necessary at WM-3 in future years. Tables 1 and 2 in Appendix I-C contain a summary of the monitoring data and the complete species list from the 2012 monitoring effort.

3.2.3.2 Soils and Hydrology Results

No soils or hydrology data were recorded during the 2012 monitoring effort. These data will be collected in 2013 and provided in the next annual report which will represent the fifth full year of monitoring at WM-3.

3.2.4 Water Treatment Plant Mitigation Sites

The District completed the construction of the Water Treatment Plant mitigation sites in May of 2009. The Water Treatment Plant mitigation sites consist of six emergent wetland areas that total 3.78 acres of wetlands. At the time of the development of the Water Treatment Plant mitigation site, the District also created 175 linear feet of stream mitigation to compensate for the 38 feet of ephemeral stream impacts resulting from construction of the water treatment plant. This will allow for additional stream mitigation beyond what is required for known stream impacts at this point.

Monitoring efforts at the Water Treatment Plant mitigation sites began in fall 2009; 2012 marked the third year with two sampling seasons. No soils or hydrology data were recorded during the 2012 monitoring effort at any of the Water Treatment Plant mitigation sites, but will be obtained as the sites are closer to the five year monitoring threshold. A discussion of the 2012 monitoring effort at each wetland mitigation site is included in the following sections.

3.2.4.1 Water Treatment Plant Mitigation Site WM-4

Wetland mitigation site WM-4 is located near the northeast corner of the water treatment plant property (Figure 1, Appendix I-D). The constructed area of WM-4 was measured using GPS in June of 2009 and calculated to be 0.69 acre. The vegetation in WM-4 was sampled using a total of 1 transect, 2 gradsects, and 10 sample plots. The dominant species in this wetland were cattail and barnyard grass (*Echinochloa crus-galli*). The dominant species in the upland buffer adjacent to WM-4 were Kentucky bluegrass and tall fescue.

WM-4 (excluding the upland gradsect) had a WA_M of 2.36 in the spring and 2.39 in the fall (Table 3-4). For comparison, using the newly assigned NWPL wetland indicator statuses issued in 2012, the recalculated WA_M values would be 2.29 in the spring in 2.28 in the fall. This wetland contained an average of 78 percent native species and 46.5 percent invasive species. The average FQI for this wetland in 2012 was 12.61, a continued increase compared to previous years' FQI values though it was impacted heavily by the high spring 2012 value of 16.92. The mean c-value at WM-4 was 3.88 in the spring and 2.40 in the fall. The mean percent cover of native wetland vegetation in WM-4 in 2012 was 73.25 percent. The variation in the mean percent cover of native wetland vegetation for WM-4 was graphed over time and is included as Figure 2 in Appendix I-D.

Table 3-4: Data Analysis Summary for WM-4 in 2012

	Spring 2012	Fall 2012
Mean Weighted Average (WA_M)	2.36	2.39
Species Richness	25	15
Species Diversity (D)	51.23	23.21
Floristic Quality Index (FQI)	16.92	8.31
Mean c-value	3.88	2.40
Percent Cover of Native Wetland Vegetation	88.5	58

No invasive species control took place at WM-4 in 2012. The drought conditions in 2012 limited the proliferation of cattail, but invasive species at the site will continue to be monitored and controlled as

necessary at WM-4 in future years. Tables 1 and 2 in Appendix I-D contain a summary of the monitoring data and the complete species list from the 2012 monitoring effort.

3.2.4.2 Water Treatment Plant Mitigation Site WM-5

Wetland mitigation site WM-5 is located in the north-central portion of the water treatment plant property (Figure 1, Appendix I-E). The constructed area of WM-5 was measured using GPS in June of 2009 and calculated to be 0.57 acre. The vegetation in WM-5 was sampled using a total of 1 transect, 2 gradsects, and 10 sample plots. The dominant species in this wetland were hop sedge (*Carex lupulina*), fox sedge (*Carex vulpinoidea*), and common rush (*Juncus effusus*). The dominant species in the upland buffer adjacent to WM-5 was tall fescue.

WM-5 (excluding the upland gradsect) had a WA_M of 2.18 in the spring and 1.49 in the fall (Table 3-5). For comparison, using the newly assigned NWPL wetland indicator statuses issued in 2012, the recalculated WA_M values would be 2.23 in the spring in 2.69 in the fall. This wetland contained an average of 79 percent native species and 40.5 percent invasive species. The average FQI for this wetland in 2012 was 13.97, down from the 2011 value of 15.01 at WM-5. This decrease is largely attributable to the low FQI reading from the fall 2012 monitoring effort. The mean c-value at WM-5 was 4.00 in the spring and 3.50 in the fall. The mean percent cover of native wetland vegetation in WM-5 in 2011 was 145.3 percent. The variation in the mean percent cover of native wetland vegetation for WM-5 was graphed over time and is included as Figure 2 in Appendix I-E.

Table 3-5: Data Analysis Summary for WM-5 in 2012

	Spring 2012	Fall 2012
Mean Weighted Average (WA_M)	2.18	1.65
Species Richness	23	12
Species Diversity (D)	33.44	15.33
Floristic Quality Index (FQI)	17.44	15.33
Mean c-value	4.00	3.50
Percent Cover of Native Wetland Vegetation	198.5	92

No invasive species control took place at WM-5 in 2012. The drought conditions in 2012 limited the proliferation of cattail and purple loosestrife, but invasive species at the site will continue to be monitored and controlled as necessary at WM-5 in future years. Tables 1 and 2 in Appendix I-E contain a summary of the monitoring data and the complete species list from the 2011 monitoring effort.

3.2.4.3 Water Treatment Plant Mitigation Site WM-6

Wetland mitigation site WM-6 is located in the southwest corner of the water treatment plant property (Figure 1, Appendix I-F). The constructed area of WM-6 was measured using GPS in June of 2009 and calculated to be 0.78 acre. The vegetation in WM-6 was sampled using a total of 1 transect, 2 gradsects, and 10 sample plots. The dominant species in this wetland were Virginia wildrye (*Elymus virginicus*) and peachleaf willow (*Salix amygdaloides*). The dominant species in the upland buffer adjacent to WM-6 were Kentucky bluegrass, big bluestem, and sweetclover.

WM-6 (excluding the upland gradsect) had a WA_M of 2.39 in the spring and 2.56 in the fall (Table 3-6). For comparison, using the newly assigned NWPL wetland indicator statuses issued in 2012, the recalculated WA_M values would be 2.17 in the spring in 2.57 in the fall. This wetland contained an average of 80 percent native species and 54.5 percent invasive species. The average FQI for this wetland in 2012 was 12.82, continuing an upward trend from the previous three years of monitoring. The mean c-value at WM-6 was 3.50 in the spring and 2.93 in the fall. The mean percent cover of native wetland vegetation in WM-6 in 2012 was 89 percent. The variation in the mean percent cover of native wetland vegetation for WM-6 was graphed over time and is included as Figure 2 in Appendix I-F.

Table 3-6 Data Analysis Summary for WM-6 in 2012

	Spring 2012	Fall 2012
Mean Weighted Average (WA_M)	2.39	2.56
Species Richness	18	22
Species Diversity (D)	19.69	28.89
Floristic Quality Index (FQI)	13.56	12.09
Mean c-value	3.50	2.93
Percent Cover of Native Wetland Vegetation	84.5	93.5

No invasive species control took place at WM-6 in 2012; however, invasive species will continue to be monitored and controlled as necessary in future years. Tables 1 and 2 in Appendix I-F contain a summary of the monitoring data and the complete species list from the 2012 monitoring effort.

3.2.4.4 Water Treatment Plant Mitigation Site WM-7

Wetland mitigation site WM-7 is located in the southwest portion of the water treatment plant property, immediately east of WM-6 (Figure 1, Appendix I-G). The constructed area of WM-7 was measured using GPS in June of 2009 and calculated to be 0.58 acre. The vegetation in WM-7 was sampled using 1 transect, 2 gradsects, and 10 sample plots. The dominant species in this wetland were hop sedge and fox

sedge. Other dominant species in the wetland included barnyard grass, shortbeak sedge (*Carex brevior*), common rush and New England Aster (*Symphyotrichum novae-angliae*). The dominant species in the upland buffer adjacent to WM-7 were tall fescue, Kentucky bluegrass, and little bluestem (*schizachyrium scoparium*).

WM-7 (excluding the upland gradsect) had a WA_M of 1.82 in the spring and 1.66 in the fall (Table 3-7). For comparison, using the newly assigned NWPL wetland indicator statuses issued in 2012, the recalculated WA_M values would be 1.61 in both the spring and the fall. This wetland contained an average of 94.5 percent native species and 28.5 percent invasive species. The average FQI for this wetland in 2012 was 13.89, continuing an upward trend from the previous years of monitoring. The mean c-value at WM-7 was 5.25 in the spring and 4.57 in the fall. The mean percent cover of native wetland vegetation in WM-7 in 2012 was 55.5 percent. The variation in the mean percent cover of native wetland vegetation for WM-7 has been graphed over time and is included as Figure 2 in Appendix I-G.

Table 3-7: Data Analysis Summary for WM-7 in 2012

	Spring 2012	Fall 2012
Mean Weighted Average (WA_M)	1.82	1.66
Species Richness	8	9
Species Diversity (D)	18.33	19.50
Floristic Quality Index (FQI)	14.85	12.93
Mean c-value	5.25	4.57
Percent Cover of Native Wetland Vegetation	41	70

No invasive species control took place at WM-7 in 2012; however, invasive species will continue to be monitored and controlled as necessary in future years. Tables 1 and 2 in Appendix I-G contain a summary of the monitoring data and the complete species list from the 2012 monitoring effort.

3.2.4.5 Water Treatment Plant Mitigation Site WM-8

Wetland mitigation site WM-8 is located in the south-central portion of the water treatment plant property, immediately east of WM-7 (Figure 1, Appendix I-H). The constructed area of WM-8 was measured using GPS in June of 2009 and calculated to be 0.74 acre. The vegetation in WM-8 was sampled using 1 transect, 2 gradsects, and 10 sample plots. The dominant species in this wetland were Virginia wildrye and sandbar willow (*Salix interior*). The dominant species in the upland buffer adjacent to WM-8 were Kentucky bluegrass and tall fescue.

WM-8 (excluding the upland gradsects) had a WA_M of 2.72 in the spring and 2.65 in the fall (Table 3-8). For comparison, using the newly assigned NWPL wetland indicator statuses issued in 2012, the recalculated WA_M values would be 2.48 in the spring in 2.56 in the fall. This wetland contained an average of 80.5 percent native species and 35.5 percent invasive species. The average FQI for this wetland in 2012 was 13.08, continuing an upward trend from the previous years of monitoring. The mean c-value at WM-8 was 3.91 in the spring and 3.50 in the fall. The mean percent cover of native wetland vegetation in WM-8 in 2012 was 59.8 percent. The variation in the mean percent cover of native wetland vegetation for WM-8 was graphed over time and is included as Figure 2 in Appendix I-H.

Table 3-8: Data Analysis Summary for WM-8 in 2012

	Spring 2012	Fall 2012
Mean Weighted Average (WA_M)	2.72	2.65
Species Richness	15	16
Species Diversity (D)	38.00	42.00
Floristic Quality Index (FQI)	13.54	12.62
Mean c-value	3.91	3.50
Percent Cover of Native Wetland Vegetation	75	44.5

No invasive species control took place at WM-8 in 2012; however, invasive species will continue to be monitored and controlled as necessary in future years. Tables 1 and 2 in Appendix I-H contain a summary of the monitoring data and the complete species list from the 2012 monitoring effort.

3.2.4.6 Water Treatment Plant Mitigation Site WM-9

Wetland mitigation site WM-9 is located in the southeast corner of the water treatment plant property (Figure 1, Appendix I-I). The constructed area of WM-9 was measured using GPS in June of 2009 and calculated to be 1.90 acres. Of the 1.90 acres, 1.48 acres are open water habitat while 0.42 acre was constructed as emergent wetland and was included in the total acreage of the Water Treatment Plant mitigation sites. The vegetation in WM-9 was sampled using a total of 2 transects, 4 gradsects, and 20 sample plots. The dominant species in this wetland were prairie cordgrass and smooth brome (*Bromus inermis*). The dominant species in the upland buffer adjacent to WM-9 was tall fescue.

WM-9 (excluding the upland gradsects) had a WA_M of 2.73 in the spring and 2.30 in the fall (Table 3-9). For comparison, using the newly assigned NWPL wetland indicator statuses issued in 2012, the recalculated WA_M values would be 2.88 in the spring in 2.45 in the fall. This wetland contained an average of 77 percent native species and 41 percent invasive species. The average FQI for this wetland in

2012 was 11.22, a drop from the 2011 average of 13.23. The mean c-value at WM-9 was 3.67 in the spring and 3.10 in the fall. The mean percent cover of native wetland vegetation in WM-9 in 2012 was 70.9 percent. The variation in the mean percent cover of native wetland vegetation for WM-9 was graphed over time and is included as Figure 2 in Appendix I-I.

Table 3-9: Data Analysis Summary for WM-9 in 2012

	Spring 2012	Fall 2012
Mean Weighted Average (WA_M)	2.14	2.04
Species Richness	9	10
Species Diversity (D)	9.23	5.88
Floristic Quality Index (FQI)	9.07	9.33
Mean c-value	3.43	3.11
Percent Cover of Native Wetland Vegetation	44.25	97.5

No invasive species control took place at WM-9 in 2012; however, invasive species will continue to be monitored and controlled as necessary in future years. Tables 1 and 2 in Appendix I-I contain a summary of the monitoring data and the complete species list from the 2012 monitoring effort.

3.2.4.7 Water Treatment Plant Stream Mitigation Site

As mentioned above, approximately 175 feet of stream mitigation was created as part of the Water Treatment Plant mitigation sites. The stream mitigation site is located in the southeast corner of the water treatment plant property, immediately south of WM-9. No quantitative monitoring efforts are conducted at the stream mitigation site. However, natural color photographs were taken during the spring and fall 2012 monitoring efforts and are provided in Appendix I, Section J. Hydrology at the stream mitigation site is provided by connection with WM-9 via a culvert as well as via surface water runoff from portions of the property. Shrubs consisting of dogwood (*Cornus* sp.) and pussy willow (*Salix discolor*) were planted on the northern bank of the stream channel during 2009.

3.3 HYDROLOGICAL MONITORING

Several different types of hydrological data were collected as part of the 2012 monitoring effort. These collected data have been analyzed; the results are discussed below and included in Appendix II.

3.3.1 Piezometers

Four piezometers were installed in WM-1 in the Saunders County well field in October 2005. The elevation of the local water table at each piezometer was graphed over time to allow for comparison amongst the piezometers and with other monitoring data. Two additional piezometers were installed in

WM-2 in May 2009. The piezometer data from the 2012 monitoring effort is included as Figure 1, Appendix II.

3.3.2 Other Hydrological Data

Additional hydrological data collected as part of the 2012 monitoring effort includes monthly total precipitation, monthly average ambient air temperature, and stream gauge data. The 2012 monthly total precipitation and monthly average ambient air temperature are both obtained from the weather station at Fremont Municipal Airport in Fremont, Nebraska located approximately 20 miles northwest of the well fields. The 2012 precipitation and temperature data and the historical average monthly precipitation and temperature were graphed over time; the graphs are included as Figures 2 and 3, respectively in Appendix II.

Stream gauge data is obtained from the USGS stream gauge stations on the Platte and Elkhorn rivers. Platte River data is obtained approximately 3 miles upstream of the well fields from the stream gauge near Venice, Nebraska (USGS Stream Gauge No. 06796550). The installation of this stream gauge took place at the request of, and through funding by, the District. Data collected from this stream gauge is presented in Figure 4, Appendix II. The Elkhorn River data is obtained approximately 7 miles upstream of the well fields at the stream gauge near Waterloo, Nebraska (USGS Stream Gauge No. 06800500). Data collected from this stream gauge is presented in Figure 5, Appendix II.

Project operation of the production wells in the well fields occurred throughout 2012, the fourth full year of operation. As in past years, pumping occurred well below capacity. Extreme drought conditions impacted operation of the well fields. Due to widespread groundwater drawdowns and restrictions affecting the City of Lincoln's well field located just downstream of the Platte West well fields, the District chose to voluntarily restrict pumpage in 2012. Restrictions included an overall pumpage limitation of 50 MGD of maximum withdrawal beginning in mid-July, decreasing the maximum withdrawal to 40 MGD on August 1st, and continuing with that restriction through October 18th. Maintenance issues at the District's other facilities forced the restriction to be relaxed during the first two weeks of September although September's withdrawal was only slightly above the 40 MGD limit (41.37 MGD). As a result, in spite of the severe drought conditions, annual production (January through November) decreased slightly in 2012 compared to 2011; this decrease in average daily production was approximately two million gallons per day. On average, approximately 73 percent of the total production came from the Saunders County well field with the remainder produced from Douglas County. It is important to note that Project operation is occurring, but not at full capacity.

4.0 DISCUSSION AND RECOMMENDATIONS

The goal of the monitoring program is to document the establishment of the wetland mitigation sites and to observe whether the mitigation sites develop similar functions and values as those wetlands and waters of the United States affected by Project construction and operation. While most of the mitigation sites are developing as anticipated, a few recommendations for improvement are included below.

4.1 MAINTENANCE EFFORTS

The following sections provide the details of any maintenance activities that were performed or analyze in 2012 or are recommended for 2013.

4.1.1 Wet Meadow Mitigation Site (WM-1)

No maintenance efforts were necessary at WM-1 in 2012 and none are recommended for 2013.

4.1.2 Wet Meadow Expansion Mitigation Site (WM-2)

The establishment of native wetland vegetation in WM-2 has been problematic. A series of experimental test plots were established at WM-2 in 2011 in an attempt to identify a wetland seed mix and pre-treatment method that would result in the successful establishment of native wetland vegetation. After discussion with the District and the Corps in early 2012, it was determined that monitoring at the test plots would not take place in 2012. Reevaluation of the plots will take place, if necessary, in 2013 following analysis of the 2012 vegetation data collected at the established transects in WM-2 and further discussion with the District and the Corps.

4.1.3 Backwash Drain Line Mitigation Site (WM-3)

As discussed in last year's report, WM-3 was re-graded in July of 2011 to lower the elevation in the center of the site and to improve hydrological connections throughout the site in an effort to improve water flow across the site and increase the wetland acreage. Much of the central portion of the site was lowered one- to two-feet from existing elevations.

Monitoring at WM-3 in 2012 took place as in previous years using the four transects established during the initial monitoring in the fall of 2008. These transects and their respective wetland gradsects still appear to provide a representative sample of vegetation in the wetland and upland portions of WM-3. Extending the transects and/or establishing new transects was discussed and could still be option in future years if necessary. Photographic documentation of the site was accomplished in 2012 to produce a visual record of the reestablishment of the wetland over time.

The upland buffer area surrounding WM-3 was mowed in early September to help curtail the establishment of woody species in the area. In addition to the upland buffer, the cattail-dominated wetland swale was also mowed as drier than normal conditions allowed equipment into the swale without the possibility of creating ruts or getting stuck.

4.1.4 Water Treatment Plant Mitigation Sites

No maintenance efforts took place at the water treatment plant mitigation sites in 2012; however, dense woody vegetation has become abundant in the northeastern portion of WM-9. In particular, at thick stand of peachleaf willow, sandbar willow, and eastern cottonwood (*Populous deltoides*) is located near transect 2. It may be desirable to thin out these trees in 2013. The District has asked for guidance from Burns & McDonnell. If tree removal occurs, trees in the upland area adjacent to WM-9 will be cut at ground level leaving the root structure in place and maintaining slope stability.

4.2 INVASIVE SPECIES CONTROL

No invasive species control took place in 2012. The drought conditions tempered the establishment of invasive species typically treated in past years (i.e. purple loosestrife (*Lythrum salicaria*) and cattail). The reestablishment and proliferation of invasive species will continue to be monitored closely in 2013 and control measures will be implemented as needed.

4.3 MONITORING GOALS ACCOMPLISHED

As outlined in the Mitigation Plans, mitigation efforts will be considered successful at a given mitigation site if the following criteria occur:

1. Eighty percent cover of native wetland vegetation will be established in the created emergent wetlands and along the banks of the created stream channel.

2. Positive indicators of hydric soils such as low chroma dominant colors, redoximorphic features, or oxidized rhizospheres are found in the created emergent wetlands.

3. Positive indicators of wetland hydrology such as inundation, saturation in the upper 12 inches of the soil, watermarks, and drift lines are found in the created emergent wetlands.

At this time, WM-1 has been monitored for the requisite five years; therefore, only WM-1 is included in this discussion. Monitoring at WM-1 began in the fall of 2006 and has been completed twice annually through the fall of 2012 for a total of 13 monitoring efforts over six-and-a-half years. No resolution was reached on WM-1 following the 2011 monitoring efforts so monitoring continued at WM-1 in 2012.

As each mitigation site reaches the five-year monitoring threshold, it will be evaluated to determine whether it meets the monitoring goals. Periodic reviews will also be conducted to determine if maintenance activities should be considered to compensate for a site that may not be meeting one or more goals.

After six full years of monitoring, and following a drought year in 2012, WM-1 meets all three of the monitoring goals set forth in the mitigation plan. The mean percent cover of native wetland vegetation was 90.0 percent following a value of 115.4 percent in 2011. The soils sampled at each of the sample plots in WM-1 demonstrated hydric soil characteristics with low chroma matrix colors and prominent, distinct mottling. Additionally, indicators of hydrology in WM-1 included drainage patterns, the FAC Neutral Test, and geomorphic position. Because WM-1 meets all three monitoring goals and has been successfully established, it should not require additional monitoring in 2013.

4.4 2013 MONITORING

The 2013 monitoring efforts at the mitigation sites are targeted to take place in June and September. Since the monitoring methods, as implemented during the 2006 monitoring effort, continue to yield what is considered to be good, usable data, the methods described in this report will be repeated during the 2013 monitoring effort. No changes to the monitoring methodology are recommended at this time. However, pending the approval of the Corps, WM-1 will no longer be included in the monitoring efforts as it has demonstrated that it has met all monitoring goals after more than five years of monitoring.

As mentioned above, the growth of invasive species such as cattail, purple loosestrife, and thistle will continue to be closely monitored during 2013 and control measures will be continued as necessary. Additionally, 2013 will represent the fifth full season of monitoring at WM-2 and WM-3. Soil samples will be taken at these sites and hydrological indicators will be noted during 2013 monitoring efforts.

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APPENDIX I

WETLAND MONITORING DATA FOR THE MITIGATION SITES
(FIGURES, TABLES, PHOTOGRAPHS, DATA SHEETS)

APPENDIX I - SECTION A

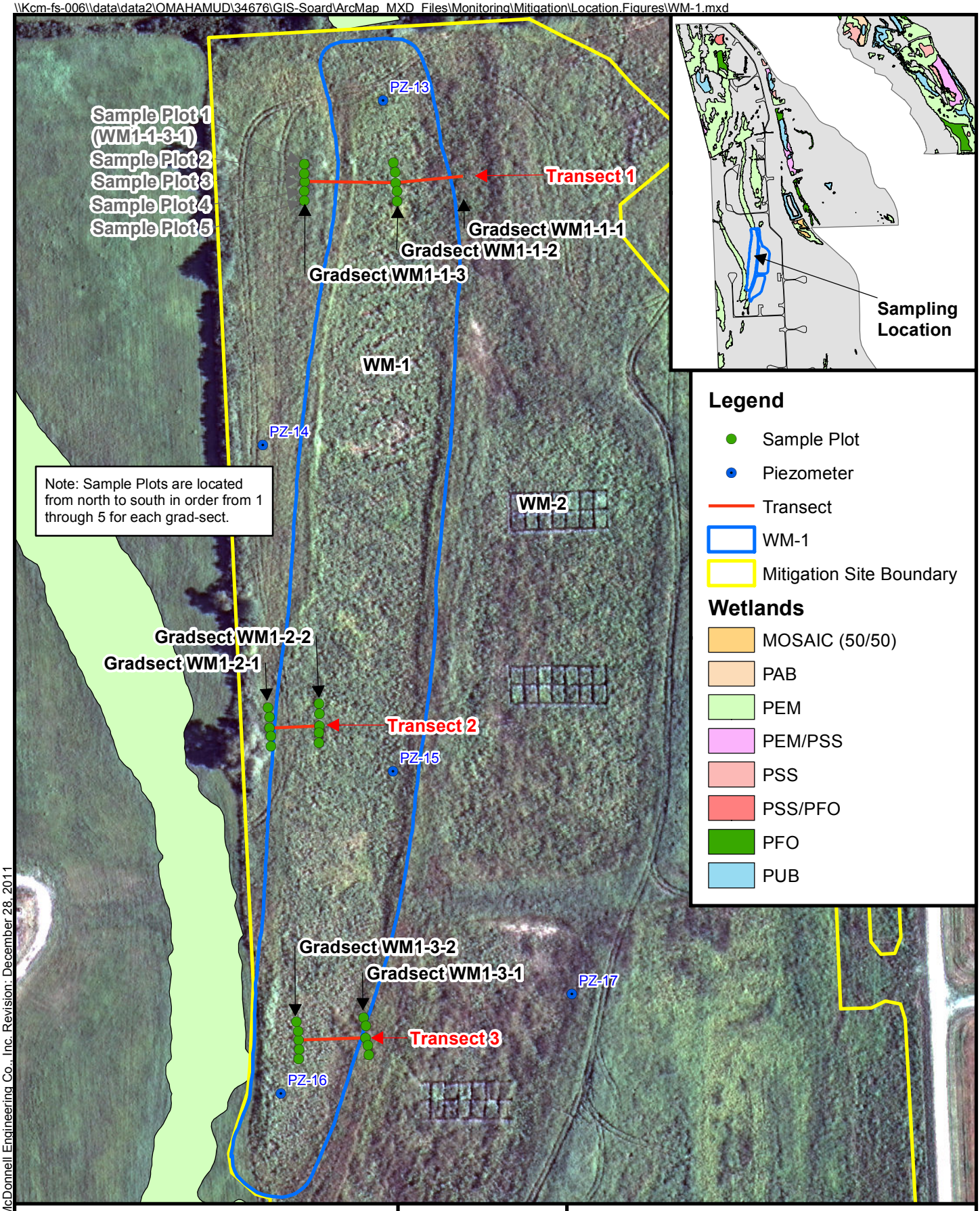
WET MEADOW MITIGATION SITE (WM-1) MONITORING DATA

TABLE OF CONTENTS

SECTION A-1

FIGURES

\\Kcm-fs-006\\data\data2\OMAHAMUD\34676\GIS-Soard\ArcMap_MXD_Files\Monitoring\Mitigation\Location.Figures\WM-1.mxd



Source: Western Air Maps 2011 Aerial Photography

Figure 1
Location Map for
Wetland Mitigation 1
Saunders County Wellfield
Metropolitan Utilities District

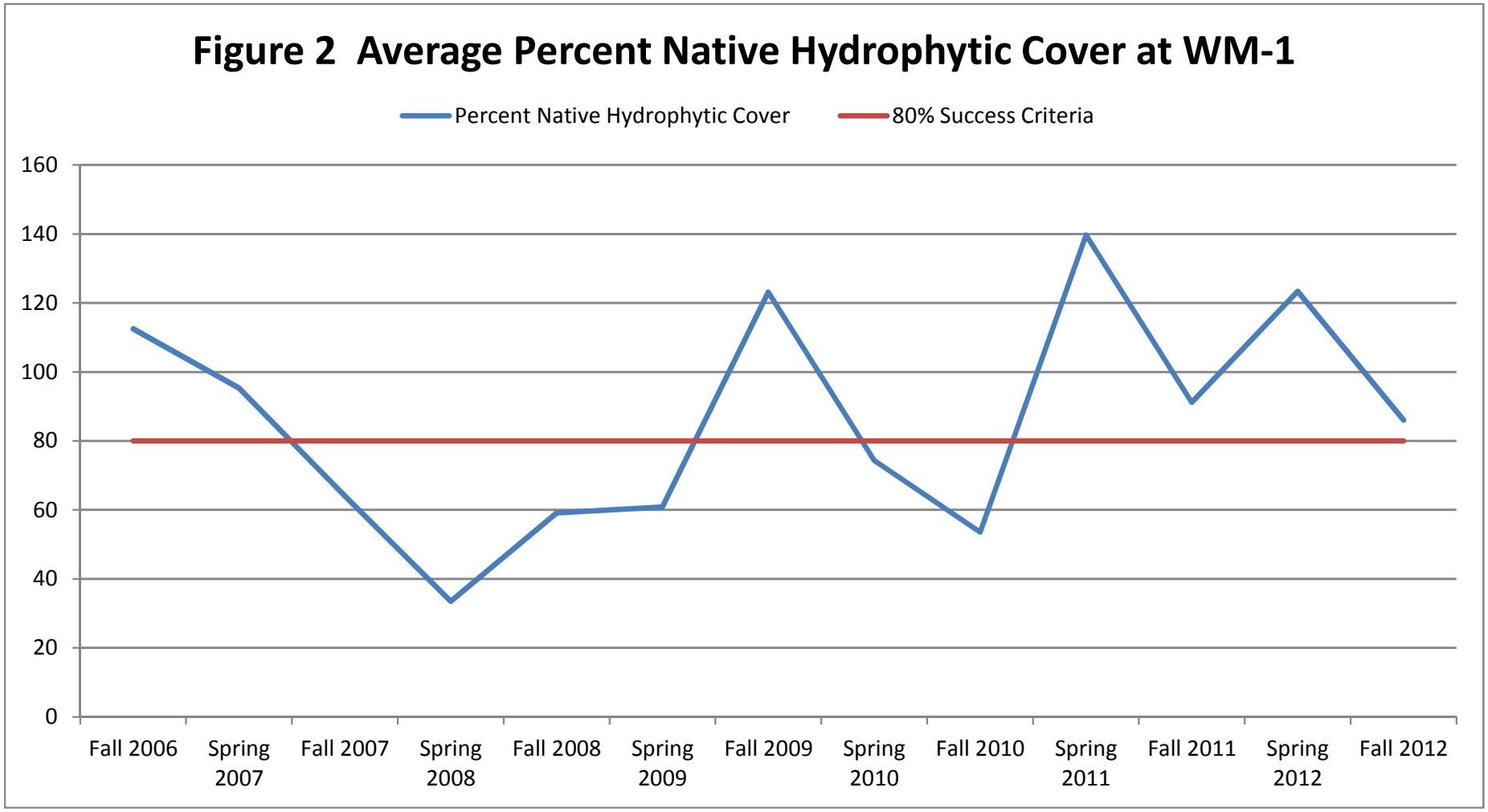


Figure 2 Average Percent Native Hydrophytic Cover at WM-1
Percent Native Hydrophytic Cover
80% Success Criteria
160
140
120
100
80
60
40
20
0
Fall 2006
Spring 2007
Fall 2007
Spring 2008
Fall 2008
Spring 2009
Fall 2009
Spring 2010
Fall 2010
Spring 2011
Fall 2011
Spring 2012
Fall 2012

SECTION A-2

TABLES

Table 1 Summary of Wetland Monitoring Data for WM-1

Wetland Name: **WM-1**
Wetland Type: **PEM**
County: **Saunders**

Number of Transects/Macroplots: **3**
Number of Gradsects: **7**
Number of Sample Plots: **35**
Number of Wetland Sample Plots: **15**

Sampling Effort: **2012 Fall**

Weighted Average: **2.99**
Species Richness: **30**
Species Diversity: **19.57**
FQI: **17.71**

Percent Native Species: **90**
Percent Invasive Species: **43**
Percent Perennial/Biennial/Annual Species: **77 / 3 / 27**
Mean C-Value: **3.41**

Dominant Species:

Scientific Name	Common Name	Wetland Indicator Status	Percent Cover per Wetland
Phyla lanceolata	Lanceleaf fogfruit	OBL	17.17
Solidago canadensis	Canada goldenrod	FACU	59.17

Sampling Effort: **2012 Spring**

Weighted Average: **2.73**
Species Richness: **36**
Species Diversity: **24.98**
FQI: **18.64**

Percent Native Species: **81**
Percent Invasive Species: **39**
Percent Perennial/Biennial/Annual Species: **75 / 6 / 25**
Mean C-Value: **3.46**

Dominant Species:

Scientific Name	Common Name	Wetland Indicator Status	Percent Cover per Wetland
Bromus arvensis	Field brome	NL	22.67
Solidago canadensis	Canada goldenrod	FACU	43.5

Table 2 Species List and Vegetative Characteristics for WM-1

Report generated:
Friday, November 16, 2012

Sampling Effort: **2012 Fall**

Scientific Name	Common Name	Wetland Indicator Status[1]	Ecological Index[2]	C-Value	Native Status	Invasive?	Frequency[3]	Average Percent Cover[4]
Agalinis tenuifolia	Slenderleaf false foxglove	FACW	2	5	Native	☐	3	3.00
Amaranthus retroflexus	Redroot amaranth	FACU	4		Native	☑	1	1.00
Ambrosia artemisiifolia	Annual ragweed	FACU	4	0	Native	☑	4	6.17
Anemone canadensis	Canadian anemone	FACW	2	4	Native	☐	3	4.50
Carex cristatella	Crested sedge	FACW	2	5	Native	☐	4	7.00
Carex lupulina	Hop sedge	FACW+	2	8	Native	☐	1	1.00
Carex sp. 1	Sedge	--	3		Native	☐	3	4.50
Carex vulpinoidea	Fox sedge	OBL	1	4	Native	☐	4	10.17
Cornus drummondii	Roughleaf dogwood	FAC	3	3	Native	☐	4	5.50
Cyperus esculentus	Yellow nutsedge	FACW	2	0	Native & Introduced	☑	1	1.00
Desmanthus illinoensis	Illinois bundleflower	FACU	4	5	Native	☐	9	12.00
Eleocharis erythropoda	Bald spikerush	OBL	1	5	Native	☐	2	2.00
Helianthus annuus	Common sunflower	FACU	4	0	Native	☑	2	3.50
Lycopus americanus	American water horehound	OBL	1	4	Native	☑	1	1.00
Melilotus officinalis	Yellow sweetclover	FACU	4		Introduced	☑	2	3.50
Muhlenbergia asperifolia	Scratchgrass	FACW	2	5	Native	☐	3	7.67
Muhlenbergia racemosa	Marsh muhly	FACW	2	4	Native	☑	2	5.17
Panicum virgatum	Switchgrass	FAC	3	4	Native	☐	1	1.00

1 = OBL - obligate; FACW - facultative wet; FAC - facultative; FACU - facultative upland; UPL - upland; NI - no indicator

2 = Ecological Index values correspond to the wetland indicator status for each species

3 = Frequency is the total number of plots in which the species was identified

4 = Average percent cover is calcuated from the coverages estimated during this monitoring effort.

Table 2 Species List and Vegetative Characteristics for WM-1

Report generated:
Friday, November 16, 2012

Phyla lanceolata	Lanceleaf fogfruit	OBL	1	3	Native	☐	12	17.17
Physalis heterophylla	Clammy groundcherry	NL	3	4	Native	☑	1	0.17
Poa pratensis	Kentucky bluegrass	FACU	4		Native & Introduced	☑	8	14.00
Polygonum pensylvanicum	Pennsylvania smartweed	FACW+	2		Native	☑	1	0.17
Setaria faberi	Japanese bristlegrass	UPL	5		Introduced	☑	1	1.00
Setaria pumila ssp. pumila	Yellow foxtail	FAC	3		Introduced	☑	9	15.00
Solidago canadensis	Canada goldenrod	FACU	4	2	Native	☐	14	59.17
Solidago gigantea	Giant goldenrod	FACW	2	3	Native	☐	5	5.00
Spartina pectinata	Prairie cordgrass	FACW	2	5	Native	☐	7	14.67
Symphyotrichum lanceolatum	White panicle aster	NI	3	2	Native	☐	2	2.00
Symphyotrichum pilosum	Hairy white oldfield aster	FACU	4	0	Native	☐	4	7.00
Taraxacum officinale	Common dandelion	FACU	4		Native & Introduced	☑	1	0.17

Sampling Effort: **2012 Spring**

Scientific Name	Common Name	Wetland Indicator Status[1]	Ecological Index[2]	C-Value	Native Status	Invasive?	Frequency[3]	Average Percent Cover[4]
Abutilon theophrasti	Velvetleaf	UPL	5		Introduced	☑	1	0.17
Agalinis tenuifolia	Slenderleaf false foxglove	FACW	2	5	Native	☐	1	0.17
Agrostis stolonifera	Creeping bentgrass	FAC+	3		Introduced	☑	1	1.00
Amaranthus retroflexus	Redroot amaranth	FACU	4		Native	☑	1	1.00
Ambrosia artemisiifolia	Annual ragweed	FACU	4	0	Native	☑	4	4.67

1 = OBL - obligate; FACW - facultative wet; FAC - facultative; FACU - facultative upland; UPL - upland; NI - no indicator

2 = Ecological Index values correspond to the wetland indicator status for each species

3 = Frequency is the total number of plots in which the species was identified

4 = Average percent cover is calcuated from the coverages estimated during this monitoring effort.

Table 2 Species List and Vegetative Characteristics for WM-1

Report generated:
Friday, November 16, 2012

Andropogon gerardii	Big bluestem	FAC-	3	5	Native	☐	6	9.00
Anemone canadensis	Canadian anemone	FACW	2	4	Native	☐	5	7.70
Bromus arvensis	Field brome	NL	3		Introduced	☐	11	22.67
Calamagrostis canadensis	Bluejoint	OBL	1	6	Native	☐	6	12.17
Carex cristatella	Crested sedge	FACW	2	5	Native	☐	3	6.00
Carex lupulina	Hop sedge	FACW+	2	8	Native	☐	1	1.00
Carex praegracilis	Clustered field sedge	FACW	2	4	Native	☐	1	1.00
Carex vulpinoidea	Fox sedge	OBL	1	4	Native	☐	2	6.67
Cornus drummondii	Roughleaf dogwood	FAC	3	3	Native	☐	5	4.17
Cyperus esculentus	Yellow nutsedge	FACW	2	0	Native & Introduced	☑	8	12.50
Desmanthus illinoensis	Illinois bundleflower	FACU	4	5	Native	☐	9	14.33
Eleocharis erythropoda	Bald spikerush	OBL	1	5	Native	☐	3	3.67
Eleocharis sp.	Spikerush	--	3		--	☐	3	4.50
Elymus virginicus	Virginia wildrye	FAC	3	4	Native	☐	2	3.50
Eryngium yuccifolium var. yu	Rattlesnakemaster	NI	3	3	Native	☐	1	2.50
Hordeum jubatum	Foxtail barley	FACW	2	1	Native	☑	7	10.00
Lycopus americanus	American water horehound	OBL	1	4	Native	☑	3	1.33
Medicago lupulina	Black medick	FAC	3		Introduced	☑	3	9.17
Melilotus officinalis	Yellow sweetclover	FACU	4		Introduced	☑	1	1.00
Muhlenbergia racemosa	Marsh muhly	FACW	2	4	Native	☑	1	1.00
Phyla lanceolata	Lanceleaf fogfruit	OBL	1	3	Native	☐	12	14.17

1 = OBL - obligate; FACW - facultative wet; FAC - facultative; FACU - facultative upland; UPL - upland; NI - no indicator

2 = Ecological Index values correspond to the wetland indicator status for each species

3 = Frequency is the total number of plots in which the species was identified

4 = Average percent cover is calcuated from the coverages estimated during this monitoring effort.

Table 2 Species List and Vegetative Characteristics for WM-1

Report generated:
Friday, November 16, 2012

Poa pratensis	Kentucky bluegrass	FACU	4		Native & Introduced	☑	4	8.50
Schoenoplectus pungens	Common threesquare	OBL	1	4	Native	☐	2	2.00
Setaria pumila ssp. pumila	Yellow foxtail	FAC	3		Introduced	☑	1	1.00
Solidago canadensis	Canada goldenrod	FACU	4	2	Native	☐	14	43.50
Solidago gigantea	Giant goldenrod	FACW	2	3	Native	☐	6	13.50
Spartina pectinata	Prairie cordgrass	FACW	2	5	Native	☐	6	18.33
Symphyotrichum lanceolatum	White panicle aster	NI	3	2	Native	☐	2	2.00
Symphyotrichum pilosum	Hairy white oldfield aster	FACU	4	0	Native	☐	3	5.17
Taraxacum officinale	Common dandelion	FACU	4		Native & Introduced	☑	4	4.00
Xanthium strumarium	Rough cocklebur	FAC	3	1	Native	☑	2	3.50

1 = OBL - obligate; FACW - facultative wet; FAC - facultative; FACU - facultative upland; UPL - upland; NI - no indicator

2 = Ecological Index values correspond to the wetland indicator status for each species

3 = Frequency is the total number of plots in which the species was identified

4 = Average percent cover is calcuated from the coverages estimated during this monitoring effort.

SECTION A-3

MITIGATION SITE WM-1 GROUND PHOTOGRAPHS

Photo 1: View east of Transect 1 at WM-1 (June 2012).

Photo 2: View north of Gradsect 3 on Transect 1 at WM-1 (June 2012).

Photo 3: View north of Gradsect 2 on Transect 1 at WM-1 (June 2012).

Photo 4: View east of Transect 2 at WM-1 (June 2012).

Photo 5: View north of Gradsect 1 on Transect 2 at WM-1 (June 2012).

Photo 6: View north of Gradsect 2 on Transect 2 at WM-1 (June 2012).

Photo 7: View west of Transect 3 at WM-1 (June 2012).

Photo 8: View north of Gradsect 1 on Transect 3 at WM-1 (June 2012).

Photo 9: View north of Gradsect 2 on Transect 3 at WM-1 (June 2012).

Photo 10: View east of Transect 1 at WM-1 (September 2012).

Photo 11: View north of Gradsect 3 on Transect 1 at WM-1 (September 2012).

Photo 12: View north of Gradsect 2 on Transect 1 at WM-1 (September 2012).

Photo 13: View east of Transect 2 at WM-1 (September 2012).

Photo 14: View north of Gradsect 1 on Transect 2 at WM-1 (September 2012).

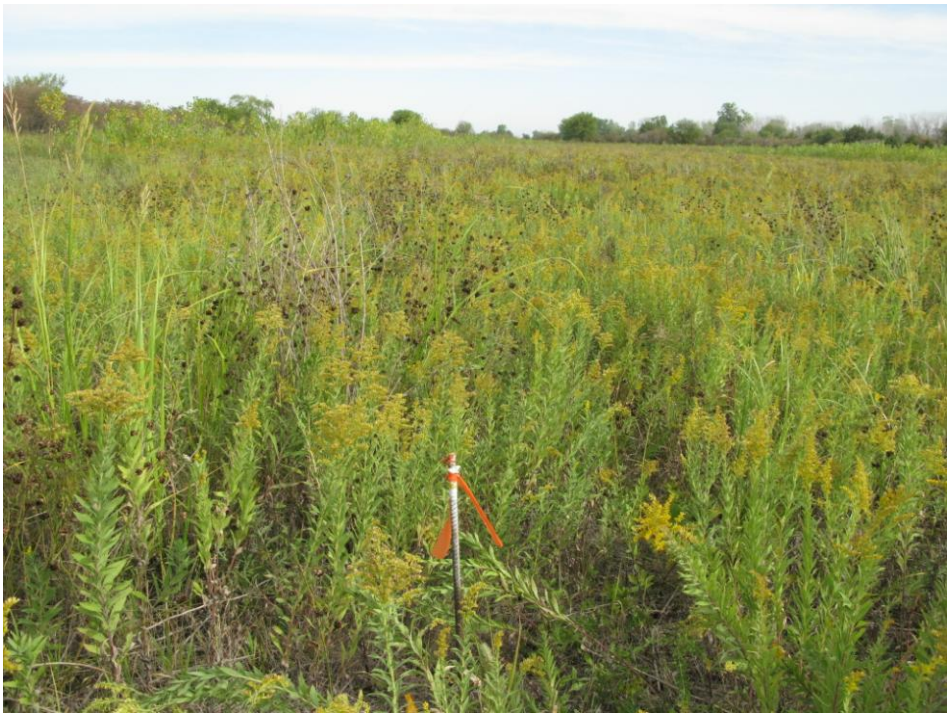


Photo 15: View north of Gradsect 2 on Transect 2 at WM-1 (September 2012).

Photo 16: View west of Transect 3 at WM-1 (September 2012).

Photo 17: View north of Gradsect 1 on Transect 3 at WM-1 (September 2012).

Photo 18: View north of Gradsect 2 on Transect 3 at WM-1 (September 2012).

SECTION A-4

WETLAND VEGETATION COVER AND WATER DEPTH RAW DATA SHEETS

Wetland Vegetation Cover and Water Depth at WM-1

Wetland Name: **WM-1**

Wetland Transect/Gradsect #: WM1-1-2

Sampling Date: 6/26/2012 **Last Rain Date:** 6/20/2012 **Last Rain Amount (in):** 0.62

Canopy Coverage Analysis	**Plot 1**	**Plot 2**	**Plot 3**	**Plot 4**	**Plot 5**
Depth of Standing Water (in):					
Open Water (in):					
Bare Soil (in):	6	6	6	6	6
Abutilon theophrasti	2				
Agalinis tenuifolia					2
Agrostis stolonifera		3			
Amaranthus retroflexus				3	
Ambrosia artemisiifolia		2			
Andropogon gerardii				4	
Anemone canadensis		1	4		4
Bromus arvensis	2			3	4
Calamagrostis canadensis	4	3			
Carex cristatella		3	4		4
Carex lupulina	3				
Carex praegracilis					3
Carex vulpinoidea	4				
Cornus drummondii			3	2	
Cyperus esculentus	3	4	3		4
Desmanthus illinoensis	5	4			
Eleocharis erythropoda				4	
Eryngium yuccifolium var. yu	4				
Hordeum jubatum	4	3		4	
Lycopus americanus	2		2	3	
Phyla lanceolata	3	3	4	2	3
Poa pratensis		4	4	3	
Schoenoplectus pungens		3			
Setaria pumila ssp. pumila				3	
Solidago canadensis	4	5	5		5
Solidago gigantea	4	4			
Spartina pectinata			5		
Symphyotrichum pilosum		2	4		4
Taraxacum officinale					3
Xanthium strumarium				4	

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

Wetland Vegetation Cover and Water Depth at WM-1

Wetland Name: **WM-1**

Wetland Transect/Gradsect #: WM1-1-3

Sampling Date: 6/26/2012 **Last Rain Date:** 6/20/2012 **Last Rain Amount (in):** 0.62

Canopy Coverage Analysis	**Plot 1**	**Plot 2**	**Plot 3**	**Plot 4**	**Plot 5**
Depth of Standing Water (in):					
Open Water (in):					
Bare Soil (in):	6	6	6	6	6
Andropogon gerardii	4	3	4	3	4
Bromus arvensis				3	
Cornus drummondii	3				2
Desmanthus illinoensis	3	4	4		3
Helianthus grosseserratus	5	3	3	4	4
Helianthus maximiliani	3	5	4		
Melilotus officinalis		2			
Panicum virgatum		4	4		
Poa pratensis			4	3	3
Pycnanthemum virginianum		3			
Solidago canadensis	4		5	3	4
Solidago gigantea					3
Spartina pectinata	5	5	6	7	6
Verbena hastata	2				

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

Wetland Vegetation Cover and Water Depth at WM-1

Wetland Name: **WM-1**

Wetland Transect/Gradsect #: WM1-2-1

Sampling Date: 6/26/2012 **Last Rain Date:** 6/20/2012 **Last Rain Amount (in):** 0.62

Canopy Coverage Analysis	**Plot 1**	**Plot 2**	**Plot 3**	**Plot 4**	**Plot 5**
Depth of Standing Water (in):					
Open Water (in):					
Bare Soil (in):	6	6	6	5	6
Andropogon gerardii			5	5	
Carex vulpinoidea				4	3
Cornus drummondii				3	3
Desmanthus illinoensis	6	5	5	5	6
Eleocharis sp.				3	
Panicum virgatum		3	4	6	4
Phyla lanceolata			3		
Schoenoplectus pungens				3	
Solidago canadensis					3
Solidago gigantea	3	3	4	4	4
Spartina pectinata	6	6	5	4	5
Symphyotrichum pilosum		3			

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

Wetland Vegetation Cover and Water Depth at WM-1

Wetland Name: **WM-1**

Wetland Transect/Gradsect #: WM1-2-2

Sampling Date: 6/26/2012 **Last Rain Date:** 6/20/2012 **Last Rain Amount (in):** 0.62

Canopy Coverage Analysis	**Plot 1**	**Plot 2**	**Plot 3**	**Plot 4**	**Plot 5**
Depth of Standing Water (in):					
Open Water (in):					
Bare Soil (in):	6	7	6	6	7
Andropogon gerardii		3		3	3
Anemone canadensis	4				
Bromus arvensis	3	4			5
Cyperus esculentus	4			3	
Desmanthus illinoensis	2	3	3	4	3
Eleocharis sp.		4	3	3	
Elymus virginicus	3		4		
Hordeum jubatum	3	3	3	3	
Phyla lanceolata	3			3	4
Poa pratensis		4			
Solidago canadensis	4	4	4	3	4
Solidago gigantea	3	4	4	4	
Spartina pectinata	4		4		
Symphyotrichum lanceolatum			3		
Taraxacum officinale		3			

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

Wetland Vegetation Cover and Water Depth at WM-1

Wetland Name: **WM-1**

Wetland Transect/Gradsect #: WM1-3-1

Sampling Date: 6/26/2012 **Last Rain Date:** 6/20/2012 **Last Rain Amount (in):** 0.62

Canopy Coverage Analysis	**Plot 1**	**Plot 2**	**Plot 3**	**Plot 4**	**Plot 5**
Depth of Standing Water (in):					
Open Water (in):					
Bare Soil (in):	6	6	6	6	6
Amaranthus retroflexus	2				2
Andropogon gerardii					6
Apocynum cannabinum	3				1
Boehmeria cylindrica	3				
Bromus arvensis	4				
Carex vulpinoidea	4	5	4	6	
Conyza canadensis			2		
Cornus drummondii		3			
Desmanthus illinoensis	3	5	4	5	4
Helenium autumnale		3			
Helianthus grosseserratus				3	
Helianthus maximiliani				3	3
Hordeum jubatum			3		
Medicago lupulina	2		3		
Melilotus officinalis			3	5	3
Panicum virgatum	5	5	6	4	4
Phalaris arundinacea			3		
Phyla lanceolata	3	3	3		
Populus deltoides	5	3	3		3
Rudbeckia hirta					1
Salix amygdaloides		3			
Solidago canadensis	4	3			3
Spartina pectinata		5	3	4	
Symphyotrichum lanceolatum		4			3
Symphyotrichum pilosum	2				
Taraxacum officinale		3			
Toxicodendron radicans	2				

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

Wetland Vegetation Cover and Water Depth at WM-1

Wetland Name: **WM-1**

Wetland Transect/Gradsect #: WM1-3-2

Sampling Date: 6/26/2012 **Last Rain Date:** 6/20/2012 **Last Rain Amount (in):** 0.62

Canopy Coverage Analysis	**Plot 1**	**Plot 2**	**Plot 3**	**Plot 4**	**Plot 5**
Depth of Standing Water (in):					
Open Water (in):					
Bare Soil (in):	6	6	7	6	6
Ambrosia artemisiifolia	3	3	4		
Andropogon gerardii	4	3			
Anemone canadensis			2		
Bromus arvensis	5	5	3	3	3
Calamagrostis canadensis	3	4	3	5	
Carex vulpinoidea					5
Cornus drummondii	3	3			3
Cyperus esculentus		3		3	
Desmanthus illinoensis		3			3
Eleocharis erythropoda			2	3	
Medicago lupulina			3	4	6
Melilotus officinalis				3	
Muhlenbergia racemosa				3	
Phyla lanceolata	3	3		3	3
Schoenoplectus pungens			3		
Solidago canadensis	5	3	4	6	5
Spartina pectinata	6			4	3
Symphyotrichum lanceolatum		3			
Taraxacum officinale				3	3
Xanthium strumarium	3				

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

Wetland Vegetation Cover and Water Depth at WM-1

Wetland Name: **WM-1**

Wetland Transect/Gradsect #: WM1-1-2

Sampling Date: 9/19/2012 **Last Rain Date:** 9/17/2012 **Last Rain Amount (in):** 0.19

Canopy Coverage Analysis	**Plot 1**	**Plot 2**	**Plot 3**	**Plot 4**	**Plot 5**
Depth of Standing Water (in):					
Open Water (in):					
Bare Soil (in):	6	6	6	6	6
Amaranthus retroflexus				3	
Ambrosia artemisiifolia		2			
Anemone canadensis		2			
Carex cristatella	3	4	3		4
Carex lupulina	3				
Carex vulpinoidea	4		4		3
Cornus drummondii			4	3	
Cyperus esculentus					3
Desmanthus illinoensis	4	3			
Helianthus annuus				4	
Lycopus americanus				3	
Panicum virgatum					3
Phyla lanceolata	4	3	3	2	4
Physalis heterophylla	2				
Poa pratensis	4	4	4		
Setaria pumila ssp. pumila	4			4	
Solidago canadensis	3	5	6		5
Solidago gigantea	3	3			
Spartina pectinata		4	4		3
Symphyotrichum pilosum		3	4		4
Taraxacum officinale					2

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

Wetland Vegetation Cover and Water Depth at WM-1

Wetland Name: **WM-1**

Wetland Transect/Gradsect #: WM1-1-3

Sampling Date: 9/19/2012 **Last Rain Date:** 9/17/2012 **Last Rain Amount (in):** 0.19

Canopy Coverage Analysis	**Plot 1**	**Plot 2**	**Plot 3**	**Plot 4**	**Plot 5**
Depth of Standing Water (in):					
Open Water (in):					
Bare Soil (in):	6	5	6	6	6
Andropogon gerardii	6	6	4	5	5
Cornus drummondii	2				2
Desmanthus illinoensis	3	3	2		
Helianthus grosseserratus	4	4	3		3
Helianthus maximiliani		4	3	3	3
Melilotus officinalis	3				
Panicum virgatum		4		4	4
Poa pratensis			3	4	
Pycnanthemum virginianum		3			
Solidago canadensis	4	3	5	3	4
Solidago gigantea					3
Spartina pectinata	4	5	5	4	4
Ulmus americana			2	2	2

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

Wetland Vegetation Cover and Water Depth at WM-1

Wetland Name: **WM-1**

Wetland Transect/Gradsect #: WM1-2-1

Sampling Date: 9/19/2012 **Last Rain Date:** 9/17/2012 **Last Rain Amount (in):** 0.19

Canopy Coverage Analysis	**Plot 1**	**Plot 2**	**Plot 3**	**Plot 4**	**Plot 5**
Depth of Standing Water (in):					
Open Water (in):					
Bare Soil (in):	6	5	6	6	6
Andropogon gerardii	5	6			
Cornus drummondii				2	
Desmanthus illinoensis	3	3	4	3	2
Panicum virgatum	5	4	6	6	4
Phyla lanceolata	2		2		
Poa pratensis				4	
Solidago canadensis				3	
Solidago gigantea	3	3	4	4	4
Spartina pectinata	3	3	5	5	5
Symphyotrichum pilosum	2	3			

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

Wetland Vegetation Cover and Water Depth at WM-1

Wetland Name: **WM-1**

Wetland Transect/Gradsect #: WM1-2-2

Sampling Date: 9/19/2012 **Last Rain Date:** 9/17/2012 **Last Rain Amount (in):** 0.19

Canopy Coverage Analysis	**Plot 1**	**Plot 2**	**Plot 3**	**Plot 4**	**Plot 5**
Depth of Standing Water (in):					
Open Water (in):					
Bare Soil (in):	6	6	6	6	6
Anemone canadensis	5				
Carex sp. 1	4			3	
Desmanthus illinoensis		3	4	3	3
Eleocharis erythropoda			3		3
Muhlenbergia asperifolia	4		3	5	
Phyla lanceolata	3			4	4
Poa pratensis		4	3	3	3
Setaria faberi					3
Setaria pumila ssp. pumila	3	3	3	4	3
Solidago canadensis	6	6	6	4	5
Solidago gigantea		3	3	3	
Spartina pectinata			4		
Symphyotrichum lanceolatum			3		

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

Wetland Vegetation Cover and Water Depth at WM-1

Wetland Name: **WM-1**

Wetland Transect/Gradsect #: WM1-3-1

Sampling Date: 9/19/2012 **Last Rain Date:** 9/17/2012 **Last Rain Amount (in):** 0.19

Canopy Coverage Analysis	**Plot 1**	**Plot 2**	**Plot 3**	**Plot 4**	**Plot 5**
Depth of Standing Water (in):					
Open Water (in):					
Bare Soil (in):	6	6	6	6	6
Agalinis tenuifolia					3
Andropogon gerardii		3	3	6	5
Carex vulpinoidea	5	4			
Cornus drummondii		3			
Desmanthus illinoensis	3	5	4	4	3
Helianthus grosseserratus				3	
Helianthus maximiliani				3	3
Melilotus officinalis			5	5	4
Panicum virgatum	6	5	6	4	5
Phyla lanceolata	3	3	2	2	
Populus deltoides	6	3	3		3
Salix amygdaloides		3			
Solidago canadensis	4	3	2		3
Spartina pectinata	4	4			
Symphyotrichum lanceolatum		3			
Symphyotrichum pilosum	3				
Taraxacum officinale		2			

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

Wetland Vegetation Cover and Water Depth at WM-1

Wetland Name: **WM-1**

Wetland Transect/Gradsect #: WM1-3-2

Sampling Date: 9/19/2012 **Last Rain Date:** 9/17/2012 **Last Rain Amount (in):** 0.19

Canopy Coverage Analysis	**Plot 1**	**Plot 2**	**Plot 3**	**Plot 4**	**Plot 5**
Depth of Standing Water (in):					
Open Water (in):					
Bare Soil (in):	6	6	7	6	6
Agalinis tenuifolia	3	3		3	
Ambrosia artemisiifolia	3	4	4		
Anemone canadensis			2		
Carex sp. 1				3	
Carex vulpinoidea					5
Cornus drummondii		3			3
Desmanthus illinoensis		3	3		3
Helianthus annuus	3				
Melilotus officinalis			3	4	
Muhlenbergia racemosa			3	5	
Phyla lanceolata	3	3		3	3
Poa pratensis					3
Polygonum pensylvanicum	2				
Setaria pumila ssp. pumila	4	3			
Solidago canadensis	5	4	4	6	6
Spartina pectinata	5			3	3
Symphyotrichum lanceolatum		3			
Symphyotrichum pilosum			3		

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

SECTION A-5

WETLAND DETERMINATION DATA FORMS

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Platte West Water Production Facility City/County: Saunders County Sampling Date: 9/19/2012

Applicant/Owner: Metropolitan Utilities District State: NE Sampling Point: SP-1

Investigator(s): Soard, Bailey Section, Township, Range: S18, T14N, R10E

Landform (hillslope, terrace, etc.) depression Local relief (concave, convex, none): concave Slope (%): 1 %

Subregion (LRR): M Lat: 41.186151 Long: -96.33693 Datum: NAD 83

Soil Map Unit Name: Obert silty clay loam, frequently fooded NWI Classification: PEMA (WM-1)

Are climate/hydrologic conditions on the site typical for this time of year? ☐ Yes ☒ No (If no, explain in Remarks)

	Vegetation	Soil	Hydrology
Significantly Disturbed?	☐	☐	☐
Naturally Problematic?	☐	☐	☐

Are "Normal Circumstances" present? ☒ Yes ☐ No

(If needed, explain any answers in Remarks)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	☒	☐
Hydric Soil Present?	☒	☐
Wetland Hydrology Present?	☒	☐
Is the Sampled Area within a Wetland?	☒	☐

Remarks: This region was assigned a Palmer Drought Index rating of between -3.00 and -3.99 (Severe Drought) during the sampling period; therefore, vegetation, soils, and hydrology have been evaluated accordingly.

VEGETATION – Use scientific names of plants

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.	%		
2.	%		
3.	%		
4.	%		
5.	%		
	0 %	= Total Cover	
Sapling/Shrub Stratum (Plot size: ____)			
1.	%		
2.	%		
3.	%		
4.	%		
5.	%		
	0 %	= Total Cover	
Herb Stratum (Plot size: 5')			
1. *Carex cristatella*	15 %	N	FACW
2. *Carex vulpinoidea*	40 %	Y	OBL
3. *Cornus drummondii*	40 %	Y	FAC
4. *Phyla lanceolata*	15 %	N	OBL
5. *Poa pratensis*	40 %	Y	FACU
6. *Solidago canadensis*	85 %	Y	FACU
7. *Spartina pectinata*	40 %	Y	FACW
8. *Symphyotrichym pilosum*	40 %	Y	FACU
9.	%		
10.	%		
	315 %	= Total Cover	
Woody Vine Stratum (Plot size: ____)			
1.	%		
2.	%		
	0 %	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species that are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	55 %	x 1 =	55
FACW species	55 %	x 2 =	110
FAC species	55 %	x 3 =	165
FACU species	165 %	x 4 =	660
UPL species	%	x 5 =	0
Column Totals:	330 %	(A)	990 (B)

Prevalence Index = B/A = 3

Hydrophytic Vegetation Indicators:

☐ Rapid Test for Hydrophytic Vegetation

☐ Dominance Test is >50%

☒ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

☒ Problematic Hydrophytic Vegetation[1] (explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? ☒ Yes ☐ No

Remarks (Include photo numbers here or on a separate sheet): The vegetation at the site was visually impacted by the severe drought conditions. Some species typically observed such as Panicum virgatum and Hordeum jubatum (both FACW) were not recorded during monitoring because no live growth was apparent.

SOIL

Sampling Point: SP-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]		
0-18	10YR 4/1	75	10YR 6/1	20	D	M	silty clay soam	
			10YR 2/2	5	C	M		
18-24	10YR 7/1	62	10YR 4/1	30	D	M	clay loam	
			10YR 5/8	8	C	M		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF 12)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____ Depth (inches): _____

Hydric Soil Present?

☒ Yes ☐ No

Remarks:Hydric soil indicator F3 is present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☒ Geomorphic Position (D2)
- ☒ FAC-Neutral Test (D5)

Field Observations:

	Yes	No	Depth (inches)
Surface Water present?	☐	☒	
Water Table present?	☐	☒	
Saturation Present? (includes capillary fringe)	☐	☒	
Wetland Hydrology Present?	☒	☐	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections, etc.), if available:

Remarks: Wetland hydrology indicators D2 and D5 are present.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Platte West Water Production Facility City/County: Saunders County Sampling Date: 9/19/2012

Applicant/Owner: Metropolitan Utilities District State: NE Sampling Point: SP-2

Investigator(s): Soard, Bailey Section, Township, Range: S18, T14N, R10E

Landform (hillslope, terrace, etc.) depression Local relief (concave, convex, none): concave Slope (%): 1 %

Subregion (LRR): M Lat: 41.184629 Long: -96.337277 Datum: NAD 83

Soil Map Unit Name: Obert silty clay loam, frequently fooded NWI Classification: PEMA (WM-1)

Are climate/hydrologic conditions on the site typical for this time of year? ☐ Yes ☒ No (If no, explain in Remarks)

	Vegetation	Soil	Hydrology
Significantly Disturbed?	☐	☐	☐
Naturally Problematic?	☐	☐	☐

Are "Normal Circumstances" present? ☒ Yes ☐ No

(If needed, explain any answers in Remarks)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	☒	☐
Hydric Soil Present?	☒	☐
Wetland Hydrology Present?	☒	☐
Is the Sampled Area within a Wetland?	☒	☐

Remarks: This region was assigned a Palmer Drought Index rating of between -3.00 and -3.99 (Severe Drought) during the sampling period; therefore, vegetation, soils, and hydrology have been evaluated accordingly.

VEGETATION – Use scientific names of plants

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.	%		
2.	%		
3.	%		
4.	%		
5.	%		
	0 %	= Total Cover	
Sapling/Shrub Stratum (Plot size: ____)			
1.	%		
2.	%		
3.	%		
4.	%		
5.	%		
	0 %	= Total Cover	
Herb Stratum (Plot size: 5')			
1. *Desmanthus illinoensis*	40 %	Y	FACU
2. *Eleocharis erythropoda*	15 %	N	OBL
3. *Solidago canadensis*	85 %	Y	FACU
4. *Solidago gigantea*	15 %	N	FACW
5. *Spartina pectinata*	40 %	Y	FACW
6. *Symphyotrichym lanceolatum*	15 %	N	NI
7. *Setaria glauca*	15 %	N	FAC
8. *Muhlenbergia asperifolia*	15 %	N	FACW
9. *Poa pratensis*	15 %	N	FACU
10.	%		
	255 %	= Total Cover	
Woody Vine Stratum (Plot size: ____)			
1.	%		
2.	%		
	0 %	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species that are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 33% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	15 %	x 1 =	15
FACW species	70 %	x 2 =	140
FAC species	15 %	x 3 =	45
FACU species	140 %	x 4 =	560
UPL species	%	x 5 =	0
Column Totals:	240 %	(A)	760 (B)

Prevalence Index = B/A = 3.17

Hydrophytic Vegetation Indicators:

☐ Rapid Test for Hydrophytic Vegetation

☐ Dominance Test is >50%

☐ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

☒ Problematic Hydrophytic Vegetation[1] (explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? ☒ Yes ☐ No

Remarks (Include photo numbers here or on a separate sheet): The vegetation at the site was visually impacted by the severe drought conditions. Some species typically observed such as Panicum virgatum and Hordeum jubatum (both FACW) were not recorded during monitoring because no live growth was apparent

SOIL

Sampling Point: SP-2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]		
0-12	10YR 3/1	80	10YR 6/1	20	D	M	silty clay loam	
12-24	10YR 6/2	65	10YR 7/1	10	D	M	silty clay	
			10YR 4/3	25	C	M	silty clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☒ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF 12)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____ Depth (inches): _____

Hydric Soil Present?

☒ Yes ☐ No

Remarks:Hydric soil indicator F7 is present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☒ Geomorphic Position (D2)
- ☒ FAC-Neutral Test (D5)

Field Observations:

	Yes	No	Depth (inches)
Surface Water present?	☐	☒	
Water Table present?	☐	☒	
Saturation Present? (includes capillary fringe)	☐	☒	
Wetland Hydrology Present?	☒	☐	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections, etc.), if available:

Remarks: Wetland hydrology indicators D2 and D5 are present.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Platte West Water Production Facility City/County: Saunders County Sampling Date: 9/19/2012

Applicant/Owner: Metropolitan Utilities District State: NE Sampling Point: SP-3

Investigator(s): Soard, Bailey Section, Township, Range: S18, T14N, R10E

Landform (hillslope, terrace, etc.) depression Local relief (concave, convex, none): concave Slope (%): 1 %

Subregion (LRR): M Lat: 41.183746 Long: -96.33739 Datum: NAD 83

Soil Map Unit Name: Obert silty clay loam, frequently fooded NWI Classification: PEMA (WM-1)

Are climate/hydrologic conditions on the site typical for this time of year? ☐ Yes ☒ No (If no, explain in Remarks)

	Vegetation	Soil	Hydrology
Significantly Disturbed?	☐	☐	☐
Naturally Problematic?	☐	☐	☐

Are "Normal Circumstances" present? ☒ Yes ☐ No

(If needed, explain any answers in Remarks)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	☒	☐
Hydric Soil Present?	☒	☐
Wetland Hydrology Present?	☒	☐
Is the Sampled Area within a Wetland?	☒	☐

Remarks: This region was assigned a Palmer Drought Index rating of between -3.00 and -3.99 (Severe Drought) during the sampling period; therefore, vegetation, soils, and hydrology have been evaluated accordingly.

VEGETATION – Use scientific names of plants

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.	%		
2.	%		
3.	%		
4.	%		
5.	%		
	0 %	= Total Cover	
Sapling/Shrub Stratum (Plot size: ____)			
1.	%		
2.	%		
3.	%		
4.	%		
5.	%		
	0 %	= Total Cover	
Herb Stratum (Plot size: 5')			
1. *Ambrosia artemisiifolia*	40 %	Y	FACU
2. *Anemone canadensis*	3 %	N	FACW
3. *Desmanthus illinoensis*	15 %	N	FACU
4. *Melilotus officinalis*	15 %	N	FACU
5. *Muhlenbergia racemosa*	15 %	N	FACW
6. *Solidago canadensis*	40 %	Y	FACU
7. *Symphyotrichum pilosum*	15 %	N	FACU
8.	%		
9.	%		
10.	%		
	143 %	= Total Cover	
Woody Vine Stratum (Plot size: ____)			
1.	%		
2.	%		
	0 %	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species that are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	%	x 1 =	0
FACW species	18 %	x 2 =	36
FAC species	%	x 3 =	0
FACU species	125 %	x 4 =	500
UPL species	%	x 5 =	0
Column Totals:	143 % (A)		536 (B)

Prevalence Index = B/A = 3.75

Hydrophytic Vegetation Indicators:

☐ Rapid Test for Hydrophytic Vegetation

☐ Dominance Test is >50%

☐ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

☐ Problematic Hydrophytic Vegetation[1] (explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? ☒ Yes ☐ No

Remarks (Include photo numbers here or on a separate sheet): The vegetation at the site was visually impacted by the severe drought conditions. Some species typically observed such as Panicum virgatum, Hordeum jubatum, and Eleocharis erythropoda (all OBL or FACW) were not recorded during monitoring because no live growth was apparent

SOIL

Sampling Point: SP-3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]		
0-20	10YR 2/1	70	10YR 4/1	30	D	M	silty clay loam	
20-24	10YR 3/1	65	5YR 6/3	35	C	M	silty clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☒ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF 12)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____ Depth (inches): _____

Hydric Soil Present?

☒ Yes ☐ No

Remarks:Hydric soil indicator F7 is present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Surface Soil Cracks (B6)
- ☒ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☒ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:	Yes	No	Depth (inches)
Surface Water present?	☐	☒	
Water Table present?	☐	☒	
Saturation Present? (includes capillary fringe)	☐	☒	
Wetland Hydrology Present?	☒	☐	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections, etc.), if available:

Remarks: Wetland hydrology indicators B10 and D2 are present.

APPENDIX I - SECTION B

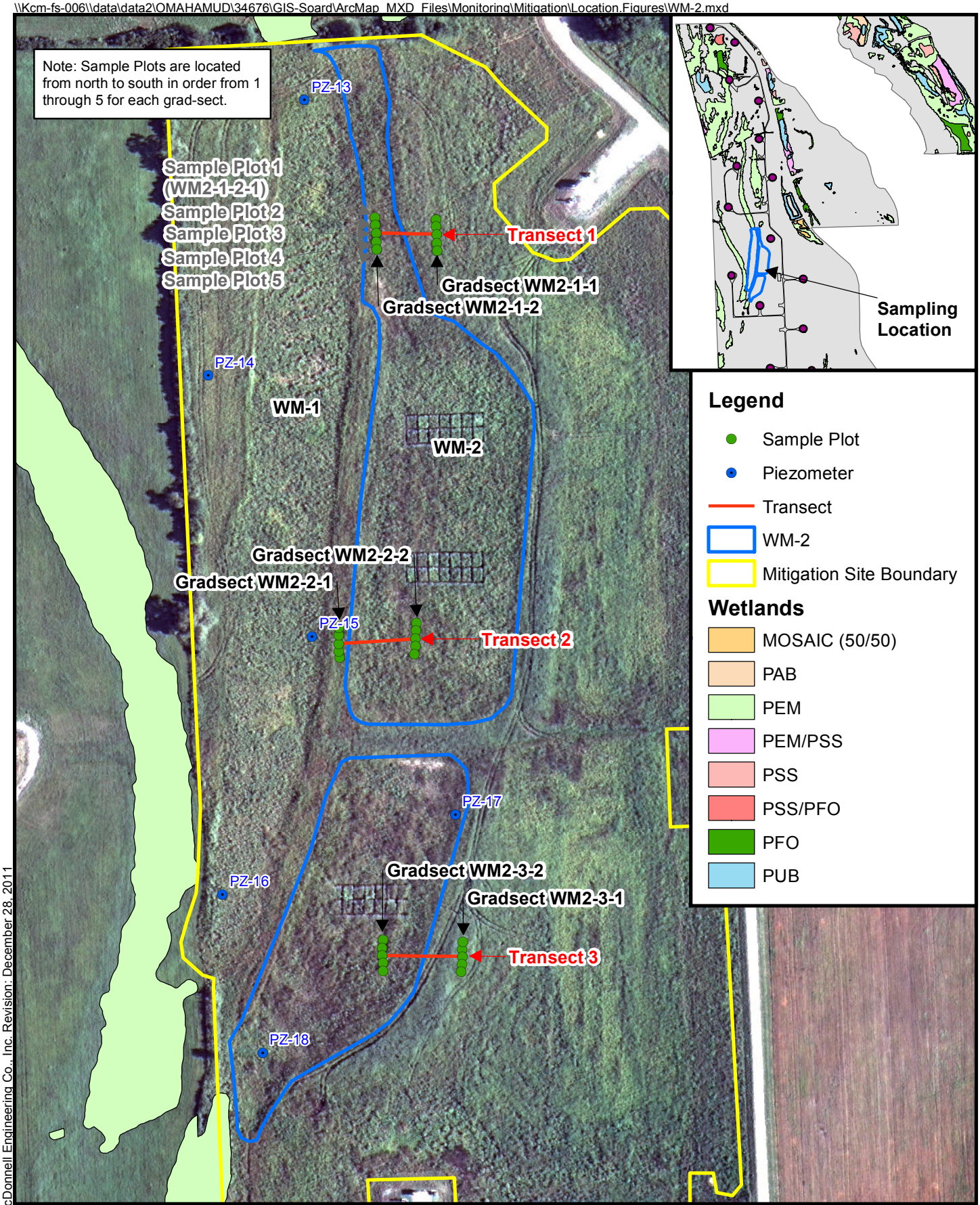
WET MEADOW EXPANSION MITIGATION SITE (WM-2) MONITORING DATA

TABLE OF CONTENTS

SECTION B-1

FIGURES

\\Kcm-fs-006\\data\data2\OMAHAMUD\34676\GIS-Soard\ArcMap_MXD_Files\Monitoring\Mitigation\Location.Figures\WM-2.mxd



0 75 150 225 300 Feet

N

Source: Western Air Maps 2011 Aerial Photography

Burns & McDonnell SINCE 1898

Figure 1
Location Map for
Wetland Mitigation 2
Saunders County Wellfield
Metropolitan Utilities District

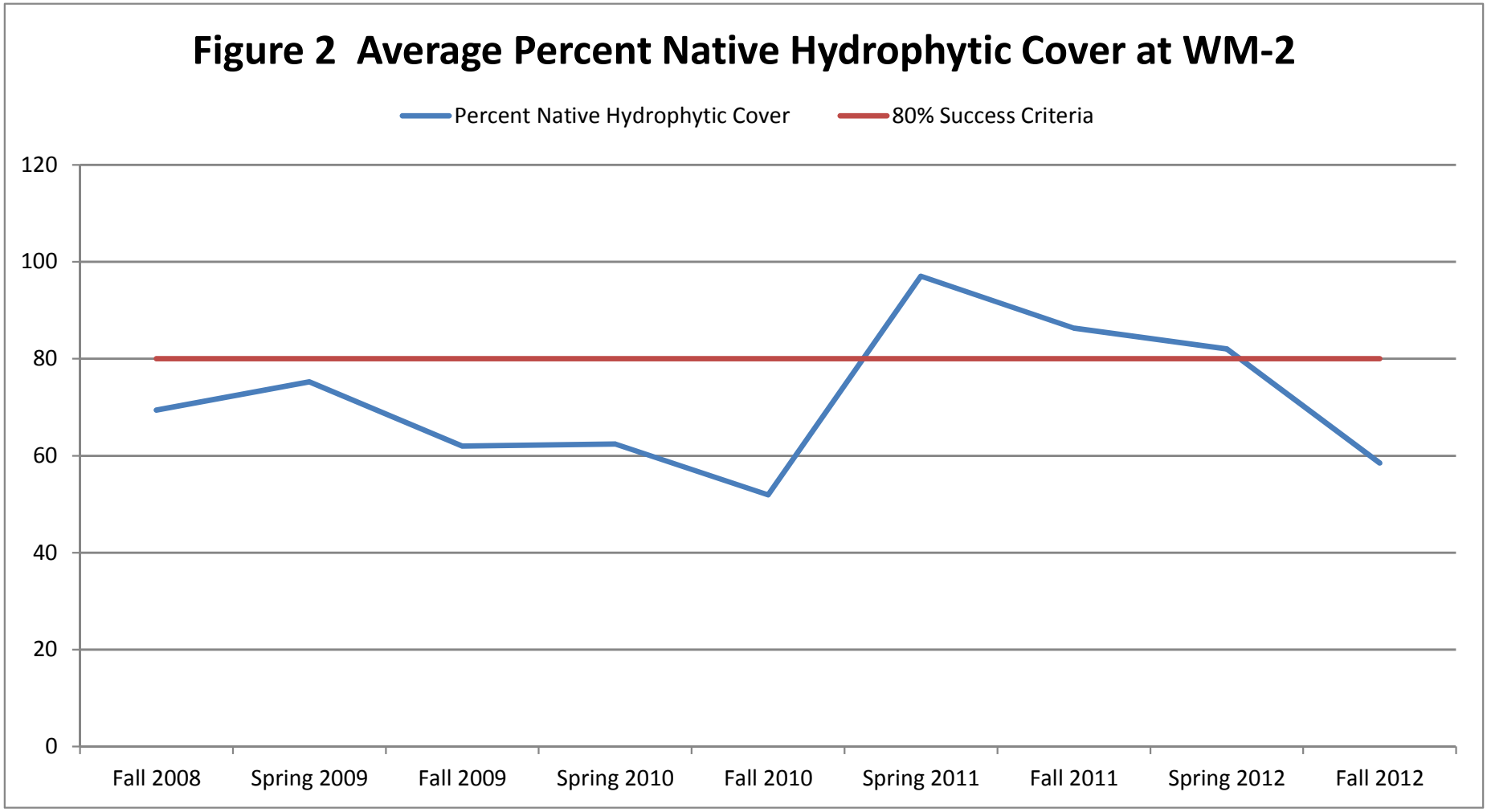


Figure 2 Average Percent Native Hydrophytic Cover at WM-2
Percent Native Hydrophytic Cover
80% Success Criteria
120
100
80
60
40
20
0
Fall 2008
Spring 2009
Fall 2009
Spring 2010
Fall 2010
Spring 2011
Fall 2011
Spring 2012
Fall 2012

SECTION B-2

TABLES

Table 1 Summary of Wetland Monitoring Data for WM-2

Wetland Name: **WM-2**
Wetland Type: **PEM**
County: **Saunders**

Number of Transects/Macroplots: **3**
Number of Gradsects: **6**
Number of Sample Plots: **30**
Number of Wetland Sample Plots: **15**

Sampling Effort: **2012 Fall**

Weighted Average: **3.55**
Species Richness: **22**
Species Diversity: **10.57**
FQI: **13.86**

Percent Native Species: **82**
Percent Invasive Species: **32**
Percent Perennial/Biennial/Annual Species: **82 / 5 / 18**
Mean C-Value: **3.27**

Dominant Species:

Scientific Name	Common Name	Wetland Indicator Status	Percent Cover per Wetland
Melilotus officinalis	Yellow sweetclover	FACU	35.33
Poa pratensis	Kentucky bluegrass	FACU	54.83
Solidago canadensis	Canada goldenrod	FACU	32.83
Spartina pectinata	Prairie cordgrass	FACW	21.67

Sampling Effort: **2012 Spring**

Weighted Average: **3.26**
Species Richness: **35**
Species Diversity: **19.18**
FQI: **15.69**

Percent Native Species: **80**
Percent Invasive Species: **31**
Percent Perennial/Biennial/Annual Species: **86 / 11 / 20**
Mean C-Value: **2.96**

Dominant Species:

Scientific Name	Common Name	Wetland Indicator Status	Percent Cover per Wetland
Melilotus officinalis	Yellow sweetclover	FACU	32.87
Poa pratensis	Kentucky bluegrass	FACU	62.83
Solidago canadensis	Canada goldenrod	FACU	21.67
Spartina pectinata	Prairie cordgrass	FACW	25.67

Table 2 Species List and Vegetative Characteristics for WM-2

Report generated:
Friday, November 16, 2012

Sampling Effort: **2012 Fall**

Scientific Name	Common Name	Wetland Indicator Status[1]	Ecological Index[2]	C-Value	Native Status	Invasive?	Frequency[3]	Average Percent Cover[4]
Agalinis tenuifolia	Slenderleaf false foxglove	FACW	2	5	Native	☐	1	2.50
Amaranthus retroflexus	Redroot amaranth	FACU	4		Native	☑	1	1.00
Cornus drummondii	Roughleaf dogwood	FAC	3	3	Native	☐	1	0.17
Desmanthus illinoensis	Illinois bundleflower	FACU	4	5	Native	☐	2	2.00
Dichanthelium acuminatum	Tapered rosette grass	FAC	3	6	Native	☐	1	1.00
Elymus virginicus	Virginia wildrye	FAC	3	4	Native	☐	1	1.00
Fraxinus pennsylvanica	Green ash	FACW	2	2	Native	☐	1	1.00
Helianthus annuus	Common sunflower	FACU	4	0	Native	☑	1	1.00
Melilotus officinalis	Yellow sweetclover	FACU	4		Introduced	☑	15	35.33
Muhlenbergia asperifolia	Scratchgrass	FACW	2	5	Native	☐	2	2.00
Panicum virgatum	Switchgrass	FAC	3	4	Native	☐	7	16.00
Physalis longifolia	Longleaf groundcherry	NL	3	0	Native	☐	3	3.00
Poa pratensis	Kentucky bluegrass	FACU	4		Native & Introduced	☑	14	54.83
Populus deltoides	Eastern cottonwood	FAC	3	3	Native	☐	7	13.17
Rumex crispus	Curly dock	FACW	2		Introduced	☑	1	0.17
Solidago canadensis	Canada goldenrod	FACU	4	2	Native	☐	14	32.83
Sorghastrum nutans	Indiangrass	FACU	4	5	Native	☐	1	1.00
Spartina pectinata	Prairie cordgrass	FACW	2	5	Native	☐	11	21.67

1 = OBL - obligate; FACW - facultative wet; FAC - facultative; FACU - facultative upland; UPL - upland; NI - no indicator

2 = Ecological Index values correspond to the wetland indicator status for each species

3 = Frequency is the total number of plots in which the species was identified

4 = Average percent cover is calcuated from the coverages estimated during this monitoring effort.

Table 2 Species List and Vegetative Characteristics for WM-2

Report generated:
Friday, November 16, 2012

Symphyotrichum pilosum	Hairy white oldfield aster	FACU	4	0	Native	☐	4	4.00
Taraxacum officinale	Common dandelion	FACU	4		Native & Introduced	☑	2	1.17
Trifolium repens	White clover	FACU	4		Introduced	☑	1	1.00
Unknown 1	Unknown seedling	--	3		--	☐	1	0.17

Sampling Effort: **2012 Spring**

Scientific Name	Common Name	Wetland Indicator Status[1]	Ecological Index[2]	C-Value	Native Status	Invasive?	Frequency[3]	Average Percent Cover[4]
Agalinis tenuifolia	Slenderleaf false foxglove	FACW	2	5	Native	☐	2	3.50
Agrostis gigantea	Redtop	NI	3	0	Introduced	☐	3	10.83
Ambrosia artemisiifolia	Annual ragweed	FACU	4	0	Native	☑	1	1.00
Andropogon gerardii	Big bluestem	FAC-	3	5	Native	☐	1	1.00
Anemone canadensis	Canadian anemone	FACW	2	4	Native	☐	9	17.33
Bromus arvensis	Field brome	NL	3		Introduced	☐	1	0.17
Calamagrostis canadensis	Bluejoint	OBL	1	6	Native	☐	3	6.00
Cirsium altissimum	Tall thistle	NL	3	1	Native	☑	1	2.50
Cornus drummondii	Roughleaf dogwood	FAC	3	3	Native	☐	3	0.50
Cyperus esculentus	Yellow nutsedge	FACW	2	0	Native & Introduced	☑	1	0.17
Desmanthus illinoensis	Illinois bundleflower	FACU	4	5	Native	☐	6	9.00
Dichanthelium acuminatum	Tapered rosette grass	FAC	3	6	Native	☐	1	1.00
Elymus canadensis	Canada wildrye	FACU	4	5	Native	☐	1	2.50

1 = OBL - obligate; FACW - facultative wet; FAC - facultative; FACU - facultative upland; UPL - upland; NI - no indicator

2 = Ecological Index values correspond to the wetland indicator status for each species

3 = Frequency is the total number of plots in which the species was identified

4 = Average percent cover is calcuated from the coverages estimated during this monitoring effort.

Table 2 Species List and Vegetative Characteristics for WM-2

Report generated:
Friday, November 16, 2012

Equisetum hyemale	Scouringrush horsetail	FACW	2	4	Native	☐	1	0.17
Erigeron strigosus	Prairie fleabane	FAC	3	2	Native	☑	1	1.00
Fraxinus pennsylvanica	Green ash	FACW	2	2	Native	☐	1	1.00
Helianthus grosseserratus	Sawtooth sunflower	FACW	2	4	Native	☑	1	0.17
Hordeum jubatum	Foxtail barley	FACW	2	1	Native	☑	1	1.00
Medicago lupulina	Black medick	FAC	3		Introduced	☑	6	11.33
Melilotus officinalis	Yellow sweetclover	FACU	4		Introduced	☑	13	32.87
Panicum virgatum	Switchgrass	FAC	3	4	Native	☐	4	8.50
Phyla lanceolata	Lanceleaf fogfruit	OBL	1	3	Native	☐	2	1.17
Physalis longifolia	Longleaf groundcherry	NL	3	0	Native	☐	2	2.00
Poa pratensis	Kentucky bluegrass	FACU	4		Native & Introduced	☑	13	62.83
Populus deltoides	Eastern cottonwood	FAC	3	3	Native	☐	8	7.17
Rudbeckia hirta	Blackeyed susan	FACU	4	4	Native	☐	1	1.00
Rumex sp.	Dock	--	3		--	☐	1	1.00
Solidago canadensis	Canada goldenrod	FACU	4	2	Native	☐	11	21.67
Solidago gigantea	Giant goldenrod	FACW	2	3	Native	☐	4	3.17
Spartina pectinata	Prairie cordgrass	FACW	2	5	Native	☐	12	25.67
Symphyotrichum lanceolatum	White panicle aster	NI	3	2	Native	☐	1	0.17
Symphyotrichum pilosum	Hairy white oldfield aster	FACU	4	0	Native	☐	4	4.00
Teucrium canadense	Canada germander	FACW	2	4	Native	☑	3	4.50
Trifolium repens	White clover	FACU	4		Introduced	☑	1	1.00

1 = OBL - obligate; FACW - facultative wet; FAC - facultative; FACU - facultative upland; UPL - upland; NI - no indicator

2 = Ecological Index values correspond to the wetland indicator status for each species

3 = Frequency is the total number of plots in which the species was identified

4 = Average percent cover is calcuated from the coverages estimated during this monitoring effort.

Table 2 Species List and Vegetative Characteristics for WM-2

Report generated:
Friday, November 16, 2012

Unknown 1	Unknown seedling	--	3	--	☐	1	1.00

1 = OBL - obligate; FACW - facultative wet; FAC - facultative; FACU - facultative upland; UPL - upland; NI - no indicator

2 = Ecological Index values correspond to the wetland indicator status for each species

3 = Frequency is the total number of plots in which the species was identified

4 = Average percent cover is calcuated from the coverages estimated during this monitoring effort.

SECTION B-3

MITIGATION SITE WM-2 GROUND PHOTOGRAPHS

Photo 1: View west of Transect 1 at WM-2 (June 2012).

Photo 2: View north of Gradsect 1 on Transect 1 at WM-2 (June 2012).

Photo 3: View north of Gradsect 2 on Transect 1 at WM-2 (June 2012).

Photo 4: View east of Transect 2 at WM-2 (June 2012).

Photo 5: View north of Gradsect 1 on Transect 2 at WM-2 (June 2012).

Photo 6: View north of Gradsect 2 on Transect 2 at WM-2 (June 2012).

Photo 7: View west of Transect 3 at WM-2 (June 2012).

Photo 8: View north of Gradsect 1 on Transect 3 at WM-2 (June 2012).

Photo 9: View north of Gradsect 2 on Transect 3 at WM-2 (June 2012).

Photo 10: View west of Transect 1 at WM-2 (September 2012).

Photo 11: View north of Gradsect 1 on Transect 1 at WM-2 (September 2012).

Photo 12: View north of Gradsect 2 on Transect 1 at WM-2 (September 2012).

Photo 13: View east of Transect 2 at WM-2 (September 2012).

Photo 14: View north of Gradsect 1 on Transect 2 at WM-2 (September 2012).

Photo 15: View north of Gradsect 2 on Transect 2 at WM-2 (September 2012).

Photo 16: View west of Transect 3 at WM-2 (September 2012).

Photo 17: View north of Gradsect 1 on Transect 3 at WM-2 (September 2012).

Photo 18: View north of Gradsect 2 on Transect 3 at WM-2 (September 2012).

SECTION B-4

WETLAND VEGETATION COVER AND WATER DEPTH RAW DATA SHEETS

Wetland Vegetation Cover and Water Depth at WM-2

Wetland Name: **WM-2**

Wetland Transect/Gradsect #: WM2-1-1

Sampling Date: 6/26/2012 **Last Rain Date:** 6/20/2012 **Last Rain Amount (in):** 0.62

Canopy Coverage Analysis	**Plot 1**	**Plot 2**	**Plot 3**	**Plot 4**	**Plot 5**
Depth of Standing Water (in):					
Open Water (in):					
Bare Soil (in):	6	6	6	6	6
Ambrosia artemisiifolia	2				
Andropogon gerardii	6	3	6	6	6
Dalea purpurea			3		
Desmanthus illinoensis	4	5	3	3	4
Elymus virginicus					3
Helianthus grosseserratus	4	6	4	5	3
Medicago lupulina	2		2		
Melilotus officinalis		2	2		2
Panicum virgatum	4	4	3	3	3
Poa pratensis			3		
Solidago gigantea				3	
Spartina pectinata	5	4	4	5	4

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

Wetland Vegetation Cover and Water Depth at WM-2

Wetland Name: **WM-2**

Wetland Transect/Gradsect #: WM2-1-2

Sampling Date: 6/26/2012 **Last Rain Date:** 6/20/2012 **Last Rain Amount (in):** 0.62

Canopy Coverage Analysis	**Plot 1**	**Plot 2**	**Plot 3**	**Plot 4**	**Plot 5**
Depth of Standing Water (in):					
Open Water (in):					
Bare Soil (in):	6	5	5	6	6
Agalinis tenuifolia				4	3
Agrostis gigantea	5	3	6		
Ambrosia artemisiifolia		3			
Andropogon gerardii	3				
Anemone canadensis	4			3	4
Calamagrostis canadensis		3	4		4
Cirsium altissimum			4		
Desmanthus illinoensis	3	4	3	4	3
Elymus canadensis				4	
Equisetum hyemale			2		
Erigeron strigosus			3		
Helianthus grosseserratus				2	
Hordeum jubatum			3		
Medicago lupulina	6				4
Melilotus officinalis	3	6	6	6	6
Panicum virgatum	3				4
Phyla lanceolata		3			
Poa pratensis		4	4	4	
Populus deltoides	3	3			
Rudbeckia hirta			3		
Rumex sp.	3				
Solidago canadensis	3	3	3	4	4
Solidago gigantea		2			
Spartina pectinata	3	3	4	3	3
Symphyotrichum pilosum		3	3		
Unknown 1			3		

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

Wetland Vegetation Cover and Water Depth at WM-2

Wetland Name: **WM-2**

Wetland Transect/Gradsect #: WM2-2-1

Sampling Date: 6/26/2012 **Last Rain Date:** 6/20/2012 **Last Rain Amount (in):** 0.62

Canopy Coverage Analysis	**Plot 1**	**Plot 2**	**Plot 3**	**Plot 4**	**Plot 5**
Depth of Standing Water (in):					
Open Water (in):					
Bare Soil (in):	6	6	6	6	6
Andropogon gerardii	5	4	4	6	5
Cornus drummondii		2			
Desmanthus illinoensis	4	4	4	4	4
Helianthus grosseserratus	3	3	3	3	3
Helianthus maximiliani					3
Melilotus officinalis	3	2	4	3	3
Panicum virgatum	4	4	5	4	4
Poa pratensis	4	5	4	4	5
Rudbeckia hirta				2	2
Solidago canadensis			2	2	
Symphyotrichum pilosum		3		3	

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

Wetland Vegetation Cover and Water Depth at WM-2

Wetland Name: **WM-2**

Wetland Transect/Gradsect #: WM2-2-2

Sampling Date: 6/26/2012 **Last Rain Date:** 6/20/2012 **Last Rain Amount (in):** 0.62

Canopy Coverage Analysis	**Plot 1**	**Plot 2**	**Plot 3**	**Plot 4**	**Plot 5**
Depth of Standing Water (in):					
Open Water (in):					
Bare Soil (in):	6	6	6	6	6
Anemone canadensis	3	4	5	4	2
Cornus drummondii		2			
Desmanthus illinoensis	3				
Medicago lupulina	3	2	3		3
Melilotus officinalis	4	3	3	3	4
Panicum virgatum	4				
Poa pratensis	5	5	6	6	6
Populus deltoides	2	3		3	
Solidago canadensis		3	3		
Solidago gigantea	3		3		3
Spartina pectinata	4	4	4	4	4
Symphyotrichum lanceolatum				2	
Symphyotrichum pilosum			3		
Teucrium canadense	3				4
Trifolium repens				3	

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

Wetland Vegetation Cover and Water Depth at WM-2

Wetland Name: **WM-2**

Wetland Transect/Gradsect #: WM2-3-1

Sampling Date: 6/26/2012 **Last Rain Date:** 6/20/2012 **Last Rain Amount (in):** 0.62

Canopy Coverage Analysis	**Plot 1**	**Plot 2**	**Plot 3**	**Plot 4**	**Plot 5**
Depth of Standing Water (in):					
Open Water (in):					
Bare Soil (in):	6	6	6	6	6
Andropogon gerardii		5	5	3	4
Desmanthus illinoensis			2		2
Helianthus grosseserratus	3	4	5	4	5
Helianthus maximiliani	5	5	3	5	4
Panicum virgatum	5	4	4	4	
Physalis heterophylla				4	
Poa pratensis			4	3	5
Rumex crispus	3				
Solidago canadensis			3		4
Solidago gigantea	3				
Spartina pectinata		3	4		
Taraxacum officinale	2				

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

Wetland Vegetation Cover and Water Depth at WM-2

Wetland Name: **WM-2**

Wetland Transect/Gradsect #: WM2-3-2

Sampling Date: 6/26/2012 **Last Rain Date:** 6/20/2012 **Last Rain Amount (in):** 0.62

Canopy Coverage Analysis	**Plot 1**	**Plot 2**	**Plot 3**	**Plot 4**	**Plot 5**
Depth of Standing Water (in):					
Open Water (in):					
Bare Soil (in):	6	6	6	5	5
Anemone canadensis			3		
Bromus arvensis					2
Cornus drummondii			2		2
Cyperus esculentus				2	
Dichanthelium acuminatum	3				
Fraxinus pennsylvanica					3
Melilotus officinalis	2		1		3
Panicum virgatum				4	
Phyla lanceolata	2				
Physalis longifolia			3	3	
Poa pratensis	7	6	7	6	6
Populus deltoides		3		3	3
Solidago canadensis		4	4	4	5
Spartina pectinata	5	4			
Symphyotrichum pilosum					3
Teucrium canadense		3			

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

Wetland Vegetation Cover and Water Depth at WM-2

Wetland Name: **WM-2**

Wetland Transect/Gradsect #: WM2-1-1

Sampling Date: 9/19/2012 **Last Rain Date:** 9/17/2012 **Last Rain Amount (in):** 0.19

Canopy Coverage Analysis	**Plot 1**	**Plot 2**	**Plot 3**	**Plot 4**	**Plot 5**
Depth of Standing Water (in):					
Open Water (in):					
Bare Soil (in):	6	6	6	6	6
Amaranthus retroflexus	2				
Desmanthus illinoensis	4	3	2	3	3
Helianthus grosseserratus		4	4	4	3
Helianthus maximiliani	3	3	3	3	
Melilotus officinalis	3	2	3	2	2
Panicum virgatum	6	6	6	6	6
Poa pratensis			3	4	4
Sorghastrum nutans		4			
Spartina pectinata	4	5	4	4	4

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

Wetland Vegetation Cover and Water Depth at WM-2

Wetland Name: **WM-2**

Wetland Transect/Gradsect #: WM2-1-2

Sampling Date: 9/19/2012 **Last Rain Date:** 9/17/2012 **Last Rain Amount (in):** 0.19

Canopy Coverage Analysis	**Plot 1**	**Plot 2**	**Plot 3**	**Plot 4**	**Plot 5**
Depth of Standing Water (in):					
Open Water (in):					
Bare Soil (in):	6	6	6	6	6
Agalinis tenuifolia				4	
Amaranthus retroflexus	3				
Desmanthus illinoensis	3				3
Elymus virginicus				3	
Helianthus annuus		3			
Melilotus officinalis	5	6	6	3	3
Muhlenbergia asperifolia	3		3		
Panicum virgatum	4	3	4	4	4
Poa pratensis	3	5	5	5	
Populus deltoides	3	3			
Solidago canadensis	3	3	5	5	4
Spartina pectinata	4	4	3		3
Symphyotrichum pilosum			3		3
Taraxacum officinale	3				
Trifolium repens	3				
Unknown 1			2		

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

Wetland Vegetation Cover and Water Depth at WM-2

Wetland Name: **WM-2**

Wetland Transect/Gradsect #: WM2-2-1

Sampling Date: 9/19/2012 **Last Rain Date:** 9/17/2012 **Last Rain Amount (in):** 0.19

Canopy Coverage Analysis	**Plot 1**	**Plot 2**	**Plot 3**	**Plot 4**	**Plot 5**
Depth of Standing Water (in):					
Open Water (in):					
Bare Soil (in):	5	5	5	5	5
Amaranthus retroflexus			2		
Andropogon gerardii	4	4	4	4	4
Desmanthus illinoensis	3	3	3	3	3
Helianthus grosseserratus	3	4	3	3	
Helianthus maximiliani				3	3
Melilotus officinalis	5	3	4	3	3
Panicum virgatum	4	4	5	5	5
Poa pratensis	4	4	5	4	4
Solidago canadensis		3	3	3	3
Solidago gigantea					3
Symphyotrichum pilosum		3		3	

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

Wetland Vegetation Cover and Water Depth at WM-2

Wetland Name: **WM-2**

Wetland Transect/Gradsect #: WM2-2-2

Sampling Date: 9/19/2012 **Last Rain Date:** 9/17/2012 **Last Rain Amount (in):** 0.19

Canopy Coverage Analysis	**Plot 1**	**Plot 2**	**Plot 3**	**Plot 4**	**Plot 5**
Depth of Standing Water (in):					
Open Water (in):					
Bare Soil (in):	6	6	6	6	6
Melilotus officinalis	5	5	3	3	4
Panicum virgatum	4				
Poa pratensis	5	5	4	5	6
Populus deltoides	3	4		3	
Rumex crispus		2			
Solidago canadensis	3	4	3	3	3
Sorghastrum nutans		3			
Spartina pectinata	3	3	4	4	3
Symphyotrichum pilosum			3		
Taraxacum officinale	2				

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

Wetland Vegetation Cover and Water Depth at WM-2

Wetland Name: **WM-2**

Wetland Transect/Gradsect #: WM2-3-1

Sampling Date: 9/19/2012 **Last Rain Date:** 9/17/2012 **Last Rain Amount (in):** 0.19

Canopy Coverage Analysis	**Plot 1**	**Plot 2**	**Plot 3**	**Plot 4**	**Plot 5**
Depth of Standing Water (in):					
Open Water (in):					
Bare Soil (in):	6	6	6	6	6
Andropogon gerardii	3	6	6	4	4
Helianthus grosseserratus	5	4	3	4	3
Helianthus maximiliani	3				
Panicum virgatum		3		3	3
Physalis heterophylla				4	
Poa pratensis					4
Solidago canadensis			3	3	5
Solidago gigantea	3				
Spartina pectinata		3	4		

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

Wetland Vegetation Cover and Water Depth at WM-2

Wetland Name: **WM-2**

Wetland Transect/Gradsect #: WM2-3-2

Sampling Date: 9/19/2012 **Last Rain Date:** 9/17/2012 **Last Rain Amount (in):** 0.19

Canopy Coverage Analysis	**Plot 1**	**Plot 2**	**Plot 3**	**Plot 4**	**Plot 5**
Depth of Standing Water (in):					
Open Water (in):					
Bare Soil (in):	6	6	6	5	6
Cornus drummondii			2		
Dichanthelium acuminatum	3				
Fraxinus pennsylvanica					3
Melilotus officinalis	3	3	3	3	3
Panicum virgatum				4	
Physalis longifolia		3	3	3	
Poa pratensis	4	5	6	5	5
Populus deltoides				5	4
Solidago canadensis		5	5	3	5
Spartina pectinata	5	4			
Symphyotrichum pilosum					3

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

SECTION B-5

WETLAND DETERMINATION DATA FORMS

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Platte West Water Production Facility City/County: Saunders County Sampling Date: 9/19/2012

Applicant/Owner: Metropolitan Utilities District State: NE Sampling Point: SP-4

Investigator(s): Soard, Bailey Section, Township, Range: S18, T14N, R10E

Landform (hillslope, terrace, etc.) depression Local relief (concave, convex, none): concave Slope (%): 1 %

Subregion (LRR): M Lat: 41.185908 Long: -96.336653 Datum: NAD 83

Soil Map Unit Name: Obert silty clay loam, frequently fooded NWI Classification: UPL (WM-2)

Are climate/hydrologic conditions on the site typical for this time of year? ☐ Yes ☒ No (If no, explain in Remarks)

	Vegetation	Soil	Hydrology
Significantly Disturbed?	☐	☐	☐
Naturally Problematic?	☐	☐	☐

Are "Normal Circumstances" present? ☒ Yes ☐ No

(If needed, explain any answers in Remarks)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	☐	☒
Hydric Soil Present?	☒	☐
Wetland Hydrology Present?	☐	☒
Is the Sampled Area within a Wetland?	☐	☒

Remarks: This region was assigned a Palmer Drought Index rating of between -3.00 and -3.99 (Severe Drought) during the sampling period; therefore, vegetation, soils, and hydrology have been evaluated accordingly.

VEGETATION – Use scientific names of plants

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.	%		
2.	%		
3.	%		
4.	%		
5.	%		
	0 %	= Total Cover	
Sapling/Shrub Stratum (Plot size: ____)			
1.	%		
2.	%		
3.	%		
4.	%		
5.	%		
	0 %	= Total Cover	
Herb Stratum (Plot size: 5')			
1. *Melilotus officinalis*	85 %	Y	FACU
2. *Panicum virgatum*	40 %	Y	FACW
3. *Poa pratensis*	63 %	Y	FACU
4. *Solidago canadensis*	63 %	Y	FACU
5. *Spartina pectinata*	15 %	N	FACW
6. *Symphyotrichum pilosum*	15 %	N	FACU
7. *Muhlenbergia asperifolia*	15 %	N	FACW
8.	%		
9.	%		
10.	%		
	296 %	= Total Cover	
Woody Vine Stratum (Plot size: ____)			
1.	%		
2.	%		
	0 %	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species that are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	%	x 1 =	0
FACW species	70 %	x 2 =	140
FAC species	%	x 3 =	0
FACU species	226 %	x 4 =	904
UPL species	%	x 5 =	0
Column Totals:	296 %	(A)	1044 (B)

Prevalence Index = B/A = 3.53

Hydrophytic Vegetation Indicators:

☐ Rapid Test for Hydrophytic Vegetation

☐ Dominance Test is >50%

☐ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

☐ Problematic Hydrophytic Vegetation[1] (explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? ☐ Yes ☒ No

Remarks (Include photo numbers here or on a separate sheet):

SOIL

Sampling Point: SP-4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]		
0-12	10YR 3/2	65	10YR 5/2	35	D	M	silty clay loam	
12-24	2.5Y 6/2	95	10YR 54	5	C	M	silty clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☒ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF 12)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____ Depth (inches): _____

Hydric Soil Present?

☒ Yes ☐ No

Remarks:Hydric soil indicator F7 is present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☒ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:	Yes	No	Depth (inches)
Surface Water present?	☐	☒	
Water Table present?	☐	☒	
Saturation Present? (includes capillary fringe)	☐	☒	
Wetland Hydrology Present?	☐	☒	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections, etc.), if available:

Remarks: Wetland hydrology indicator D2 is present.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Platte West Water Production Facility City/County: Saunders County Sampling Date: 9/19/2012

Applicant/Owner: Metropolitan Utilities District State: NE Sampling Point: SP-5

Investigator(s): Soard, Bailey Section, Township, Range: S18, T14N, R10E

Landform (hillslope, terrace, etc.) depression Local relief (concave, convex, none): concave Slope (%): 1 %

Subregion (LRR): M Lat: 41.184629 Long: -96.337277 Datum: NAD 83

Soil Map Unit Name: Wann fine sandy loam, occasionally fooded NWI Classification: UPL (WM-2)

Are climate/hydrologic conditions on the site typical for this time of year? ☐ Yes ☒ No (If no, explain in Remarks)

	Vegetation	Soil	Hydrology
Significantly Disturbed?	☐	☐	☐
Naturally Problematic?	☐	☐	☐

Are "Normal Circumstances" present? ☒ Yes ☐ No

(If needed, explain any answers in Remarks)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	☐	☒
Hydric Soil Present?	☒	☐
Wetland Hydrology Present?	☐	☒
Is the Sampled Area within a Wetland?	☐	☒

Remarks: This region was assigned a Palmer Drought Index rating of between -3.00 and -3.99 (Severe Drought) during the sampling period; therefore, vegetation, soils, and hydrology have been evaluated accordingly.

VEGETATION – Use scientific names of plants

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.	%		
2.	%		
3.	%		
4.	%		
5.	%		
	0 %	= Total Cover	
Sapling/Shrub Stratum (Plot size: ____)			
1.	%		
2.	%		
3.	%		
4.	%		
5.	%		
	0 %	= Total Cover	
Herb Stratum (Plot size: 5')			
1. *Melilotus officinalis*	15 %	N	FACU
2. *Poa pratensis*	40 %	Y	FACU
3. *Solidago canadensis*	15 %	N	FACU
4. *Spartina pectinata*	40 %	Y	FACW
5. *Symphyotrichum pilosum*	15 %	N	FACU
6.	%		
7.	%		
8.	%		
9.	%		
10.	%		
	125 %	= Total Cover	
Woody Vine Stratum (Plot size: ____)			
1.	%		
2.	%		
	0 %	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species that are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	%	x 1 =	0
FACW species	40 %	x 2 =	80
FAC species	%	x 3 =	0
FACU species	85 %	x 4 =	340
UPL species	%	x 5 =	0
Column Totals:	125 %	(A)	420 (B)

Prevalence Index = B/A = 3.36

Hydrophytic Vegetation Indicators:

☐ Rapid Test for Hydrophytic Vegetation

☐ Dominance Test is >50%

☐ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

☐ Problematic Hydrophytic Vegetation[1] (explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? ☐ Yes ☒ No

Remarks (Include photo numbers here or on a separate sheet):

SOIL

Sampling Point: SP-5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]		
0-12	10YR 3/1	90	10YR 6/1	10	D	M	silty clay loam	
12-24	2.5Y 7/2	78	10YR 6/6	2	C	M	silty clay	
			10YR 5/3	20	C	M		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☒ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF 12)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____ Depth (inches): _____

Hydric Soil Present?

☒ Yes ☐ No

Remarks:Hydric soil indicator F7 is present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☒ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:	Yes	No	Depth (inches)
Surface Water present?	☐	☒	
Water Table present?	☐	☒	
Saturation Present? (includes capillary fringe)	☐	☒	
Wetland Hydrology Present?	☐	☒	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections, etc.), if available:

Remarks: Wetland hydrology indicator D2 is present.

WETLAND DETERMINATION DATA FORM – Midwest Region

Project/Site: Platte West Water Production Facility City/County: Saunders County Sampling Date: 9/19/2012

Applicant/Owner: Metropolitan Utilities District State: NE Sampling Point: SP-6

Investigator(s): Soard, Bailey Section, Township, Range: S18, T14N, R10E

Landform (hillslope, terrace, etc.) depression Local relief (concave, convex, none): concave Slope (%): 1 %

Subregion (LRR): M Lat: 41.183366 Long: -96.336728 Datum: NAD 83

Soil Map Unit Name: Wann fine sandy loam, occasionally fooded NWI Classification: UPL (WM-2)

Are climate/hydrologic conditions on the site typical for this time of year? ☐ Yes ☒ No (If no, explain in Remarks)

	Vegetation	Soil	Hydrology
Significantly Disturbed?	☐	☐	☐
Naturally Problematic?	☐	☐	☐

Are "Normal Circumstances" present? ☒ Yes ☐ No

(If needed, explain any answers in Remarks)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	☐	☒
Hydric Soil Present?	☒	☐
Wetland Hydrology Present?	☐	☒
Is the Sampled Area within a Wetland?	☐	☒

Remarks: This region was assigned a Palmer Drought Index rating of between -3.00 and -3.99 (Severe Drought) during the sampling period; therefore, vegetation, soils, and hydrology have been evaluated accordingly.

VEGETATION – Use scientific names of plants

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.	%		
2.	%		
3.	%		
4.	%		
5.	%		
	0 %	= Total Cover	
Sapling/Shrub Stratum (Plot size: ____)			
1.	%		
2.	%		
3.	%		
4.	%		
5.	%		
	0 %	= Total Cover	
Herb Stratum (Plot size: 5')			
1. *Cornus drumondii*	3 %	N	FAC
2. *Melilotus officinalis*	15 %	N	FACU
3. *Physalis longifolia*	15 %	N	NL
4. *Poa pratensis*	85 %	Y	FACU
5. *Spartina pectinata*	60 %	Y	FACW
6.	%		
7.	%		
8.	%		
9.	%		
10.	%		
	178 %	= Total Cover	
Woody Vine Stratum (Plot size: ____)			
1.	%		
2.	%		
	0 %	= Total Cover	

Dominance Test Worksheet:

Number of Dominant Species that are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	%	x 1 =	0
FACW species	60 %	x 2 =	120
FAC species	3 %	x 3 =	9
FACU species	100 %	x 4 =	400
UPL species	%	x 5 =	0
Column Totals:	163 % (A)		529 (B)

Prevalence Index = B/A = 3.25

Hydrophytic Vegetation Indicators:

☐ Rapid Test for Hydrophytic Vegetation

☐ Dominance Test is >50%

☐ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

☐ Problematic Hydrophytic Vegetation[1] (explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? ☐ Yes ☒ No

Remarks (Include photo numbers here or on a separate sheet):

SOIL

Sampling Point: SP-6

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]		
0-10	10YR 2/1	85	10YR 5/2	15	C	M	silty clay loam	
10-24	10YR 6/2	70	10YR 5/4	25	C	M	silty clay	
			10YR 3/1	5	D	M		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☒ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF 12)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____ Depth (inches): _____

Hydric Soil Present?

☒ Yes ☐ No

Remarks:Hydric soil indicator F7 is present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☒ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)

Field Observations:	Yes	No	Depth (inches)
Surface Water present?	☐	☒	
Water Table present?	☐	☒	
Saturation Present? (includes capillary fringe)	☐	☒	
Wetland Hydrology Present?	☒	☐	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections, etc.), if available:

Remarks: Wetland hydrology indicator D2 is present.

APPENDIX I - SECTION C

DOUGLAS COUNTY BACKWASH DRAIN LINE MITIGATION SITE

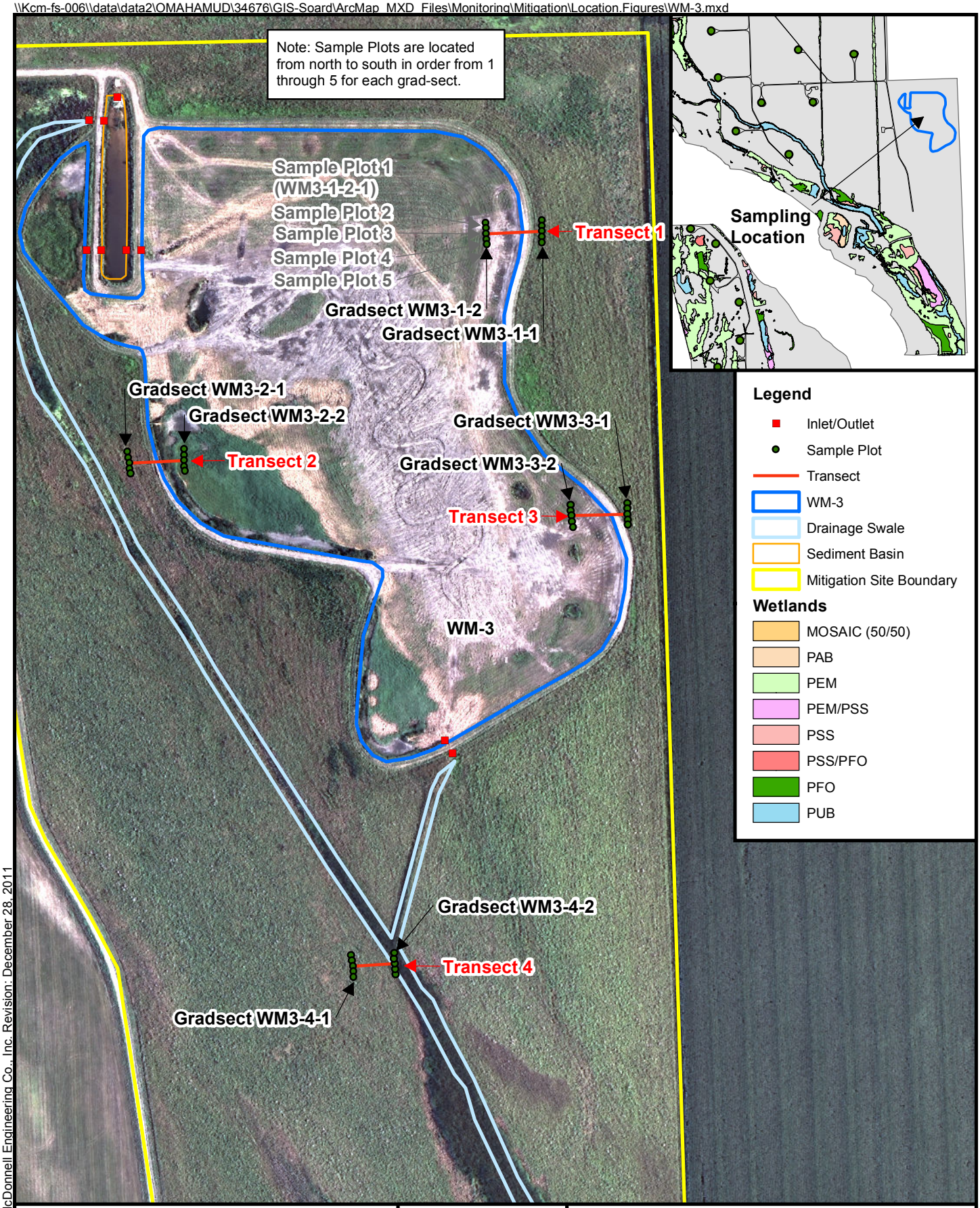
(WM-3) MONITORING DATA

TABLE OF CONTENTS

SECTION C-1

FIGURES

\\Kcm-fs-006\\data\data2\OMAHAMUD\34676\GIS-Soard\ArcMap_MXD_Files\Monitoring\Mitigation\Location.Figures\WM-3.mxd



0 100 200 300 400 Feet

N

Source: Western Air Maps 2011 Aerial Photography

Burns & McDonnell SINCE 1898

Figure 1
Location Map for
Wetland Mitigation 3
Douglas County Wellfield
Metropolitan Utilities District

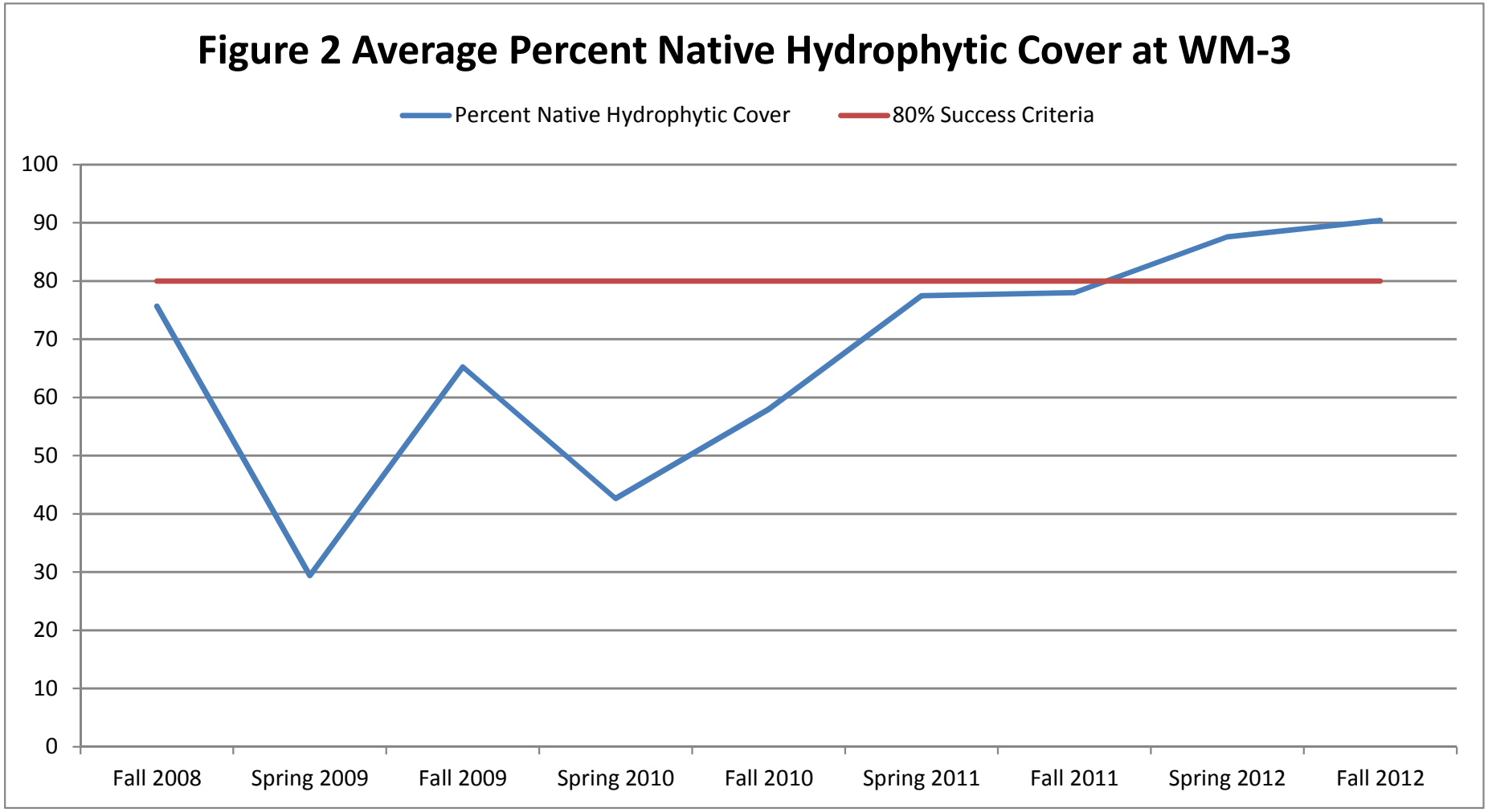


Figure 2 Average Percent Native Hydrophytic Cover at WM-3
Percent Native Hydrophytic Cover
80% Success Criteria
100
90
80
70
60
50
40
30
20
10
0
Fall 2008
Spring 2009
Fall 2009
Spring 2010
Fall 2010
Spring 2011
Fall 2011
Spring 2012
Fall 2012

SECTION C-2

TABLES

Table 1 Summary of Wetland Monitoring Data for WM-3

Wetland Name: **WM-3**
Wetland Type: **PEM**
County: **Douglas**

Number of Transects/Macroplots: **4**
Number of Gradsects: **8**
Number of Sample Plots: **40**
Number of Wetland Sample Plots: **20**

Sampling Effort: **2012 Fall**

Weighted Average: **2.05**
Species Richness: **19**
Species Diversity: **15.54**
FQI: **14.66**

Percent Native Species: **79**
Percent Invasive Species: **32**
Percent Perennial/Biennial/Annual Species: **74 / 5 / 26**
Mean C-Value: **3.79**

Dominant Species:

Scientific Name	Common Name	Wetland Indicator Status	Percent Cover per Wetland
Eleocharis compressa	Flatstem spikerush	FACW	10.38
Erigeron strigosus	Prairie fleabane	FAC	23.25
Potamogeton foliosus	Leafy pondweed	OBL	8.38
Typha latifolia	Broadleaf cattail	OBL	20

Sampling Effort: **2012 Spring**

Weighted Average: **1.88**
Species Richness: **20**
Species Diversity: **12.58**
FQI: **17.24**

Percent Native Species: **90**
Percent Invasive Species: **20**
Percent Perennial/Biennial/Annual Species: **90 / 5 / 15**
Mean C-Value: **4.06**

Dominant Species:

Scientific Name	Common Name	Wetland Indicator Status	Percent Cover per Wetland
Carex vulpinoidea	Fox sedge	OBL	9
Typha latifolia	Broadleaf cattail	OBL	30.25
Verbesina alternifolia	Wingstem	FAC	19.62

Table 2 Species List and Vegetative Characteristics for WM-3

Report generated:
Friday, November 16, 2012

Sampling Effort: **2012 Fall**

Scientific Name	Common Name	Wetland Indicator Status[1]	Ecological Index[2]	C-Value	Native Status	Invasive?	Frequency[3]	Average Percent Cover[4]
Ammannia coccinea	Valley redstem	OBL	1	4	Native	☐	2	0.88
Andropogon gerardii	Big bluestem	FAC-	3	5	Native	☐	1	0.75
Bidens aristosa	Bearded beggartick	NI	3		Native	☐	4	4.12
Carex lupulina	Hop sedge	FACW+	2	8	Native	☐	2	5.00
Carex vulpinoidea	Fox sedge	OBL	1	4	Native	☐	6	7.25
Cyperus esculentus	Yellow nutsedge	FACW	2	0	Native & Introduced	☑	6	4.38
Echinochloa crus-galli	Barnyardgrass	FACW	2		Introduced	☑	2	0.88
Eleocharis compressa	Flatstem spikerush	FACW	2	6	Native	☐	6	10.38
Eleocharis sp.	Spikerush	--	3		--	☐	1	0.75
Erigeron strigosus	Prairie fleabane	FAC	3	2	Native	☑	9	23.25
Helenium autumnale	Common sneezeweed	FACW	2	6	Native	☑	2	1.50
Lemna minor	Common duckweed	OBL	1	0	Native	☐	6	1.38
Panicum virgatum	Switchgrass	FAC	3	4	Native	☐	1	0.75
Polygonum caespitosum	Oriental lady's thumb	NI	3		Introduced	☐	2	3.75
Populus deltoides	Eastern cottonwood	FAC	3	3	Native	☐	4	6.50
Potamogeton foliosus	Leafy pondweed	OBL	1	5	Native	☐	5	8.38
Schedonorus phoenix	Tall fescue	FACU	4		Introduced	☑	1	1.88
Scirpus atrovirens	Green bulrush	OBL	1	5	Native	☐	1	0.75

1 = OBL - obligate; FACW - facultative wet; FAC - facultative; FACU - facultative upland; UPL - upland; NI - no indicator

2 = Ecological Index values correspond to the wetland indicator status for each species

3 = Frequency is the total number of plots in which the species was identified

4 = Average percent cover is calcuated from the coverages estimated during this monitoring effort.

Table 2 Species List and Vegetative Characteristics for WM-3

Report generated:
Friday, November 16, 2012

Typha latifolia	Broadleaf cattail	OBL	1	1	Native	☑	8	20.00

Sampling Effort: **2012 Spring**

Scientific Name	Common Name	Wetland Indicator Status[1]	Ecological Index[2]	C-Value	Native Status	Invasive?	Frequency[3]	Average Percent Cover[4]
Bidens aristosa	Bearded beggartick	NI	3		Native	☐	5	2.38
Carex grayi	Gray's sedge	FACW	2	0	Native	☐	3	3.38
Carex lupulina	Hop sedge	FACW+	2	8	Native	☐	1	1.88
Carex vulpinoidea	Fox sedge	OBL	1	4	Native	☐	6	9.00
Cornus drummondii	Roughleaf dogwood	FAC	3	3	Native	☐	1	0.12
Eleocharis compressa	Flatstem spikerush	FACW	2	6	Native	☐	3	4.62
Eleocharis erythropoda	Bald spikerush	OBL	1	5	Native	☐	2	3.75
Gaillardia pulchella	Firewheel	NL	3	5	Native	☐	1	0.75
Helenium autumnale	Common sneezeweed	FACW	2	6	Native	☑	1	0.75
Juncus effusus	Common rush	OBL	1	6	Native	☐	2	2.62
Pascopyrum smithii	Western wheatgrass	NL	3		Native	☐	1	0.75
Phalaris arundinacea	Reed canarygrass	FACW+	2	0	Native	☑	1	4.25
Phyla lanceolata	Lanceleaf fogfruit	OBL	1	3	Native	☐	1	0.12
Polygonum hydropiper	Marshpepper knotweed	OBL	1		Introduced	☐	1	0.75
Populus deltoides	Eastern cottonwood	FAC	3	3	Native	☐	3	4.62
Salix interior	Sandbar willow	NL	3	3	Native	☐	1	0.75

1 = OBL - obligate; FACW - facultative wet; FAC - facultative; FACU - facultative upland; UPL - upland; NI - no indicator

2 = Ecological Index values correspond to the wetland indicator status for each species

3 = Frequency is the total number of plots in which the species was identified

4 = Average percent cover is calcuated from the coverages estimated during this monitoring effort.

Table 2 Species List and Vegetative Characteristics for WM-3

Report generated:
Friday, November 16, 2012

Schedonorus phoenix	Tall fescue	FACU	4		Introduced	☑	1	4.25
Scirpus pendulus	Rufous bulrush	OBL	1	8	Native	☐	2	2.62
Typha latifolia	Broadleaf cattail	OBL	1	1	Native	☑	10	30.25
Verbesina alternifolia	Wingstem	FAC	3	4	Native	☐	9	19.62

1 = OBL - obligate; FACW - facultative wet; FAC - facultative; FACU - facultative upland; UPL - upland; NI - no indicator

2 = Ecological Index values correspond to the wetland indicator status for each species

3 = Frequency is the total number of plots in which the species was identified

4 = Average percent cover is calcuated from the coverages estimated during this monitoring effort.

SECTION C-3

MITIGATION SITE WM-3 GROUND PHOTOGRAPHS

Photo 1: View west of Transect 1 in WM-3 (June 2012).

Photo 2: View north of Gradsect 1 on Transect 1 in WM-3 (June 2012).

Photo 3: View north of Gradsect 2 on Transect 1 in WM-3 (June 2012).

Photo 4: View east of Transect 2 in WM-3 (June 2012).

Photo 5: View north of Gradsect 1 on Transect 2 in WM-3 (June 2012).

Photo 6: View north of Gradsect 2 on Transect 2 in WM-3 (June 2012).

Photo 7: View west of Transect 3 in WM-3 (June 2012).

Photo 8: View north of Gradsect 1 on Transect 3 in WM-3 (June 2012).

Photo 9: View north of Gradsect 2 on Transect 3 in WM-3 (June 2012).

Photo 10: View east of Transect 4 in WM-3 (June 2012).

Photo 11: View north of Gradsect 1 on Transect 4 in WM-3 (June 2012).

Photo 12: View north of Gradsect 2 on Transect 4 in WM-3 (June 2012).

Photo 13: View west of Transect 1 in WM-3 (September 2012).

Photo 14: View north of Gradsect 1 on Transect 1 in WM-3 (September 2012).

Photo 15: View north of Gradsect 2 on Transect 1 in WM-3 (September 2012).

Photo 16: View east of Transect 2 in WM-3 (September 2012).

Photo 17: View north of Gradsect 1 on Transect 2 in WM-3 (September 2012).

Photo 18: View north of Gradsect 2 on Transect 2 in WM-3 (September 2012).

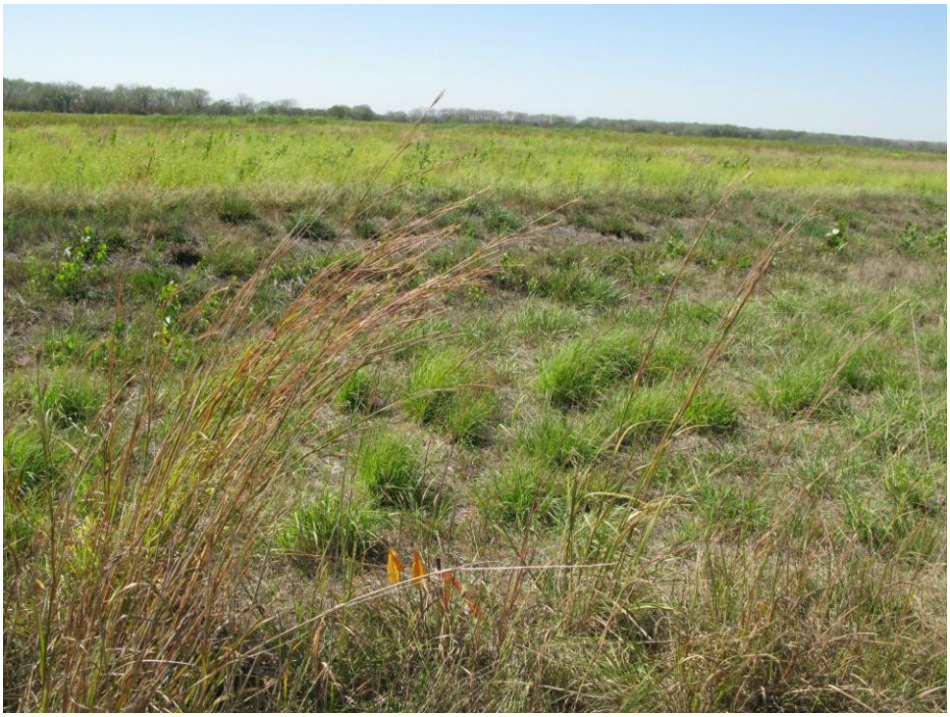


Photo 19: View west of Transect 3 in WM-3 (September 2012).

Photo 20: View north of Gradsect 1 on Transect 3 in WM-3 (September 2012).

Photo 21: View north of Gradsect 2 on Transect 3 in WM-3 (September 2012).

Photo 22: View east of Transect 4 in WM-3 (September 2012).

Photo 23: View north of Gradsect 1 on Transect 4 in WM-3 (September 2012).

Photo 24: View north of Gradsect 2 on Transect 4 in WM-3 (September 2012).

SECTION C-4

WETLAND VEGETATION COVER AND WATER DEPTH RAW DATA SHEETS

Wetland Vegetation Cover and Water Depth at WM-3

Wetland Name: **WM-3**

Wetland Transect/Gradsect #: WM3-1-1

Sampling Date: 6/26/2012 **Last Rain Date:** 6/20/2012 **Last Rain Amount (in):** 0.62

Canopy Coverage Analysis	**Plot 1**	**Plot 2**	**Plot 3**	**Plot 4**	**Plot 5**
Depth of Standing Water (in):					
Open Water (in):					
Bare Soil (in):	6	6	6	5	6
Ambrosia artemisiifolia	1				
Andropogon gerardii					5
Bromus arvensis		5			
Eryngium yuccifolium var. yu	4				
Helenium autumnale				2	
Monarda fistulosa			4		
Panicum virgatum	5	3		4	
Poa pratensis		4	4	5	6
Rudbeckia hirta	3	3	3	3	3
Schedonorus phoenix	4	4	6	5	4
Solidago canadensis		3			
Solidago gigantea		3			
Symphyotrichum lanceolatum				2	
Unknown 1	4	3			3

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

Wetland Vegetation Cover and Water Depth at WM-3

Wetland Name: **WM-3**

Wetland Transect/Gradsect #: WM3-1-2

Sampling Date: 6/26/2012 **Last Rain Date:** 6/20/2012 **Last Rain Amount (in):** 0.62

Canopy Coverage Analysis	**Plot 1**	**Plot 2**	**Plot 3**	**Plot 4**	**Plot 5**
Depth of Standing Water (in):	5	4.5	6	5	5
Open Water (in):	7	7	7	7	7
Bare Soil (in):	7	7	7	7	6
Carex grayi			4		
Carex lupulina				4	
Carex vulpinoidea		4	4	3	4
Cornus drummondii					2
Eleocharis compressa	5			3	3
Phyla lanceolata					2
Polygonum hydropiper			3		
Populus deltoides		3			
Scirpus pendulus			4		3
Typha latifolia	4	5	4	3	3
Verbesina alternifolia	3	3		4	3

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

Wetland Vegetation Cover and Water Depth at WM-3

Wetland Name: **WM-3**

Wetland Transect/Gradsect #: WM3-2-1

Sampling Date: 6/26/2012 **Last Rain Date:** 6/20/2012 **Last Rain Amount (in):** 0.62

Canopy Coverage Analysis	**Plot 1**	**Plot 2**	**Plot 3**	**Plot 4**	**Plot 5**
Depth of Standing Water (in):					
Open Water (in):					
Bare Soil (in):	6	6	6	6	6
Andropogon gerardii	5	4			
Bidens aristosa		5			
Bromus inermis		5	5		5
Conyza canadensis			2	2	
Elymus virginicus			4	3	
Eryngium yuccifolium var. yu			3		
Hordeum jubatum		3			
Medicago lupulina	4				
Melilotus officinalis					3
Panicum virgatum	5	6			
Phleum pratense		3		2	
Poa pratensis	5	6	6	5	6
Populus deltoides	3		3		3
Rudbeckia hirta				2	
Schedonorus phoenix	4	4	3	6	4
Schizachyrium scoparium	5	3			
Symphyotrichum lanceolatum				4	
Trifolium repens				3	4

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

Wetland Vegetation Cover and Water Depth at WM-3

Wetland Name: **WM-3**

Wetland Transect/Gradsect #: WM3-2-2

Sampling Date: 6/26/2012 **Last Rain Date:** 6/20/2012 **Last Rain Amount (in):** 0.62

Canopy Coverage Analysis	Plot 1	Plot 2	Plot 3	Plot 4	Plot 5
Depth of Standing Water (in):	14	19	18	18	14
Open Water (in):	7	7	7	7	7
Bare Soil (in):	7	7	7	7	7

No Living Vegetation

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

Wetland Vegetation Cover and Water Depth at WM-3

Wetland Name: **WM-3**

Wetland Transect/Gradsect #: WM3-3-1

Sampling Date: 6/26/2012 **Last Rain Date:** 6/20/2012 **Last Rain Amount (in):** 0.62

Canopy Coverage Analysis	**Plot 1**	**Plot 2**	**Plot 3**	**Plot 4**	**Plot 5**
Depth of Standing Water (in):					
Open Water (in):					
Bare Soil (in):	6	6	5	6	5
Andropogon gerardii	5	6	4	6	
Bromus inermis				3	4
Panicum virgatum	4	4	4	4	3
Physalis longifolia				3	
Poa pratensis	7	6	7	5	5
Schedonorus phoenix					7
Solidago canadensis					3
Symphyotrichum lanceolatum				3	
Verbesina alternifolia				3	

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

Wetland Vegetation Cover and Water Depth at WM-3

Wetland Name: **WM-3**

Wetland Transect/Gradsect #: WM3-3-2

Sampling Date: 6/26/2012 **Last Rain Date:** 6/20/2012 **Last Rain Amount (in):** 0.62

Canopy Coverage Analysis	**Plot 1**	**Plot 2**	**Plot 3**	**Plot 4**	**Plot 5**
Depth of Standing Water (in):					
Open Water (in):					
Bare Soil (in):	6	6	6	7	6
Bidens aristosa	2	2	2	2	4
Carex grayi		3	3		
Carex vulpinoidea		4			3
Eleocharis erythropoda		4			
Gaillardia pulchella					3
Helenium autumnale				3	
Pascopyrum smithii					3
Populus deltoides			3	5	
Salix interior				3	
Schedonorus phoenix					6
Verbesina alternifolia	6	6	5	5	3

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

Wetland Vegetation Cover and Water Depth at WM-3

Wetland Name: **WM-3**

Wetland Transect/Gradsect #: WM3-4-1

Sampling Date: 6/26/2012 **Last Rain Date:** 6/20/2012 **Last Rain Amount (in):** 0.62

Canopy Coverage Analysis	**Plot 1**	**Plot 2**	**Plot 3**	**Plot 4**	**Plot 5**
Depth of Standing Water (in):					
Open Water (in):					
Bare Soil (in):	6	6	6	6	6
Andropogon gerardii	5	5	4	4	5
Bromus inermis					4
Dalea purpurea			3		
Eryngium yuccifolium var. yu				3	3
Medicago sativa	3	3			
Monarda fistulosa		4	3	4	
Panicum virgatum	4				4
Poa pratensis	5	4	4	5	5
Schedonorus phoenix		4	5	5	3
Schizachyrium scoparium				5	4

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

Wetland Vegetation Cover and Water Depth at WM-3

Wetland Name: **WM-3**

Wetland Transect/Gradsect #: WM3-4-2

Sampling Date: 6/26/2012 **Last Rain Date:** 6/20/2012 **Last Rain Amount (in):** 0.62

Canopy Coverage Analysis	**Plot 1**	**Plot 2**	**Plot 3**	**Plot 4**	**Plot 5**
Depth of Standing Water (in):					
Open Water (in):					
Bare Soil (in):	7	6	6	6	6
Eleocharis erythropoda		4			
Juncus effusus		4		3	
Phalaris arundinacea					6
Typha latifolia	6	6	7	6	6

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

Wetland Vegetation Cover and Water Depth at WM-3

Wetland Name: **WM-3**

Wetland Transect/Gradsect #: WM3-1-1

Sampling Date: 9/19/2012 **Last Rain Date:** 9/17/2012 **Last Rain Amount (in):** 0.19

Canopy Coverage Analysis	**Plot 1**	**Plot 2**	**Plot 3**	**Plot 4**	**Plot 5**
Depth of Standing Water (in):					
Open Water (in):					
Bare Soil (in):	6	6	6	4	6
Andropogon gerardii				3	5
Bidens aristosa		3	2		
Bromus inermis	4			4	
Elymus canadensis		3			
Helenium autumnale				3	
Hypericum perforatum	4	3			
Monarda fistulosa			3		
Panicum virgatum	4			5	
Poa pratensis	4	5			5
Rudbeckia hirta			2	3	3
Schedonorus phoenix	5	4	6	4	5
Silphium integrifolium		3			3
Solidago canadensis	3	4			
Sorghastrum nutans				4	
Symphyotrichum lanceolatum				3	

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

Wetland Vegetation Cover and Water Depth at WM-3

Wetland Name: **WM-3**

Wetland Transect/Gradsect #: WM3-1-2

Sampling Date: 9/19/2012 **Last Rain Date:** 9/17/2012 **Last Rain Amount (in):** 0.19

Canopy Coverage Analysis	**Plot 1**	**Plot 2**	**Plot 3**	**Plot 4**	**Plot 5**
Depth of Standing Water (in):	5	3.5	6	6	5
Open Water (in):	7	7	7	7	7
Bare Soil (in):	6	6	6	6	6
Ammannia coccinea	3	2			
Carex lupulina			6	3	
Carex vulpinoidea		4	4	3	4
Cyperus esculentus	3	3			3
Eleocharis compressa	5	3	3	4	5
Erigeron strigosus	5	5		3	5
Lemna minor			2	2	2
Polygonum caespitosum			4	4	
Populus deltoides		3			
Scirpus atrovirens			3		
Typha latifolia	6	6	6	5	5

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

Wetland Vegetation Cover and Water Depth at WM-3

Wetland Name: **WM-3**

Wetland Transect/Gradsect #: WM3-2-1

Sampling Date: 9/19/2012 **Last Rain Date:** 9/17/2012 **Last Rain Amount (in):** 0.19

Canopy Coverage Analysis	**Plot 1**	**Plot 2**	**Plot 3**	**Plot 4**	**Plot 5**
Depth of Standing Water (in):					
Open Water (in):					
Bare Soil (in):	5	5	5	5	5
Andropogon gerardii					4
Bidens aristosa		3			
Bromus inermis					4
Conyza canadensis			3		
Echinochloa crus-galli			4		
Eryngium yuccifolium var. yu			3		
Medicago lupulina	4				
Melilotus officinalis	3				3
Panicum virgatum	4	5		2	2
Poa pratensis	5	4	6	4	5
Populus deltoides			3		3
Rudbeckia hirta				2	
Schedonorus phoenix	5	5	4	5	4
Setaria faberi			3		
Sorghastrum nutans	4	3			
Symphyotrichum lanceolatum				4	
Trifolium repens				3	4

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

Wetland Vegetation Cover and Water Depth at WM-3

Wetland Name: **WM-3**

Wetland Transect/Gradsect #: WM3-2-2

Sampling Date: 9/19/2012 **Last Rain Date:** 9/17/2012 **Last Rain Amount (in):** 0.19

Canopy Coverage Analysis	Plot 1	Plot 2	Plot 3	Plot 4	Plot 5
Depth of Standing Water (in):	14	15	15	16	15
Open Water (in):	7	7	7	7	7
Bare Soil (in):	7	7	7	7	7
Eleocharis sp.					3
Lemna minor		2	3		2
Potamogeton foliosus	3	5	4	4	3

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

Wetland Vegetation Cover and Water Depth at WM-3

Wetland Name: **WM-3**

Wetland Transect/Gradsect #: WM3-3-1

Sampling Date: 9/10/2012 **Last Rain Date:** 9/3/2012 **Last Rain Amount (in):** 0.01

Canopy Coverage Analysis	**Plot 1**	**Plot 2**	**Plot 3**	**Plot 4**	**Plot 5**
Depth of Standing Water (in):					
Open Water (in):					
Bare Soil (in):	5	6	6	4	5
Andropogon gerardii	5	5	6	4	
Erechtites hieraciifolia				3	
Panicum virgatum	3	3		3	3
Physalis longifolia				3	
Poa pratensis	6	4	5	4	4
Rudbeckia hirta	2				
Schedonorus phoenix	3	3			6
Solidago canadensis					3
Sorghastrum nutans	4			5	
Symphyotrichum lanceolatum				3	

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

Wetland Vegetation Cover and Water Depth at WM-3

Wetland Name: **WM-3**

Wetland Transect/Gradsect #: WM3-3-2

Sampling Date: 9/10/2012 **Last Rain Date:** 9/3/2012 **Last Rain Amount (in):** 0.01

Canopy Coverage Analysis	**Plot 1**	**Plot 2**	**Plot 3**	**Plot 4**	**Plot 5**
Depth of Standing Water (in):					
Open Water (in):					
Bare Soil (in):	6	6	6	6	6
Bidens aristosa	2		3	2	5
Carex vulpinoidea		3			2
Cyperus esculentus	2	4	2		
Eleocharis compressa		3			
Erigeron strigosus	6	5	5	4	3
Helenium autumnale		3		3	
Panicum virgatum					3
Populus deltoides	3		4	5	
Schedonorus phoenix					4

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

Wetland Vegetation Cover and Water Depth at WM-3

Wetland Name: **WM-3**

Wetland Transect/Gradsect #: WM3-4-1

Sampling Date: 9/10/2012 **Last Rain Date:** 9/3/2012 **Last Rain Amount (in):** 0.01

Canopy Coverage Analysis	**Plot 1**	**Plot 2**	**Plot 3**	**Plot 4**	**Plot 5**
Depth of Standing Water (in):					
Open Water (in):					
Bare Soil (in):	6	6	6	6	5
Andropogon gerardii	5	3	5	3	3
Eryngium yuccifolium var. yu				3	2
Medicago sativa	4	4			3
Monarda fistulosa		3	3	4	
Panicum virgatum	4		4		3
Poa pratensis	4		3	4	4
Populus deltoides		2			
Ratibida pinnata			3		
Rudbeckia hirta					2
Schedonorus phoenix	3	4		4	
Schizachyrium scoparium		5	3	4	4

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

Wetland Vegetation Cover and Water Depth at WM-3

Wetland Name: **WM-3**

Wetland Transect/Gradsect #: WM3-4-2

Sampling Date: 9/10/2012 **Last Rain Date:** 9/3/2012 **Last Rain Amount (in):** 0.01

Canopy Coverage Analysis	**Plot 1**	**Plot 2**	**Plot 3**	**Plot 4**	**Plot 5**
Depth of Standing Water (in):					
Open Water (in):					
Bare Soil (in):	6	6	6	6	6
Andropogon gerardii					3
Echinochloa crus-galli			2		3
Typha latifolia	2	3			2

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

APPENDIX I - SECTION D

WATER TREATMENT PLANT MITIGATION SITE WM-4 MONITORING DATA

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SECTION D-1

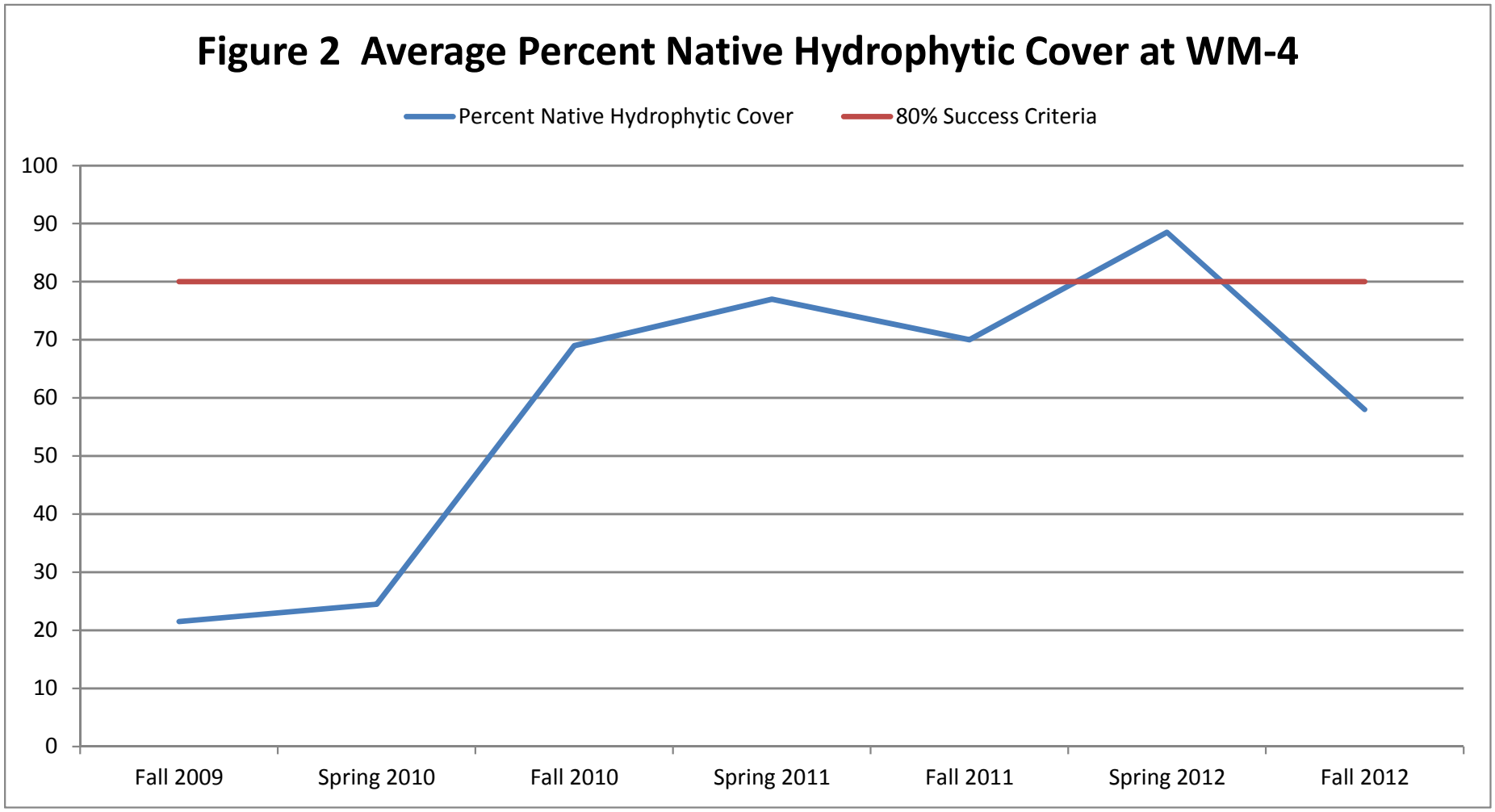
FIGURES

\\Kcm-fs-006\\data\data2\OMAHAMUD\34676\GIS-Soard\ArcMap_MXD_Files\Monitoring\Mitigation\Location.Figures\W-4.mxd

Source: Western Air Maps 2011 Aerial Photography

Figure 1
Sample Plot Location Map for
Wetland Mitigation 4
Water Treatment Plant - Douglas County
Metropolitan Utilities District

Figure 2 Average Percent Native Hydrophytic Cover at WM-4



SECTION D-2

TABLES

Table 1 Summary of Wetland Monitoring Data for WM-4

Wetland Name: **WM-4**
Wetland Type: **PEM**
County: **Douglas**

Number of Transects/Macroplots: **1**
Number of Gradsects: **2**
Number of Sample Plots: **10**
Number of Wetland Sample Plots: **5**

Sampling Effort: **2012 Fall**

Weighted Average: **2.39**
Species Richness: **15**
Species Diversity: **23.21**
FQI: **8.31**

Percent Native Species: **80**
Percent Invasive Species: **53**
Percent Perennial/Biennial/Annual Species: **73 / 13 / 33**
Mean C-Value: **2.40**

Dominant Species:

Scientific Name	Common Name	Wetland Indicator Status	Percent Cover per Wetland
Echinochloa crus-galli	Barnyardgrass	FACW	28
Melilotus officinalis	Yellow sweetclover	FACU	10.5
Oligoneuron riddellii	Riddell's goldenrod	NI	20
Typha latifolia	Broadleaf cattail	OBL	32

Sampling Effort: **2012 Spring**

Weighted Average: **2.36**
Species Richness: **25**
Species Diversity: **51.23**
FQI: **16.92**

Percent Native Species: **76**
Percent Invasive Species: **40**
Percent Perennial/Biennial/Annual Species: **80 / 8 / 20**
Mean C-Value: **3.88**

Dominant Species:

Scientific Name	Common Name	Wetland Indicator Status	Percent Cover per Wetland
Carex vulpinoidea	Fox sedge	OBL	15.5
Echinochloa crus-galli	Barnyardgrass	FACW	25
Oligoneuron riddellii	Riddell's goldenrod	NI	15
Typha latifolia	Broadleaf cattail	OBL	37

Table 2 Species List and Vegetative Characteristics for WM-4

Report generated:
Friday, November 16, 2012

Sampling Effort: **2012 Fall**

Scientific Name	Common Name	Wetland Indicator Status[1]	Ecological Index[2]	C-Value	Native Status	Invasive?	Frequency[3]	Average Percent Cover[4]
Ambrosia artemisiifolia	Annual ragweed	FACU	4	0	Native	☑	3	1.50
Ambrosia trifida	Great ragweed	FACW	2	0	Native	☑	1	3.00
Carex lupulina	Hop sedge	FACW+	2	8	Native	☐	1	7.50
Carex vulpinoidea	Fox sedge	OBL	1	4	Native	☐	1	3.00
Cyperus esculentus	Yellow nutsedge	FACW	2	0	Native & Introduced	☑	1	0.50
Echinochloa crus-galli	Barnyardgrass	FACW	2		Introduced	☑	3	28.00
Elymus virginicus	Virginia wildrye	FAC	3	4	Native	☐	2	6.00
Melilotus officinalis	Yellow sweetclover	FACU	4		Introduced	☑	2	10.50
Oligoneuron riddellii	Riddell's goldenrod	NI	3		Native	☐	2	20.00
Poa pratensis	Kentucky bluegrass	FACU	4		Native & Introduced	☑	1	7.50
Populus deltoides	Eastern cottonwood	FAC	3	3	Native	☐	1	3.00
Salix interior	Sandbar willow	NL	3	3	Native	☐	2	6.00
Trifolium pratense	Red clover	FACU	4		Introduced	☐	2	6.00
Typha latifolia	Broadleaf cattail	OBL	1	1	Native	☑	3	32.00
Xanthium strumarium	Rough cocklebur	FAC	3	1	Native	☑	1	3.00

1 = OBL - obligate; FACW - facultative wet; FAC - facultative; FACU - facultative upland; UPL - upland; NI - no indicator

2 = Ecological Index values correspond to the wetland indicator status for each species

3 = Frequency is the total number of plots in which the species was identified

4 = Average percent cover is calcuated from the coverages estimated during this monitoring effort.

Table 2 Species List and Vegetative Characteristics for WM-4

Report generated:
Friday, November 16, 2012

Sampling Effort: **2012 Spring**

Scientific Name	Common Name	Wetland Indicator Status[1]	Ecological Index[2]	C-Value	Native Status	Invasive?	Frequency[3]	Average Percent Cover[4]
Abutilon theophrasti	Velvetleaf	UPL	5		Introduced	☑	1	0.10
Achillea millefolium	Common yarrow	FACU	4	2	Native & Introduced	☑	1	0.50
Ambrosia artemisiifolia	Annual ragweed	FACU	4	0	Native	☑	2	1.00
Ambrosia trifida	Great ragweed	FACW	2	0	Native	☑	2	1.00
Asclepias incarnata	Swamp milkweed	OBL	1	4	Native	☑	1	3.00
Carex bicknellii	Bicknell's sedge	FACU	4	6	Native	☐	1	3.00
Carex lupulina	Hop sedge	FACW+	2	8	Native	☐	1	7.50
Carex vulpinoidea	Fox sedge	OBL	1	4	Native	☐	2	15.50
Echinochloa crus-galli	Barnyardgrass	FACW	2		Introduced	☑	2	25.00
Elymus virginicus	Virginia wildrye	FAC	3	4	Native	☐	2	10.50
Eupatorium perfoliatum	Common boneset	OBL	1	5	Native	☐	2	1.00
Juncus effusus	Common rush	OBL	1	6	Native	☐	1	3.00
Juncus tenuis	Poverty rush	FAC	3	3	Native	☐	1	3.00
Lycopus virginicus	Virginia water horehound	OBL	1	5	Native	☐	1	0.50
Lythrum alatum	Winged lythrum	OBL	1	6	Native	☐	1	0.50
Melilotus officinalis	Yellow sweetclover	FACU	4		Introduced	☑	2	10.50
Oligoneuron riddellii	Riddell's goldenrod	NI	3		Native	☐	2	15.00
Poa pratensis	Kentucky bluegrass	FACU	4		Native & Introduced	☑	2	10.50

1 = OBL - obligate; FACW - facultative wet; FAC - facultative; FACU - facultative upland; UPL - upland; NI - no indicator

2 = Ecological Index values correspond to the wetland indicator status for each species

3 = Frequency is the total number of plots in which the species was identified

4 = Average percent cover is calcuated from the coverages estimated during this monitoring effort.

Table 2 Species List and Vegetative Characteristics for WM-4

Report generated:
Friday, November 16, 2012

Populus deltoides	Eastern cottonwood	FAC	3	3	Native	☐	1	3.00
Salix interior	Sandbar willow	NL	3	3	Native	☐	1	0.50
Trifolium pratense	Red clover	FACU	4		Introduced	☐	1	7.50
Trifolium repens	White clover	FACU	4		Introduced	☑	2	10.50
Typha latifolia	Broadleaf cattail	OBL	1	1	Native	☑	3	37.00
Unknown 1	Unknown seedling	--	3		--	☐	1	0.50
Zizia aurea	Golden zizia	FAC	3	6	Native	☐	1	3.00

1 = OBL - obligate; FACW - facultative wet; FAC - facultative; FACU - facultative upland; UPL - upland; NI - no indicator

2 = Ecological Index values correspond to the wetland indicator status for each species

3 = Frequency is the total number of plots in which the species was identified

4 = Average percent cover is calcuated from the coverages estimated during this monitoring effort.

SECTION D-3

MITIGATION SITE WM-4 GROUND PHOTOGRAPHS

Photo 1: View north of Transect 1 in WM-4 (June 2012).

Photo 2: View east of Gradsect 1 on Transect 1 in WM-4 (June 2012).

Photo 3: View east of Gradsect 2 on Transect 1 in WM-4 (June 2012).

Photo 4: View north of Transect 1 in WM-4 (September 2012).

Photo 5: View east of Gradsect 1 on Transect 1 in WM-4 (September 2012).

Photo 6: View east of Gradsect 2 on Transect 1 in WM-4 (September 2012).

SECTION D-4

WETLAND VEGETATION COVER AND WATER DEPTH RAW DATA SHEETS

Wetland Vegetation Cover and Water Depth at WM-4

Wetland Name: **WM-4**

Wetland Transect/Gradsect #: WM4-1-1

Sampling Date: 6/25/2012 **Last Rain Date:** 6/20/2012 **Last Rain Amount (in):** 0.62

Canopy Coverage Analysis	**Plot 1**	**Plot 2**	**Plot 3**	**Plot 4**	**Plot 5**
Depth of Standing Water (in):					
Open Water (in):					
Bare Soil (in):	5	5	6	6	5
Andropogon gerardii	3	3	4	3	4
Chamaecrista fasciculata	5	5		3	
Medicago lupulina	3		3	3	3
Melilotus officinalis	3	4		2	6
Poa pratensis	6	7	4	5	6
Schedonorus phoenix	4	5	4	4	4
Trifolium repens	5		6	6	5

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

Wetland Vegetation Cover and Water Depth at WM-4

Wetland Name: **WM-4**

Wetland Transect/Gradsect #: WM4-1-2

Sampling Date: 6/25/2012 **Last Rain Date:** 6/20/2012 **Last Rain Amount (in):** 0.62

Canopy Coverage Analysis	Plot 1	Plot 2	Plot 3	Plot 4	Plot 5
Depth of Standing Water (in):		1.5	4.5	5	
Open Water (in):		7	7	7	
Bare Soil (in):	6	7	7	7	6
Abutilon theophrasti	1				
Achillea millefolium					2
Ambrosia artemisiifolia		2			2
Ambrosia trifida	2				2
Asclepias incarnata	3				
Carex bicknellii					3
Carex lupulina					4
Carex vulpinoidea	3				5
Echinochloa crus-galli		5		5	
Elymus virginicus	4				3
Eupatorium perfoliatum	2				2
Juncus effusus					3
Juncus tenuis					3
Lycopus virginicus					2
Lythrum alatum					2
Melilotus officinalis	3				4
Oligoneuron riddellii	4				4
Poa pratensis	4				3
Populus deltoides	3				
Salix interior		2			
Trifolium pratense	4				
Trifolium repens	4				3
Typha latifolia		4	6	5	
Unknown 1		2			
Zizia aurea					3

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

Wetland Vegetation Cover and Water Depth at WM-4

Wetland Name: **WM-4**

Wetland Transect/Gradsect #: WM4-1-1

Sampling Date: 9/18/2012 **Last Rain Date:** 9/17/2012 **Last Rain Amount (in):** 0.19

Canopy Coverage Analysis	**Plot 1**	**Plot 2**	**Plot 3**	**Plot 4**	**Plot 5**
Depth of Standing Water (in):					
Open Water (in):					
Bare Soil (in):	5	5	5	5	5
Medicago sativa	5				
Melilotus officinalis	3	4	3	3	2
Poa pratensis	6	6	5	5	5
Schedonorus phoenix	3	4	4	5	3
Schizachyrium scoparium	3	4	3		
Trifolium repens	2	2	3	4	3

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

Wetland Vegetation Cover and Water Depth at WM-4

Wetland Name: **WM-4**

Wetland Transect/Gradsect #: WM4-1-2

Sampling Date: 9/18/2012 **Last Rain Date:** 9/17/2012 **Last Rain Amount (in):** 0.19

Canopy Coverage Analysis	**Plot 1**	**Plot 2**	**Plot 3**	**Plot 4**	**Plot 5**
Depth of Standing Water (in):					
Open Water (in):					
Bare Soil (in):	6	6	6	6	5
Ambrosia artemisiifolia	2	2			2
Ambrosia trifida	3				
Carex lupulina					4
Carex vulpinoidea					3
Cyperus esculentus				2	
Echinochloa crus-galli		5	3	5	
Elymus virginicus	3				3
Melilotus officinalis	4				3
Oligoneuron riddellii	5				4
Poa pratensis	4				
Populus deltoides	3				
Salix interior		3			3
Trifolium pratense	3				3
Typha latifolia		4	6	4	
Xanthium strumarium			3		

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

APPENDIX I - SECTION E

WATER TREATMENT PLANT MITIGATION SITE WM-5 MONITORING DATA

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SECTION E-1

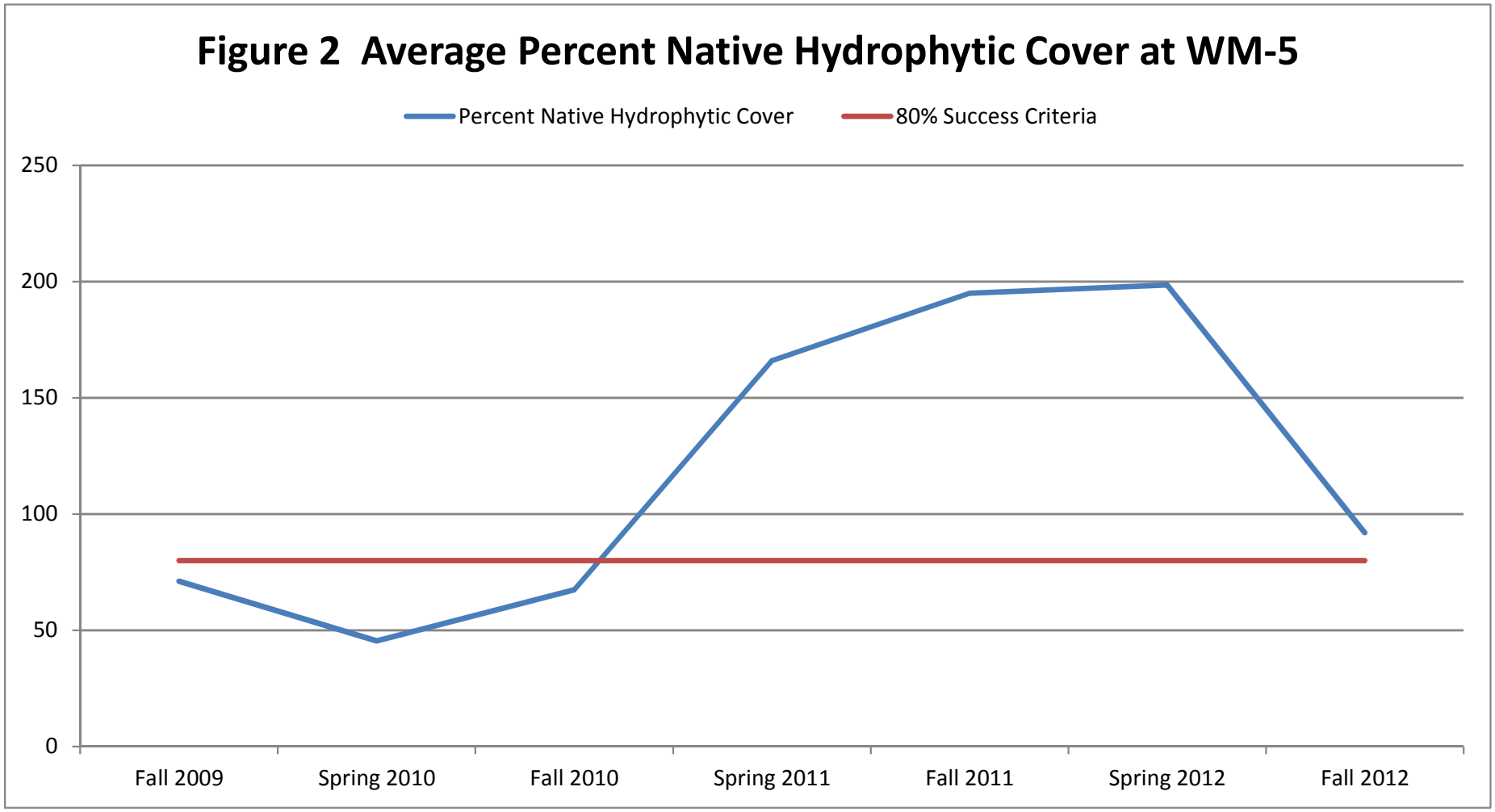
FIGURES

\\Kcm-fs-006\\data\data2\OMAHAMUD\34676\GIS-Soard\ArcMap_MXD_Files\Monitoring\Mitigation\Location.Figures\WM-5.mxd

Source: Western Air Maps 2011 Aerial Photography

Figure 1
Sample Plot Location Map for
Wetland Mitigation 5
Water Treatment Plant - Douglas County
Metropolitan Utilities District

Figure 2 Average Percent Native Hydrophytic Cover at WM-5



SECTION E-2

TABLES

Table 1 Summary of Wetland Monitoring Data for WM-5

Wetland Name: **WM-5**
Wetland Type: **PEM**
County: **Douglas**

Number of Transects/Macroplots: **1**
Number of Gradsects: **2**
Number of Sample Plots: **10**
Number of Wetland Sample Plots: **5**

Sampling Effort: **2012 Fall**

Weighted Average: **1.64**
Species Richness: **12**
Species Diversity: **15.33**
FQI: **10.50**

Percent Native Species: **75**
Percent Invasive Species: **42**
Percent Perennial/Biennial/Annual Species: **75 / 8 / 33**
Mean C-Value: **3.50**

Dominant Species:

Scientific Name	Common Name	Wetland Indicator Status	Percent Cover per Wetland
Carex lupulina	Hop sedge	FACW+	27.5
Carex vulpinoidea	Fox sedge	OBL	23
Echinochloa crus-galli	Barnyardgrass	FACW	14
Juncus effusus	Common rush	OBL	15.5

Sampling Effort: **2012 Spring**

Weighted Average: **2.18**
Species Richness: **23**
Species Diversity: **33.44**
FQI: **17.44**

Percent Native Species: **83**
Percent Invasive Species: **39**
Percent Perennial/Biennial/Annual Species: **78 / 13 / 26**
Mean C-Value: **4.00**

Dominant Species:

Scientific Name	Common Name	Wetland Indicator Status	Percent Cover per Wetland
Carex lupulina	Hop sedge	FACW+	44
Carex vulpinoidea	Fox sedge	OBL	37.5
Eupatorium perfoliatum	Common boneset	OBL	20
Juncus effusus	Common rush	OBL	24.5

Table 2 Species List and Vegetative Characteristics for WM-5

Report generated:
Friday, November 16, 2012

Sampling Effort: **2012 Fall**

Scientific Name	Common Name	Wetland Indicator Status[1]	Ecological Index[2]	C-Value	Native Status	Invasive?	Frequency[3]	Average Percent Cover[4]
Ambrosia trifida	Great ragweed	FACW	2	0	Native	☑	1	7.50
Ammannia coccinea	Valley redstem	OBL	1	4	Native	☐	1	3.00
Carex grayi	Gray's sedge	FACW	2	0	Native	☐	1	3.00
Carex lupulina	Hop sedge	FACW+	2	8	Native	☐	3	27.50
Carex sp. 1	Sedge	--	3		Native	☐	1	0.50
Carex vulpinoidea	Fox sedge	OBL	1	4	Native	☐	3	23.00
Echinochloa crus-galli	Barnyardgrass	FACW	2		Introduced	☑	4	14.00
Eupatorium perfoliatum	Common boneset	OBL	1	5	Native	☐	3	6.50
Juncus effusus	Common rush	OBL	1	6	Native	☐	2	15.50
Melilotus officinalis	Yellow sweetclover	FACU	4		Introduced	☑	1	0.50
Trifolium repens	White clover	FACU	4		Introduced	☑	2	6.00
Typha latifolia	Broadleaf cattail	OBL	1	1	Native	☑	2	6.00

Sampling Effort: **2012 Spring**

Scientific Name	Common Name	Wetland Indicator Status[1]	Ecological Index[2]	C-Value	Native Status	Invasive?	Frequency[3]	Average Percent Cover[4]
Ambrosia artemisiifolia	Annual ragweed	FACU	4	0	Native	☑	1	0.50

1 = OBL - obligate; FACW - facultative wet; FAC - facultative; FACU - facultative upland; UPL - upland; NI - no indicator

2 = Ecological Index values correspond to the wetland indicator status for each species

3 = Frequency is the total number of plots in which the species was identified

4 = Average percent cover is calcuated from the coverages estimated during this monitoring effort.

Table 2 Species List and Vegetative Characteristics for WM-5

Report generated:
Friday, November 16, 2012

Ambrosia trifida	Great ragweed	FACW	2	0	Native	☑	1	7.50
Asclepias incarnata	Swamp milkweed	OBL	1	4	Native	☑	1	0.50
Bromus arvensis	Field brome	NL	3		Introduced	☐	1	7.50
Bromus inermis	Smooth brome	NL	3		Native & Introduced	☑	1	3.00
Carex bicknellii	Bicknell's sedge	FACU	4	6	Native	☐	1	17.00
Carex brevior	Shortbeak sedge	FAC	3	4	Native	☐	3	18.00
Carex lupulina	Hop sedge	FACW+	2	8	Native	☐	3	44.00
Carex vulpinoidea	Fox sedge	OBL	1	4	Native	☐	3	37.50
Erechtites hieraciifolia	American burnweed	FAC	3	1	Native	☐	3	18.00
Eupatorium perfoliatum	Common boneset	OBL	1	5	Native	☐	2	20.00
Hordeum jubatum	Foxtail barley	FACW	2	1	Native	☑	3	6.50
Juncus effusus	Common rush	OBL	1	6	Native	☐	2	24.50
Melilotus officinalis	Yellow sweetclover	FACU	4		Introduced	☑	2	8.00
Phyla lanceolata	Lanceleaf fogfruit	OBL	1	3	Native	☐	3	4.00
Poa pratensis	Kentucky bluegrass	FACU	4		Native & Introduced	☑	2	6.00
Polygonum pensylvanicum	Pennsylvania smartweed	FACW+	2		Native	☑	1	0.50
Sagittaria latifolia	Broadleaf arrowhead	OBL	1	5	Native	☐	1	0.50
Scirpus atrovirens	Green bulrush	OBL	1	5	Native	☐	1	0.50
Scirpus pendulus	Rufous bulrush	OBL	1	8	Native	☐	1	7.50
Trifolium pratense	Red clover	FACU	4		Introduced	☐	2	6.00
Trifolium repens	White clover	FACU	4		Introduced	☑	2	10.50

1 = OBL - obligate; FACW - facultative wet; FAC - facultative; FACU - facultative upland; UPL - upland; NI - no indicator

2 = Ecological Index values correspond to the wetland indicator status for each species

3 = Frequency is the total number of plots in which the species was identified

4 = Average percent cover is calcuated from the coverages estimated during this monitoring effort.

Table 2 Species List and Vegetative Characteristics for WM-5

Report generated:
Friday, November 16, 2012

Verbena hastata	Swamp verbena	FACW	2	4	Native	☐	3	9.00

1 = OBL - obligate; FACW - facultative wet; FAC - facultative; FACU - facultative upland; UPL - upland; NI - no indicator

2 = Ecological Index values correspond to the wetland indicator status for each species

3 = Frequency is the total number of plots in which the species was identified

4 = Average percent cover is calcuated from the coverages estimated during this monitoring effort.

SECTION E-3

MITIGATION SITE WM-5 GROUND PHOTOGRAPHS

Photo 1: View south of Transect 1 in WM-5 (June 2012).

Photo 2: View east of Gradsect 1 on Transect 1 in WM-5 (June 2012).

Photo 3: View east of Gradsect 2 on Transect 1 in WM-5 (June 2012).

Photo 4: View south of Transect 1 in WM-5 (September 2012).

Photo 5: View east of Gradsect 1 on Transect 1 in WM-5 (September 2012).

Photo 6: View east of Gradsect 2 on Transect 1 in WM-5 (September 2012).

SECTION E-4

WETLAND VEGETATION COVER AND WATER DEPTH RAW DATA SHEETS

Wetland Vegetation Cover and Water Depth at WM-5

Wetland Name: **WM-5**

Wetland Transect/Gradsect #: WM5-1-1

Sampling Date: 6/25/2012 **Last Rain Date:** 6/20/2012 **Last Rain Amount (in):** 0.62

Canopy Coverage Analysis	**Plot 1**	**Plot 2**	**Plot 3**	**Plot 4**	**Plot 5**
Depth of Standing Water (in):					
Open Water (in):					
Bare Soil (in):	6	6	6	6	6
Andropogon gerardii	4		4		
Helianthus grosseserratus	5		2		
Medicago sativa		3	3	5	6
Melilotus officinalis	2				
Poa pratensis	3				
Schedonorus phoenix	6	7	6	7	6
Trifolium repens	2		4		

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

Wetland Vegetation Cover and Water Depth at WM-5

Wetland Name: **WM-5**

Wetland Transect/Gradsect #: WM5-1-2

Sampling Date: 6/25/2012 **Last Rain Date:** 6/20/2012 **Last Rain Amount (in):** 0.62

Canopy Coverage Analysis	**Plot 1**	**Plot 2**	**Plot 3**	**Plot 4**	**Plot 5**
Depth of Standing Water (in):	12				20
Open Water (in):	7	4		3	7
Bare Soil (in):	7	4	5	5	7
Ambrosia artemisiifolia				2	
Ambrosia trifida			4		
Asclepias incarnata		2			
Bromus arvensis			4		
Bromus inermis			3		
Carex bicknellii				6	
Carex brevior		4	4	3	
Carex lupulina		6	4	7	
Carex vulpinoidea		5	5	5	
Erechtites hieraciifolia		4	3	4	
Eupatorium perfoliatum			6	3	
Hordeum jubatum		3	3	2	
Juncus effusus		6		4	
Melilotus officinalis			4	2	
Phyla lanceolata		2	3	2	
Poa pratensis			3	3	
Polygonum pensylvanicum		2			
Sagittaria latifolia	2				
Scirpus atrovirens				2	
Scirpus pendulus		4			
Trifolium pratense		3		3	
Trifolium repens			4	3	
Verbena hastata		3	3	3	

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

Wetland Vegetation Cover and Water Depth at WM-5

Wetland Name: **WM-5**

Wetland Transect/Gradsect #: WM5-1-1

Sampling Date: 9/18/2012 **Last Rain Date:** 9/17/2012 **Last Rain Amount (in):** 0.19

Canopy Coverage Analysis	**Plot 1**	**Plot 2**	**Plot 3**	**Plot 4**	**Plot 5**
Depth of Standing Water (in):					
Open Water (in):					
Bare Soil (in):	6	6	5	5	5
Amaranthus retroflexus				2	
Andropogon gerardii			4		
Medicago sativa		2		5	6
Poa pratensis	3				
Schedonorus phoenix	4	4	5	5	4

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

Wetland Vegetation Cover and Water Depth at WM-5

Wetland Name: **WM-5**

Wetland Transect/Gradsect #: WM5-1-2

Sampling Date: 9/18/2012 **Last Rain Date:** 9/17/2012 **Last Rain Amount (in):** 0.19

Canopy Coverage Analysis	**Plot 1**	**Plot 2**	**Plot 3**	**Plot 4**	**Plot 5**
Depth of Standing Water (in):					
Open Water (in):					
Bare Soil (in):	7	5	5	5	7
Ambrosia trifida			4		
Ammannia coccinea					3
Carex grayi				3	
Carex lupulina		4	4	5	
Carex sp. 1					2
Carex vulpinoidea		4	5	3	
Echinochloa crus-galli	4	3		2	3
Eupatorium perfoliatum		3	3	2	
Juncus effusus		5		3	
Melilotus officinalis		2			
Trifolium repens		3		3	
Typha latifolia				3	3

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

APPENDIX I - SECTION F

WATER TREATMENT PLANT MITIGATION SITE WM-6 MONITORING DATA

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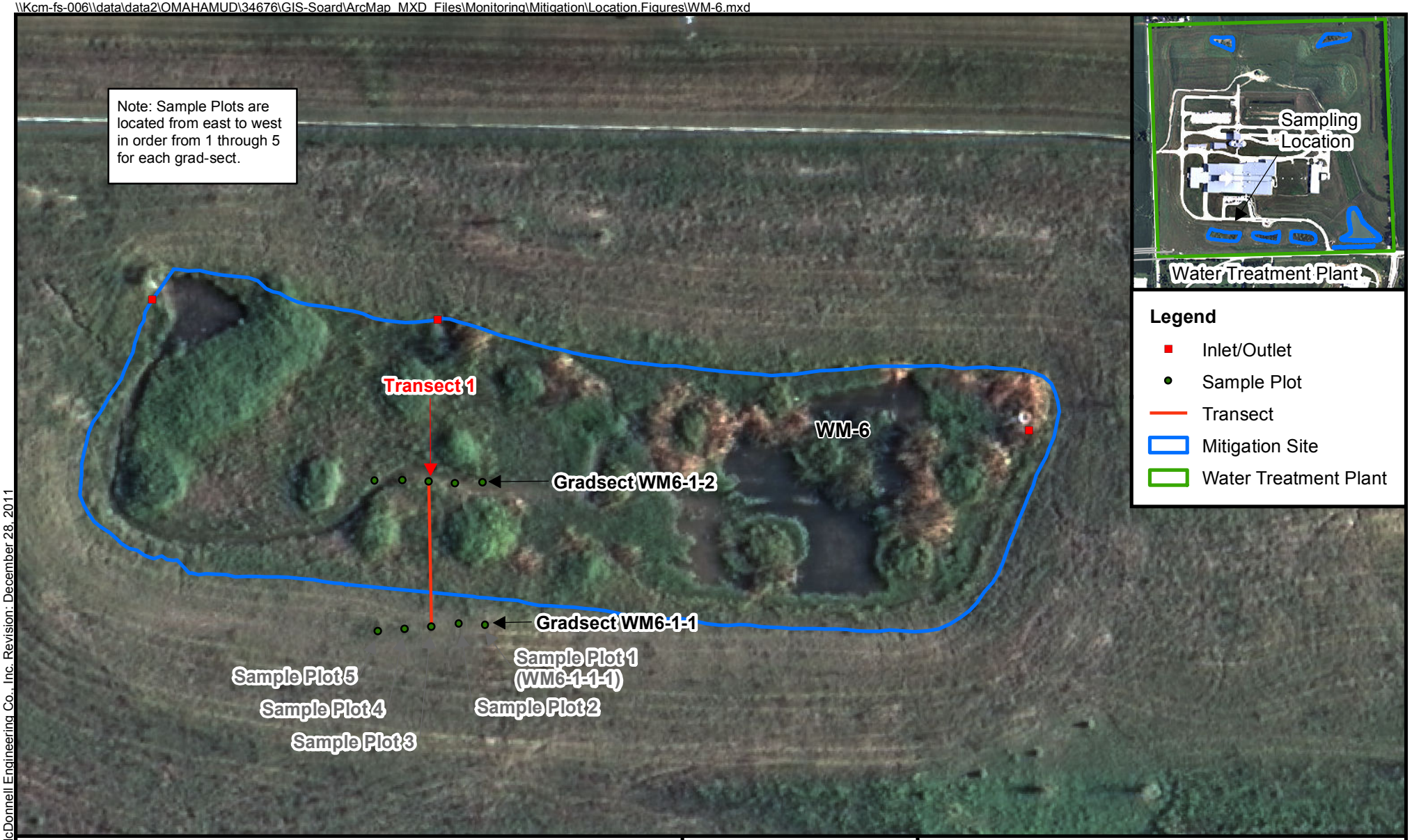
SECTION F-1

FIGURES

\\Kcm-fs-006\\data\data2\OMAHAMUD\34676\GIS-Soard\ArcMap_MXD_Files\Monitoring\Mitigation\Location.Figures\WM-6.mxd



0 25 50 75 100 Feet

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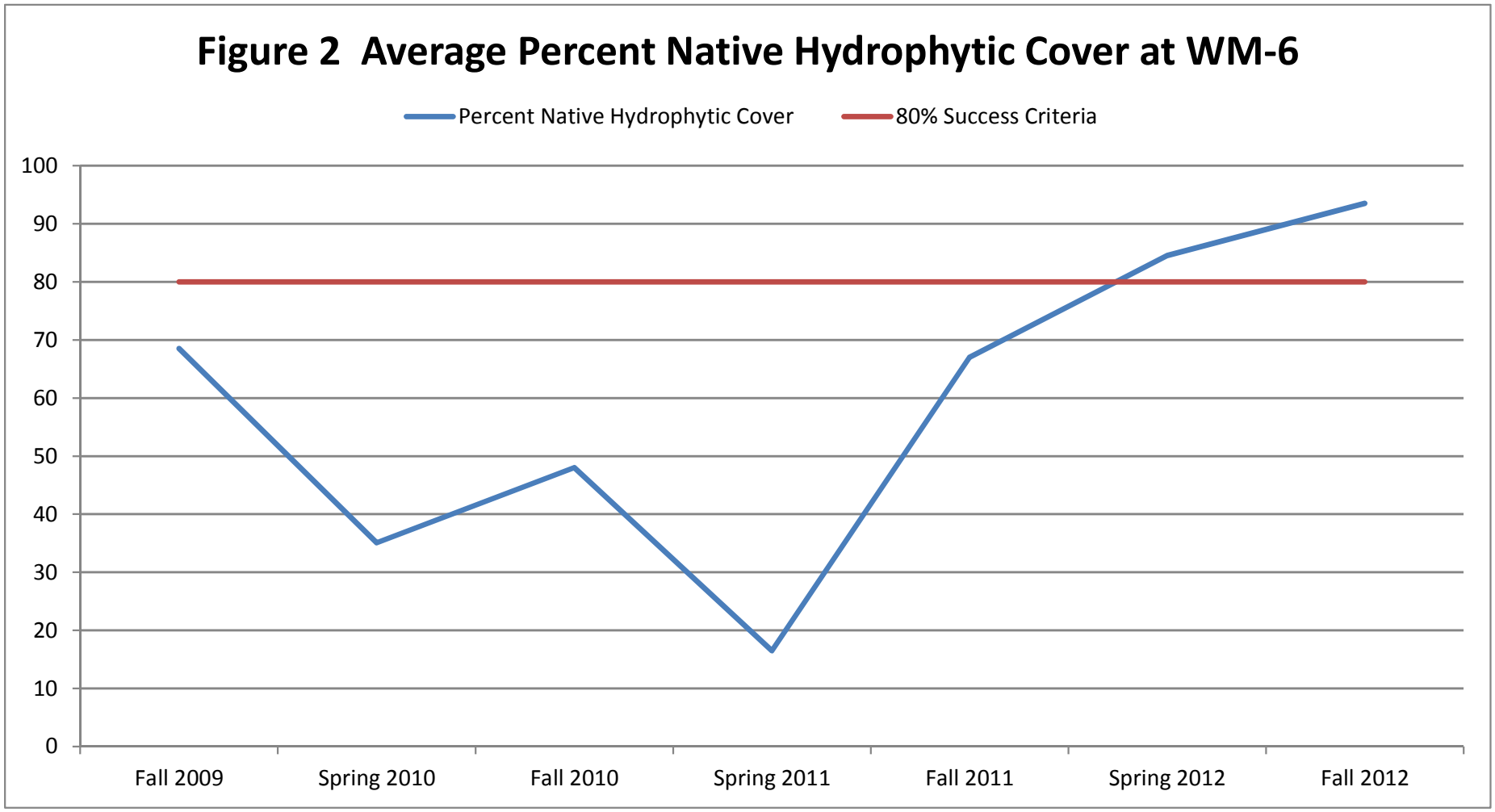
Source: Western Air Maps 2011 Aerial Photography

Burns & McDonnell SINCE 1898

Figure 1
Sample Plot Location Map for
Wetland Mitigation 6
Water Treatment Plant - Douglas County
Metropolitan Utilities District

Figure 2 Average Percent Native Hydrophytic Cover at WM-6



SECTION F-2

TABLES

Table 1 Summary of Wetland Monitoring Data for WM-6

Wetland Name: **WM-6**
Wetland Type: **PEM**
County: **Douglas**

Number of Transects/Macroplots: **1**
Number of Gradsects: **2**
Number of Sample Plots: **10**
Number of Wetland Sample Plots: **5**

Sampling Effort: **2012 Fall**

Weighted Average: **2.56**
Species Richness: **22**
Species Diversity: **28.89**
FQI: **12.09**

Percent Native Species: **77**
Percent Invasive Species: **59**
Percent Perennial/Biennial/Annual Species: **59 / 5 / 50**
Mean C-Value: **2.93**

Dominant Species:

Scientific Name	Common Name	Wetland Indicator Status	Percent Cover per Wetland
Panicum capillare	Witchgrass	FAC	13.5
Salix amygdaloides	Peachleaf willow	FACW	23
Setaria pumila ssp. pumila	Yellow foxtail	FAC	14

Sampling Effort: **2012 Spring**

Weighted Average: **2.39**
Species Richness: **18**
Species Diversity: **19.69**
FQI: **13.56**

Percent Native Species: **83**
Percent Invasive Species: **50**
Percent Perennial/Biennial/Annual Species: **78 / 6 / 33**
Mean C-Value: **3.50**

Dominant Species:

Scientific Name	Common Name	Wetland Indicator Status	Percent Cover per Wetland
Carex vulpinoidea	Fox sedge	OBL	8
Elymus virginicus	Virginia wildrye	FAC	26.5
Lythrum alatum	Winged lythrum	OBL	12.5
Schedonorus phoenix	Tall fescue	FACU	13.5

Table 2 Species List and Vegetative Characteristics for WM-6

Report generated:
Friday, November 16, 2012

Sampling Effort: **2012 Fall**

Scientific Name	Common Name	Wetland Indicator Status[1]	Ecological Index[2]	C-Value	Native Status	Invasive?	Frequency[3]	Average Percent Cover[4]
Amaranthus retroflexus	Redroot amaranth	FACU	4		Native	☑	1	0.50
Ambrosia trifida	Great ragweed	FACW	2	0	Native	☑	2	3.50
Carex vulpinoidea	Fox sedge	OBL	1	4	Native	☐	2	10.50
Cerastium nutans	nodding chickweed	FACU	4	4	Native	☐	1	3.00
Echinochloa crus-galli	Barnyardgrass	FACW	2		Introduced	☑	1	3.00
Elymus virginicus	Virginia wildrye	FAC	3	4	Native	☐	2	10.50
Equisetum hyemale	Scouringrush horsetail	FACW	2	4	Native	☐	1	0.50
Helianthus annuus	Common sunflower	FACU	4	0	Native	☑	1	3.00
Helianthus tuberosus	Jerusalem artichoke	FAC	3	4	Native	☑	2	6.00
Lycopus americanus	American water horehound	OBL	1	4	Native	☑	1	3.00
Lythrum alatum	Winged lythrum	OBL	1	6	Native	☐	4	9.50
Melilotus officinalis	Yellow sweetclover	FACU	4		Introduced	☑	2	10.50
Panicum capillare	Witchgrass	FAC	3	0	Native	☑	3	13.50
Polygonum pensylvanicum	Pennsylvania smartweed	FACW+	2		Native	☑	3	6.50
Populus deltoides	Eastern cottonwood	FAC	3	3	Native	☐	1	0.50
Salix amygdaloides	Peachleaf willow	FACW	2	4	Native	☐	3	23.00
Salix interior	Sandbar willow	NL	3	3	Native	☐	1	3.00
Schedonorus phoenix	Tall fescue	FACU	4		Introduced	☑	1	3.00

1 = OBL - obligate; FACW - facultative wet; FAC - facultative; FACU - facultative upland; UPL - upland; NI - no indicator

2 = Ecological Index values correspond to the wetland indicator status for each species

3 = Frequency is the total number of plots in which the species was identified

4 = Average percent cover is calcuated from the coverages estimated during this monitoring effort.

Table 2 Species List and Vegetative Characteristics for WM-6

Report generated:
Friday, November 16, 2012

Setaria faberi	Japanese bristlegrass	UPL	5		Introduced	☑	1	3.00
Setaria pumila ssp. pumila	Yellow foxtail	FAC	3		Introduced	☑	4	14.00
Solidago gigantea	Giant goldenrod	FACW	2	3	Native	☐	1	3.00
Xanthium strumarium	Rough cocklebur	FAC	3	1	Native	☑	2	3.50

Sampling Effort: **2012 Spring**

Scientific Name	Common Name	Wetland Indicator Status[1]	Ecological Index[2]	C-Value	Native Status	Invasive?	Frequency[3]	Average Percent Cover[4]
Ambrosia trifida	Great ragweed	FACW	2	0	Native	☑	1	0.50
Carex vulpinoidea	Fox sedge	OBL	1	4	Native	☐	2	8.00
Echinochloa crus-galli	Barnyardgrass	FACW	2		Introduced	☑	2	6.00
Eleocharis obtusa	Blunt spikerush	OBL	1	3	Native	☐	1	3.00
Elymus virginicus	Virginia wildrye	FAC	3	4	Native	☐	5	26.50
Equisetum hyemale	Scouringrush horsetail	FACW	2	4	Native	☐	1	0.50
Helianthus grosseserratus	Sawtooth sunflower	FACW	2	4	Native	☑	2	6.00
Juncus dudleyi	Dudley's rush	NL	3	5	Native	☐	2	6.00
Lycopus americanus	American water horehound	OBL	1	4	Native	☑	2	3.50
Lythrum alatum	Winged lythrum	OBL	1	6	Native	☐	5	12.50
Melilotus officinalis	Yellow sweetclover	FACU	4		Introduced	☑	2	1.00
Polygonum pensylvanicum	Pennsylvania smartweed	FACW+	2		Native	☑	1	3.00
Populus deltoides	Eastern cottonwood	FAC	3	3	Native	☐	1	0.50

1 = OBL - obligate; FACW - facultative wet; FAC - facultative; FACU - facultative upland; UPL - upland; NI - no indicator

2 = Ecological Index values correspond to the wetland indicator status for each species

3 = Frequency is the total number of plots in which the species was identified

4 = Average percent cover is calcuated from the coverages estimated during this monitoring effort.

Table 2 Species List and Vegetative Characteristics for WM-6

Report generated:
Friday, November 16, 2012

Salix amygdaloides	Peachleaf willow	FACW	2	4	Native	☐	1	7.50
Salix interior	Sandbar willow	NL	3	3	Native	☐	1	3.00
Schedonorus phoenix	Tall fescue	FACU	4		Introduced	☑	3	13.50
Teucrium canadense	Canada germander	FACW	2	4	Native	☑	1	3.00
Xanthium strumarium	Rough cocklebur	FAC	3	1	Native	☑	3	4.00

1 = OBL - obligate; FACW - facultative wet; FAC - facultative; FACU - facultative upland; UPL - upland; NI - no indicator

2 = Ecological Index values correspond to the wetland indicator status for each species

3 = Frequency is the total number of plots in which the species was identified

4 = Average percent cover is calcuated from the coverages estimated during this monitoring effort.

SECTION F-3

MITIGATION SITE WM-6 GROUND PHOTOGRAPHS

Photo 1: View north of Transect 1 in WM-6 (June 2012).

Photo 2: View east of Gradsect 1 on Transect 1 in WM-6 (June 2012).

Photo 3: View east of Gradsect 2 on Transect 1 in WM-6 (June 2012).

Photo 4: View north of Transect 1 in WM-6 (September 2012).

Photo 5: View east of Gradsect 1 on Transect 1 in WM-6 (September 2012).

Photo 6: View east of Gradsect 2 on Transect 1 in WM-6 (September 2012).

SECTION F-4

WETLAND VEGETATION COVER AND WATER DEPTH RAW DATA SHEETS

Wetland Vegetation Cover and Water Depth at WM-6

Wetland Name: **WM-6**

Wetland Transect/Gradsect #: WM6-1-1

Sampling Date: 6/25/2012 **Last Rain Date:** 6/20/2012 **Last Rain Amount (in):** 0.62

Canopy Coverage Analysis	**Plot 1**	**Plot 2**	**Plot 3**	**Plot 4**	**Plot 5**
Depth of Standing Water (in):					
Open Water (in):					
Bare Soil (in):	6	6	6	5	6
Andropogon gerardii	4	5	5	4	4
Bouteloua curtipendula			4	3	4
Helianthus annuus	3		2	2	3
Melilotus officinalis	5	3	3	4	
Poa pratensis	6	5	5	5	4
Schedonorus phoenix	4				
Schizachyrium scoparium			4	3	5

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

Wetland Vegetation Cover and Water Depth at WM-6

Wetland Name: **WM-6**

Wetland Transect/Gradsect #: WM6-1-2

Sampling Date: 6/25/2012 **Last Rain Date:** 6/20/2012 **Last Rain Amount (in):** 0.62

Canopy Coverage Analysis	Plot 1	Plot 2	Plot 3	Plot 4	Plot 5
Depth of Standing Water (in):			4.5		
Open Water (in):			6	4	
Bare Soil (in):	6	7	7	6	6
Ambrosia trifida		2			
Carex vulpinoidea	4	2			
Echinochloa crus-galli	3	3			
Eleocharis obtusa			3		
Elymus virginicus	3	3	2	4	5
Equisetum hyemale			2		
Helianthus grosseserratus	3	3			
Juncus dudleyi	3				3
Lycopus americanus		3			2
Lythrum alatum	3	3	2	3	3
Melilotus officinalis	2			2	
Polygonum pensylvanicum			3		
Populus deltoides					2
Salix amygdaloides	4				
Salix interior				3	
Schedonorus phoenix			3	3	4
Teucrium canadense	3				
Xanthium strumarium	2	3	2		

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

Wetland Vegetation Cover and Water Depth at WM-6

Wetland Name: **WM-6**

Wetland Transect/Gradsect #: WM6-1-1

Sampling Date: 9/18/2012 **Last Rain Date:** 9/17/2012 **Last Rain Amount (in):** 0.19

Canopy Coverage Analysis	**Plot 1**	**Plot 2**	**Plot 3**	**Plot 4**	**Plot 5**
Depth of Standing Water (in):					
Open Water (in):					
Bare Soil (in):	6	6	6	5	6
Andropogon gerardii		3	3	3	4
Bouteloua curtipendula			3	5	4
Helianthus tuberosus				2	3
Melilotus officinalis	5	2	3	4	3
Poa pratensis	5		4	4	4
Schedonorus phoenix	5	3			4
Schizachyrium scoparium	4	4	6	3	3

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

Wetland Vegetation Cover and Water Depth at WM-6

Wetland Name: **WM-6**

Wetland Transect/Gradsect #: WM6-1-2

Sampling Date: 9/18/2012 **Last Rain Date:** 9/17/2012 **Last Rain Amount (in):** 0.19

Canopy Coverage Analysis	**Plot 1**	**Plot 2**	**Plot 3**	**Plot 4**	**Plot 5**
Depth of Standing Water (in):					
Open Water (in):					
Bare Soil (in):	6	6	7	7	5
Amaranthus retroflexus		2			
Ambrosia trifida		3		2	
Carex vulpinoidea	4	3			
Cerastium nutans			3		
Echinochloa crus-galli			3		
Elymus virginicus	3				4
Equisetum hyemale					2
Helianthus annuus		3			
Helianthus tuberosus	3	3			
Lycopus americanus		3			
Lythrum alatum		3	3	2	3
Melilotus officinalis	3				4
Panicum capillare	3	4		3	
Polygonum pensylvanicum		2	3	3	
Populus deltoides		2			
Salix amygdaloides	5	4		3	
Salix interior				3	
Schedonorus phoenix					3
Setaria faberi					3
Setaria pumila ssp. pumila	4	3	2	3	
Solidago gigantea			3		
Xanthium strumarium			3	2	

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

APPENDIX I - SECTION G

WATER TREATMENT PLANT MITIGATION SITE WM-7 MONITORING DATA

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SECTION G-1

FIGURES

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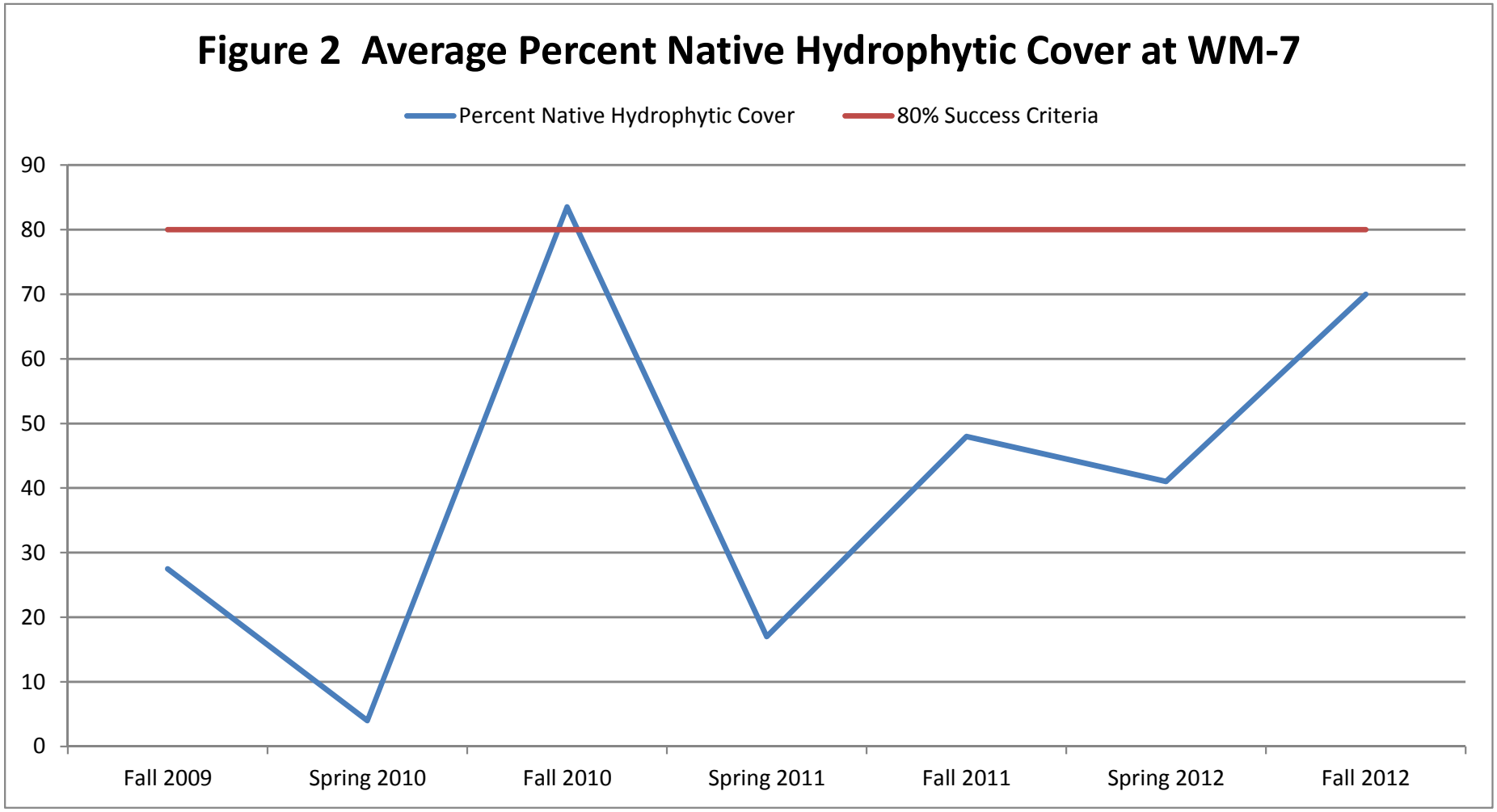
Feet
0 25 50 75 100

N

Source: Western Air Maps 2011 Aerial Photography

Figure 1
Sample Plot Location Map for
Wetland Mitigation 7
Water Treatment Plant - Douglas County
Metropolitan Utilities District

Figure 2 Average Percent Native Hydrophytic Cover at WM-7



SECTION G-2

TABLES

Table 1 Summary of Wetland Monitoring Data for WM-7

Wetland Name: **WM-7**
Wetland Type: **PEM**
County: **Douglas**

Number of Transects/Macroplots: **1**
Number of Gradsects: **2**
Number of Sample Plots: **10**
Number of Wetland Sample Plots: **5**

Sampling Effort: **2012 Fall**

Weighted Average: **1.66**
Species Richness: **9**
Species Diversity: **19.50**
FQI: **12.93**

Percent Native Species: **89**
Percent Invasive Species: **44**
Percent Perennial/Biennial/Annual Species: **78 / 0 / 22**
Mean C-Value: **4.57**

Dominant Species:

Scientific Name	Common Name	Wetland Indicator Status	Percent Cover per Wetland
Carex lupulina	Hop sedge	FACW+	29.5
Carex vulpinoidea	Fox sedge	OBL	25
Echinochloa crus-galli	Barnyardgrass	FACW	20
Symphyotrichum novae-angliae	New England aster	FACW	6

Sampling Effort: **2012 Spring**

Weighted Average: **1.82**
Species Richness: **8**
Species Diversity: **18.33**
FQI: **14.85**

Percent Native Species: **100**
Percent Invasive Species: **13**
Percent Perennial/Biennial/Annual Species: **100 / 0 / 0**
Mean C-Value: **5.25**

Dominant Species:

Scientific Name	Common Name	Wetland Indicator Status	Percent Cover per Wetland
Carex brevior	Shortbeak sedge	FAC	6
Carex lupulina	Hop sedge	FACW+	15
Carex vulpinoidea	Fox sedge	OBL	6
Juncus effusus	Common rush	OBL	7.5

Table 2 Species List and Vegetative Characteristics for WM-7

Report generated:
Friday, November 16, 2012

Sampling Effort: **2012 Fall**

Scientific Name	Common Name	Wetland Indicator Status[1]	Ecological Index[2]	C-Value	Native Status	Invasive?	Frequency[3]	Average Percent Cover[4]
Amaranthus retroflexus	Redroot amaranth	FACU	4		Native	☑	1	0.50
Carex lupulina	Hop sedge	FACW+	2	8	Native	☐	2	29.50
Carex vulpinoidea	Fox sedge	OBL	1	4	Native	☐	2	25.00
Echinochloa crus-galli	Barnyardgrass	FACW	2		Introduced	☑	2	20.00
Helenium autumnale	Common sneezeweed	FACW	2	6	Native	☑	1	3.00
Juncus effusus	Common rush	OBL	1	6	Native	☐	1	3.00
Phyla lanceolata	Lanceleaf fogfruit	OBL	1	3	Native	☐	1	0.50
Symphyotrichum novae-angli	New England aster	FACW	2	4	Native	☐	2	6.00
Typha latifolia	Broadleaf cattail	OBL	1	1	Native	☑	1	3.00

Sampling Effort: **2012 Spring**

Scientific Name	Common Name	Wetland Indicator Status[1]	Ecological Index[2]	C-Value	Native Status	Invasive?	Frequency[3]	Average Percent Cover[4]
Carex bicknellii	Bicknell's sedge	FACU	4	6	Native	☐	1	3.00
Carex brevior	Shortbeak sedge	FAC	3	4	Native	☐	2	6.00
Carex lupulina	Hop sedge	FACW+	2	8	Native	☐	2	15.00
Carex vulpinoidea	Fox sedge	OBL	1	4	Native	☐	2	6.00

1 = OBL - obligate; FACW - facultative wet; FAC - facultative; FACU - facultative upland; UPL - upland; NI - no indicator

2 = Ecological Index values correspond to the wetland indicator status for each species

3 = Frequency is the total number of plots in which the species was identified

4 = Average percent cover is calcuated from the coverages estimated during this monitoring effort.

Table 2 Species List and Vegetative Characteristics for WM-7

Report generated:
Friday, November 16, 2012

Eupatorium perfoliatum	Common boneset	OBL	1	5	Native	☐	1	3.00
Juncus effusus	Common rush	OBL	1	6	Native	☐	1	7.50
Lycopus americanus	American water horehound	OBL	1	4	Native	☑	1	0.50
Potamogeton foliosus	Leafy pondweed	OBL	1	5	Native	☐	1	3.00

1 = OBL - obligate; FACW - facultative wet; FAC - facultative; FACU - facultative upland; UPL - upland; NI - no indicator

2 = Ecological Index values correspond to the wetland indicator status for each species

3 = Frequency is the total number of plots in which the species was identified

4 = Average percent cover is calcuated from the coverages estimated during this monitoring effort.

SECTION G-3

MITIGATION SITE WM-7 GROUND PHOTOGRAPHS

Photo 1: View south of Transect 1 in WM-7 (June 2012).

Photo 2: View east of Gradsect 1 on Transect 1 in WM-7 (June 2012).

Photo 3: View east of Gradsect 2 on Transect 1 in WM-7 (June 2012).

Photo 4: View south of Transect 1 in WM-7 (September 2012).

Photo 5: View east of Gradsect 1 on Transect 1 in WM-7 (September 2012).

Photo 6: View east of Gradsect 2 on Transect 1 in WM-7 (September 2012).

SECTION G-4

WETLAND VEGETATION COVER AND WATER DEPTH RAW DATA SHEETS

Wetland Vegetation Cover and Water Depth at WM-7

Wetland Name: **WM-7**

Wetland Transect/Gradsect #: WM7-1-1

Sampling Date: 6/25/2012 **Last Rain Date:** 6/20/2012 **Last Rain Amount (in):** 0.62

Canopy Coverage Analysis	**Plot 1**	**Plot 2**	**Plot 3**	**Plot 4**	**Plot 5**
Depth of Standing Water (in):					
Open Water (in):					
Bare Soil (in):	5	6	5	5	5
Agrostis stolonifera					4
Andropogon gerardii	4	4	4	3	3
Bouteloua curtipendula	4				
Bromus inermis	4				
Elymus canadensis			4	4	
Helianthus maximiliani		2			2
Melilotus officinalis	2				
Poa pratensis	5	4	3	4	4
Schedonorus phoenix	5		4	4	4
Schizachyrium scoparium		6	5	4	5

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

Wetland Vegetation Cover and Water Depth at WM-7

Wetland Name: **WM-7**

Wetland Transect/Gradsect #: WM7-1-2

Sampling Date: 6/25/2012 **Last Rain Date:** 6/20/2012 **Last Rain Amount (in):** 0.62

Canopy Coverage Analysis	**Plot 1**	**Plot 2**	**Plot 3**	**Plot 4**	**Plot 5**
Depth of Standing Water (in):	4.5	5	30	20	20
Open Water (in):	7	7	7	7	7
Bare Soil (in):	7	7	7	7	7
Carex bicknellii		3			
Carex brevior	3	3			
Carex lupulina	4	4			
Carex vulpinoidea	3	3			
Eupatorium perfoliatum	3				
Juncus effusus	4				
Lycopus americanus		2			
Potamogeton foliosus	3				

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

Wetland Vegetation Cover and Water Depth at WM-7

Wetland Name: **WM-7**

Wetland Transect/Gradsect #: WM7-1-1

Sampling Date: 9/18/2012 **Last Rain Date:** 9/17/2012 **Last Rain Amount (in):** 0.19

Canopy Coverage Analysis	**Plot 1**	**Plot 2**	**Plot 3**	**Plot 4**	**Plot 5**
Depth of Standing Water (in):					
Open Water (in):					
Bare Soil (in):	4	6	5	4	4
Bouteloua curtipendula	6		5	4	4
Bromus inermis	4	4	5		4
Elymus canadensis			4		
Helianthus tuberosus		2			
Poa pratensis	3	3	3		4
Schedonorus phoenix	4	4	4	4	5
Schizachyrium scoparium		5	5	5	5

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

Wetland Vegetation Cover and Water Depth at WM-7

Wetland Name: **WM-7**

Wetland Transect/Gradsect #: WM7-1-2

Sampling Date: 9/18/2012 **Last Rain Date:** 9/17/2012 **Last Rain Amount (in):** 0.19

Canopy Coverage Analysis	**Plot 1**	**Plot 2**	**Plot 3**	**Plot 4**	**Plot 5**
Depth of Standing Water (in):	3	4.5	28	22	18
Open Water (in):	6	6	7	7	7
Bare Soil (in):	6	6	7	7	7
Amaranthus retroflexus	2				
Carex lupulina	6	5			
Carex vulpinoidea	5	5			
Echinochloa crus-galli	4	5			
Helenium autumnale	3				
Juncus effusus	3				
Phyla lanceolata	2				
Symphyotrichum novae-angli	3	3			
Typha latifolia					3

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

APPENDIX I - SECTION H

WATER TREATMENT PLANT MITIGATION SITE WM-8 MONITORING DATA

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SECTION H-1

FIGURES

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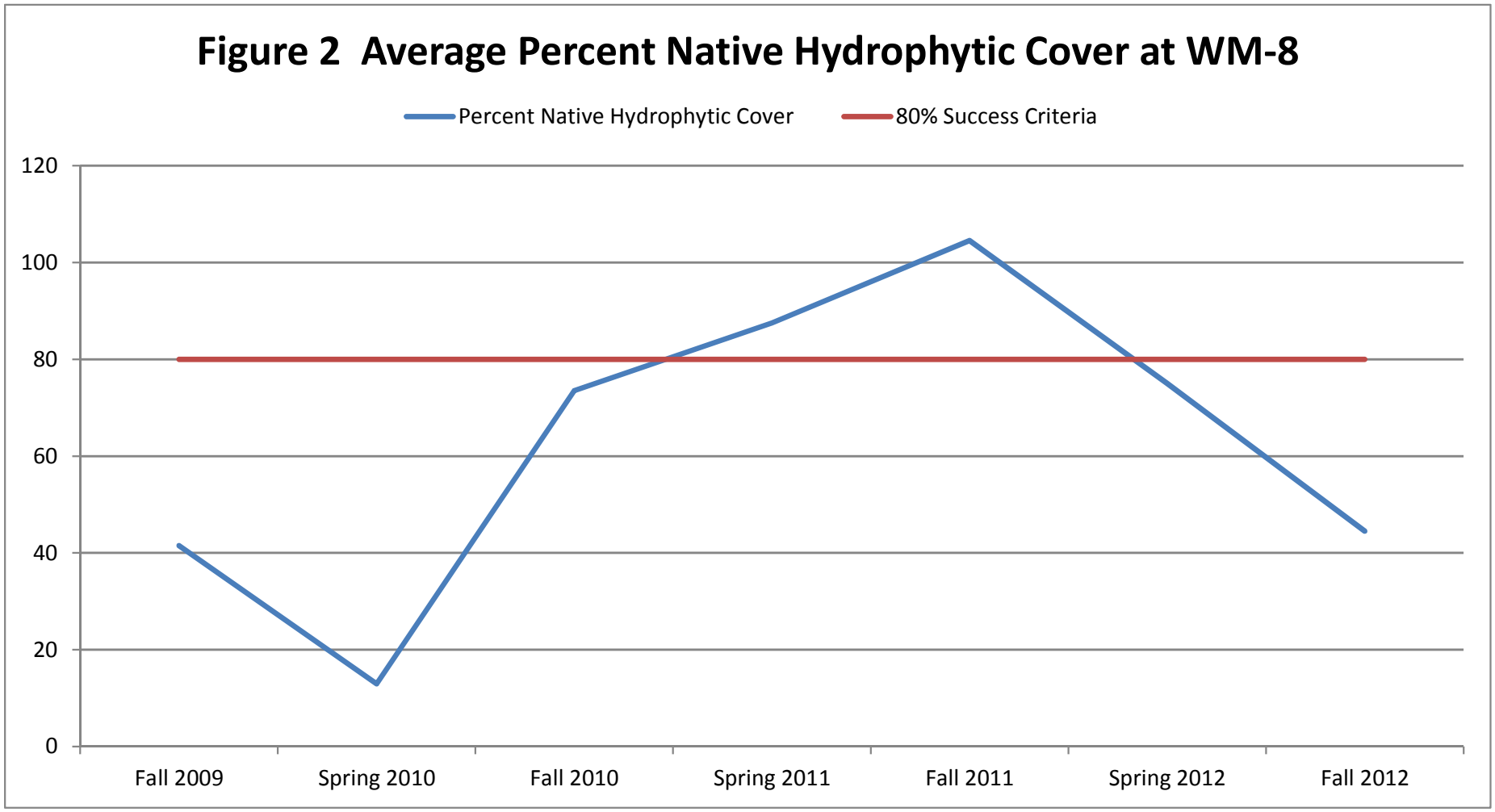
Feet
0 25 50 75 100

N

Source: Western Air Maps 2011 Aerial Photography

Figure 1
Sample Plot Location Map for
Wetland Mitigation 8
Water Treatment Plant - Douglas County
Metropolitan Utilities District

Figure 2 Average Percent Native Hydrophytic Cover at WM-8



SECTION H-2

TABLES

Table 1 Summary of Wetland Monitoring Data for WM-8

Wetland Name: **WM-8**
Wetland Type: **PEM**
County: **Douglas**

Number of Transects/Macroplots: **1**
Number of Gradsects: **2**
Number of Sample Plots: **10**
Number of Wetland Sample Plots: **5**

Sampling Effort: **2012 Fall**

Weighted Average: **2.65**
Species Richness: **16**
Species Diversity: **42.00**
FQI: **12.62**

Percent Native Species: **81**
Percent Invasive Species: **31**
Percent Perennial/Biennial/Annual Species: **88 / 6 / 19**
Mean C-Value: **3.50**

Dominant Species:

Scientific Name	Common Name	Wetland Indicator Status	Percent Cover per Wetland
Oligoneuron riddellii	Riddell's goldenrod	NI	12.5

Sampling Effort: **2012 Spring**

Weighted Average: **2.72**
Species Richness: **15**
Species Diversity: **38.00**
FQI: **13.54**

Percent Native Species: **80**
Percent Invasive Species: **40**
Percent Perennial/Biennial/Annual Species: **87 / 7 / 20**
Mean C-Value: **3.91**

Dominant Species:

Scientific Name	Common Name	Wetland Indicator Status	Percent Cover per Wetland
Elymus virginicus	Virginia wildrye	FAC	20
Helianthus grosseserratus	Sawtooth sunflower	FACW	15
Melilotus officinalis	Yellow sweetclover	FACU	15.5
Salix interior	Sandbar willow	NL	20

Table 2 Species List and Vegetative Characteristics for WM-8

Report generated:
Friday, November 16, 2012

Sampling Effort: **2012 Fall**

Scientific Name	Common Name	Wetland Indicator Status[1]	Ecological Index[2]	C-Value	Native Status	Invasive?	Frequency[3]	Average Percent Cover[4]
Ambrosia trifida	Great ragweed	FACW	2	0	Native	☑	1	3.00
Carex lupulina	Hop sedge	FACW+	2	8	Native	☐	2	10.50
Echinochloa crus-galli	Barnyardgrass	FACW	2		Introduced	☑	2	10.50
Elymus virginicus	Virginia wildrye	FAC	3	4	Native	☐	2	10.50
Eupatorium perfoliatum	Common boneset	OBL	1	5	Native	☐	1	3.00
Helianthus tuberosus	Jerusalem artichoke	FAC	3	4	Native	☑	1	7.50
Hydrophyllum virginianum	eastern waterleaf	FACW	2	2	Native	☐	1	0.50
Juncus effusus	Common rush	OBL	1	6	Native	☐	1	3.00
Melilotus officinalis	Yellow sweetclover	FACU	4		Introduced	☑	2	10.50
Oligoneuron riddellii	Riddell's goldenrod	NI	3		Native	☐	1	12.50
Phyla lanceolata	Lanceleaf fogfruit	OBL	1	3	Native	☐	1	0.50
Rumex sp.	Dock	--	3		--	☐	1	7.50
Salix interior	Sandbar willow	NL	3	3	Native	☐	2	10.50
Symphyotrichum lanceolatum	White panicle aster	NI	3	2	Native	☐	1	7.50
Symphyotrichum novae-angli	New England aster	FACW	2	4	Native	☐	1	3.00
Typha latifolia	Broadleaf cattail	OBL	1	1	Native	☑	1	3.00

1 = OBL - obligate; FACW - facultative wet; FAC - facultative; FACU - facultative upland; UPL - upland; NI - no indicator

2 = Ecological Index values correspond to the wetland indicator status for each species

3 = Frequency is the total number of plots in which the species was identified

4 = Average percent cover is calcuated from the coverages estimated during this monitoring effort.

Table 2 Species List and Vegetative Characteristics for WM-8

Report generated:
Friday, November 16, 2012

Sampling Effort: **2012 Spring**

Scientific Name	Common Name	Wetland Indicator Status[1]	Ecological Index[2]	C-Value	Native Status	Invasive?	Frequency[3]	Average Percent Cover[4]
Ambrosia trifida	Great ragweed	FACW	2	0	Native	☑	1	3.00
Bromus arvensis	Field brome	NL	3		Introduced	☐	1	7.50
Carex lupulina	Hop sedge	FACW+	2	8	Native	☐	1	12.50
Elymus virginicus	Virginia wildrye	FAC	3	4	Native	☐	2	20.00
Helianthus grosseserratus	Sawtooth sunflower	FACW	2	4	Native	☑	2	15.00
Juncus effusus	Common rush	OBL	1	6	Native	☐	2	8.00
Juncus interior	Inland rush	FAC	3	4	Native	☐	1	3.00
Melilotus officinalis	Yellow sweetclover	FACU	4		Introduced	☑	2	15.50
Poa pratensis	Kentucky bluegrass	FACU	4		Native & Introduced	☑	1	7.50
Rumex crispus	Curly dock	FACW	2		Introduced	☑	1	7.50
Salix interior	Sandbar willow	NL	3	3	Native	☐	2	20.00
Symphyotrichum lanceolatum	White panicle aster	NI	3	2	Native	☐	1	7.50
Symphyotrichum praealtum	Willowleaf aster	FACW	2	5	Native	☐	1	3.00
Typha latifolia	Broadleaf cattail	OBL	1	1	Native	☑	1	3.00
Zizia aurea	Golden zizia	FAC	3	6	Native	☐	1	7.50

1 = OBL - obligate; FACW - facultative wet; FAC - facultative; FACU - facultative upland; UPL - upland; NI - no indicator

2 = Ecological Index values correspond to the wetland indicator status for each species

3 = Frequency is the total number of plots in which the species was identified

4 = Average percent cover is calcuated from the coverages estimated during this monitoring effort.

SECTION H-3

MITIGATION SITE WM-8 GROUND PHOTOGRAPHS

Photo 1: View north of Transect 1 in WM-8 (June 2012).

Photo 2: View east of Gradsect 1 on Transect 1 in WM-8 (June 2012).

Photo 3: View east of Gradsect 2 on Transect 1 in WM-8 (June 2012).

Photo 4: View north of Transect 1 in WM-8 (September 2012).

Photo 5: View east of Gradsect 1 on Transect 1 in WM-8 (September 2012).

Photo 6: View east of Gradsect 2 on Transect 1 in WM-8 (September 2012).

SECTION H-4

WETLAND VEGETATION COVER AND WATER DEPTH RAW DATA SHEETS

Wetland Vegetation Cover and Water Depth at WM-8

Wetland Name: **WM-8**

Wetland Transect/Gradsect #: WM8-1-1

Sampling Date: 6/25/2012 **Last Rain Date:** 6/20/2012 **Last Rain Amount (in):** 0.62

Canopy Coverage Analysis	**Plot 1**	**Plot 2**	**Plot 3**	**Plot 4**	**Plot 5**
Depth of Standing Water (in):					
Open Water (in):					
Bare Soil (in):	6	6	6	6	6
Desmanthus illinoensis		3			
Helianthus annuus	3				
Helianthus maximiliani	2	3	3	3	3
Melilotus officinalis		3	3	5	2
Poa pratensis	5	5	5	4	5
Schedonorus phoenix	6	4	6	6	6

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

Wetland Vegetation Cover and Water Depth at WM-8

Wetland Name: **WM-8**

Wetland Transect/Gradsect #: WM8-1-2

Sampling Date: 6/25/2012 **Last Rain Date:** 6/20/2012 **Last Rain Amount (in):** 0.62

Canopy Coverage Analysis	**Plot 1**	**Plot 2**	**Plot 3**	**Plot 4**	**Plot 5**
Depth of Standing Water (in):		10	14	12	
Open Water (in):		7	7	7	
Bare Soil (in):	6	7	7	7	6
Ambrosia trifida					3
Bromus arvensis					4
Carex lupulina	5				
Elymus virginicus	4				5
Helianthus grosseserratus	4				4
Juncus effusus	4				2
Juncus interior	3				
Melilotus officinalis	3				5
Poa pratensis	4				
Rumex crispus					4
Salix interior	4				5
Symphyotrichum lanceolatum					4
Symphyotrichum praealtum	3				
Typha latifolia	3				
Zizia aurea	4				

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

Wetland Vegetation Cover and Water Depth at WM-8

Wetland Name: **WM-8**

Wetland Transect/Gradsect #: WM8-1-1

Sampling Date: 9/18/2012 **Last Rain Date:** 9/17/2012 **Last Rain Amount (in):** 0.19

Canopy Coverage Analysis	Plot 1	Plot 2	Plot 3	Plot 4	Plot 5
Depth of Standing Water (in):					
Open Water (in):					
Bare Soil (in):	5	6	5	5	5
Helianthus tuberosus	3	3	2	3	3
Melilotus officinalis		3	3	4	
Poa pratensis	3	4	4	4	3
Schedonorus phoenix	5	4	5	6	6
Schizachyrium scoparium	4	5	3		

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

Wetland Vegetation Cover and Water Depth at WM-8

Wetland Name: **WM-8**

Wetland Transect/Gradsect #: WM8-1-2

Sampling Date: 9/18/2012 **Last Rain Date:** 9/17/2012 **Last Rain Amount (in):** 0.19

Canopy Coverage Analysis	Plot 1	Plot 2	Plot 3	Plot 4	Plot 5
Depth of Standing Water (in):		4.5	8	5	
Open Water (in):		7	7	7	
Bare Soil (in):	5	7	7	7	6
Ambrosia trifida					3
Carex lupulina	4				3
Echinochloa crus-galli		3		4	
Elymus virginicus	3				4
Eupatorium perfoliatum	3				
Helianthus tuberosus					4
Hydrophyllum virginianum	2				
Juncus effusus	3				
Melilotus officinalis	4				3
Oligoneuron riddellii	5				
Phyla lanceolata	2				
Rumex sp.					4
Salix interior	3				4
Symphyotrichum lanceolatum					4
Symphyotrichum novae-angli					3
Typha latifolia	3				

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

APPENDIX I - SECTION I

WATER TREATMENT PLANT MITIGATION SITE WM-9 MONITORING DATA

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SECTION I-1

FIGURES

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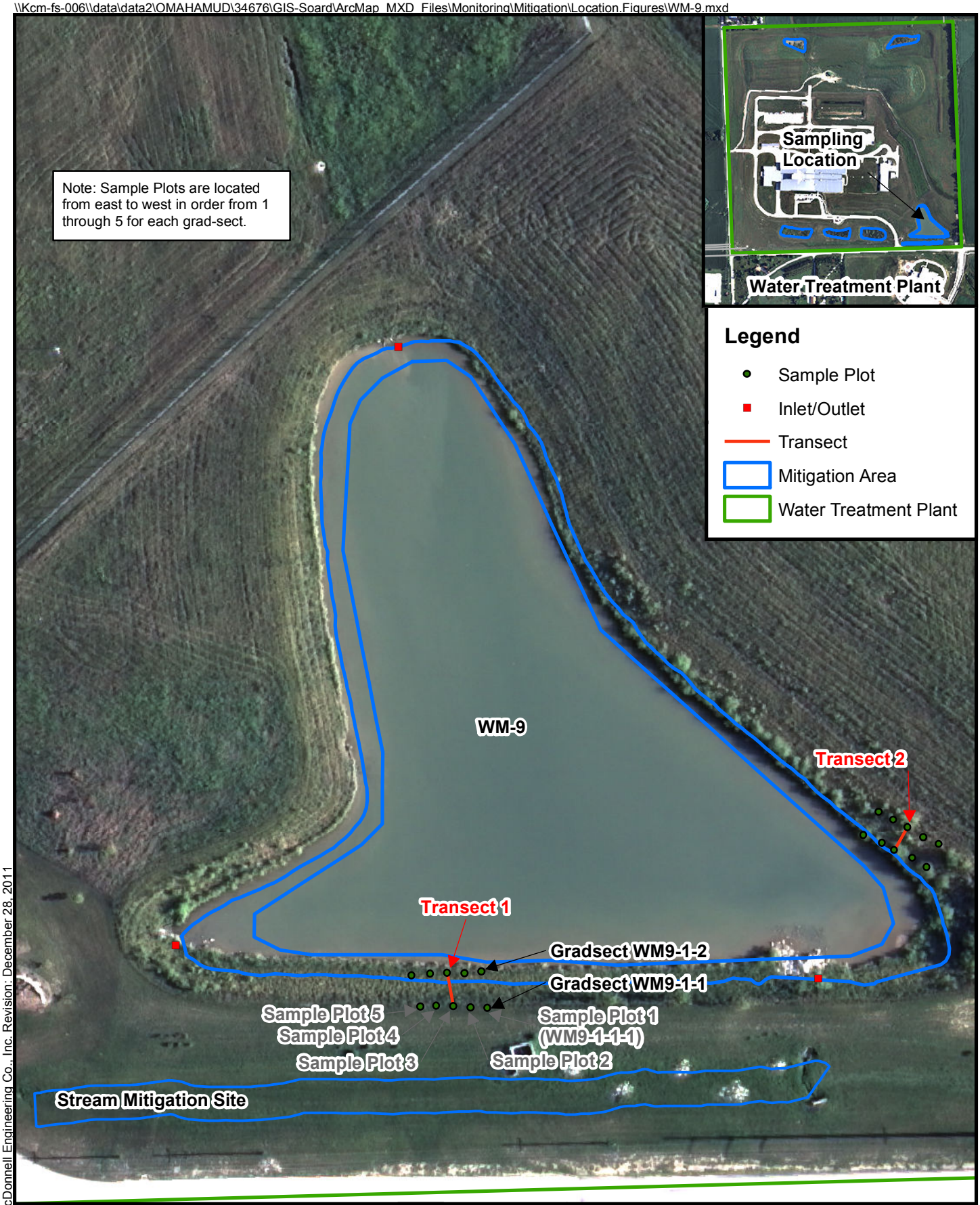


Feet
0 30 60 90 120

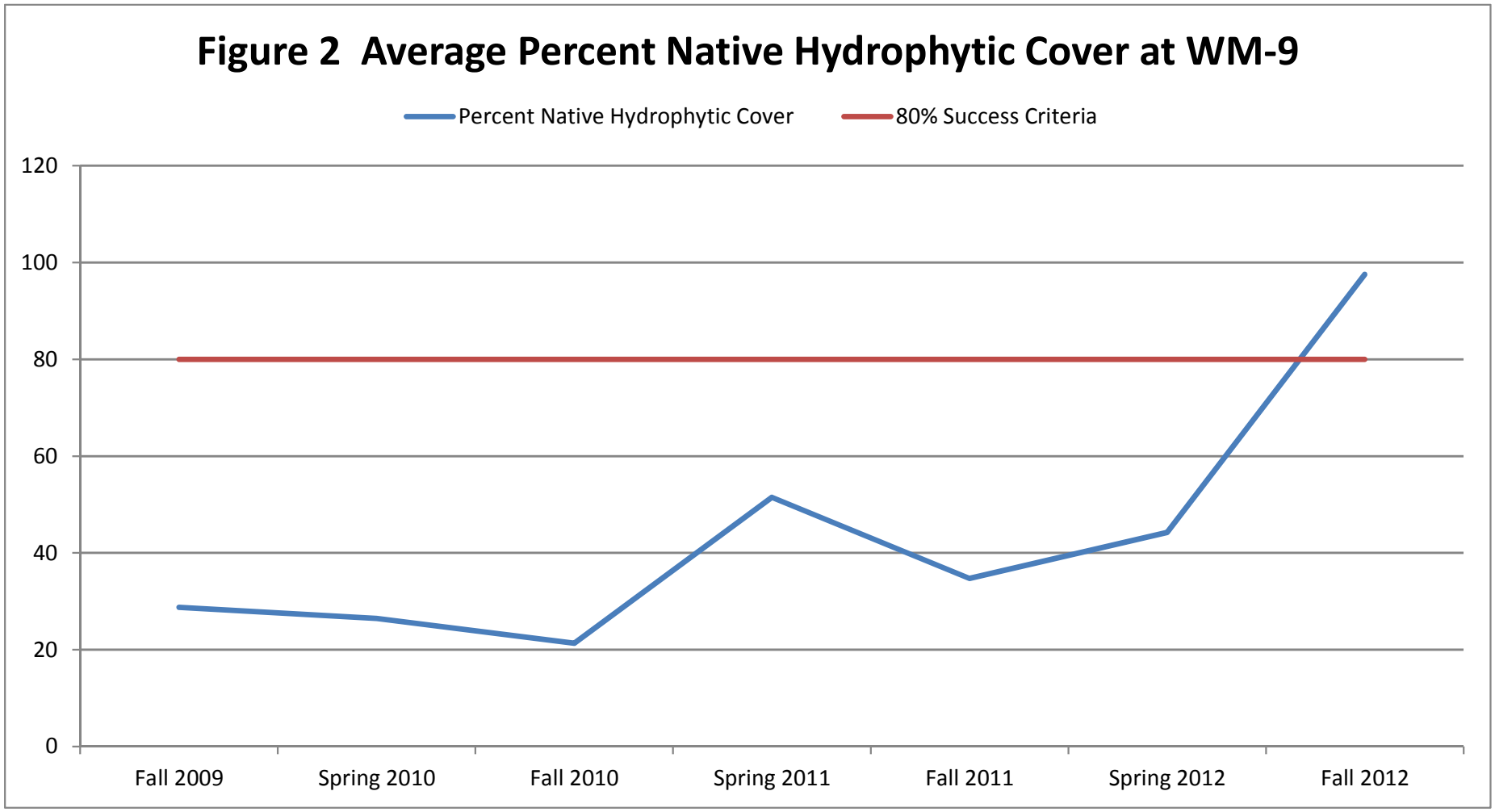
N

Source: Western Air Maps 2011 Aerial Photography

Burns & McDonnell SINCE 1898

Figure 1
Sample Plot Location Map for
Wetland Mitigation 9 and the
Stream Mitigation Site
Water Treatment Plant - Douglas County
Metropolitan Utilities District

Figure 2 Average Percent Native Hydrophytic Cover at WM-9



SECTION I-2

TABLES

Table 1 Summary of Wetland Monitoring Data for WM-9

Wetland Name: **WM-9**
Wetland Type: **PEM**
County: **Douglas**

Number of Transects/Macroplots: **2**
Number of Gradsects: **4**
Number of Sample Plots: **20**
Number of Wetland Sample Plots: **10**

Sampling Effort: **2012 Fall**

Weighted Average: **2.30**
Species Richness: **13**
Species Diversity: **8.21**
FQI: **10.28**

Percent Native Species: **85**
Percent Invasive Species: **38**
Percent Perennial/Biennial/Annual Species: **92 / 0 / 8**
Mean C-Value: **3.10**

Dominant Species:

Scientific Name	Common Name	Wetland Indicator Status	Percent Cover per Wetland
Bromus inermis	Smooth brome	NL	10
Salix amygdaloides	Peachleaf willow	FACW	56.25
Schedonorus phoenix	Tall fescue	FACU	8.5
Spartina pectinata	Prairie cordgrass	FACW	19.75

Sampling Effort: **2012 Spring**

Weighted Average: **2.73**
Species Richness: **16**
Species Diversity: **20.00**
FQI: **12.16**

Percent Native Species: **69**
Percent Invasive Species: **44**
Percent Perennial/Biennial/Annual Species: **94 / 6 / 13**
Mean C-Value: **3.67**

Dominant Species:

Scientific Name	Common Name	Wetland Indicator Status	Percent Cover per Wetland
Bromus inermis	Smooth brome	NL	14.75
Calystegia sepium	Hedge false bindweed	FAC	7.5
Salix interior	Sandbar willow	NL	10
Spartina pectinata	Prairie cordgrass	FACW	14.5

Table 2 Species List and Vegetative Characteristics for WM-9

Report generated:
Friday, November 16, 2012

Sampling Effort: **2012 Fall**

Scientific Name	Common Name	Wetland Indicator Status[1]	Ecological Index[2]	C-Value	Native Status	Invasive?	Frequency[3]	Average Percent Cover[4]
Ambrosia trifida	Great ragweed	FACW	2	0	Native	☑	1	1.50
Bromus inermis	Smooth brome	NL	3		Native & Introduced	☑	2	10.00
Calystegia sepium	Hedge false bindweed	FAC	3	1	Native & Introduced	☑	1	1.50
Carex vulpinoidea	Fox sedge	OBL	1	4	Native	☐	1	6.25
Juncus tenuis	Poverty rush	FAC	3	3	Native	☐	1	3.75
Leersia oryzoides	Rice cutgrass	OBL	1	4	Native	☐	2	1.75
Panicum virgatum	Switchgrass	FAC	3	4	Native	☐	1	3.75
Populus deltoides	Eastern cottonwood	FAC	3	3	Native	☐	2	3.00
Rumex crispus	Curly dock	FACW	2		Introduced	☑	1	1.50
Salix amygdaloides	Peachleaf willow	FACW	2	4	Native	☐	8	56.25
Salix interior	Sandbar willow	NL	3	3	Native	☐	2	5.25
Schedonorus phoenix	Tall fescue	FACU	4		Introduced	☑	1	8.50
Spartina pectinata	Prairie cordgrass	FACW	2	5	Native	☐	7	19.75

Sampling Effort: **2012 Spring**

Scientific Name	Common Name	Wetland Indicator Status[1]	Ecological Index[2]	C-Value	Native Status	Invasive?	Frequency[3]	Average Percent Cover[4]

1 = OBL - obligate; FACW - facultative wet; FAC - facultative; FACU - facultative upland; UPL - upland; NI - no indicator

2 = Ecological Index values correspond to the wetland indicator status for each species

3 = Frequency is the total number of plots in which the species was identified

4 = Average percent cover is calcuated from the coverages estimated during this monitoring effort.

Table 2 Species List and Vegetative Characteristics for WM-9

Report generated:
Friday, November 16, 2012

Agrostis stolonifera	Creeping bentgrass	FAC+	3		Introduced	☑	1	3.75
Bromus arvensis	Field brome	NL	3		Introduced	☐	1	3.75
Bromus inermis	Smooth brome	NL	3		Native & Introduced	☑	2	14.75
Calystegia sepium	Hedge false bindweed	FAC	3	1	Native & Introduced	☑	2	7.50
Carex bicknellii	Bicknell's sedge	FACU	4	6	Native	☐	1	3.75
Carex vulpinoidea	Fox sedge	OBL	1	4	Native	☐	2	6.50
Elymus virginicus	Virginia wildrye	FAC	3	4	Native	☐	1	3.75
Leersia oryzoides	Rice cutgrass	OBL	1	4	Native	☐	2	5.25
Melilotus officinalis	Yellow sweetclover	FACU	4		Introduced	☑	1	1.50
Poa pratensis	Kentucky bluegrass	FACU	4		Native & Introduced	☑	1	3.75
Populus deltoides	Eastern cottonwood	FAC	3	3	Native	☐	1	1.50
Rumex crispus	Curly dock	FACW	2		Introduced	☑	1	1.50
Salix interior	Sandbar willow	NL	3	3	Native	☐	2	10.00
Schedonorus phoenix	Tall fescue	FACU	4		Introduced	☑	1	6.25
Spartina pectinata	Prairie cordgrass	FACW	2	5	Native	☐	5	14.50
Ulmus americana	American elm	FAC	3	3	Native	☐	1	1.50

1 = OBL - obligate; FACW - facultative wet; FAC - facultative; FACU - facultative upland; UPL - upland; NI - no indicator

2 = Ecological Index values correspond to the wetland indicator status for each species

3 = Frequency is the total number of plots in which the species was identified

4 = Average percent cover is calcuated from the coverages estimated during this monitoring effort.

SECTION I-3

MITIGATION SITE WM-9 GROUND PHOTOGRAPHS

Photo 1: View north of Transect 1 in WM-9 (June 2012).

Photo 2: View east of Gradsect 1 on Transect 1 in WM-9 (June 2012).

Photo 3: View east of Gradsect 2 on Transect 1 in WM-9 (June 2012).

Photo 4: View south of Transect 2 in WM-9 (June 2012).

Photo 5: View southeast of Gradsect 1 on Transect 2 in WM-9 (June 2012).

Photo 6: View southeast of Gradsect 2 on Transect 2 in WM-9 (June 2012).

Photo 7: View north of Transect 1 in WM-9 (September 2012).

Photo 8: View east of Gradsect 1 on Transect 1 in WM-9 (September 2012).

Photo 9: View east of Gradsect 2 on Transect 1 in WM-9 (September 2012).

Photo 10: View south of Transect 2 in WM-9 (September 2012).

Photo 11: View southeast of Gradsect 1 on Transect 2 in WM-9 (September 2012).

Photo 12: View southeast of Gradsect 2 on Transect 2 in WM-9 (June 2012).

SECTION I-4

WETLAND VEGETATION COVER AND WATER DEPTH RAW DATA SHEETS

Wetland Vegetation Cover and Water Depth at WM-9

Wetland Name: **WM-9**

Wetland Transect/Gradsect #: WM9-1-1

Sampling Date: 6/25/2012 **Last Rain Date:** 6/20/2012 **Last Rain Amount (in):** 0.62

Canopy Coverage Analysis	**Plot 1**	**Plot 2**	**Plot 3**	**Plot 4**	**Plot 5**
Depth of Standing Water (in):					
Open Water (in):					
Bare Soil (in):	6	6	6	6	6
Bromus inermis	4	5	5	5	4
Calystegia sepium		2	2	3	
Melilotus officinalis		2	4	4	3
Rumex crispus				3	
Schedonorus phoenix	7	5	4	4	6

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

Wetland Vegetation Cover and Water Depth at WM-9

Wetland Name: **WM-9**

Wetland Transect/Gradsect #: WM9-1-2

Sampling Date: 6/25/2012 **Last Rain Date:** 6/20/2012 **Last Rain Amount (in):** 0.62

Canopy Coverage Analysis	Plot 1	Plot 2	Plot 3	Plot 4	Plot 5
Depth of Standing Water (in):	8	8	8.5	7	7
Open Water (in):	7	7	7	7	7
Bare Soil (in):	7	7	7	7	7
Carex vulpinoidea				2	
Leersia oryzoides					3
Melilotus officinalis					3
Spartina pectinata					3

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

Wetland Vegetation Cover and Water Depth at WM-9

Wetland Name: **WM-9**

Wetland Transect/Gradsect #: WM9-2-1

Sampling Date: 6/25/2012 **Last Rain Date:** 6/20/2012 **Last Rain Amount (in):** 0.62

Canopy Coverage Analysis	**Plot 1**	**Plot 2**	**Plot 3**	**Plot 4**	**Plot 5**
Depth of Standing Water (in):					
Open Water (in):					
Bare Soil (in):	6	6	6	6	6
Andropogon gerardii	4		4	3	4
Bouteloua curtipendula	3	4			
Bromus arvensis		4			
Bromus inermis		4			
Helianthus maximiliani	3				3
Melilotus officinalis			3	4	3
Pascopyrum smithii		3			
Poa pratensis			4	4	6
Salix interior		4	3	4	4
Schedonorus phoenix	6		6	6	5
Unknown 1		3			

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

Wetland Vegetation Cover and Water Depth at WM-9

Wetland Name: **WM-9**

Wetland Transect/Gradsect #: WM9-2-2

Sampling Date: 6/25/2012 **Last Rain Date:** 6/20/2012 **Last Rain Amount (in):** 0.62

Canopy Coverage Analysis	**Plot 1**	**Plot 2**	**Plot 3**	**Plot 4**	**Plot 5**
Depth of Standing Water (in):			3	6	18
Open Water (in):			6	7	7
Bare Soil (in):	5	5	6	7	7
Agrostis stolonifera	4				
Bromus arvensis	4				
Bromus inermis	5	6			
Calystegia sepium	4	4			
Carex bicknellii			4		
Carex vulpinoidea			5		
Elymus virginicus		4			
Leersia oryzoides			4		
Poa pratensis		4			
Populus deltoides			3		
Rumex crispus		3			
Salix interior	4		5		
Schedonorus phoenix	5				
Spartina pectinata	4	5	3	3	
Ulmus americana		3			

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

Wetland Vegetation Cover and Water Depth at WM-9

Wetland Name: **WM-9**

Wetland Transect/Gradsect #: WM9-1-1

Sampling Date: 9/18/2012 **Last Rain Date:** 9/17/2012 **Last Rain Amount (in):** 0.19

Canopy Coverage Analysis	**Plot 1**	**Plot 2**	**Plot 3**	**Plot 4**	**Plot 5**
Depth of Standing Water (in):					
Open Water (in):					
Bare Soil (in):	5	4	4	5	5
Bromus inermis	5	5	3	4	
Calystegia sepium			2		
Helianthus tuberosus		3	3		3
Melilotus officinalis			4	4	4
Poa pratensis	3	4	4	4	
Rumex crispus				3	
Schedonorus phoenix	6	5	6	5	7
Symphyotrichum lanceolatum		3			

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

Wetland Vegetation Cover and Water Depth at WM-9

Wetland Name: **WM-9**

Wetland Transect/Gradsect #: WM9-1-2

Sampling Date: 9/18/2012 **Last Rain Date:** 9/17/2012 **Last Rain Amount (in):** 0.19

Canopy Coverage Analysis	**Plot 1**	**Plot 2**	**Plot 3**	**Plot 4**	**Plot 5**
Depth of Standing Water (in):	12	12	12	13	10
Open Water (in):	7	7	7	7	7
Bare Soil (in):	7	7	7	7	7
Leersia oryzoides					2
Populus deltoides					3
Salix amygdaloides	4			6	3
Spartina pectinata	2	2		3	4

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

Wetland Vegetation Cover and Water Depth at WM-9

Wetland Name: **WM-9**

Wetland Transect/Gradsect #: WM9-2-1

Sampling Date: 9/18/2012 **Last Rain Date:** 9/17/2012 **Last Rain Amount (in):** 0.19

Canopy Coverage Analysis	**Plot 1**	**Plot 2**	**Plot 3**	**Plot 4**	**Plot 5**
Depth of Standing Water (in):					
Open Water (in):					
Bare Soil (in):	4	6	5	4	4
Bouteloua curtipendula		5	3		
Bromus arvensis		5	4		4
Helianthus tuberosus	3				4
Melilotus officinalis		4	4	4	
Poa pratensis					4
Salix interior		6	5	5	6
Schedonorus phoenix	6	3	6	6	4
Schizachyrium scoparium					4
Setaria pumila ssp. pumila		4			
Sorghastrum nutans	4				

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

Wetland Vegetation Cover and Water Depth at WM-9

Wetland Name: **WM-9**

Wetland Transect/Gradsect #: WM9-2-2

Sampling Date: 9/18/2012 **Last Rain Date:** 9/17/2012 **Last Rain Amount (in):** 0.19

Canopy Coverage Analysis	**Plot 1**	**Plot 2**	**Plot 3**	**Plot 4**	**Plot 5**
Depth of Standing Water (in):			5	5	14
Open Water (in):			5	7	7
Bare Soil (in):	5	5	6	7	7
Ambrosia trifida		3			
Bromus inermis	4	5			
Calystegia sepium		3			
Carex vulpinoidea			5		
Juncus tenuis			4		
Leersia oryzoides			3		
Panicum virgatum		4			
Populus deltoides			3		
Rumex crispus		3			
Salix amygdaloides	6	6	6	6	6
Salix interior	3		4		
Schedonorus phoenix	6				
Spartina pectinata		3	5	5	

Class 1: 0-1%; Class 2: 1-5%; Class 3: 5-25%; Class 4: 25-50%; Class 5: 50-75%; Class 6: 75-95%; Class 7: 95-100%

APPENDIX I - SECTION J

WATER TREATMENT PLANT MITIGATION SITE STREAM MITIGATION MONITORING DATA

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SECTION J-1

FIGURES

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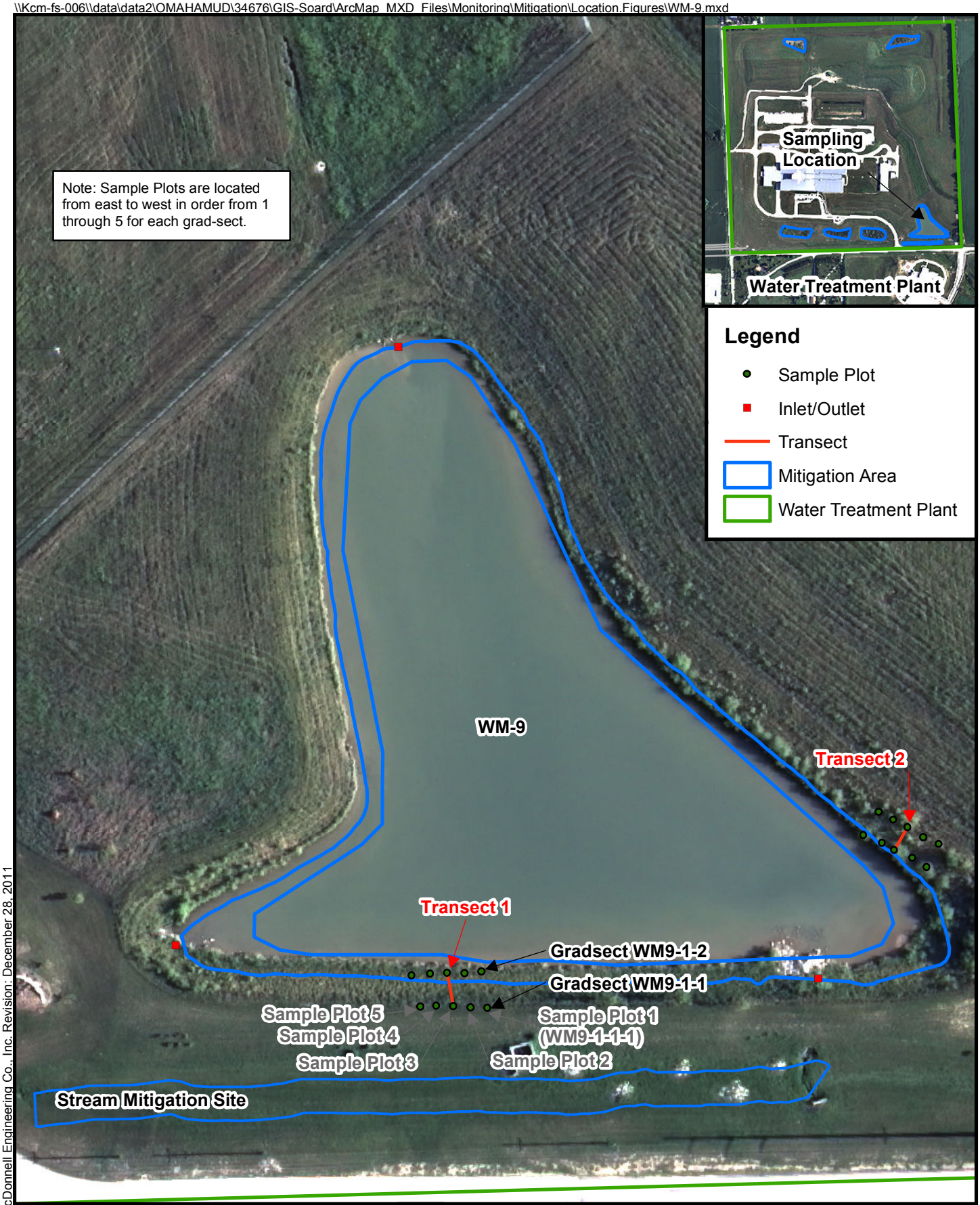

Feet
0 30 60 90 120

N

Source: Western Air Maps 2011 Aerial Photography

Burns & McDonnell SINCE 1898

Figure 1
Sample Plot Location Map for
Wetland Mitigation 9 and the
Stream Mitigation Site
Water Treatment Plant - Douglas County
Metropolitan Utilities District

SECTION J-2

STREAM MITIGATION GROUND PHOTOGRAPHS

Photo 1: View east of the Stream Mitigation Site (June 2012).

Photo 2: View west of the Stream Mitigation Site (June 2012).

Photo 3: View east of the Stream Mitigation Site (September 2012).

Photo 4: View west of the Stream Mitigation Site bank (September 2012).

APPENDIX II

HYDROLOGICAL DATA

APPENDIX II

HYDROLOGICAL DATA

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Figure 1 2012 Piezometer Readings at the Phase I and Phase II Wet Meadow Mitigation Sites (WM-1 and WM-2)

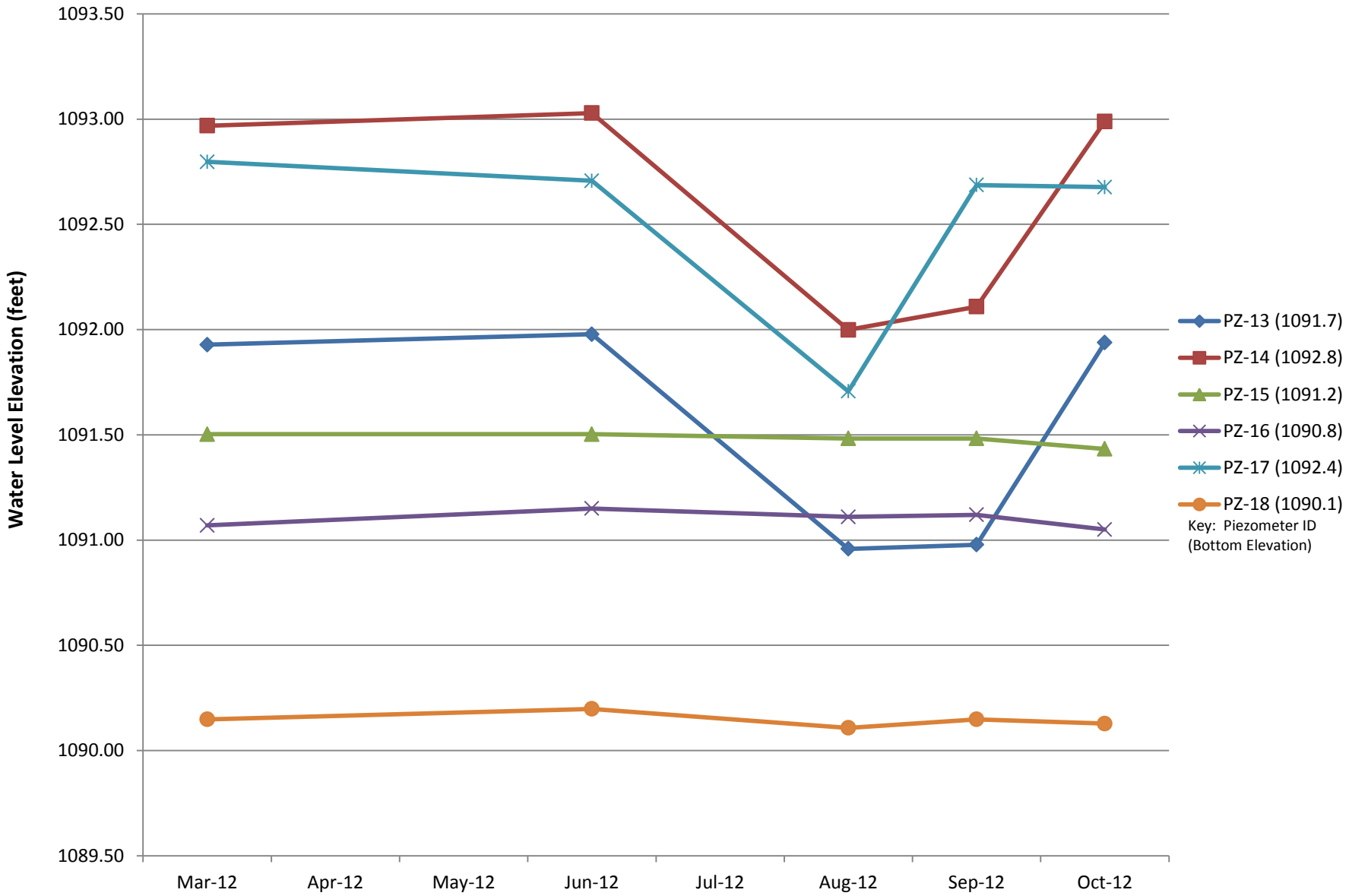


Figure 2 2012 Total Monthly Precipitation
Fremont, NE

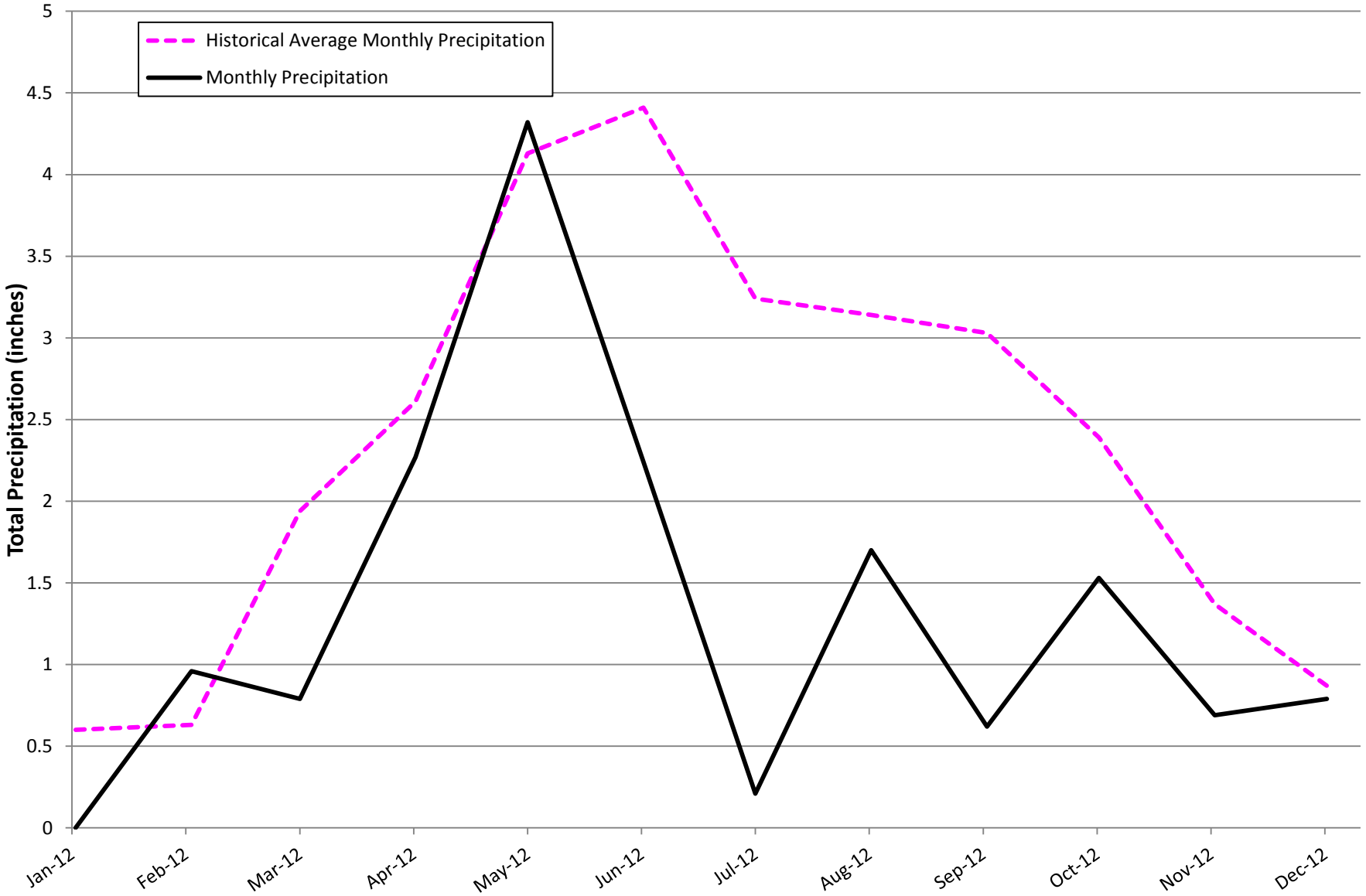


Figure 3 2012 Monthly Average Ambient Air Temperature
Fremont, NE

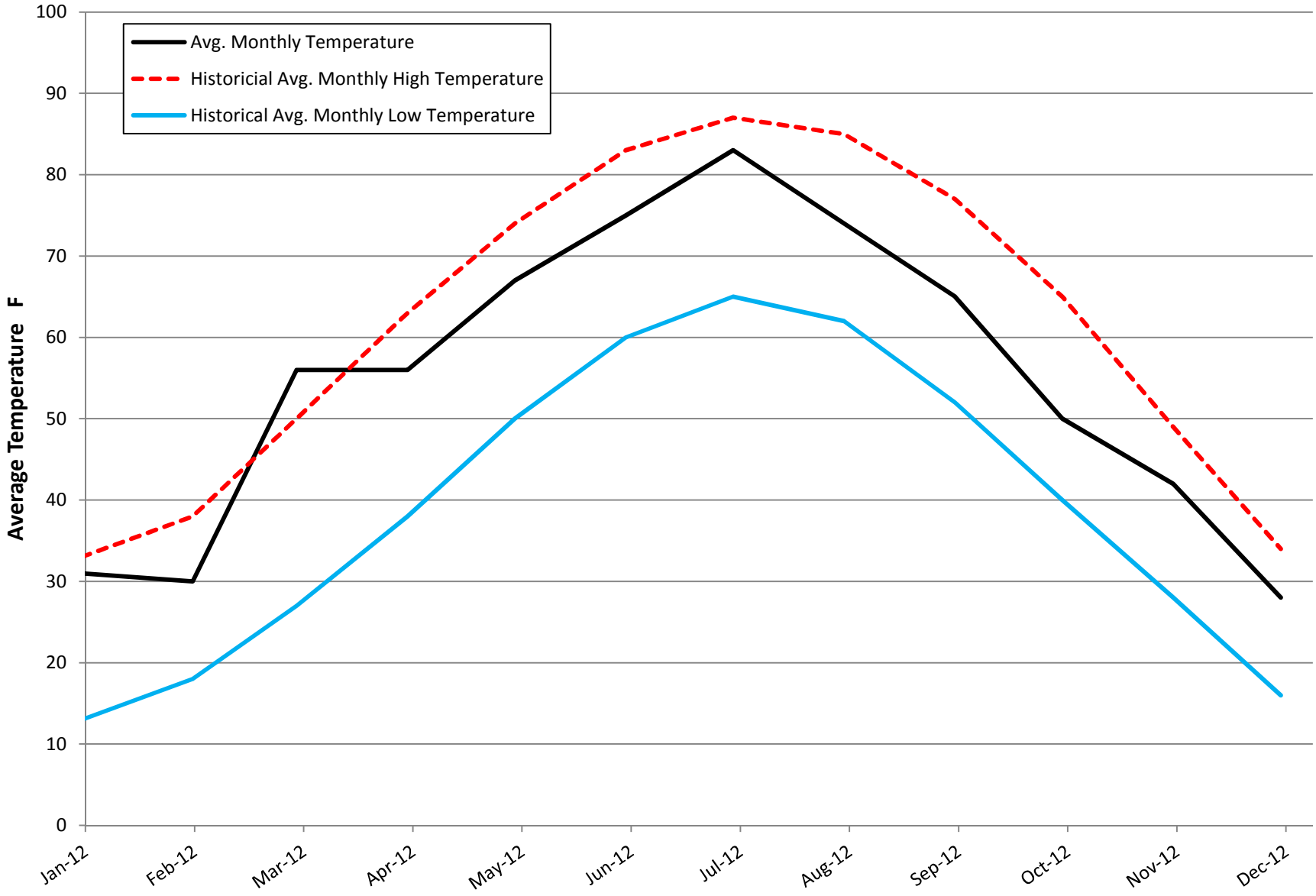
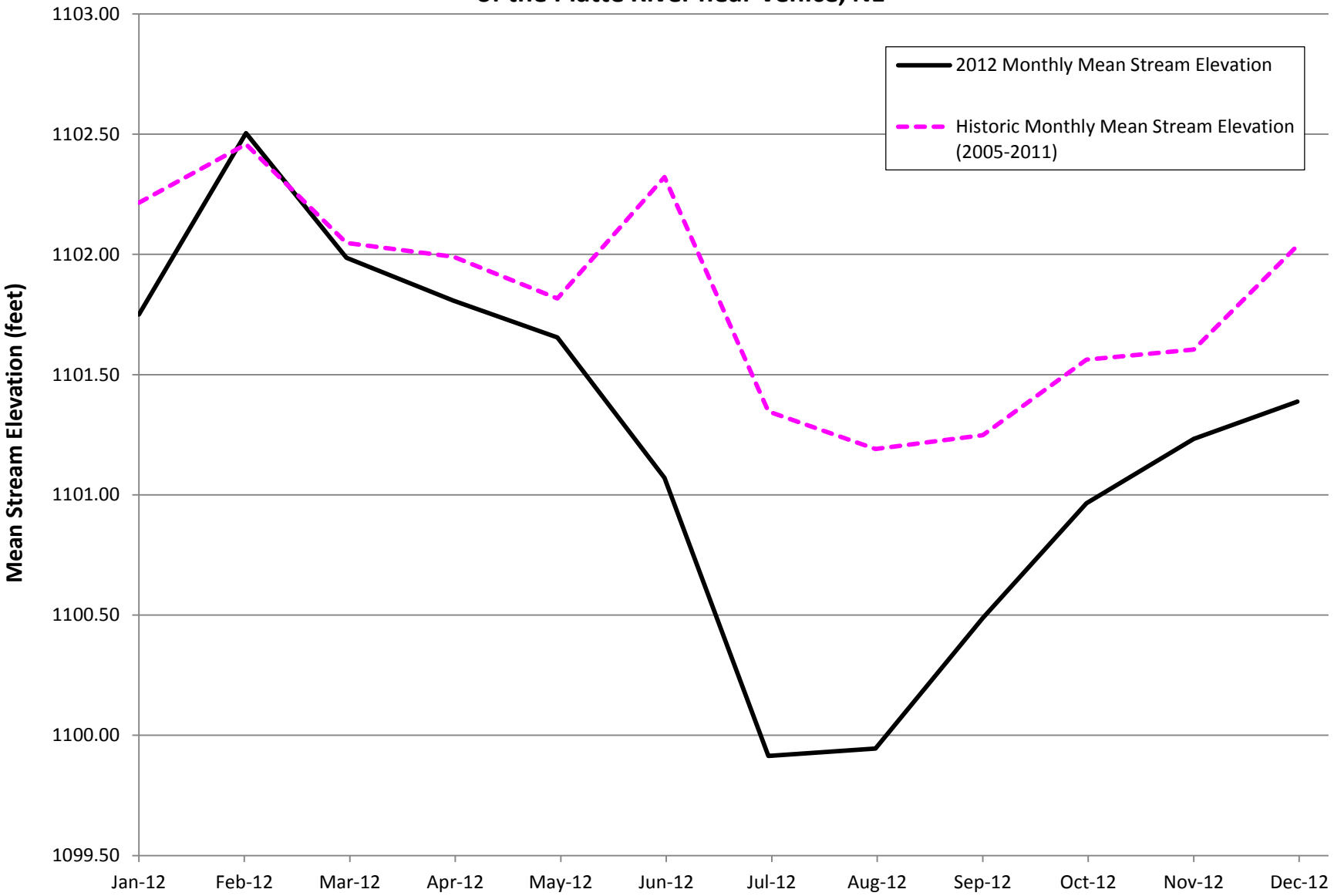
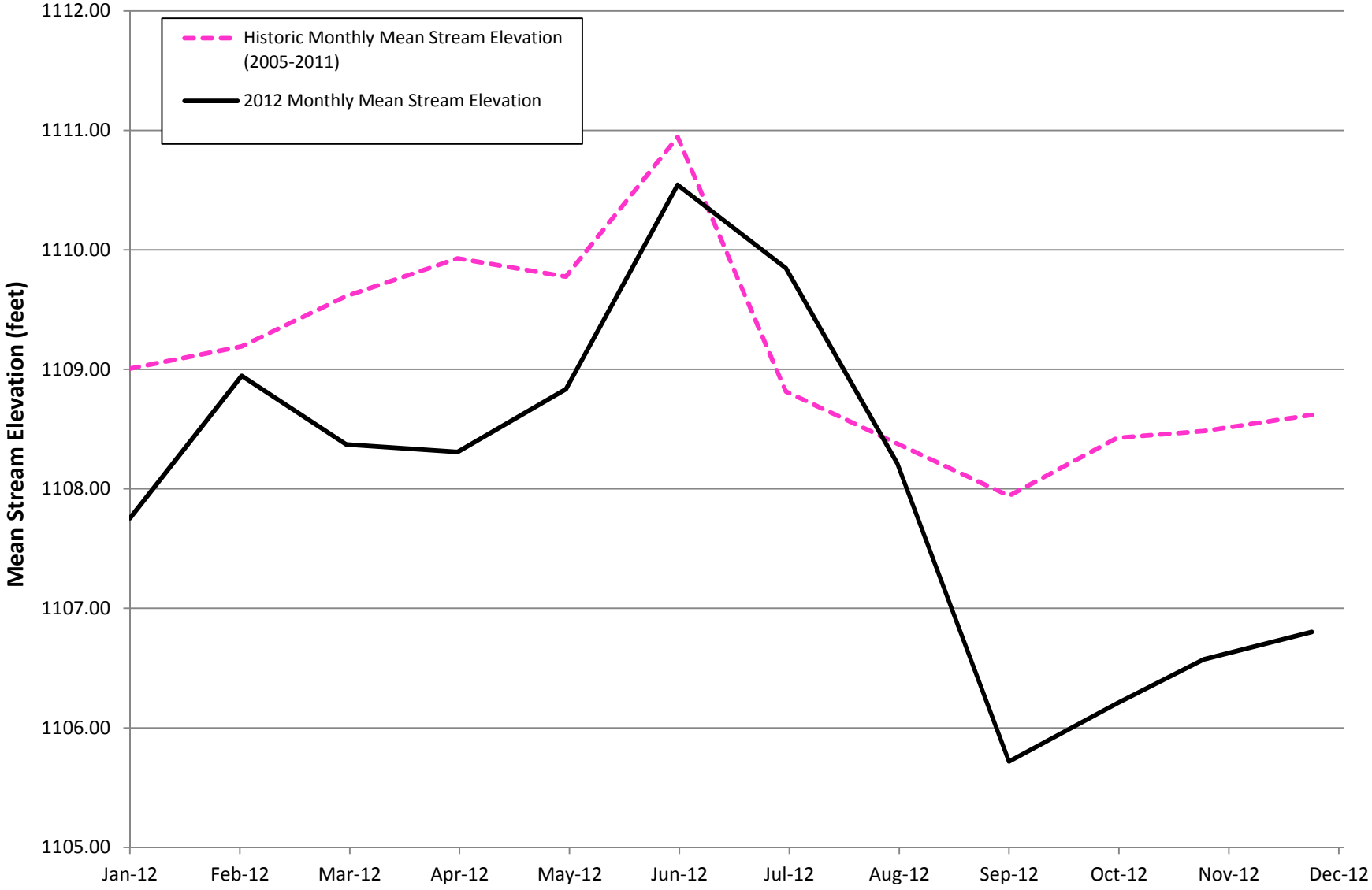


Figure 4 2012 Monthly Mean Stream Elevation of the Platte River near Venice, NE



Source: USGS. 2012b. National Water Information System: Platte River near Venice, Nebraska 06796500.

Figure 5 2012 Monthly Mean Stream Elevation of the Elkhorn River at Waterloo, NE



Source: USGS. 2012a. National Water Information System: Elkhorn River at Waterloo, Nebraska 06800500.

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