PRRIP GRASSLAND VEGETATION ASSESSMENT FINAL REPORT

Buffalo, Dawson, Hall, Kearney, and Phelps Counties in Nebraska

Prepared for Platte River Recovery Implementation Program
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Prairie Legacy Inc.

GRASSLAND VEGETATION ASSESSMENT

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1.0 INTRODUCTION AND BACKGROUND

The Platte River Recovery Implementation Program (Program) has acquired or secured management agreements for parcels of grassland along the Platte River Valley between Lexington and Chapman, Nebraska, with the long-term goal of improvement and maintenance of migration and reproductive habitat for least terns, piping plovers, and whopping cranes. This second year of vegetation surveys on native and restored grassland areas can be used to monitor potential shifts in vegetation communities and/or plant species composition over time.

PURPOSE

1) Provide an inventory of vegetation communities and plant species composition on Program owned or managed grassland, wet meadow habitat and cropland areas that have been converted to grassland. Established plots will be assessed for changes in vegetation composition and density.
2) Monitor sites for problem areas or colonies of invasive and noxious plant species and program species of concern. Identify any rare or threatened plant species which may appear.
3) Determine species composition in each sample area in order to track potential shifts in dominant species. Data collected will be used in comparative analyses in future years to determine changes from previous surveys in vegetative composition and dominance.

LOCATIONS

The area of interest consists of Program owned or managed grassland areas along the Platte River beginning at the junction of U.S. Highway 283 and Interstate 80 near Lexington, Nebraska and extending eastward to Chapman, Nebraska. This survey includes sites first analyzed in 2013 and 2014 and 4 additional sites first analyzed in the current study year (2016),

A total of nearly 4,400 grassland acres on 35 sites, serving as buffer and habitat between agricultural land and built infrastructure and the Platte River were surveyed. These sites are managed in a variety of ways, including grazing, burning, and haying. A few of the sites were formerly in agricultural production or were disturbed in other ways and were thus replanted to a native seed mix in the years prior to this survey. All sites and their acreage are listed in Tables 1A and 1B along with the date of seeding, number of plots that were placed at each site and the management since the time of the first survey in June of 2013.

METHODS

Data were collected during the three weeks beginning the last full week of June in 2013 and again in 2016. Two sites, Fox and Blessing were surveyed for the first time in 2014 and four other sites, CWR North 3, NGPC, Speidelll North and Speidelll South were surveyed for the first time in 2016. The survey protocol is attached as Appendix A. Scientific nomenclature for species was taken from the Natural Heritage Database (Steinhauer and Rolfsmeier, 2013). The identification key was *Flora of Nebraska* Vol. 2 (Kaul, et.al. 2012)

PLOTS & TRANSECTS

Cover data were collected in microplots along a transect within a larger macroplot. These transect locations were marked by GPS using UTM NAD 83. New sites were marked by Program staff with rebar stakes and flags. Macroplot sites were analyzed with soil maps and moved if necessary to provide an appropriate number of sites distributed among these soil types in order to provide sampling locations from a majority of potential community types. Final locations are listed in Appendix B. Plots were marked with rebar. Program staff buried these rebar in 2013 and 2014 after data were taken. Plots marked in previous surveys were relocated for 2016 surveys by Program staff using GPS coodinates. An attempt was made to locate the buried rebar, but mainly new rebar was placed close to the original coordinates. Photos were taken at each macroplot showing the transect and quadrat and labeled with the site name, plot number, year, and T (transect) or Q (quadrat). General plant communities were mapped in 2013, but not in 2016.

FINDINGS

PLANT SPECIES OF CONCERN

No threatened or endangered plant species were encountered during the 2016 surveys. Musk thistle was much less prevalent in all areas. Only a few were encountered among plots. In general observations, reed canarygrass (*Phalaris arundinacea*) and Phragmites were still found along stream channels and along the Platte River edges. Phalaris in particular was less prominent. Tall wheatgrass (*Thinopyrum ponticum*) remains a concern in several sites and has been found within additional plots in 2016.

PLANT SPECIES, DOMINANCE AND ABUNDANCE

All scientific and common names of plant species found within the plots are listed in Appendix C along with their value of conservatism and wetness indicator status as assigned by Nebraska Natural Heritage Program and the national wetland plant list (Steinhauer and Rolfsmeier, 2013; Lichvar, 2013). This list also includes the plant symbol (P-Symbol) assigned by the Natural Resource Conservation Service (NRCS National Plant Database, 2013).

Plant species were assessed by percent cover at each site. Cover is a measure of the visual obstruction of each plant species in a 20x50 cm frame. This measure can exceed 100 percent for the frame as some species overlap each other. Tables 2 through 7 summarize the average percent

cover of all species by site. The tables are separated by west (A), middle (B), and east regions (C). The species are categorized by cool and warm season grasses(Tables 2A-C and 3A-C), grass-like species (Tables 4A-C), forb species (Tables 5A-C & 6A-C) and litter and bare ground (Tables 7A-C). The trees are included with forbs species as these were rarely more than seedlings in the plots. These percentages are a summary of the conditions found in 2016, which can be compared to similar measures from 2013 and in subsequent years.

FQI

Evaluations based on plant species richness and diversity can be supplemented by weighting or rating species based on their tolerance of disturbance beyond historically normal natural disturbances. This is the idea on which Swink and Wilhelm based their Floristic Quality Index (FQI) (Swink and Wilhelm, 1979, 1994). Plant species are assigned a coefficient of conservatism (C) by experts in each State. C is a value from 0 to 10 placed on native plant species, which describes adaptations of each plant species to disturbance. Exotic plant species are not assigned a value. A value of 0-3 indicates the species are adapted to disturbance and is found in a wide variety of conditions. Plants which are consistently found in the native community matrix are given a value of 4-6. Values of 7-10 are reserved for late seral species which are less adapted to disturbance, have a high degree of preference for specific ecological conditions and as such are usually found in intact plant communities.

An average C value can be calculated to get a quick idea of the vegetative condition of an area. It is calculated by taking the average of all the C values for a list of species within an area. The floristic quality index (FQI) is calculated by the following formula: $FQI = (C/N)*(\sqrt{N})$, where C is the coefficient of conservatism and N is the total number of species found in an area. Using $(\sqrt{N})$ adjusts for differences in the area being evaluated. These FQI values were calculated for each site (Table 8). Taft et al. (1997) promote the use of both exotic and native species in the index computations in order to provide a measure of structural integrity (the self-correcting potential) of a native area. Non-native species are assigned a value of 0 for computational purposes.

The cover percentages of plants found among the sampled plots was used to weight the C values to provide an additonal dimension of floristic quality (FQIw), that of overall dominance or abundance of the plant. The cover of each species multiplied by its C value gives greater weight to abundant species and less weight to the less abundant species. Non-natives are included in the number of species present. Since they are not given C values, those weights are not included. I deal with how these may be weighted in the summary section.

The average C value and the FQI were calculated for each site using only native species, then using both native and exotic species, and finally for the weighted average of both native and exotic species. These are presented in Table 8. FQI was been calculated for native species only and for both native and exotic taken together. When exotic species are added to the FQI calculation we see a more complete picture of the overall condition of a prairie. The best use of these results is as a comparison of species richness and abundance in successive years. Baseline values collected in 2013 are presented and compared with 2016 values in Table 9.

The best measure of overall change in warm season and native abundance is weighted floristic quality however, it should be stressed that each measure of floristic quality provides insight into the potential causes for the change (Table 9). Each of the parameters of the floristic quality index should be examined as they each account for a different perspective on quality. The number of species detected (N) will affect all calculations of floristic quality. In sites with higher average C values, it is not unusual for average C values to decrease in subsequent years as more species are added to the total. A decrease of .2 or .3 in the average C value over 3 to 5 years can indicate detrimental effects and suggest a change is needed in management regimen, while a stable or increasing average C value can be a measure of effective management (Wilhelm and Masters 1995). Changes in weighted FQI show changes in the abundance of higher or lower value species. Each of these measures applied to this second set of data will be used to compare with previous years, allowing analysis of changing vegetation.

Floristic quality analysis (FQA) in 2013 indicated that some sites had reached levels of disturbance for which native species may not be able to adapt (Table 9) These instances may be an FQI below 20 with very little diversity and very little or no warm season grass components. Others still had many native species at the site, but these may not have been abundant. Weighted FQI will help us determine the impact of changes in the abundance of native taxa.

Non-native taxa can reduce the restoration potential and integrity of the natural community (Taft et al., 1997). Changes in the presence or absence of non-native taxa influence floristic quality measures, however, since they are not given a numeric value, changes in the abundance of these species are less apparent than that of native taxa. All FQI values in 2016 will help us to speculate if over the last 3 years, some change has taken place and whether that change may have been influenced by further invasion of non-native taxa or change in the abundance of native taxa.

CONDITION ASSESSMENT

Sites with Native average C values above 3 and Native FQI above 30 have been considered desirable from a conservation standpoint (Swink and Wilhelm, 1979, 1994). Four of the Binfield sites reached that benchmark in 2013. This year 7 surveyed sites have an average native C value above 3 (Table 8). Sites with the higher average C values have a greater opportunity for improvement with good management. None of the 16 have an FQI above 30 (Figure 12; Table 8), indicating that there is still opportunity for management to make some positive changes in the abundance of desirable vegetation. FQI was designed to allow comparison or ranking among sites.

Weighted FQI (FQI_w) will vary considerably from site to site. Comparing the weighted FQI_w of individual sites over time can show increasing or decreasing native species abundance. These measures across all sites over the two survey dates indicate improvement in about half of the sites (Figure 13; Table 9). Four sites in particular stand out, Fox, Binfield North Meadow, Binfield West Meadow and Binfield West Hay Meadow. These sites all showed marked improvement in weighted FQI. We must be cautious in our optimism however, as these sites also saw marked increases in cool season grasses which do not show up well in FQIw. Figures 14 and 15 show total coverage of

cool and warm season species, respectively, for each of the sites in 2016 and 2013. Johns meadows and Wyoming showed some improvement as well. Although scores were all different than those of 2013, most of them did not vary greatly. It is important to note that these changes in weighted FQI should be used to assess one site against itself and should also be analyzed against other FQA parameters and against the species abundance data to determine the potential causes for the change. Those causes can be analyzed further to analyze previous management and to develop future management strategy. .

Sites with FQI below 20 are in need of intervention. For simplicity, further references to FQI for each of these sites will mean FQI using native and exotic species combined. All of the sites with FQI scores below 20 in 2013 remained below 20 in 2016. These sites support low quality vegetation. Roughly 1/3 of sites showed improved FQI scores. Most sites had original FQI scores above 20. Morse Hay North, Morse Hay South, CWR North 2, NGPC and Sullwald Hay Meadows also have weighted FQI that are also 20 or below. Some more drastic remediation may be warranted on these sites.

SITE ASSESSMENTS

Locations of transects are shown in Figures 1 through 8. Observations of musk thistle (*Carduus nutans*) have decreased greatly since 2013 in all areas. At a few sites different areas of the site exhibited different coverage of warm or cool season species. Those differences have become less pronounced in several areas. Cool and Warm season data at each transect is shown in Table 10 and compared with the same data from 2013. The 2013 report included color-coded maps with cool season coverage ranges for each site. Any changes in those coverages is noted below, under the name of the site beside the word coverage. Floristic quality is presented for each site and is shown in comparison in Figures 12 and 13 and Tables 8 and 9. Total cool and warm season comparisons can be found in Figures 14 and 15.

PLUM CREEK COMPLEX SITES

This complex is on the western edge of the properties. References in the following discussion for coverages at these sites can be found in Tables 2A through 7A.

COOK

Coverage: cool 88%, warm 20%; Dominants: smooth brome

In 2013 it was noted that Cook Hay Meadow may have originally been dominated by big bluestem and other warm season grasses. In 2013 big bluestem was the single most prominent species, however, transect data in 2016 indicates that cool season introduced species are now dominant covering more than 88% of the transect plots. This is an increase from 44% in 2013. Warm season coverage is less than 20%. This is reflected in a decrease in floristic quality and a decrease in the overall diversity of species. Burning in 2015 was not sufficient to decrease the encroachment of smooth brome over the last 3 years. While haying after July 15 is early enough to allow perennial

warm season grass to withstand winter temperatures, it is not early enough to reduce seed production of smooth brome. Timing is very important in the reduction of smooth brome. Burning in late April and early May reduce the carbohydrate reserves at the time of tiller elongation and bud formation stages. Also very important in this equation is that burning in the absence of warm season competitors is not adequate to produce a substantial reduction in brome (Wilson and Stubbendieck, 2000). This site did have warm season grasses at one time and thus there may still be a chance to reduce the brome at this site with good timing. Spring burns in late April and eary May will set back smooth brome in the appropriate phenologic state (Wilson and Stubbendieck, 2000). Warm spring weather such as we have had lately would allow an earlier spring burn by as much as 2 or 3 weeks. Dual action of prescribed fire, along with fall herbicide application in mid October or heavy grazing after mid September, may be necessary for several years in sequence to regain some control of the vegetation at this site. Frequent mowing beginning in late May has also been shown to be effective in reducing brome coverage (Lawrence and Ashford, 1964).

DYER

Coverage: cool 29%, warm 24%; Dominant: annual brome

Dyer grassland had been seeded in 2010. At the time of survey in 2013, Dyer grassland was characterized by weedy forb species and both annual and smooth brome. Annual brome still dominates with 18% cover, similar to 23% cover on the northern half of the Dyer grassland in 2013. Eleven of the one-hundred sixty-seven (167) species in the upland seed mix were found in the sampled areas. Only one of the eighty (80) species from the slough mix were found within the plots. Sixty–two percent of the 69 species found within the sampling areas are native. Carex species have similar cover (22%) in 2016 to that in 2013 (19%). Sand dropseed, switchgrass and cordgrass are the dominant warm season grasses at 11%. Vegetation is less sparse than in 2013, but still very open and sandy allowing annual species such as Japanese and downy brome. Control of annual brome can be attempted by mowing before it goes to seed and by additional seeding of desirable species.

COTTONWOOD RANCH (CWR) COMPLEX SITES

This complex is on the middle of the properties. References in the following discussion for coverages at these sites can be found in Tables 2A through 7A.

CWR NORTH 1

Coverage: cool 53%, warm 13%; Dominant: Japanese brome, redtop and Carex

Cover of cool season exotic species was just under 50% in 2013 and just over 50% in 2016. Japanese brome, redtop and Carex were the dominant species. Warm–season cover was 16% in 2013 and 13% in 2016. Saltgrass was the most dominant warm season grass. Grasslike and exotic species cover were similar in both sampling years. Native forb cover increased from 12% to 25%. The number of species encountered increased in CWR N1 in 2016 along with average C value, FQI and weighted FQI.

CWR NORTH 2

Coverage: cool 51% (formerly 60-80% range),warm 5%; Dominant: Kentucky bluegrass and ragweed

Kentucky bluegrass and ragweed were the dominant species in CWR N2. Big bluestem which was present in 2013 was not recorded in the plots in 2016. Fewer species were recorded at this site in 2016 leading to a reduction in all floristic quality index values. There was 8% cover of exotic forbs and 40% native forbs. Flooding is one possible cause for a reduction in the number of species present.

CWR NORTH 3

Coverage: cool 35%, warm 30%; Dominant: (All native) Prairie cordgrass, western ragweed, Canada wildrye

This site was first sampled in 2016. It differs from North 1 and 2 in that is is a more mesic site. Swales run east and west through this site. The average C value is less than 2, however, the weighted FQI indicates that native species are more abundant here than in either CWR N1 or CWR N2. Prairie cordgrass, western ragweed, Canada wildrye and other rye grasses (all native) are the most dominant species. This mesic landscape, with nearly 80% (63% native) forb cover, provides good wildlife habitat.

CWR EAST LLOYD ISLAND

Coverage: cool 37%, warm 26%; Dominant: Kentucky bluegrass, annual brome, foxtail barley, cordgrass

This site was grazed all season long in 2013, 2014 and 2015. In 2016 it was burned in the spring and rested. There has been a decrease in cover of warm season grasses along with a decrease in cover of sedges which negotiated a drop in the weighted floristic quality. The drop from 70% to 6% in cover of exotic cool season grasses had less impact on FQIw since these species are already valued at zero. The management pattern appears to have decreased the total cover of plant species as a whole. Increases occurred in Kentucky and Canada bluegrass species.

MORSE NORTH

Coverage: cool 23% (entire site is now in the 20-40% range), warm 31%; Dominant: smooth brome, big bluestem

Although there were fewer species found in the transects in 2016, there were no dramatic changes in average C, or FQI. This parcel has two major community types with annual bromes, and ragweed dominating much of the northern section. Smooth brome is still dominant in the southern section. Overall, the exotic cool season grasses (mainly smooth brome) have decreased from nearly 60% cover to 23% at this site. Native warm season grass cover remains at 31% close to the 33% cover in 2013. Exotic forb cover is 10%, down from 34% and native forbs have 62% cover, up from 25%. These changes have lead to a slight increase in the weighted FQI at this site.

CWR EAST

Coverage: cool 78% (cool season coverage in the North section is up from 60-80% range, South up from in the 20-40% range), warm 21%; Dominant: Japanese brome, Big bluestem, Kentucky bluegrass

In spite of a decrease in the number of species sampled, all other measures of floristic quality increased, though not appreciably. Annual brome is still a large component of the northern half of this site, with cannabis and dogwood still evident. Native warm season grasses increased from 7% in 2013 to 21% in 2016. Cover of native cool season grasses have increased along with exotic cool season grasses. For the site as a whole, exotic cool season grasses still out compete native cool season grasses and cover of native and exotic forbs is equal at 30% each.

CWR NORTHEAST

Coverage: cool 28%, warm 17%; Dominant: annual brome, big bluestem

The number of species found among these transects increased slightly. Average C and FQI were only slightly decreased. The weighted FQI, however decreased sharply. The cover of introduced cool season grasses remained unchanged and dominated by annual bromes. Annual brome cover is reduced from 30% to 16% in 2016. Warm season grass cover, however, decreased form 34% to 17%. In addition, the cover of exotic forbs increased from 14% to 28%. The decrease in warmseason grass cover and the increase in exotic forb cover explain the sharp decline in weighted FQI. Spring burns with rest from grazing should be able to control annual bromes and many exotic forbs.

CWR NORTHWEST

Coverage: cool 33%, warm 14%; Dominant: tall wheatgrass, annual brome

Floristic quality measures remain constant at this site with the exception of weighted FQI, which decreased from from 30 to 20. A decrease in cover of native warm–season grasses is likely the cause for this change. This site was grazed just after a spring burn and again just before sampling, so in spite of an increase in frequency of big bluestem in the plots, the decrease in cover produced a lower weighted FQI. This site was also grazed prior to sampling in 2013. Exotic cool season grasses in the northern portion of this site remains at 43% with the dominants being tall wheatgrass and smooth brome. There was 10% cover of cool season grasses in the southern section in 2016 compared to 20% in 2013. Cover of native vs. exotic forb species for the site as a whole was 17% and 41% respectively.

MORSE HAY NORTH

Coverage: cool 95%, warm 0%; Dominant: tall wheatgrass, annual brome

This hay field is dominated by smooth brome and bindweed. Warm season grasses were no longer detectable in 2016. Forb cover is only 13%. Previous comments regarding the timing of prescribed fire, mowing timing and frequency and the effect of decreasing or absent warm season grasses apply to this site as well. A spring burn that occurs in March or early April can enhance the growth of brome rather than decreasing tiller growth in that species. Haying after July 15 allows brome to

seed at will. The number of species has decreased here by 30% over 3 years ago. The average C value and FQI have decreased but not appreciably. Weighted FQI on the other hand has decreased dramatically due to the decrease in warm season over other species.

MORSE MIDDLE

Coverage: cool 41%, warm 30%; Dominant: smooth brome

Morse Middle, like Morse Hay North is dominated by smooth brome. Cool season exotic grasses have 40% cover, similar to the 46% in 2013. Morse Middle has 30% cover of native warm season grasses; down from 60% in 2013. The exotic forbs and native forbs have switched rolls this year with (17% and 39%, respectively) natives out-performing the exotics. Measures of floristic quality remained unchanged except for a decrease in weighted FQI brought about by a sizeable decrease in native warm season grasses.

MORSE HAY SOUTH

Coverage: cool 55%, warm 12%; Dominant: tall wheatgrass, annual brome

This site is uniquely divided into areas dominated by different speces and both upland and wetland habitats. The cool season tall fescue planting in the southern edge, which was not sampled, is moving into the southern most transect. The northern portion of the tract is dominated by smooth brome and held 68% cover of exotic cool season grasses (48% in 2013), but has a few warm season native species present. Tall wheatgrass is moving into the northern sampling area. It should be controlled before it becomes dominant. Native forbs had 9% cover (30% in 2013), while exotic forbs had 3% cover (20% in 2013) at this parcel. Keeping in mind the disparate regions of upland and lowland vegetation, overall there were fewer species recorded for this site, but changes in floristic quality were insignificant. Vegetation boundaries were not re-mapped during this sampling so the extent of expansion or remission of reed canarygrass is not known, but mapping of such near monocultures is something that can be done to help track the effect of management on this species.

CWR SOUTHWEST

Coverage: cool 58% (coverage in of both north and south is up into the 20-40% range in the north and into the 60-80% range in the south), warm 13%; Dominant: tall wheatgrass, big bluestem

Transect 54 in the northern area of this parcel still has the greatest cover of native warm season grass species, however, this cover was reduced from 32% in 2013 to 24% in 2016. Warm season grasses give way to cool season dominance as you move south within this parcel. Cool season cover was 23% (10% in 2013) in the north and 76% (48% in 2013) in the southern half. Warm season cover was 12% (16% in 2013) in the north and 11% (10% in 2013) in the south. Fewer species were present in the plots as well. The results of these changes were decreasing values in floristic quality as well as in abundance weighted floristic quality.

MORSE SOUTHWEST

Coverage: cool 65% (coverage in the southern 1/3 80%+ range), warm 11%; Dominant: tall wheatgrass, Canada bluegrass, and smooth brome

This is another site where vegetation mapping could provide some good feedback in terms of the advancement or recession of tall wheatgrass. Cool season grass cover is 43% (47%in 2013) in the northern 2/3 of this site and 90% (63% in 2013) in the south. The dominant species in the south is smooth brome. The northern portion of this site is a near monoculture of tall wheatgrass except where a swale provides enough moisture to keep the wheatgrass from invading (so far). A recently burned patch within transect 50 (Figures 9 and 10) on the edge of this swale, reduced tall wheatgrass from 36% in 2013 to less than 2% in 2016. The dominant species in the south is smooth brome. The burned patch in the first plot caused an increase in the number of species recorded for the plot as well as a decrease in the cool season exotic cover (tall wheatgrass). The additional species had low C values and thus decreased the average C value. The change in cover of cool season exotics caused by this treatment at this one site distorted the data and caused a noticeable increase in the floristic quality rating at this site. The authors of this study are unaware of the circumstances leading to this late season burn and whether it was an experimental treatment or a brush pile inadvertently placed over a transect that happened to be burned prior to survey. Either way, the effect was noticeable and if repeatable may be worth further investigation for potential control of tall wheatgrass. If this treatment is to be used for control of tall wheatgrass, a treatment of herbicide on re-emergence of the tall wheatgrass may be necessary to prevent it from re-establishing dominance.

MORSE CROP

Coverage: cool 22%, warm 16%; Dominant: (All native) Canada wildrye, foxtail barley, big bluestem and rosinweed

This site was seeded in 2012. Eleven of the 179 species planted here were present in the transects. One of the dominant species, foxtail barley, is a native species which was not included in the seed mix. Cool season exotic species cover has increased from less than 1% in 2013 to 4% in 2016. The cause is the spread of the fescue planted in Morse Hay South. Dominant species here are Canada wildrye, foxtail barley, big bluestem and rosinweed; all native species. Sedges, which dominated in 2013, were not recorded in 2016. Warm season grasses still had similar cover of 16% (18% in 2013). Overall, the number of species found and all floristic quality indexes were slightly higher as is expected in a site in the 4th or 5th year after seeding.

ELM CREEK COMPLEX SITES

This complex is on the middle of the properties. References in the following discussion for coverages at these sites can be found in Tables 2B through 7B.

JOHNS NORTH

Coverage: cool 21%, warm 34%; Dominant: Annual brome, dropseed and sedges

The number of species found along with the average C value and the FQI increased at this site in 2016. In spite of this the weighted FQI decreased by half. This is an indication that while more high value species were found at this site, the less desirable species covered more area than in 2013. This might include annual forbs such as camphor-weed along with other adventive species that respond to disturbances. Cover of cool season grasses is 21%. Exotic cool season grass cover was

6% versus 18% in 2013. Overall cover of nearly every category of species decreased, including noxious weeds and warm season grasses. This overall drop in cover is may be due to early spring flooding, or heavy grazing. Annual brome, dropseed and sedges were dominants.

JOHNS SOUTH

Coverage: cool 29%, warm 41%; Dominant: Cordgrass, sedges, smooth and annual brome

In 2013 this site was divided into two sections for mapping vegetation communities. In 2016, sampling shows a decrease in exotic cool season grasses in the northern section of Johns South Wet Meadow (15% compared with 27% in 2013). Warm season grasses averaged 34%, up from 22%. Cover of cool season grasses in the southern most transect increased to 16% in 2016 from 1% in 2013. Warm season natives also increased to 58% from 45% (chiefly cordgrass) in the southern transect.

For the entire site, dominant exotic grasses are annual brome, smooth brome, Kentucky bluegrass and tall wheatgrass. Cordgrass, switchgrass and big bluestem were dominant warm season species, although with less cover than in the previous sampling year. Overall fewer species were found among thetransects in 2016. Average C value and FQI increased. John's South Meadow also experienced a decline in weighted FQI though less dramatic than in John's North Meadow. The reduction in the higher value warm season grasses is likely the cause.

SULLWALD

Coverage: cool 103%, warm 5%; Dominant: smooth brome, Canada bluegrass

Sullwald meadow is still dominated by smooth brome and bluegrass. With a weighted FQI of less than 11, this site is in need ofremediation . In spite of the fact that 70% of the species found here are native, 80% is covered in smooth brome. The number of species delined nearly 30% from the last survey and the smooth brome marches on. The exotic cool season grass species cover is now over 100% from transect data, up from 77%. There are very few other species of note. With less than 5% warm season cover, this site may not be able to recover even with prescribed fire, herbicide treatments or grazing. Again, haying after July 15 is a production practice which does not decrease the spread of brome or bluegrass seed. The more drastic approach of vegetation removal and reseeding may be necessary if warm season grasses are desired here.

NGPC

Coverage: cool 92%, warm 2%; Dominant: smooth brome

This site was added to the vegetation assessment in 2016. Sampling transects in this first year indicated 90% cover of smooth brome with very small components (2%) of warm season grasses. A few exotic forbs, dogbane, wild licorice and ironweed make up the majority of the remainder of species. This is one of those rare cases where floristic quality weighted by abundance (cover) data is actually lower (FQIw=6) than floristic quality. This site is comparable to Sullwald hay meadow and comments about potential recovery are applicable here as well.

MCCORMICK NORTH ISLAND

Coverage: cool 13%, warm 12%; Dominant: sedges, annual brome, ragweed

McCormick North now has a 12% warm season grass component, similar to the 9% in 2013. Cool season exotic grasses are 8% only slightly less than 9% in 2013. Cool season native grasses in sampled areas had a cover of 12.5%, up from the 5% in 2013. Native forbs have over 28% cover, down from 60% in 2013, while exotic forbs had 8% cover down from 15% cover. In addition, only 57 species were recorded in the transects, down from 77 in 2013. The overall reduction in cover and species may be due to flooding. There was very little change in the overall floristic quality in spite of these changes. Upland sites with floristic quality of less than 20 are considered underachievers, however, with frequent flooding, especially if under water for several weeks, change in species numbers is to be expected. Dominants were Carex species, annual brome ragweed, bulrush, common ragweed, and black medick.

MCCORMICK SOUTH MEADOW

Coverage: cool 18%, warm 43%; Dominant: northern reedgrass, sedges, switchgrass

This parcel still has several woody dominated areas which were designated as 0-20 percent cool season understory. These were chiefly cottonwood, green ash, eastern red cedar, and a few Russian olive. Transect data from the remaining area shows a reduction to 6% cover of introduced cool season grasses from 23% in 2013. Warm season grass cover has increased from under 10% in 2013 to 43% Western ragweed, though less prevalent was still the dominant forb species however there was less forb cover overall. The number of forb species found in the plot transects were fewer, but average C values, FQI and weighted FQI were similar.

FORT KEARNEY COMPLEX SITES

This complex is on the middle of the properties. References in the following discussion for coverages at these sites can be found in Tables 2B through 7B.

BLESSING

Coverage: cool 38% (formerly 40-60% range), warm 54%; Dominant: big bluegrass, switchgrass, ragweed

Vegetation at the Blessing site was first surveyed in 2014 and again in 2016. Cedars had been cleared from this former CRP land just prior to survey in 2014. Average C value was similar in both years. Floristic quality decreased somewhat in 2016, but weighted floristic quality increased. A spring burn and rest in 2016 likely contributed to the decreases in cover of cool season exotic species from 46% to 38% and in the increase in cover of big bluestem from 6% to 20% and switchgrass from 3% to 8%

WYOMING SOUTH

Coverage: cool 60%, warm 9%; Dominant: tall and meadow fescue, sedges

The northern edge community is still dominated by warm season grass though the cover was reduced. Cool season cover was reduced as well in this small area. This reduction is presumably due to grazing early in the season. Over the entire site, the cover of cool season exotics increased. The fescues and Carex are dominant species. The fescues increased from 28% to nearly 40%. This was the major reason for the increase in exotic cool season grasses to 60% from 47%. The number of species found in the transects decreased more than 20%. Average C value and FQI increased very slightly. An increase in the cover of native sedges was the major reason that weighted FQI increased in spite of the increase in cover of cool season exotic species and decrease in warm season grass cover.

SPEIDELLL NORTH

Coverage: cool 62%, warm 33%; Dominant: Canada wildrye, Kentucky bluegrass, annual brome

Speidelll North was first sampled in 2016. This site has 104 species; the highest number of species of any site sampled on this project. Eighty-one percent are native, although many of these are of low quality as is the case with most of the other sites on the project. It has 36% cover of exotic cool season grass species and 20% native cover. It has 1% exotic cover and 32% cover of native warm season species. It has 13% cover of native sedge species. There is a 50% cover of exotic forbs dominated by white sweet clover and cannabis. Ragweed and camphorweed are dominant native forbs which together comprise a 90% cover overall. The low C value of most of these species kept the weighted FQI relatively low.

SPEIDELL SOUTH

Coverage: cool 56%, warm 37%; Dominant: Kentucky bluegrass, big bluestem, annual brome

Speidell South was also sampled for the first time in 2016. This site had fewer species within the sampled transects but a higher average C value than Speidelll North. Speidell South had nearly 50% cover of exotic cool season grasses, just slightly more native warm season cover (46%), and less sweet clover and cannabis. The floristic quality indexes were just slightly lower than Speidell North (Table 9). Both Speidell North and South have favorable warm season grass components which can be enhanced with management.

FOX

Coverage: cool 43%, warm 49%; Dominant: annual brome, tall dropseed, sideoats grama, sweet clover

This is one of two sites which were first sampled in 2014 and again in 2016. Two of the original six transects were not sampled in 2016 due to flooding. The omission of these diverse wetland areas contributed to a reduction in the total number of species found at the site from 81 in 2014 to just 36 in 2016 and a corresponding drop in the floristic quality index. Average C value increased slightly indicating that the remaining species were of somewhat higher quality. A large increase in the cover of warm season natives and a much smaller increase in the cover of exotic cool season species supports an increase in weighted floristic quality. This site was seeded in 2012. Three mixes were planted here. In the two sampling years, 13 of 18 sandy upland species; 12 of 20 mesic species and 16 of 28 planted wet-meadow species were recorded. Cover of exotic annual bromes increased

from 18% to 45% while native cool season grasses such as Canada wildrye decreased from 12% to less than 2%. Canada wildrye is a shortlived perennial grass used in grass mixes as a cover crop to help fill in until warm season grasses are well established, so its reduction at this site is not unexpected. Exotic warm season grasses decreased led by foxtail with a decrease from 54% to less than 1%. Native warm season grasses increased overall from 19% to 43%.

HOSTETLER

Coverage: cool 36%, warm 6%; Dominant: Western wheatgrass, black-eyed susan, sweet clovers

This site was seeded in 2011 and was dramatically different in appearance in 2016 than in 2013 (Figure 11). Twelve of 16 originally seeded species were recorded in the sampled plots. Total species recorded were 64 with 67% native. There was a slight increase in the number of species found as well as in average C value and FQI. Grasses were beginning to fill in among the previously forb-dominated landscape. This competition caused a decrease in the overall cover of forbs, many of which were annual species. The cover of native forbs dropped from 82% in 2013 to 36% and warm season native grasses decreased from 15% to 6% in 2016. The result was a decrease in weighted FQI. No sedges were found at the site. The dominant species were Western wheatgrass, annual black-eyed susan and the exotic yellow and white sweet clovers.

SHOEMAKER ISLAND COMPLEX SITES

These grassland sites range from frequently and occasionally flooded Northern Cordgrass Wet Prairie in northen Binfield East and West Meadow sites with some inclusions of Western Alkali Meadow characterized by saltgrass, alkali arrowgrass and foxtail barley in Binfield West Meadow.

Most of these sites show an increase in weighted FQI despite having an increased dominance of Agrostis species (redtop/ bentgrass), a cool season exotic species. The reason is that exotic species are not assigned a C value. This means that increases and decreases in exotics only change weighted FQI if the entire species is eradicated or if one is added, changing the number of species (N value). The causes of these increases in FQIw are discussed in the sections below.

This complex is on the eastern edge of the properties. References in the following discussion for coverages at these sites can be found in Tables 2C through 7C.

BINFIELD NORTH

Coverage: cool 38%, warm 49%; Dominant: Redtop, foxtail barley, Canada bluegrass

Some changes were noted in the makeup of species at this site. Average C value increased without a corresponding increase in the number of species. This means that more desirable species were found here in 2016 and some less desirable species were not recorded. Native cool season grasses increased in cover (18.8% from 7% in 2013) while exotic cool season species decreased (19% from 45%) from the previous survey. Ragweed is still a prominent species. Big and little bluestem decreased as did foxtail, overall decreasing warm season cover from 77% to 49%. Black medick was less dominant and white sage became more dominant. Eighty-nine percent of species recorded

at this site were native. Native forb cover increased from 17% to over 100%. (remember that cover is measured as canopy and can therefore overlap other species producing more than 100% cover). So while diversity increased average C value and FQI, the decrease in cover of warm season grasses muted the increase in weighted FQI.

BINFIELD NORTH HAY

Coverage: cool 44%, warm 14%; Dominant: Fescue, big bluestem and switchgrass

Redtop cover appears to have been reduced while fescue cover increased. One explanation may be a difference in phenological stage of each species at the time of the burn. Fescue, big bluestem and switchgrass are the dominant grasses here. Cool season exotic grasses increased from 24% cover to nearly 40% cover in 2016. While this represents three years of management, it is disappointing given the spring burn and rest in 2016. The cool season grasses may not have been at the best phenologic stage at the time of the burn, especially if it was conducted prior to April 15. Warm season grass cover is 14% (up from 8% in 2013). Sedge cover was 10% this year (16% in 2013). A reduction in cover of exotic forb species from 40% to 1% and an increase in several native forb species with values of 4 or higher lead to an increase in the weighted floristic quality at this site in spite of the increased cover of cool season grasses.

BINFIELD SOUTH HAY

Coverage: cool 60%, warm 30%; Dominant: Redtop, big bluestem and cordgrass

This hay meadow has had some variation in management over the last 4 years prescribed fire, haying and resting. There has been a noticeable increase in weighted floristic quality in 2016. Smooth brome cover decreased at this site, but redtop cover increased from less than 1% to nearly 50%. An increase in big bluestem and cordgrass changed a 7% cover of warm season grasses to 30% in 2016. Cover of sedges increased from 10% to 20%. Exotic forbs increased from 4% to 12%, but so did native forbs from 19% to 49%. The number of species increased from 49 to 68 causing a net decrease in average C value, however the higher valued species outperformed the lower valued species increasing the weighed FQI.

BINFIELD EAST MEADOW

Coverage: cool 26%, warm 23%; Dominant: Redtop, big bluestem and cordgrass

Northern areas are dominated by Carex species, cordgrass, and bulrush transitioning in the south half to switchgrass, bluegrass, bluestem and smooth brome. Both cool and warm season grass cover decreased at this site overall. The greatest change was in the warm season decrease in the southern half, which led to the decrease in weighted floristic quality in spite of slight increases in all other measures of floristic quality (table 9). The 2016 spring burn on the southern 1/3 would have made this warm season dominated area very desirable for cattle. This site could benefit from a spring burn with a period of rest from grazing.

BINFIELD SOUTH MEADOW

Coverage: cool 38% (cover increased to 20 to 40% range), warm 69%; Dominant: Big bluestem, creeping bentgrass (redtop), switchgrass, cordgrass

The south meadow is characterized by an increase in the number of species from 47 to 71. Average C value remained at 2.9. There was an increase in FQI and a large increase in weighted FQI. Again smooth brome cover decreased but redtop (all Agrosts spp.) increased from less than 1% cover to 23% cover. Northern reedgrass, a native cool season grass also increased at this site from cover of less than 1% to nearly 10%. Native warm season grasses also increased from 18% cover to 68% cover. Native Carex species cover doubled from 13% to 30%. These increases in native species were the impetus behind the increase in weighted FQI. There were also decreases in dogwood and coral-berry. Community boundaries were drawn between the western ¼ and the eastern ¾. In the east, cool season exotics collectively had 35% (31% in 2013) cover. Sedges had a cover of 20% in the east and 7% in the west. Warm- and cool season grass cover increased to over 70% each.

BINFIELD WEST MEADOW

Coverage: cool 36% (cover increased to 20 to 40% range), warm 40%; Dominant: Agrostis, switchgrass and sedges.

Agrosits species (redtop and bentgrass) have increased from 3% to 20%, similarly to other sites in this complex. Desirable cool season species such as the sedges increased from 23% cover to 40% cover. Cover of warm season grasses increased at this site as well from 32% to 40%. Exotic forb species decrease slightly. Cover of native forbs increased from 67% to 90%. Dominant forbs are ironweed, vicid goldentop and ragweed. Spring burns favor warm season grasses. Season-long grazing benefits cool season species. Both appear to have benefited from these management practices.

Transect data averaged across each of the three secions of this parcel suggest that all now fall into the 0 to 20% category of cool season dominance. Calamagrostis was dominanet in 2013. Agrostis species now dominate this parcel along with switchgrass and sedges. Wood's rose is less prominent than in the 2013 survey although it still has a strong presence. The number of species increased from 74 to 93 and there were corresponding modest increases in average C value, FQI, and weighted FQI.

BINFIELD WEST HAY MEADOW

Coverage: cool 56%, warm 39%; Dominant: Agrostis, switchgrass and smooth brome

Introduced cool season grasses increased here as well. Bentgrass increased from 7% to 30% and smooth brome from 5% to 14% resulting in an overall cool season increase from 12% to 56%.. Sedge cover increased from 4% cover to 27% cover. Cover of warm season grasses increased at this site as well from 21% to 39%. Exotic forb species decreased from 8% to 2%. Cover of native forbs remained about the same. Dominant forbs are Maxamillian sunflower and Illinois bundleflower.

A few additional species were found at this site in 2016. Average C values and FQI remained essentially the same, however weighted FQI increased as a result of an increase in warm season grass cover and increased native sedge cover. This increase is countered by the increase in exotic cool season grasses from 12% to 56%; a fact that does not show itself in the FQIw, since all these

exotic grasses zero value in a weighted index. Since they already are accounted for in the number of species (N), a change in abundance does not affect the FQIw.

SUMMARY AND GENERAL RECOMMENDATIONS

Floristic quality was assessed for a large area with reltatively few plots. While some species were not detected in any one sampling period, in many cases, those species can still be found in some location on the site. Therefore, measures of floristic quality should be understood to be very conservative. Weighted FQI will indicate changes in desireable species very well, but may completely miss expansion of exotic species unless that expansion has reached a level that excludes native taxa.

The weighted FQI gives an indication of the changes in one site from one sampling period to the next. It includes all vegetation types including exotic, native, cool- and warm season, forbs, grasslikes and grasses. It does not however indicate any change when there is an increase or a decrease the abundance of any species with a value of 0. Therefore, it is inadequate to report changes in exotic cool season grass cover which is often a necessary indicator for plant community health and for management success. One solution is to assign values between 0 and 1 or negative values to these species. Since values between 0 and 1 are so small they show very little change with some very large changes in community dynamics. Negative values can show more dynamic change, however, one does not know if the change is from exotic species or from abundances of native species. I propose development of an index for exotic species separately from native species. These species can be assigned a value designed to indicate the difficulty of control and the invasive nature of the species. If a higher value means it is less desirable, it would work opposite the FQIw for native species. In other words, higher values would mean increases in the worst exotics. These two indexes would be an additional management tool.

Delineating edges of tall wheatgrass or reed canarygrass monocultures every few years is another management tool which can provide insight into the effectiveness of management practices on reduction of these species. Control of tall wheatgrass is a subject that is less well studied than that of brome. The burn at plot 50 in Morse SW was very advantageous, at least in the short-term and is something that should be monitored and perhaps replicated.

Prescribed fire can be very effective for control of cool season species if it is timed to the phenology of the species being controlled. Multiple factors must be aligned in order for this tool to be effective for control of cool season species and non-detrimental to other wildlife or other native cool season species. This can be difficult when weather changes from year to year and when other species are also in need of control or when ground nesting birds must be avoided. Burning too early can warm the soil and encourage the growth of cool season species, however timing the burn to the lengthening of tillers or elongation of flowering stems can reduce the carbohydrate reserves of cool season grasses, allowing warm season species to expand. “Shifting the plant community by timing burns to coincide with the most vulnerable stage of the target nonnative species while favoring

native species, is seen as key to success (Emery and Gross 2005, MacDonald et al. 2007, Simmons et al. 2007)." When fire is not possible at the correct stage or when community structure has shifted too far from warm season grasses, other treatments may be necessary. Mowing brome 3 or 4 times per year at certain stages in its growth cycle, beginning in late May have been used successfully (Lawrence and Ashford, 1964).

Several sites have very low floristic quality and present a challenge in order to shift the community back into warm season dominance. When a plant community has shifted substantially so that the composition is almost completely cool season exotics, it may require multiple prescribed burns to make an effect or it may be beyond recovery with burning alone (Willson and Stubbendieck, 2000). Timing is everything when using fire as a management tool. It is also one of the most difficult parameters to control.

In Shoemaker sites, redtop increased in several areas despite spring burns, but decreased in Binfield North Hay, while fescue increased. The timing of burns at these sites could have favored the phenology of one cool season species over another. Timing of tiller elongation and flowering can be different by 2 to 2 ½ weeks for these species so that a burn can favor one species and reduce the carbohydrate reserves of another. It is worth some investigation into the timing of burns at any of these sites to determine which species were affected the most.

Cool season grass cover appears to have increased overall, however, warm season grasses increased in several sites as well. Comparing the management of the past three years with the cover data will help to provide insight for future management. Managers will have to keep in mind the limitations of any one measure of grassland quality as well as the effect of treatments just prior to sampling.

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FIGURES

Figure 1. Plum Creek Complex Transects

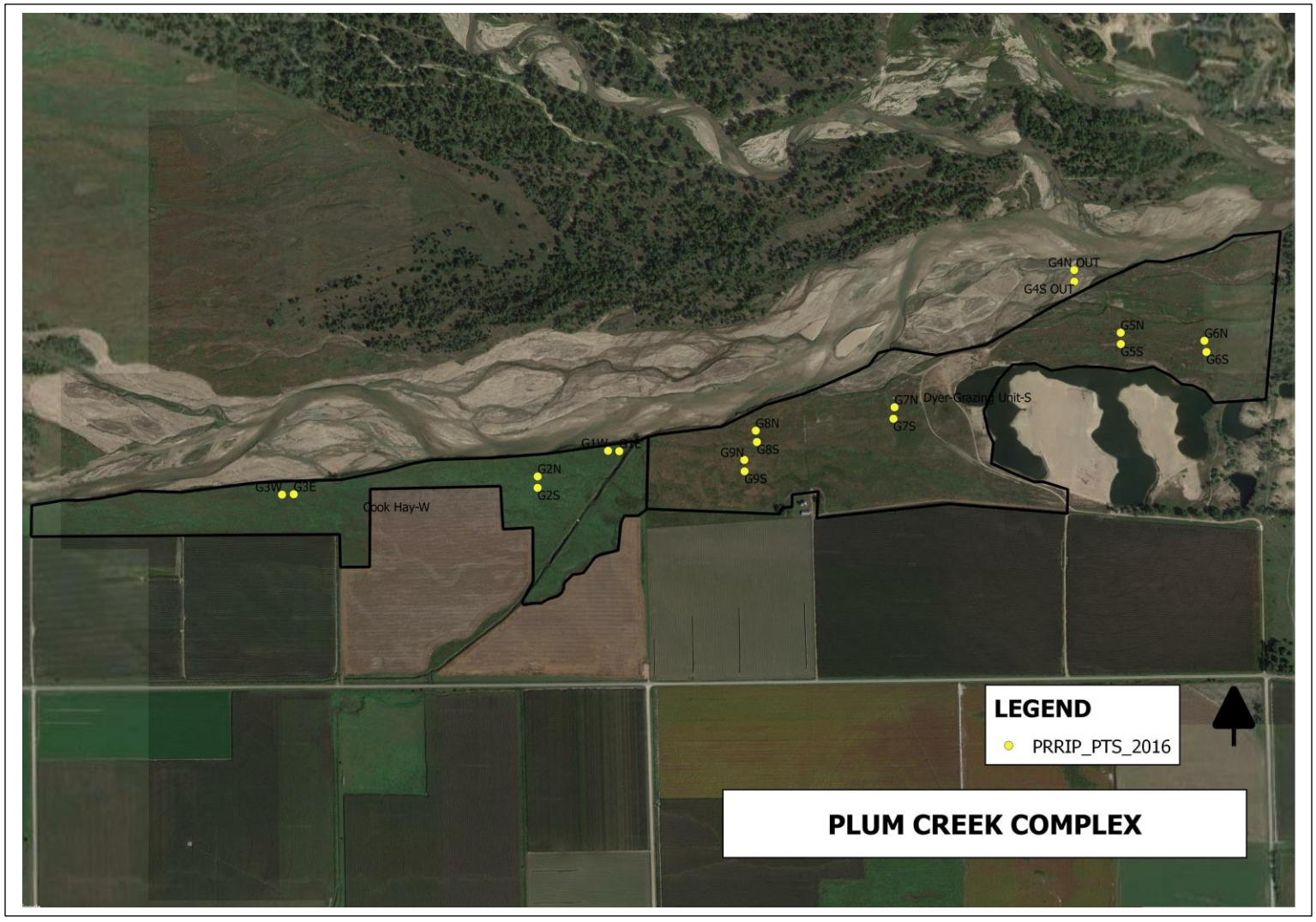


Figure 2. Elm Creek Complex – West Transects

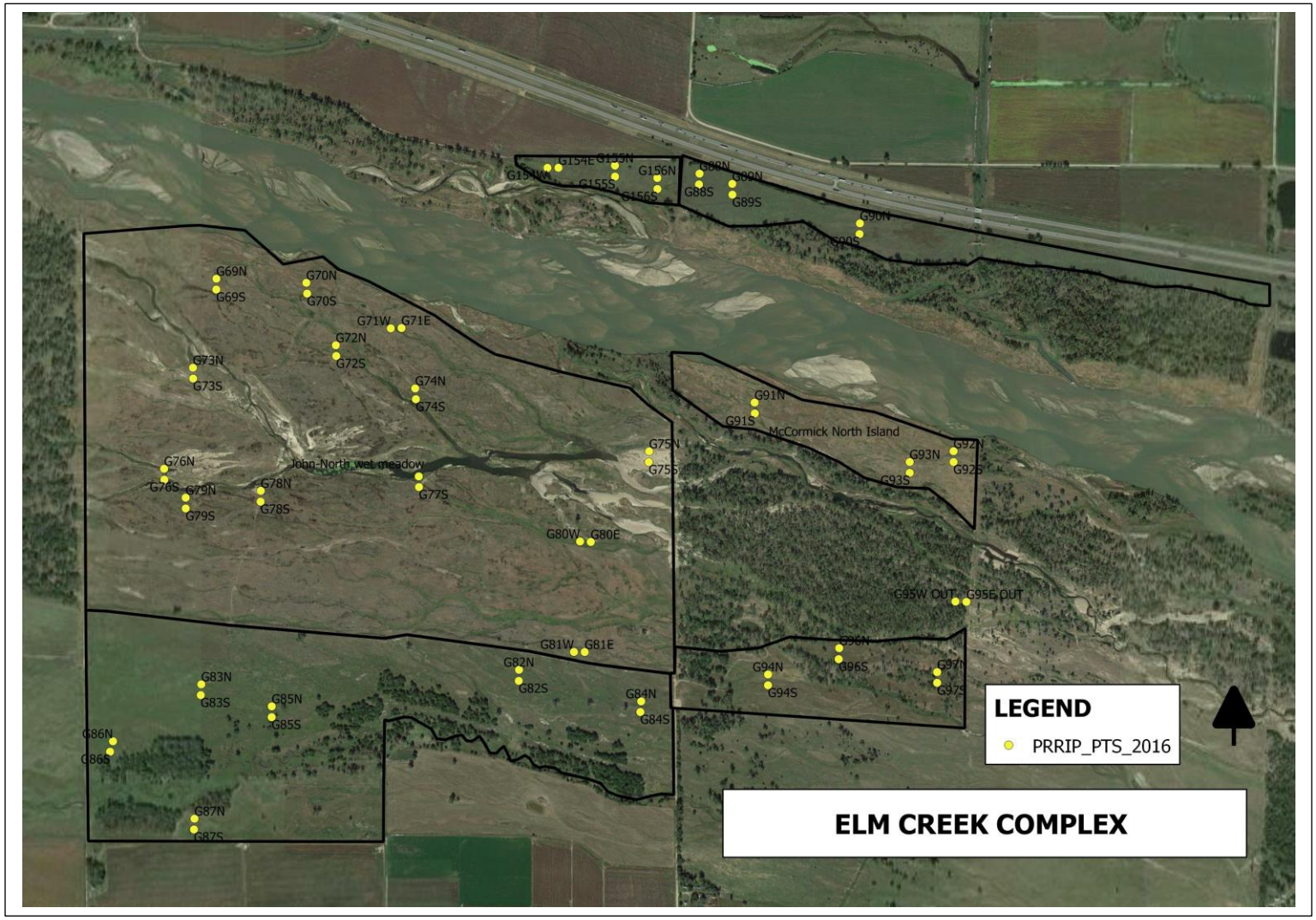


Figure 3. Fort Kearney Complex – West Transects

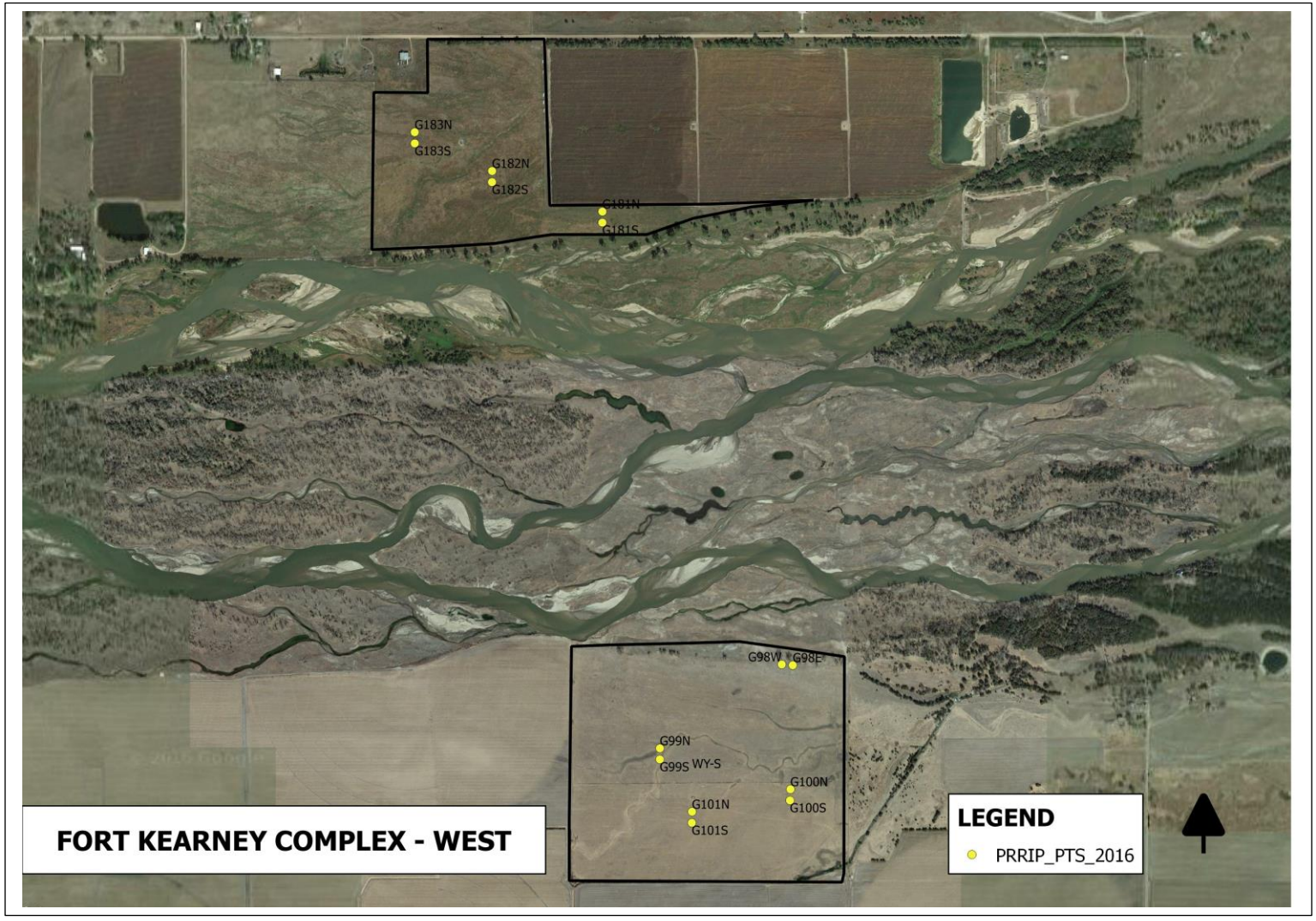


Figure 4. Fort Kearney Complex – East Transects

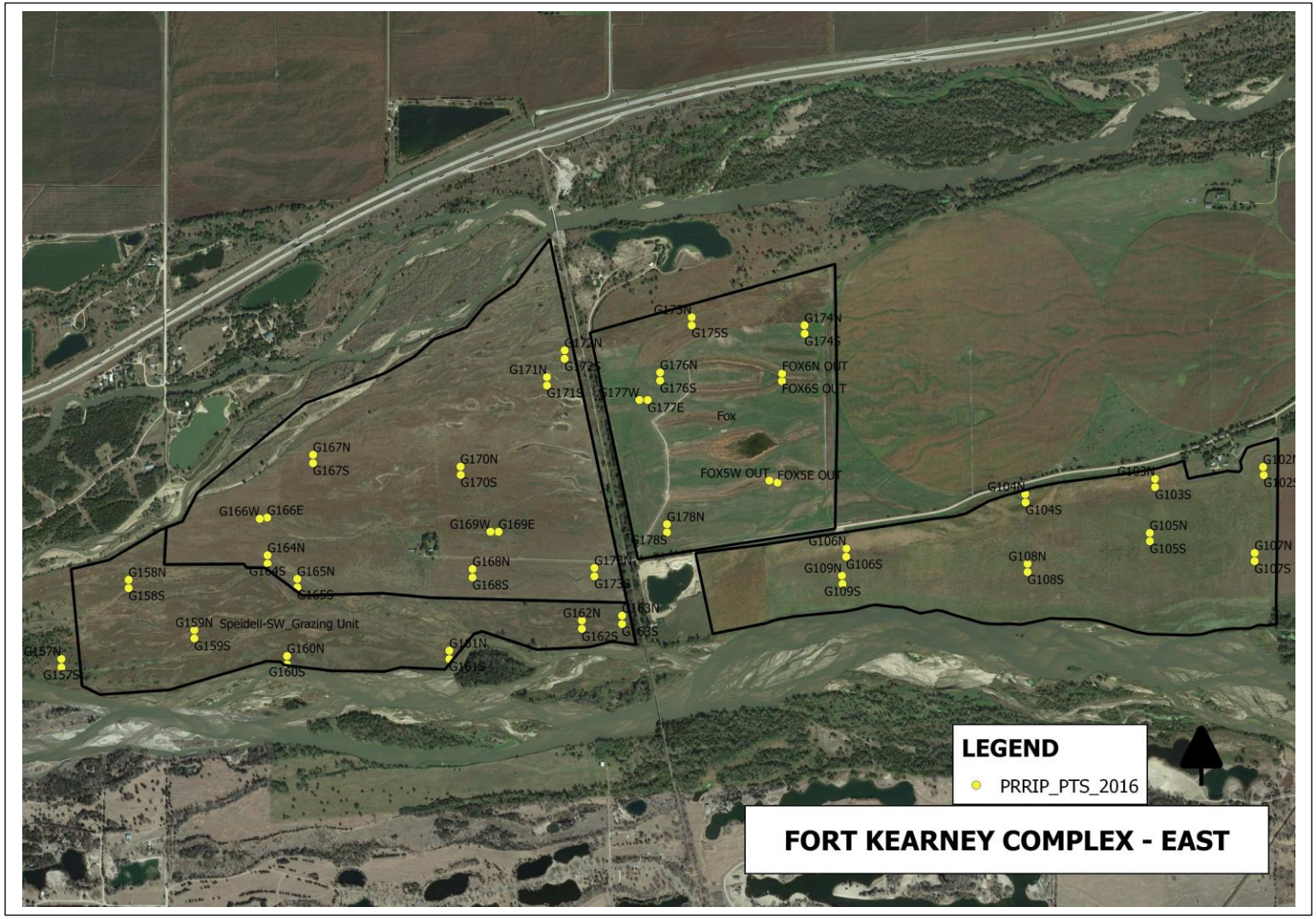


Figure 5. Cottonwood Ranch Complex – North Transects

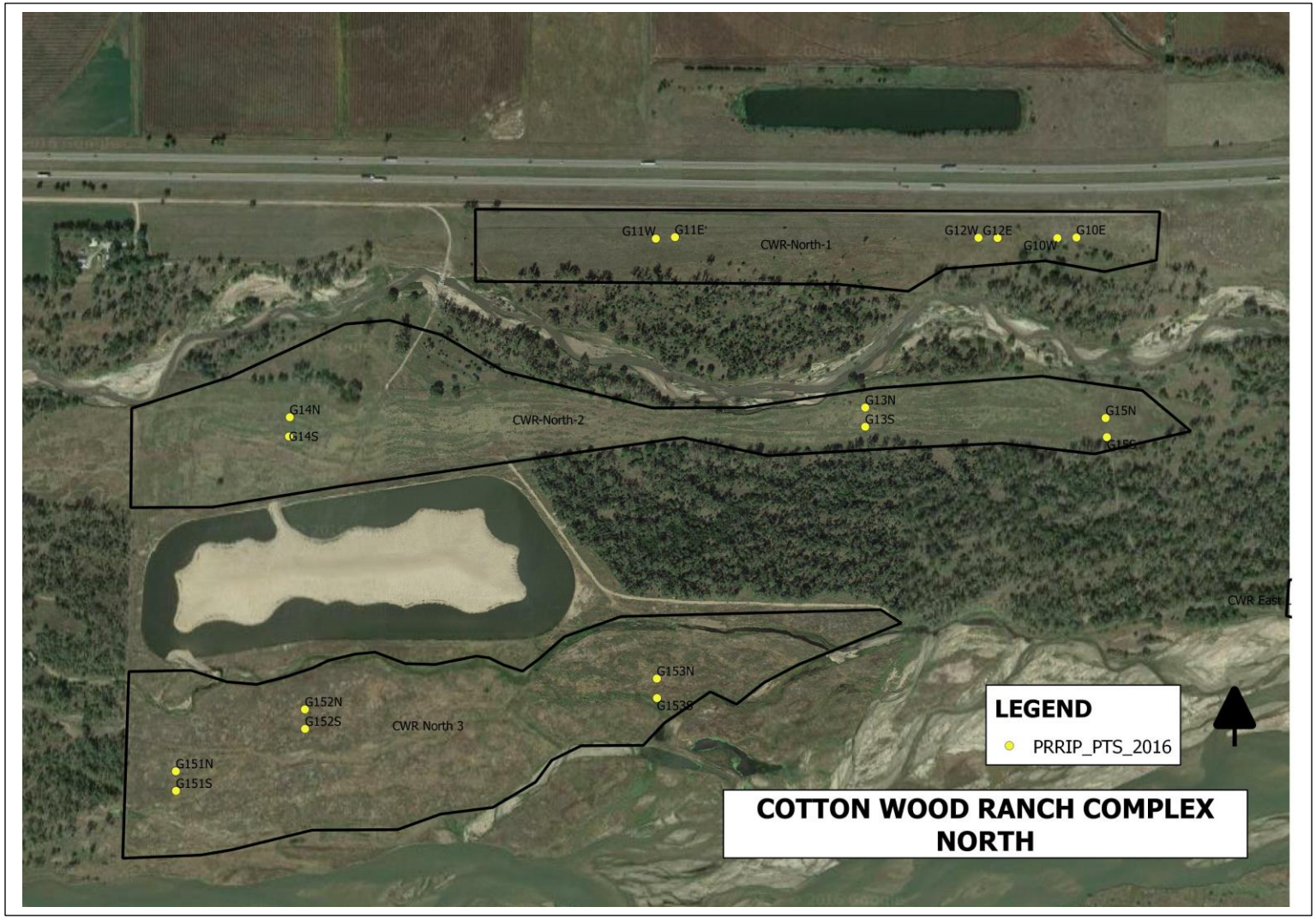


Figure 6. Cottonwood Ranch Complex – East Lloyd Island Transects

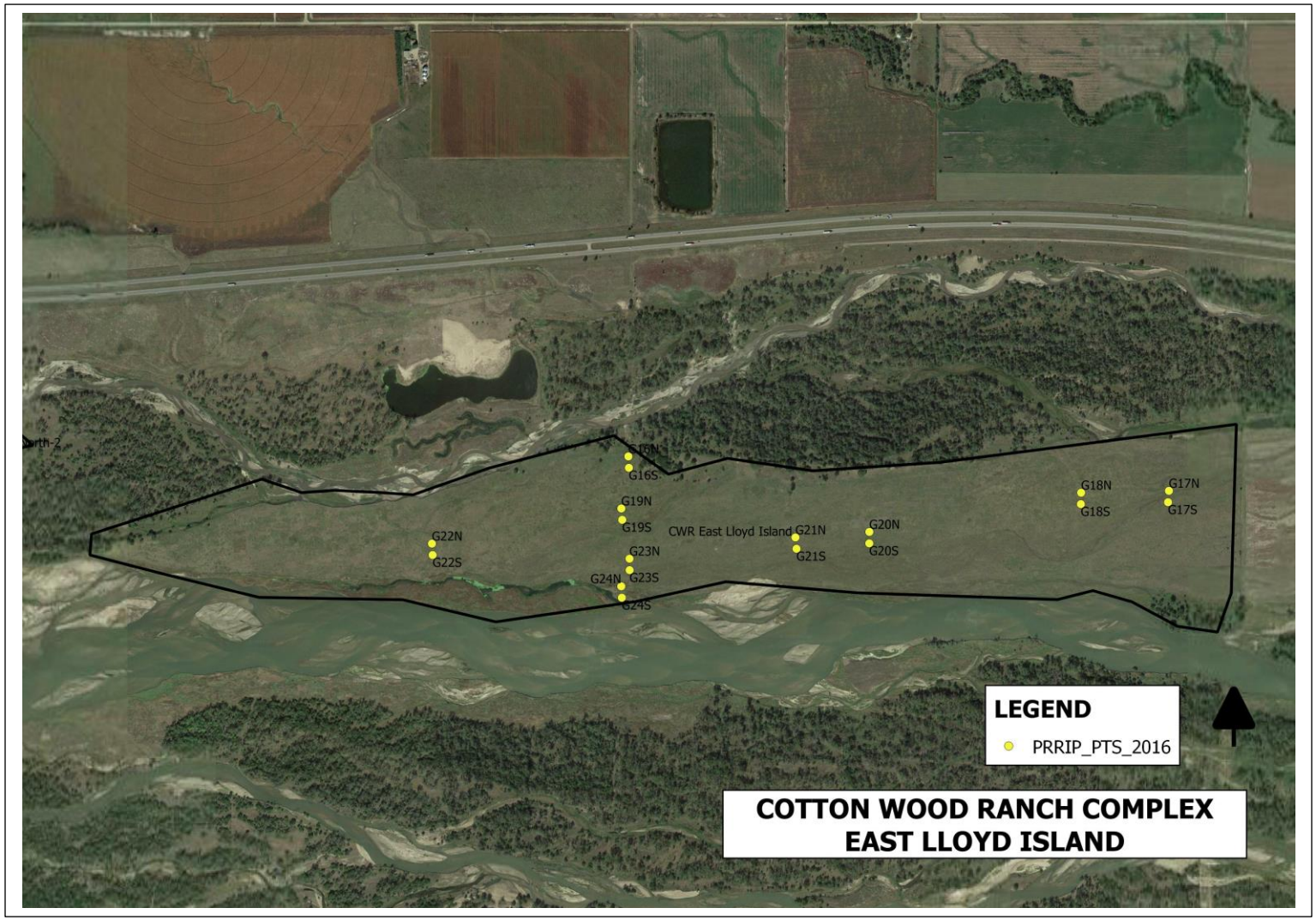


Figure 7. Cottonwood Ranch Complex – South Transects

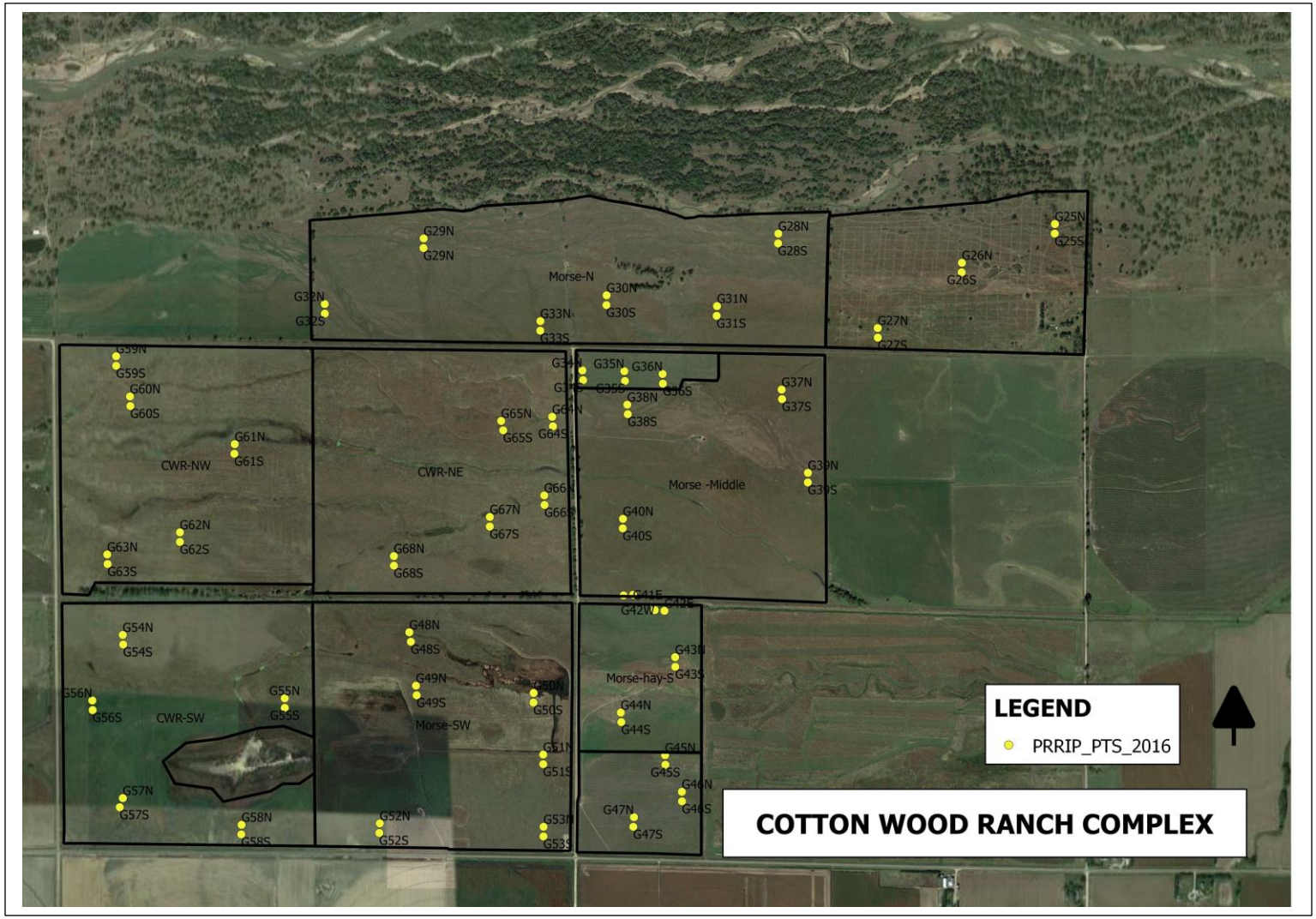


Figure 8. Shoemaker Island Complex – Transects

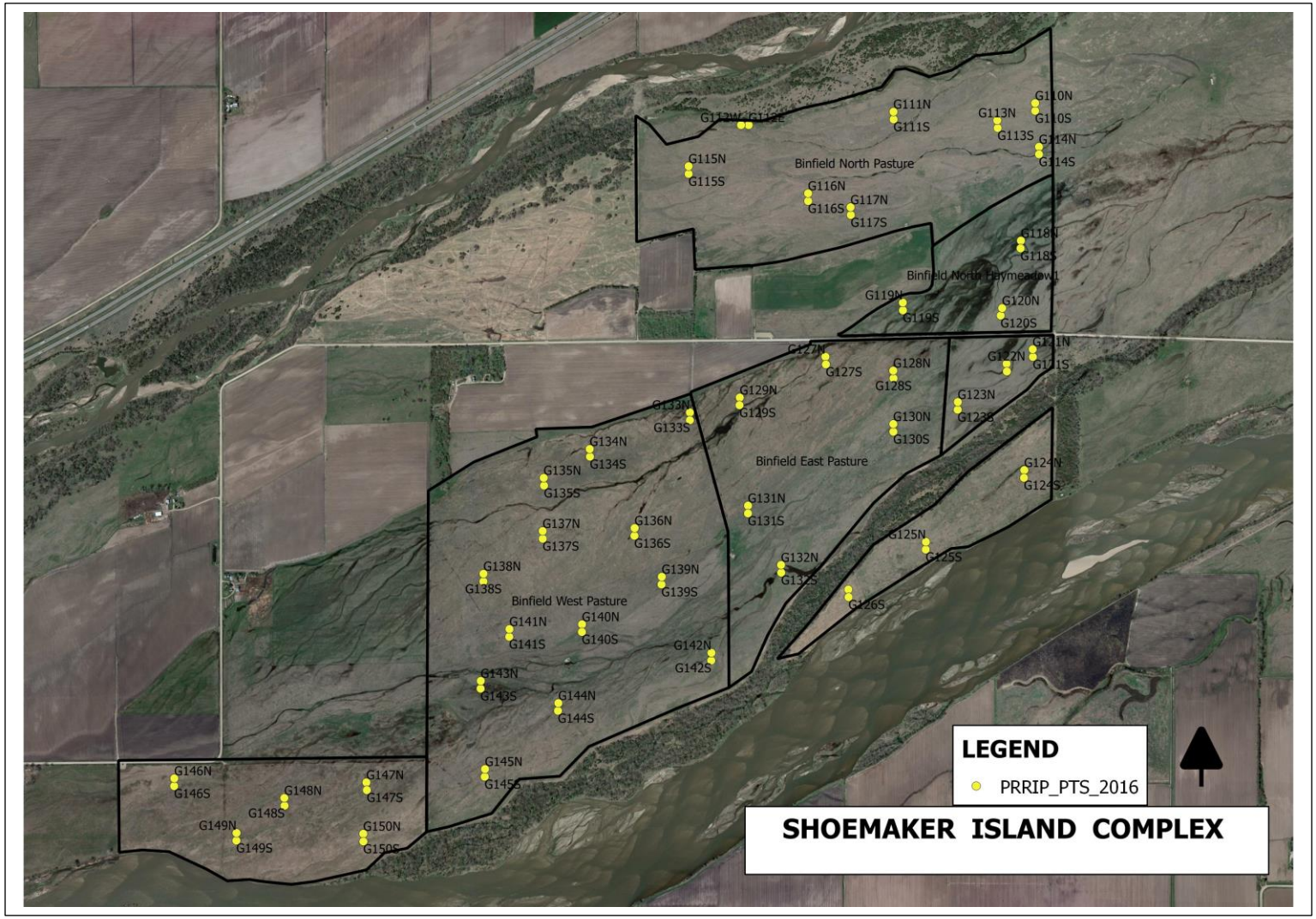


Figure 9: Morse SW plot 50 transect in 2013

Figure 10: Morse SW plot 50 transect in 2016 after a burn

Figure 11: Hostetler crop site in 2013 and again in 2016 at the same transect.

Figure 12: Comparison of FQI and weighted FQI values. This chart compares floristic quality and weighted floristic quality of each site.

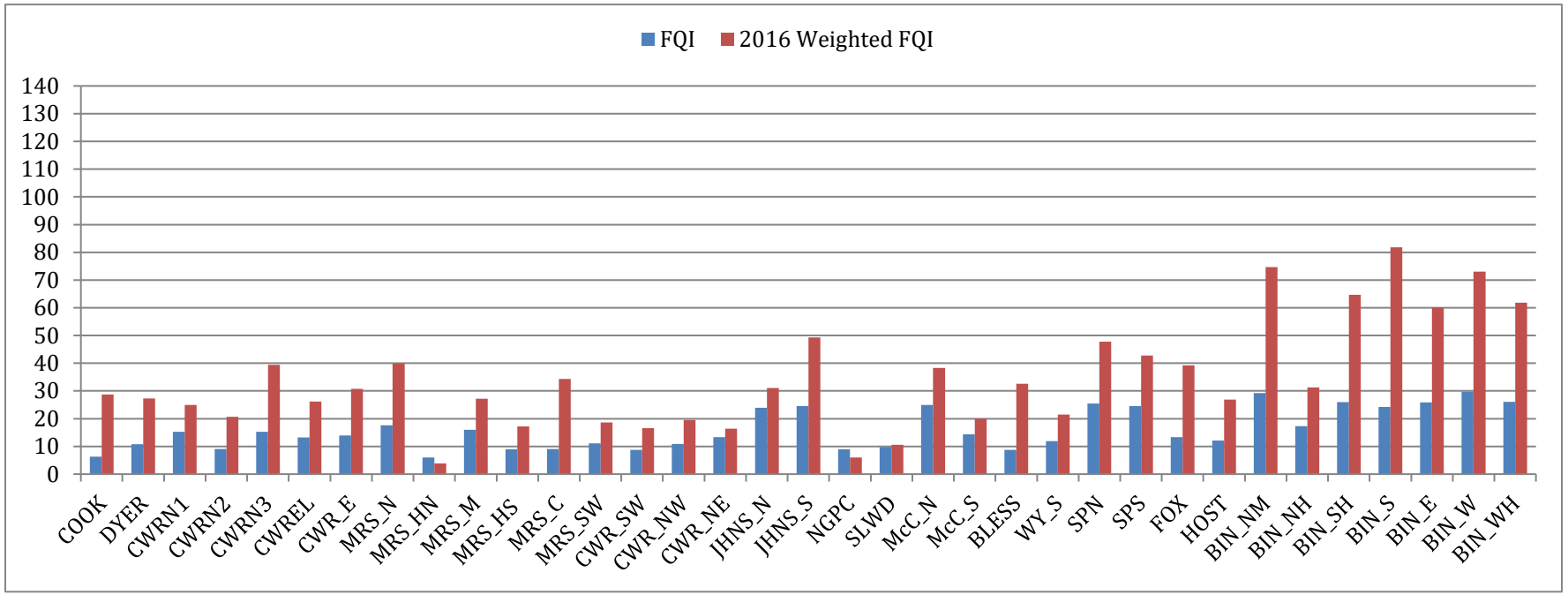


Figure 13: Comparison of weighted FQI values. This chart compares weighted Floristic quality values of 2013 with those of 2016. Fox and Blessing sites were first surveyed in 2014 and those values are included in the 2013 data on this graph. Higher values in 2016 indicates an increase in the cover of higher quality native species or a decrease in the cover of lower quality species or a combination of both.

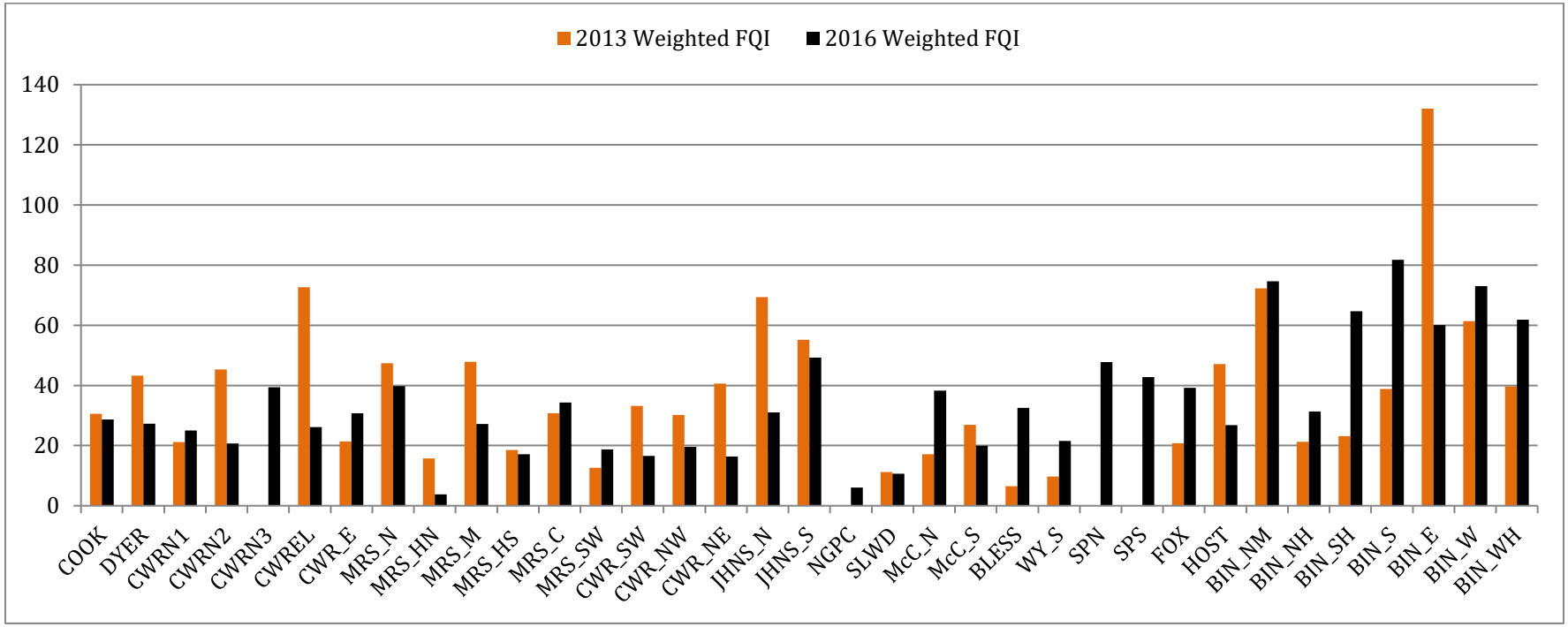
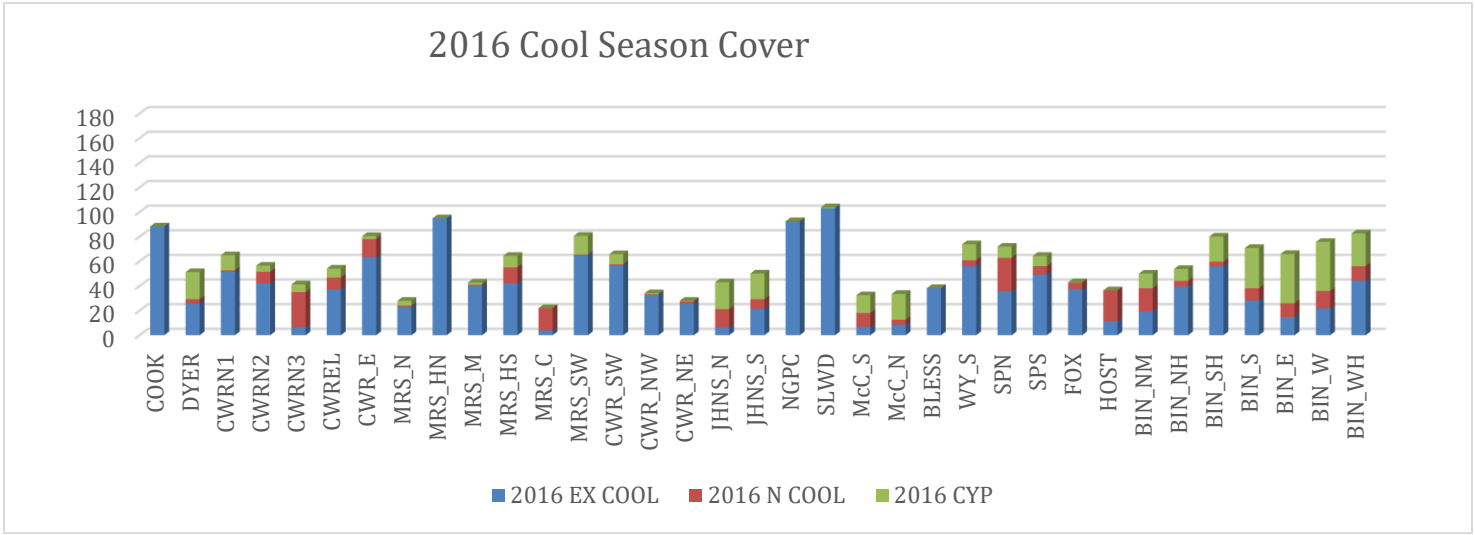


Figure 14: Cool season cover 2016 and 2013. These charts each combine exotic cool season grasses, native cool sewson grasses and grasslike coverage in stacks to show total cool season coverage.



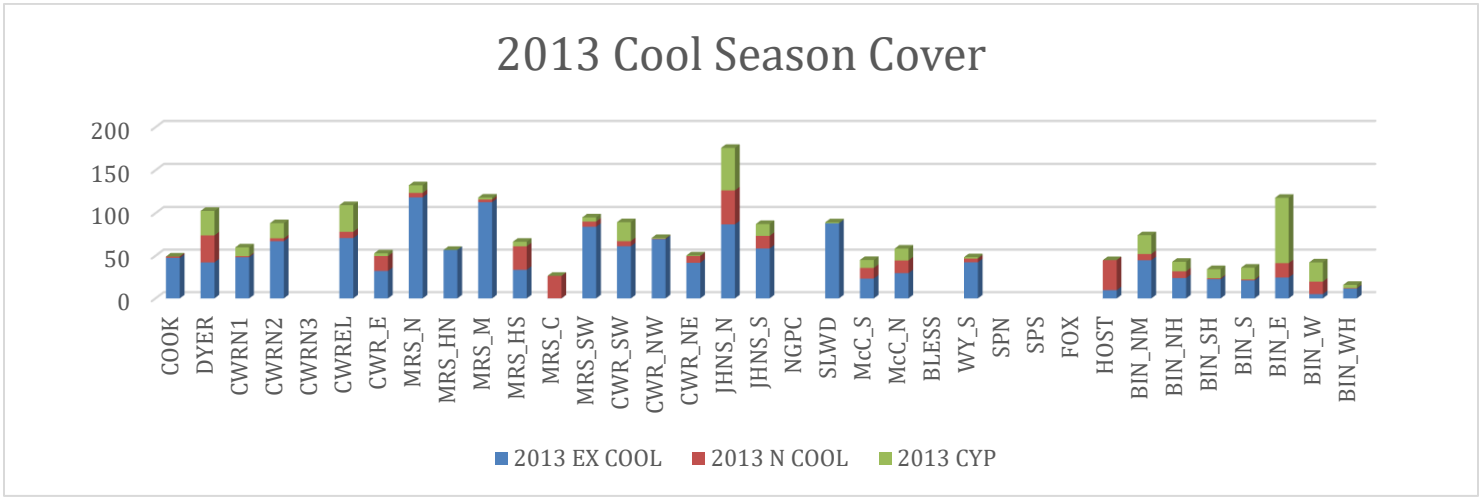
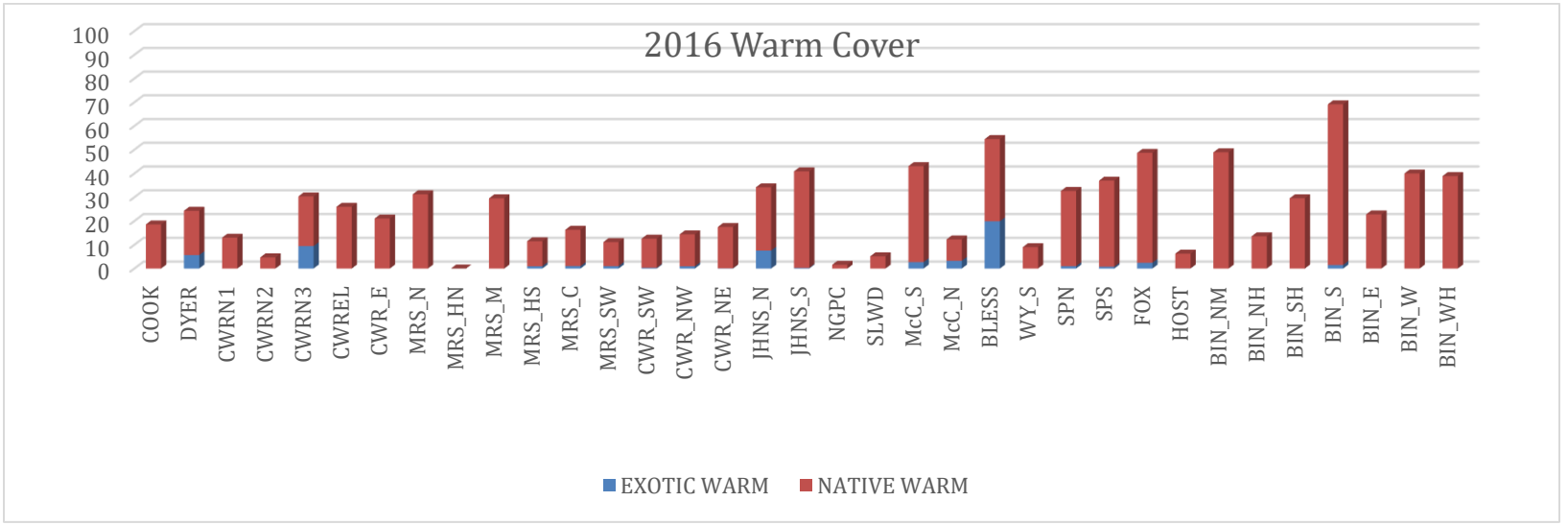
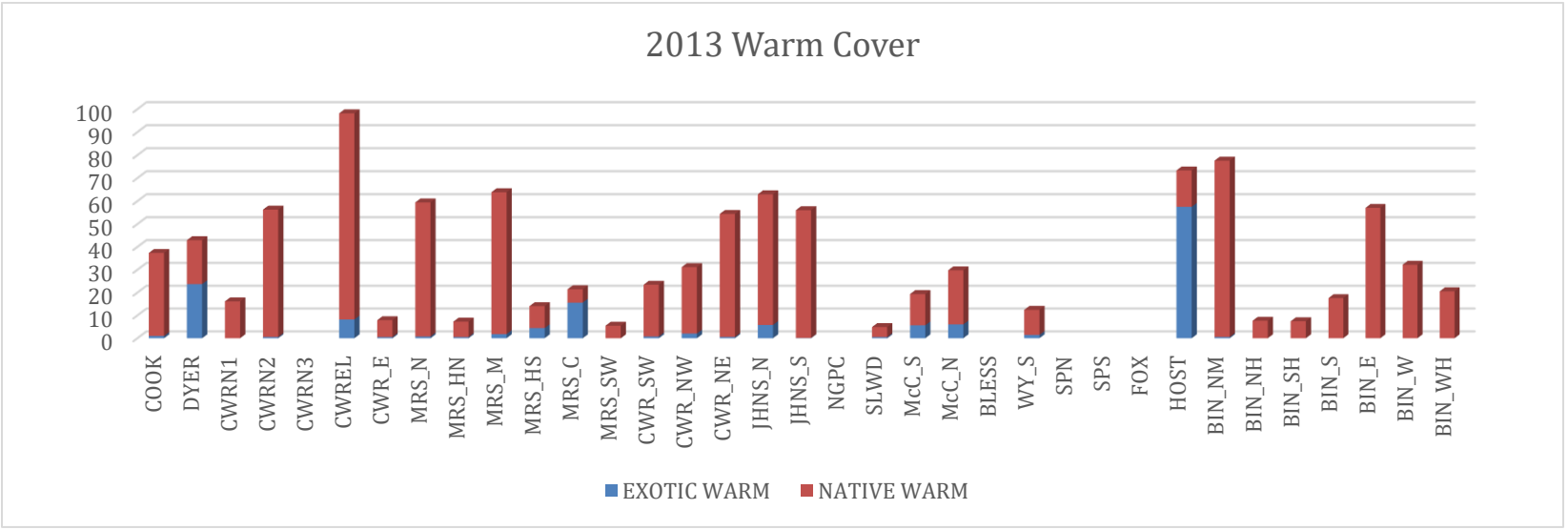


Figure 15: Warm season cover 2016 and 2013. These charts each combine exotic warm season grasses and native warm season grasses in stacks to show total warm season coverage.





TABLES

Table 1B. Site names west of Kearney. Acres, management since the date of the 2013 survey and the number of plots placed at each location. Activities July 15, 2016, and later were completed after this survey.

SITE NAME	ACRES	MGMT 2013 Survey <July15	MGMT 2014	MGMT 2015	MGMT 2016 Survey <July15	# PLOTS
Cook Hay Meadow	61	Hay	Rest	Burn/Rest	Hay	3
Dyer Grassland	125	Seeded 2010	Graze May 1-July 31 38 pr/1 bull (1 AU/4 acres)	Spring burn Graze May 1-July 31 38 pr & 1 bull (1 AU/4 acres)	Grazed May 1-July 31 38 pairs & 1 bull (1 AU/4 acres)	6
CWR North	59	Grazed	Graze 75 pr May-Oct July 1 rest ELI	Graze 100 pr May-Oct July 1 rest ELI	Grazed	3
CWR North 1 & 2	81	Grazed			Grazed	6
CWR East Lloyd Island	252				Spr Burn/Rest	9
CWR North 3			N/A	N/A	Rest	
CWR East	92	Grazed	Graze fall calves	Graze fall calves	Graze fall calves	3
Morse North	166	Hay	Graze 100 pr 4/15 to 5/15 & 7/1 to 8/1	Spr Burn/Graze 109 pr first 2 wks June, Aug, Oct	Graze 85 pr first2wksJune,Aug,Oct	6
Morse Hay North	12	Grazed	Hay July 15	Hay July 15	Spr Burn/Hay July 15	3
Morse Middle	135	Grazed	Graze 100pr 6/15-7/1	Graze 109 pr last 2 weeks June, Aug, Oct	Grazed 85 pr Last 2 wks May July Sept	5
Morse Hay South	44	Hay	Hay July 15	Hay July 15	Hay July 15	3
Morse Crop	30	Seeded, Hay	Hay July 15	Spr Burn/ Hay July 15	Rest	3
Morse SW	153	Grazed	Graze 100 pr 5/15-6/15 & Sept 1-30	Graze 37 pr 5/1-10/15 Hay late Sept	Graze 26 pr 5/1-Oct 15 Hay July 15	6
CWR SW	128	Grazed	Graze 60 pr 4/15-6/15 & 9/15-11/15	Graze 40 pr 4/15-10/15	Graze 18 pr 4/15-10/15	5
CWR NW	145	Grazed	graze 100 pr Aug 1-Sept 1	graze 109 pr 5/1-15,7/1-15, & 9/1-15	Spr burn/graze 85 pr 5/1-15, 7/1-15, & 9/1-15	5
CWR NE	150	Grazed	Graze April 15-Oct 15 30 pairs (1 AU/5 acres)	Spring burn/graze May 16-31, July 16-31, & Sep 15-30 w/109	Rgraze April 15-30, June 16-30, & Aug 16-31 with 85 pairs	5
Johns North Wet Meadow	381	Grazed	Graze May 1-July 15 with 40 pair	Graze May 15-June 15, Aug 1-Sep 1, Sep 15- Oct 15 w/ 40 pr	Spring burn North 1/2 & Graze May 1-Oct 15 with 36 pair	13
Johns South Wet Meadow	182	Grazed	Graze July 15- Sept 30 with 40 pair	Spring burn & Graze first 2 weeks May June, Sept 40 pair	Rest	6
NGPC		N/A	N/A	N/A	Hay July 15	3
Sullwald Hay Meadow	36	Hay July 15	Spr burn/ Rest	Hay July 15	Hay	3
McCormick North Island	34	Grazed	Graze April 1-May 1 188 pairs (1 AU/.56 acres)	Burned	Rest	3
McCormick South Meadow	42	Grazed		Graze April 1-May 1 with 101 pairs (1 AU/1.1 acres)	Spring burned & RestedGrazed	4

Table 1B. Site names East of Kearney. Acres, management since the date of the 2013 survey and the number of plots placed at each location. Activities July 15, 2016, and later were completed after this survey.

SITE NAME	ACRES	MGMT 2013 Survey <July15	MGMT 2014	MGMT 2015	MGMT 2016 Survey <July15	# PLOTS
Blessing	68	Former CRP	Cedars Cleared / graze May 1-15, June 1-15, July 1-15, & Aug 1-15 with 10 pairs	graze May 1-15, June 1-15, July 1-15, & Aug 1-15 with 9 pairs	Spr Burn/Rest	4
WY South Meadow	118	Grazed	Graze May 1-Sept 30 with 15 pairs (1 AU/8 acres) & hay S. 1/2 after July 15	Burned south 1/2 in spring & Graze May 1-Sept 30 with 15 pairs (1 AU/8 acres)	Graze May 1-Sept 30 with 15 pairs (1 AU/8 acres) & hay NE 1/4 & S 1/2 after July 15	4
Speidelll North	298		N/A	Graze April 1-Sept 30 with 70 pairs (1 AU/4.3 acres)	Rested & hayed south 1.3 after July 15	5
Speidelll South	148		N/A	Rest	Graze May 1-Sept 30 with 70 pairs (1 AU/3 acres)	5
Fox	181	Seeded 2012	Hayed after July 15	Hayed after July 15	Graze May 1-Sept 30 with 26 pairs & 1 bull (1 AU/6.4 acres)	5
Hostetler Crop	222	Seeded	Hayed July 15	Burned whole tract & hayed east 1/2 after July 15	Graze May 1-Sept 30 with 22 pairs & 1 bull (1 AU/9.6 acres)	8
Binfield North Meadow	223	Grazed	Graze May 1- Sep 30 26 pairs (1 AU/9 acres)	Graze May 1- Sep 30 with 40 pairs (1 AU/6 acres)	Graze May 1- Sep 30 with 31 pairs (1 AU/7 acres)	8
Binfield North Hay Meadow	66	Hay	Hay July 15	Hay July 15	Spring Burn/ Rest	6
Binfield South Hay Meadow	30	Hay	Rest	Burned &Hayed after July 15	Hay July 15	3
Binfield South Meadow	57	Grazed	Graze May 1- Sep 12 26 pairs (1 AU/5 acres)	Graze May 1- Sep 12 with 26 pairs (1 AU/5 acres)	Spring Burn/ Rest	3
Binfield East Meadow	179	Grazed	Graze May 1- Sep 30 23 pairs (1 AU/8 acres)	Spring burn North 1/2 & Graze May 1- Sep 30 with 31 pairs (1 AU/6 acres)	Spring burn South 1/3 & Graze May 1- Sep 30 with 23 pairs (1 AU/8 acres)	6
Binfield West Meadow	361	Grazed	Graze May 1- Sep 30 with 26 pairs (1 AU/9 acres)	Spring burn North 1/2 & Graze May 1- Sep 30 with 47 pairs (1 AU/8 acres)	Spring burn South 1/2 & Graze May 1- Sep 30 with 37 pairs (1 AU/ 10 acres)	13
Binfield West Hay Meadow	124	Hay	Hay July 15	Spr Burn/Rest	Hay July 15	5

Table 2A. Cool season grass cover of the western sites. Cover of individual cool season grass species listed by site. Exotic cool season grasses are listed first with a total cover followed by natives and a total of all cool season cover. Cover is given as canopy cover therefore, the total cover may exceed 100%.

EXOTIC COOL SEASON SPECIES	COMMON NAME	COOK	DYER	CWR N1	CWR N2	CWR N3	CWREL	CWR_ E	MRS_ N	MRS_ HN	MRS_ M	MRS _HS	MRS_ C	MRS_ SW	CWR_ SW	CWR_ NW	CWR_ NE
AGROSTIS GIGANTEA	redtop			10.50													
AGROSTIS STOLONIFERA	creeping bentgrass						3.94									0.50	
BROMUS INERMIS	smooth brome	47.28	4.71	5.00	0.08		4.19	1.07	15.34	89.17	18.29	20.3		10.49	1.46	9.54	8.18
BROMUS JAPONICUS	Japenese brome		9.81	26.70	8.90	1.60	7.23	44.97	1.42		1.48		0.53		0.82	0.35	8.50
BROMUS TECTORUM	downy brome	6.80	8.17	3.33		0.50	0.71	9.17					0.53				
DACTYLIS GLOMERATA	orchard grass													0.50			
ELYMUS REPENS	quackgrass														0.05		3.37
PHLEUM PRATENSE	timothy													0.31			
POA COMPRESSA	Canada bluegrass		0.47	1.32	3.52	3.27	7.86		2.16		4.98			17.13	13.26	0.94	1.43
POA PRATENSIS	Kentucky bluegrass	34.23	2.59	2.47	29.52	1.03	8.29	6.77	3.59	5.78	2.37	3.50	0.50		4.59	3.00	1.11
POLYPOGON MONSPELIENSIS	rabbitfoot grass						0.50										
SCHEDONORUS ARUNDINACEUS	tall fescue							1.32			9.51		2.20	2.63	2.84		0.69
SCHEDONORUS PRATENSIS	meadow fescue								0.31			9.10					
THINOPYRUM PONTICUM	tall wheatgrass			2.10			4.50				3.50	9.02		33.93	33.50	18.40	2.13
TRITICUM AESTIVUM	bread wheat																
TOTAL EXOTIC COOL SEASON		88.32	25.75	51.42	42.02	6.40	37.22	63.28	22.82	94.95	40.13	42.0	3.77	64.98	56.52	32.73	25.41
Native cool season																	
Calamagrostis stricta	northern reedgrass					3.00											
Dichanthelium acuminatum	spring-panicum					4.93											
Dichanthelium oligosanthes	Scribner's panicum		1.00	0.50	9.00	2.43	0.21	0.62	1.08		0.69					0.50	
Elymus canadensis	Canada wild-rye		1.01			8.42		2.72					9.95				0.50
Elymus sp.						6.43											
Hordeum jubatum	foxtail barley		1.00			0.50	7.20	5.75				0.78	8.25	0.50	0.60		1.62
Muhlenbergia racemosa	marsh muhly					2.35					0.05						
Panicum dichotomiflorum	fall panicum																
Pascopyrum smithii	western wheatgrass		0.47	0.70	0.50		1.44		0.08		0.05				0.37		
Phalaris arundinacea	reed canary grass					0.50	0.71	2.63				12.3					
Sphenopholis obtusata	prairie wedge grass							3.00									
TOTAL NATIVE COOL SEASON		0.00	3.48	1.20	9.50	28.57	9.56	14.72	1.16	0.00	0.79	13.1	18.20	0.50	0.97	0.50	2.12
TOTAL ALL COOL- SEASON		88.32	29.23	52.62	51.52	34.97	46.77	78.00	23.98	94.95	40.92	55.0	21.97	65.48	57.49	33.23	27.53

Table 2B. Cool season grass cover of the Middle 12 sites. Cover of individual cool season grass species listed by site. Exotic cool season grasses are listed first with a total cover followed by natives and a total of all cool season cover. Cover is given as canopy cover therefore, the total cover may exceed 100%.

SPECIES	COMMON NAME	JHNS_N	JHNS_S	NGPC	SLWD	McC_S	McC_N	BLESS	WY_S	SPN	SPS	FOX	HOST
AGROSTIS GIGANTEA	redtop		1.50						1.00	3.00			
AGROSTIS STOLONIFERA	creeping bentgrass								0.06				
BROMUS INERMIS	smooth brome	1.45	4.93	90.00	81.32	1.79		17.40	4.78	5.63	3.53	0.70	
BROMUS JAPONICUS	Japenese brome	2.18	5.08			3.76	7.70	5.45	0.13	8.73	5.60	31.81	9.22
BROMUS TECTORUM	downy brome	0.17						1.85		0.40	6.63	4.92	1.53
ELYMUS REPENS	quackgrass						0.62						
PHLEUM PRATENSE	timothy												
POA COMPRESSA	Canada bluegrass	0.19	1.98		14.82	0.06		13.40	3.83	3.50	2.78		
POA PRATENSIS	Kentucky bluegrass	2.15	4.45	1.98	6.95	0.99			4.06	14.35	30.60		
POLYPOGON MONSPELIENSIS	rabbitfoot grass	0.19											
SCHEDONORUS ARUNDINACEUS	tall fescue								12.06		0.04		
SCHEDONORUS PRATENSIS	meadow fescue								27.48				
THINOPYRUM PONTICUM	tall wheatgrass		3.38						2.56				0.50
TRITICUM AESTIVUM	bread wheat												
TOTAL EXOTIC COOL SEASON		6.34	21.32	91.98	103.08	6.60	8.32	38.10	55.95	35.59	49.17	37.43	11.25
Native cool season													
Calamagrostis stricta	northern reedgrass		0.31							0.74			
Dichanthelium acuminatum	spring-panicum	0.35				4.46	0.33				0.07		
Dichanthelium oligosanthes	Scribner's -panicum	7.03	1.75			1.33	0.62			17.56	4.54		
Elymus canadensis	Canada wild-rye	0.50	0.62			0.50				6.20	0.50	1.78	1.85
Elymus trachycaulus	slender wheatgrass	0.01	1.23					0.08	0.53			1.48	
Elymus virginicu	Virginia wild-rye					0.50	0.62						
Festuca octoflora	six-weeks fescue									0.26		1.11	
Hordeum jubatum	foxtail barley	3.03	0.54			0.50			3.04		0.23		0.50
Hordeum pusillum	little barley	0.20				0.93							
Muhlenbergia racemosa	marsh muhly										0.04		
Panicum dichotomiflorum	fall panicum												
Pascopyrum smithii	western wheatgrass	0.01	0.53			0.06			1.33	1.98	1.51	0.84	22.81
Phalaris arundinacea	reed canary grass	3.16	1.98	0.50		3.06	2.65						
Sphenopholis obtusata	prairie wedge grass	0.54	1.00			0.06				0.45			
TOTAL NATIVE COOL SEASON		14.83	7.97	0.50	0.00	11.40	4.22	0.08	4.89	27.19	6.89	5.21	25.16
TOTAL ALL COOL- SEASON		21.17	29.28	92.48	103.08	18.00	12.53	38.18	60.84	62.78	56.06	42.64	36.41

Table 2C. Cool season grass cover of the Binfield sites. Cover of individual cool season grass species listed by site. Exotic cool season grasses are listed first with a total cover followed by natives and a total of all cool season cover. Cover is given as canopy cover therefore, the total cover may exceed 100%.

EXOTIC COOL SEASON SPECIES	COMMON NAME	BIN_NM	BIN_NH	BIN_SH	BIN_S	BIN_E	BIN_W	BIN_WH
AGROSTIS GIGANTEA	redtop	6.59	10.30	42.68	3.53	0.27	9.58	
AGROSTIS STOLONIFERA	creeping bentgrass			10.87	19.53	10.54	9.60	29.94
BROMUS INERMIS	smooth brome	0.99	1.23	1.20	4.07	0.27	0.93	13.61
BROMUS JAPONICUS	Japenese brome	3.34			0.67		0.27	
BROMUS TECTORUM	downy brome					0.13		
DACTYLIS GLOMERATA	orchard grass							
ELYMUS REPENS	quackgrass							
PHLEUM PRATENSE	timothy							
POA COMPRESSA	Canada bluegrass	5.41	0.25	0.08		0.08	0.12	
POA PRATENSIS	Kentucky bluegrass	2.92	0.62	0.53	0.25	3.58	1.39	0.05
POLYPOGON MONSPELIENSIS	rabbitfoot grass							
SCHEDONORUS ARUNDINACEUS	tall fescue							
SCHEDONORUS PRATENSIS	meadow fescue		27.08	0.62				0.64
THINOPYRUM PONTICUM	tall wheatgrass							
TRITICUM AESTIVUM	bread wheat							
TOTAL EXOTIC COOL SEASON		19.24	39.48	55.98	28.05	14.86	21.88	44.24
Native cool season								
Calamagrostis stricta	northern reedgrass		2.72	0.78	7.47	9.77	3.13	9.04
Dichanthelium acuminatum	spring-panicum	2.13	0.50	0.95	0.53	0.13	0.40	0.79
Dichanthelium oligosanthes	Scribner's panicum	4.11		0.50	1.23		0.44	0.05
Festuca octoflora	six-weeks fescue	0.06						
Hordeum jubatum	foxtail barley	6.68	0.62	1.00	0.08	0.77	4.52	
Hordeum pusillum	little barley	0.20						
Koeleria macrantha	Junegrass	0.03						
Leersia oryzoides	rice cutgrass					0.27	0.14	
Muhlenbergia racemosa	marsh muhly			0.50				
Pascopyrum smithii	western wheatgrass	5.59			0.78	0.17	5.49	1.88
Phalaris arundinacea	reed canary grass		0.78					
Sphenopholis obtusata	prairie wedge grass							
TOTAL NATIVE COOL SEASON		18.80	4.62	3.73	10.10	11.09	14.12	11.76
TOTAL ALL COOL- SEASON		38.04	44.10	59.72	38.15	25.95	36.01	56.00

Table 3A. Warm season grass cover of the western Sites. Cover of individual warm season grass species listed by site. Exotic warm season grasses are listed first with a total cover followed by natives and a total of all warm season cover. Cover is given as canopy cover therefore the total cover may exceed 100%.

SPECIES	COMMON NAME	COOK	DYER	CWRN1	CWRN2	CWRN3	CWREL	CWR_E	MRS_N	MRS_HN	MRS_M	MRS_HS	MRS_C	MRS_SW	CWR_SW	CWR_NW	CWR_NE
EXOTIC WARM SEASON																	
ECHINOCHLOA CRUS-GALLI	barnyard grass											0.08		0.50		0.15	
SETARIA FABERI	Chinese foxtail											0.87					
SETARIA PUMILA	yellow foxtail		0.05											0.50			
SETARIA VERTICILLATA	bristly foxtail		1.33										0.95			0.69	0.10
SETARIA VIRIDIS	green foxtail		4.29			9.42							0.08		0.32	0.10	
SORGHUM HALEPENSE	Johnson grass																
TOTAL EXOTIC WARM SEASON		0.00	5.67	0.00	0.00	9.42	0.00	0.00	0.00	0.00	0.00	0.95	1.03	1.00	0.32	0.94	0.10
Andropogon gerardii	big bluestem	16.60	0.79	2.80			3.62	11.83	13.35		14.03	1.65	7.60	3.38	5.45	7.98	6.76
Aristida oligantha	old field three-awn				0.50												
Bouteloua curtipendula	sideoats grama								0.08		0.70				0.55	0.32	0.79
Bouteloua dactyloides	buffalo grass										3.00						
Bouteloua gracilis	blue grama			0.50													
Bouteloua hirsuta	hairy grama			0.50													
Chloris verticillata	windmill grass	0.50	0.10		1.77	0.50	0.50		0.50		0.10						0.05
Digitaria cognata	fall witchgrass										3.00						
Distichlis spicata	saltgrass	0.87		5.18			9.22		0.50		0.79	0.62	0.87	4.83		0.32	1.64
Panicum capillare	common witchgrass					5.53			3.00		0.42						
Panicum virgatum	switchgrass		3.50				1.69	1.85	1.67		5.29	0.08	1.03	1.28	0.84	1.06	1.26
Paspalum setaceum	yellow sand paspalum					0.08		0.58	0.58					0.08			
Phragmites australis	common reed																
Schedonnardus paniculatus	tumblegrass																
Schizachyrium scoparium	little bluestem								0.77				3.95				0.50
Sorghastrum nutans	Indian grass				0.50		0.71		6.68		0.89		1.65		5.39	3.43	3.33
Spartina pectinata	prairie cordgrass	0.50	3.50	0.62		6.00	7.05	4.75	3.00			8.02	0.08	0.27			3.00
Sporobolus airoides	alkali sacaton			2.63													
Sporobolus compositus	tall dropseed	0.08		0.50		1.03	3.00		0.58		1.26	0.17	0.08	0.27		0.32	0.05
Sporobolus cryptandrus	sand dropseed		10.75	0.25	1.93	7.77	0.18	2.02	0.52		0.05						
Sporobolus heterolepis	prairie dropseed																
Tridens flavus var. flavus	purpletop																
TOTAL NATIVE WARM SEASON		18.55	18.64	12.98	4.70	20.92	25.96	21.03	31.23	0.00	29.53	10.53	15.27	10.12	12.23	13.43	17.38
TOTAL WARM SEASON		18.55	24.31	12.98	4.70	30.33	25.96	21.03	31.23	0.00	29.53	11.48	16.30	11.12	12.55	14.37	17.48

Table 3B. Warm season grass cover of the middle 12 Sites. Cover of individual warm season grass species listed by site. Exotic warm season grasses are listed first with a total cover followed by natives and a total of all warm season cover. Cover is given as canopy cover therefore the total cover may exceed 100%.

SPECIES	COMMON NAME	JHNS_N	JHNS_S	NGPC	SLWD	McC_S	McC_N	BLESS	WY_S	SPN	SPS	FOX	HOST
EXOTIC WARM SEASON													
ECHINOCHLOA CRUS-GALLI	barnyard grass					0.50							
ERAGROSTIS CILIANENSIS	stinkgrass	0.40				0.99	0.62						
SETARIA FABERI	Chinese foxtail							1.68					
SETARIA PUMILA	yellow foxtail	0.05	0.27			0.71	0.70	13.65				0.80	
SETARIA VERTICILLATA	bristly foxtail												
SETARIA VIRIDIS	green foxtail	7.09				0.50	1.90	4.52		0.50	0.76	1.63	0.03
SORGHUM HALEPENSE	Johnson grass									0.50			
TOTAL EXOTIC WARM SEASON		7.54	0.27	0.00	0.00	2.70	3.22	19.85	0.00	1.00	0.76	2.43	0.03
Andropogon gerardii	big bluestem	0.60	6.06	0.50	0.50	1.53	0.50	19.47		4.08	21.85	3.86	
Bouteloua curtipendula	sideoats grama	0.17				0.96					0.04	8.74	2.44
Bouteloua dactyloides	buffalo grass	3.00										0.10	
Bouteloua gracilis	blue grama	0.08				0.50	0.62						1.56
Bouteloua hirsuta	hairy grama	0.01								0.51			
Calamovilfa longifolia	prairie sandreed	0.03								0.29	0.57		
Chloris verticillata	tumble windmill grass	0.21			1.07	0.19			1.24	0.50			
Digitaria cognata	fall witchgrass		0.08										
Distichlis spicata	saltgrass	0.12	0.17			0.06			0.65	0.95			
Echinochloa muricata	rough barnyard grass	0.31								1.87			
Eragrostis spectabilis	purple lovegrass		0.04			0.93			0.46		0.23	0.10	
Hesperostipa comata	needle-and-thread											3.00	
MUHLENBERGIA SP.		0.01	0.31				0.08						
Panicum capillare	common witchgrass	1.13					2.30		1.00			0.50	
Panicum virgatum	switchgrass	0.58	8.73		0.50	4.19	0.50	8.00	1.00	6.32	0.41	3.32	0.43
Paspalum setaceum	yellow sand paspalum	0.57				1.00				1.13	0.56		
Schizachyrium scoparium	little bluestem	0.50				1.36		5.55		0.55	9.14	4.45	0.50
Sorghastrum nutans	Indian grass		3.03			9.60		0.53		9.82	1.19	7.19	1.28
Spartina pectinata	prairie cordgrass	3.71	19.53	1.08		1.00	1.32			0.50			
Sporobolus airoides	alkali sacaton												
Sporobolus compositus	tall dropseed	0.72	2.65		3.00	17.16	3.00	0.53	1.73	2.96	1.03	13.71	
Sporobolus cryptandrus	sand dropseed	14.38			0.08	1.39	0.70	0.53	2.93	1.52	1.21	0.94	
Sporobolus heterolepis	prairie dropseed									0.66			
Tridens flavus var. flavus	purpletop					0.50						0.32	
TOTAL NATIVE WARM SEASON		26.64	40.61	1.58	5.15	40.36	9.02	34.62	9.00	31.63	36.23	46.23	6.22
TOTAL WARM SEASON		34.18	40.88	1.58	5.15	43.06	12.23	54.47	9.00	32.63	36.99	48.66	6.25

Table 3C. Warm season grass cover of the Binfield sites. Cover of individual warm season grass species listed by site. Exotic warm season grasses are listed first with a total cover followed by natives and a total of all warm season cover. Cover is given as canopy cover therefore the total cover may exceed 100%.

SPECIES	COMMON NAME	BIN_NM	BIN_NH	BIN_SH	BIN_S	BIN_E	BIN_W	BIN_WH
EXOTIC WARM SEASON								
ECHINOCHLOA CRUS-GALLI	barnyard grass				0.50			
SETARIA PUMILA	yellow foxtail				0.50			
SETARIA VIRIDIS	green foxtail				0.50			
TOTAL EXOTIC WARM SEASON		0.00	0.00	0.00	1.50	0.00	0.00	0.00
Andropogon gerardii	big bluestem	19.49	6.17	11.62	33.03	1.33	8.89	3.13
Chloris verticillata	tumble windmill grass	0.20						
Digitaria cognata	fall witchgrass		0.17	3.42	1.23		4.06	3.00
Distichlis spicata	saltgrass					9.00	3.24	
Eragrostis pectinacea	tufted lovegrass	0.26						
Eragrostis spectabilis	purple lovegrass	0.66						
Hesperostipa comata	needle-and-thread	0.56						
Panicum virgatum	switchgrass	13.46	1.15	0.33	16.28	5.59	15.22	23.12
Paspalum setaceum	yellow sand paspalum	0.03					0.50	
Schizachyrium scoparium	little bluestem	1.25		1.07			0.02	
Sorghastrum nutans	Indian grass	2.58	1.03	3.42	5.02	0.31	0.58	2.17
Spartina pectinata	prairie cordgrass	6.23	5.03	9.72	12.08	5.95	7.47	6.94
Sporobolus airoides	alkali sacaton					0.58		0.05
Sporobolus compositus	tall dropseed	3.67						
Sporobolus cryptandrus	sand dropseed	0.53						
Tridens flavus var. flavus	purpletop							0.50
TOTAL NATIVE WARM SEASON		48.91	13.55	29.57	67.65	22.76	39.98	38.91
TOTAL WARM SEASON		48.91	13.55	29.57	69.15	22.76	39.98	38.91

Table 4A. Grass-like species for western sites. These species are predominantly cool season and may influence overall management decisions if they are large components of any one site. Cover is given as canopy cover therefore, the total cover may exceed 100%.

SPECIES	COMMON NAME	COOK	DYER	CWR N1	CWR N2	CWR_ N3	CWREL	CWR_ E	MRS_ N	MRS_ HN	MRS_ M	MRS_ HS	MRS_ C	MRS_ SW	CWR_ SW	CWR_ NW	CWR_ NE
Bolboschoenus fluviatilis	river bulrush																
Bolboschoenus maritimus	salt-marsh bulrush																
Carex blanda	woodland sedge																
Carex brachyglossa	yellow-fruit sedge																
Carex brevior	short-beak sedge		0.50	1.73	0.08	0.62	1.29	0.08	0.54							0.50	
Carex crawei	Crawe's sedge																
Carex emoryi	Emory's sedge																
Carex gravida	heavy-fruit sedge		0.50			1.40		0.50									
Carex grisea	gray wood sedge																
Carex hallii	deer sedge																
Carex heliophila	sun sedge		7.40		2.63												
Carex meadii	Mead's sedge																
Carex pellita	woolly sedge																
Carex praegracilis	clustered field sedge						3.89		0.50								
Carex scoparia	broom sedge																
Carex spp.	sedge		13.58	10.55	1.93	3.58	1.63	1.85	0.74		1.12	1.15		0.35	0.05	0.32	
Carex vulpinoidea	fox sedge																
Cyperus acuminatus	short-pt flatsedge													0.27			
Cyperus esculentus	yellow nut-sedge																
CYPERUS FUSCUS	brown flatsedge																
Cyperus lupulinus	Grt Plains flatsedge				0.25				0.50						0.50		
Cyperus schweinitzii	sand flatsedge					0.17											
Cyperus squarrosus	awned flatsedge																
Cyperus strigosus	straw-colr flatsedge																
Eleocharis compressa	flat-stem spikerush								0.70		0.69						
Eleocharis palustris	marsh spikerush					0.50			0.93			2.02			3.00		0.32
Fimbristylis puberula	hairy fimbry																
Schoenoplectus pungens	3-square bulrush						0.50					6.17		14.59	4.73		0.10
TOTAL GRASS-LIKE		**0.00**	**21.98**	**12.28**	**4.90**	**6.27**	**7.31**	**2.43**	**3.91**	**0.00**	**1.81**	**9.33**	**0.00**	**15.21**	**8.28**	**0.82**	**0.42**

Table 4B. Grass-like species for middle 12 sites. These species are predominantly cool season and may influence overall management decisions if they are large components of any one site. Cover is given as canopy cover therefore, the total cover may exceed 100%.

SPECIES	COMMON NAME	JHNS_N	JHNS_S	NGPC	SLWD	McC_S	McC_N	BLESS	WY_S	SPN	SPS	FOX	HOST
Bolboschoenus fluviatilis	river bulrush					0.50							
Bolboschoenus maritimus	salt-marsh bulrush												
Carex blanda	woodland sedge												
Carex brachyglossa	yellow-fruit sedge												
Carex brevior	short-beak sedge	1.25	4.08		0.78	5.50		0.08	0.40	1.75	4.54		
Carex crawei	Crawe's sedge					2.06							
Carex emoryi	Emory's sedge												
Carex gravida	heavy-fruit sedge	3.00									0.50		
Carex grisea	gray wood sedge	0.04											
Carex hallii	deer sedge					0.40							
Carex heliophila	sun sedge												
Carex meadii	Mead's sedge												
Carex pellita	woolly sedge		0.27										
Carex praegracilis	clustered field sedge		6.38						0.46		0.50		
Carex scoparia	broom sedge												
Carex spp.	sedge	7.83	6.58	0.08		1.64	8.93		1.79	3.70	0.53	0.37	
Carex vulpinoidea	fox sedge								6.00				
Cyperus acuminatus	shrt-point flatsedge						0.83			3.07			
Cyperus esculentus	yellow nut-sedge	0.17											
CYPERUS FUSCUS	brown flatsedge												
Cyperus lupulinus	Grt Plains flatsedge	0.54	0.50										
Cyperus schweinitzii	sand flatsedge	0.93				0.06					1.00		
Cyperus squarrosus	awned flatsedge	0.18					1.40						
Cyperus strigosus	straw-colr flatsedge	0.50											
Eleocharis compressa	flat-stem spikerush		0.93			0.46							
Eleocharis palustris	marsh spikerush	5.39				3.30	3.53		1.91	0.21	0.76		
Fimbristylis puberula	hairy fimbry		0.08										
Schoenoplectus pungens	3-square bulrush	1.95	1.93			0.50	6.25		2.44	0.32	0.50		
TOTAL GRASS-LIKE		**21.78**	**20.75**	**0.08**	**0.78**	**14.43**	**20.95**	**0.08**	**13.00**	**9.04**	**8.32**	**0.37**	**0.00**

Table 4C. Grass-like species for Binfield sites. These species are predominantly cool season and may influence overall management decisions if they are large components of any one site. Cover is given as canopy cover therefore, the total cover may exceed 100%.

SPECIES	COMMON NAME	BIN_NM	BIN_NH	BIN_SH	BIN_S	BIN_E	BIN_W	BIN_WH
Bolboschoenus fluviatilis	river bulrush							
Bolboschoenus maritimus	salt-marsh bulrush							
Carex blanda	woodland sedge							
Carex brachyglossa	yellow-fruit sedge						0.50	
Carex brevior	short-beak sedge	3.83						
Carex crawei	Crawe's sedge	0.03						
Carex emoryi	Emory's sedge					0.04		
Carex gravida	heavy-fruit sedge	0.03		1.60				
Carex grisea	gray wood sedge							
Carex hallii	deer sedge	0.03					0.32	
Carex heliophila	sun sedge							
Carex meadii	Mead's sedge	0.29	0.17	8.23				
Carex pellita	woolly sedge		1.32			0.31	3.47	4.50
Carex praegracilis	clustered field sedge	0.03	3.18	9.22		0.35	8.26	
Carex scoparia	broom sedge							
Carex spp.	sedge	0.88	3.42	0.62	15.30	9.49	12.57	8.92
Carex vulpinoidea	fox sedge							
Cyperus acuminatus	shrt-point flatsedge							
Cyperus esculentus	yellow nut-sedge							
CYPERUS FUSCUS	brown flatsedge							
Cyperus lupulinus	Grt Plains flatsedge							
Cyperus schweinitzii	sand flatsedge							
Cyperus squarrosus	awned flatsedge							
Cyperus strigosus	straw-colr flatsedge							
Eleocharis compressa	flat-stem spikerush	3.41	1.48	0.70	9.43	0.43	4.60	6.59
Eleocharis palustris	marsh spikerush	3.39			5.20	5.35	4.35	5.46
Fimbristylis puberula	hairy fimbry						1.02	
Schoenoplectus pungens	3-square bulrush		0.08		2.73	24.00	4.62	1.14
TOTAL GRASS-LIKE		**11.93**	**9.65**	**20.37**	**32.67**	**39.98**	**39.71**	**26.61**

Table 5A. Cover of exotic forb species on western sites.

EXOTIC FORB SPECIES	COMMON NAME	COOK	DYER	CWR_N1	CWR_N2	CWR_N3	CWR EL	CWR_E	MRS_N	MRS_HN	MRS_M	MRS_HS	MRS_C	MRS_SW	CWR_SW	CWR_NW	CWR_NE
ABUTILON THEOPHRASTI	velvet-leaf					3.00							0.08	0.50		0.42	
ASPARAGUS OFFICINALIS	garden asparagus					0.50											
ATRIPLEX PROSTATA	thin-leaf spearscale														0.47		
CANNABIS SATIVA	hemp		1.32	0.50		1.08	3.00	5.37	0.54					0.50		0.55	3.00
CARDUUS NUTANS	musk thistle		1.00	0.50			4.03		0.50	0.58	1.00	0.17	3.50	0.50		6.00	1.00
CHENOPODIUM ALBUM	lamb's-quarters		0.50						0.50		3.00		0.08		0.05	0.05	
CIRSIUM ARVENSE	Canada thistle													6.04	3.00		
CIRSIUM VULGARE	bull thistle					0.50	0.50						4.23	3.81	4.05		2.39
CONIUM MACULATUM	poison-hemlock																
CONVOLVULUS ARVENSIS	field bindweed									1.95				0.50	0.05		
DATURA STRAMONIUM	jimson-weed													0.50			
DESCURAINIA SOPHIA	flix-weed tansy mustard						0.50										
ELAEAGNUS ANGUSTIFOLIA	Russian-olive																0.50
KALI TRAGUS	prickly Russian-thistle		0.20														
LACTUCA SERRIOLA	prickly lettuce		2.00			0.50	0.50						0.58	0.50			0.50
LEPIDIUM LATIFOLIUM	broad-leaf pepper-grass		0.50														
MEDICAGO LUPULINA	black medick		0.10	3.85	4.07	5.53	7.04		6.03	0.58	8.11	0.75		3.00	12.03	1.11	0.52
MEDICAGO SATIVA	alfalfa									1.00							
MELILOTUS ALBUS	white sweet-clover						0.50			0.50	0.05	0.50	3.00	0.50	2.08	0.50	3.00
MELILOTUS OFFICINALIS	yellow sweet-clover						2.00		1.08	0.75	4.63	0.08	0.50	0.89	0.92	3.17	3.67
MOLLUGO VERTICILLATA	green carpet-weed																
MORUS ALBA	white mulberry		8.00				0.03			0.50	0.05					1.00	
NEPETA CATARIA	catnip		0.50			0.50							0.08	0.50	0.50	0.05	6.00
RUMEX CRISPUS	curly dock			0.50			0.36							0.50		0.50	0.50
SISYMBRIUM LOESELII	tall hedge mustard		1.05									0.50	0.50		4.00		3.15
SONCHUS OLERACEUS	store-front sow-thistle												0.50				
TARAXACUM OFFICINALE	common dandelion		0.50				0.50				0.50		0.17	3.23	4.70	0.50	0.25
THLASPI ARVENSE	field penny cress		0.50														
TRAGOPOGON DUBIUS	yellow goat's-beard		1.15	1.00	0.50	0.50	0.50		1.50	1.08	0.50	0.87					0.50
TRIFOLIUM PRATENSE	red clover				0.17		0.36										
TRIFOLIUM REPENS	white clover				2.67	3.87	0.79		0.08					0.50	0.50		
ULMUS PUMILA	Siberian elm															0.50	
VERBASCUM THAPSUS	common mullein		3.00	0.67	0.25	1.00	2.00							0.77	0.82	3.00	3.50
TOTAL EXOTIC FORBS		0.00	20.32	7.02	7.65	16.98	22.61	5.37	10.24	6.95	17.84	2.87	13.23	22.73	33.17	17.35	28.48

Table 5B. Cover of exotic forb species on middle 12 sites.

EXOTIC FORB SPECIES	COMMON NAME	JHNS_N	JHNS_S	NGPC	SLWD	McC_S	McC_N	BLESS	WY_S	SPN	SPS	FOX	HOST
ABUTILON THEOPHRASTI	velvet-leaf												0.03
ASPARAGUS OFFICINALIS	garden asparagus	0.50											
CANNABIS SATIVA	hemp	1.67	0.25	0.50		0.56			0.06	14.22	0.26		1.46
CARDUUS NUTANS	musk thistle	1.51	0.27	0.50		1.00					2.00		
CHENOPODIUM ALBUM	lamb's-quarters	0.01					0.78				0.50		0.53
CIRSIUM ARVENSE	Canada thistle												0.50
CIRSIUM VULGARE	bull thistle		0.04	0.50									0.50
CONIUM MACULATUM	poison-hemlock	0.01				0.50							
CONVOLVULUS ARVENSIS	field bindweed	0.01	1.11	0.08				0.62					
DESCURAINIA SOPHIA	flix-weed tansy mustard												0.50
EUPHORBIA VIRGATA	leafy spurge	0.19											
KALI TRAGUS	prickly Russian-thistle									0.50		0.05	1.50
LACTUCA SERRIOLA	prickly lettuce	0.50				0.50				0.32			0.20
LEPIDIUM LATIFOLIUM	broad-leaf pepper-grass												
LYTHRUM SALICARIA	purple loosestrife	1.50											
MATRICARIA CHAMOMILLA	German chamomile												
MEDICAGO LUPULINA	black medick	0.14	0.63		0.67	2.73	4.17		2.13	5.61	3.29	1.61	2.36
MEDICAGO SATIVA	alfalfa				0.50	0.50	0.50						1.00
MELILOTUS ALBUS	white sweet-clover	0.03		0.50	0.50	0.50	0.50			18.45	1.00		4.70
MELILOTUS OFFICINALIS	yellow sweet-clover				0.50	0.50	0.83		0.25	0.03	1.50	5.90	5.51
MOLLUGO VERTICILLATA	green carpet-weed	0.11											
MORUS ALBA	white mulberry	1.00	0.08			0.50				1.00	0.50		
NEPETA CATARIA	catnip		0.54					0.50		0.50		3.00	
POLYGONUM AVICULARE	yard knotweed					0.06							
RUMEX CRISPUS	curly dock	1.51				0.50	0.17						
TARAXACUM OFFICINALE	common dandelion								0.06	0.21			0.50
THLASPI ARVENSE	field penny cress	0.21				0.50	0.08		1.00				
TRAGOPOGON DUBIUS	yellow goat's-beard				1.00	1.00	1.00				3.04	0.50	1.00
TRIFOLIUM FRAGIFERUM	strawberry clover								1.00				
TRIFOLIUM PRATENSE	red clover	0.01							0.59				
TYPHA ANGUSTIFOLIA	narrow-leaf cattail	0.18											
ULMUS PUMILA	Siberian elm		0.50							0.50			1.03
VERBASCUM THAPSUS	common mullein	3.17		0.50		0.50	0.08	0.50		7.77	6.00		0.50
VERONICA ANAGALLIS-AQUATICA	water speedwell	0.08					0.08			1.17			
TOTAL EXOTIC FORBS		12.36	3.42	2.58	3.17	9.85	8.20	1.62	5.09	50.26	18.09	11.06	21.81

Table 5C. Cover of exotic forb species on Binfield sites.

EXOTIC FORB SPECIES	COMMON NAME	BIN_NM	BIN_NH	BIN_SH	BIN_S	BIN_E	BIN_W	BIN_WH
CANNABIS SATIVA	hemp	0.50						
CARDUUS NUTANS	musk thistle	1.00						
CIRSIUM VULGARE	bull thistle				0.50	0.27	0.50	
LYTHRUM SALICARIA	purple loosestrife					0.50	0.50	0.55
MATRICARIA CHAMOMILLA	German chamomile							
MEDICAGO LUPULINA	black medick	5.71	0.33	3.12	1.98	0.21	0.89	0.62
MEDICAGO SATIVA	alfalfa							
MELILOTUS ALBUS	white sweet-clover			0.58	0.17	0.50	0.47	0.65
MELILOTUS OFFICINALIS	yellow sweet-clover			0.17			0.50	
NEPETA CATARIA	catnip						0.02	
RUMEX CRISPUS	curly dock	0.50		1.00	0.50		1.00	
SISYMBRIUM LOESELII	tall hedge mustard							
SONCHUS ASPER	prickly sow-thistle				0.50			
TARAXACUM OFFICINALE	common dandelion	0.53	0.08	7.27		0.13	0.63	0.10
THLASPI ARVENSE	field penny cress							
TRAGOPOGON DUBIUS	yellow goat's-beard			0.50				
TRIFOLIUM PRATENSE	red clover		0.62					
TOTAL EXOTIC FORBS		8.24	1.03	12.63	3.65	1.60	4.50	1.92

Table 6A. Native forb cover for western sites.

6A. NATIVE FORBS	COMMON NAME	COOK	DYER	CWR_N1	CWR_N2	CWR_N3	CWREL	CWR_E	MRS_N	MRS_HN	MRS_M	MRS_HS	MRS_C	MRS_SW	CWR_SW	CWR_NW	CWR_NE
Achillea millefolium	western yarrow												0.50	0.50			
Acmispon americanus	prairie trefoil			0.17													
Amaranthus retroflexus	redroot pigweed							0.50						0.04			
Ambrosia artemisiifolia	common ragweed					4.07	0.50				1.84				0.15	4.75	3.84
Ambrosia psilostachya	western ragweed		7.26	4.73	32.58	19.02	25.03	5.07	18.08		2.64			0.54	4.75	1.53	0.52
Ambrosia trifida	giant ragweed															0.50	0.55
Amorpha fruticosa	false indigo-bush			1.40													
Antennaria neglecta	field pussytoes																
Apocynum cannabinum	hemp dogbane			0.50		0.08			0.04		3.00	0.42		0.81	0.50	4.50	0.55
Asclepias speciosa	showy milkweed					4.00		0.50	0.50	0.50	1.00	0.50	1.00	0.50	0.50	0.50	0.50
Asclepias syriaca	common milkweed							0.50			0.50					0.50	
Asclepias verticillata	whorled milkweed			0.17	0.17	3.00	0.53	0.50	0.21	0.50	1.05	0.50					0.05
Callirhoe involucrata	purple poppy-mallow	0.58	3.34	1.50	1.45		2.06	0.83	0.89	0.50	0.89	0.70					
Celtis occidentalis	hackberry					0.50											
Chenopodium pratericola	desert goosefoot		0.05						0.50					1.50			
Chenopodium subglabrum	smooth goosefoot					0.87			3.00								
Cirsium altissimum	tall thistle					1.03			3.00		0.60					0.50	
Cirsium canescens	Platte thistle						0.50				0.50						3.60
Cirsium flodmanii	Flodman's thistle								1.00	1.00	0.50						
Cirsium undulatum	wavy-leaf thistle						1.00		3.50		1.00						0.50
Conyza canadensis	horseweed		6.83	0.50	0.08	2.72	1.50		0.50	0.67	1.10		4.73	1.52	2.15		1.15
Cornus drummondii	rough-leaf dogwood			0.50				6.57									
Coryphantha vivipara	purple pincushion cactus		0.50														
Croton texensis	Texas croton		0.50						0.13		0.05						
Cyclachaena xanthiifolia	giant marsh-elder						0.50					3.00			0.37	0.05	0.97
Cycloloma atriplicifolium	winged-pigweed					0.08											
Descurainia pinnata	pinnate tansy mustard													0.50	0.50		
Desmanthus illinoensis	Illinois bundleflower					1.00	1.00	0.50	3.00	0.08				0.50		2.07	0.50
Eclipta prostrata	yerba de tajo													0.70			
Elymus sp.						6.43											
Equisetum arvense	field horsetail										0.52						

6A. NATIVE FORBS	COMMON NAME	COOK	DYER	CWR_N1	CWR_N2	CWR_N3	CWREL	CWR_E	MRS_N	MRS_HN	MRS_M	MRS_HS	MRS_C	MRS_SW	CWR_SW	CWR_NW	CWR_NE
Equisetum laevigatum	smooth scouring-rush			0.08		1.53		0.25	0.08		0.60	0.25					
Eupatorium altissimum	tall boneset			0.50													
Euphorbia dentata	eastern toothed spurge		0.05	0.08													0.05
Euphorbia maculata	spotted spurge						0.18				0.10						
Euphorbia marginata	snow-on-the-mountain		1.00	1.17	0.08	3.50	4.00	0.50	3.00		0.50						
Eustoma russellianum	prairie-gentian						0.50							0.50		4.00	0.50
Fraxinus pennsylvanica	green ash															0.50	
Geum canadense	white avens							0.17									
Glycyrrhiza lepidota	wild licorice			1.93										0.62		0.32	
Grindelia squarrosa	curly-top gumweed		0.79		0.25		0.50										
Helianthus annuus	common sunflower		0.55			0.50		0.50			0.50					5.18	
Helianthus maximiliani	Maximilian's sunflower												10.22			0.50	0.97
Helianthus pauciflorus	stiff sunflower																0.05
Helianthus petiolaris	plains sunflower		3.05			1.08	0.50										
Iva annua	annual marsh-elder							0.50						0.60			
Juncus balticus	Baltic rush				0.08												
Juncus dudleyi	Dudley's rush						0.50										
Juncus torreyi	Torrey's rush						0.50							0.50			0.50
Juniperus virginiana	eastern red-cedar				3.00												0.50
Lepidium densiflorum	prairie pepper-grass		0.37		0.08				0.63						0.05		
Liatris pycnostachya	thick-spike gayfeather										0.50						
Lithospermum incisum	fringed puccoon								0.50								
Lithospermum occidentale	marble-seed										3.92						
Lycopus americanus	Amer.-horehound		0.05														
Oenothera biennis	eastern evening-primrose										0.50						
Oenothera curtiflora	velvet butterfly-plant			0.53			0.50		0.04		0.05						0.05
Oenothera filiformis	long-flower butterfly-plant			0.50													0.55
Opuntia humifusa	eastern prickly-pear		0.50														
Oxalis stricta	yellow wood-sorrel		0.10		0.08		0.03			0.08	0.47	0.50		0.66	0.40	0.05	0.10
Packera plattensis	prairie ragwort										0.05						
Persicaria amphibia	water smartweed													0.50			
Phyla lanceolata	northern fogfruit						1.31					0.08		4.72			0.32
Physalis heterophylla	clammy ground-cherry					0.58				0.50							
Physalis longifolia	common ground-cherry			0.08		0.50							1.00	1.00		3.00	2.02
Physalis virginiana	Virginia ground-cherry		1.50	0.08		1.07	0.50	1.37	4.13	0.83	0.50		0.50		0.50	0.50	
Plantago eriopoda	alkali plantain																
Plantago patagonica	woolly plantain		0.05		0.62				5.31								

6A. NATIVE FORBS	COMMON NAME	COOK	DYER	CWR_N1	CWR_N2	CWR_N3	CWREL	CWR_E	MRS_N	MRS_HN	MRS_M	MRS_HS	MRS_C	MRS_SW	CWR_SW	CWR_NW	CWR_NE
Polanisia dodecandra	sandy-seed clammy-weed					0.50											
Populus deltoides	plains cottonwood						0.50				0.50						
Potentilla norvegica	Norwegian cinquefoil						0.50										
Ratibida columnifera	upright prairie-coneflower										4.50						0.50
Rosa arkansana	dwarf prairie rose			2.38													
Rosa woodsii	western wild rose			5.47	0.53			0.50									
Rudbeckia hirta	black-eyed Susan								3.50							3.00	
Rumex altissimus	pale dock							0.50									
Salvia azurea var. grandiflora	Pitcher's sage								0.70								
Silene antirrhina	sleepy catchfly			0.50													
Silphium integrifolium	rosinweed								1.00				6.00				
Solanum interius	plains black nightshade					0.53											
Solanum rostratum	buffalo-bur					0.50	0.71				0.50			3.00		1.00	0.50
Solidago canadensis	Canada goldenrod															1.00	0.89
Solidago gigantea	late goldenrod															0.50	
Solidago rigida	stiff goldenrod			0.17													
Strophostyles leiosperma	slick-seed wild bean					0.50											
Symphyotrichum ericoides	heath aster			0.58				0.53						1.04	0.50		0.99
Symphyotrichum lanceolatum	tall white aster							0.08		1.32				0.13	1.00		0.05
Teucrium canadense	American germander					5.12											
Toxicodendron radicans	eastern poison ivy		0.50														
Tradescantia bracteata	long-bract spiderwort										0.50						
Urtica gracilis	stinging nettle							0.50									
Verbena stricta	hoary vervain	0.58	1.29	1.08	4.07	3.50	1.68	2.02	9.35		1.02	0.50		0.50		6.10	1.55
Vernonia baldwinii	western ironweed													0.50	0.50		
Vernonia fasciculata	prairie ironweed					0.50	1.18										
Viola pratincola	meadow violet								0.04								
Xanthium strumarium	cocklebur															0.50	
TOTAL NATIVE FORBS		1.17	28.28	24.62	43.08	62.72	46.19	22.38	62.62	5.98	29.90	6.45	23.95	21.37	11.87	41.05	22.82
TOTAL ALL FORBS		1.17	48.60	31.63	50.73	79.70	68.79	27.75	72.86	12.93	47.74	9.32	37.18	44.10	45.04	58.40	51.30

Table 6B. Native Forb cover for middle sites.

NATIVE FORB SPECIES	COMMON NAME	JHNS_N	JHNS_S	NGPC	SLWD	McC_S	McC_N	BLESS	WY_S	SPN	SPS	FOX	HOST
Achillea millefolium	western yarrow									0.16	1.00		
Acmispon americanus	prairie trefoil												
Agalinis tenuifolia	narrow-leaf false foxglove									0.58			
Amaranthus retroflexus	redroot pigweed	0.12										0.25	1.00
Ambrosia artemisiifolia	common ragweed	0.22	0.21		0.08		4.65						
Ambrosia psilostachya	western ragweed	2.69	8.99		0.17	16.04			1.46	13.77	0.21		0.96
Ambrosia trifida	giant ragweed												
Ammannia robusta	stout toothcup						0.70						
Amorpha fruticosa	false indigo-bush	0.50											
Apocynum cannabinum	hemp dogbane	1.01	0.17	1.08	1.08	2.50	1.50				0.50		
Arnoglossum plantagineum	tuberous Indian-plantain												
Artemisia ludoviciana	white sage										0.50		
Asclepias incarnata	swamp milkweed												
Asclepias speciosa	showy milkweed				1.00	1.00	1.00				1.50		0.50
Asclepias syriaca	common milkweed	0.50	1.00			0.96					1.00		0.50
Asclepias verticillata	whorled milkweed	0.50			0.08	0.65			1.31	0.50			
Asclepias viridiflora	green milkweed	0.50				0.06							
Brickellia eupatorioides	false-boneset										0.50		
Callirhoe alcaeoides	pale poppy-mallow	0.01											
Callirhoe involucrata	purple poppy-mallow	0.01	0.31			0.90		0.08		1.60	1.16		
Chenopodium pratericola	desert goosefoot					0.50	0.33						
Cirsium altissimum	tall thistle	1.01	0.77							0.19	3.50		1.03
Cirsium flodmanii	Flodman's thistle										0.50		
Cirsium undulatum	wavy-leaf thistle												0.50
Conyza canadensis	horseweed	4.05	1.04			0.71	0.87			4.13	1.57	2.22	3.49
Coreopsis tinctoria	plains coreopsis									0.03			
Cornus drummondii	rough-leaf dogwood	3.85									0.73		0.50
Coryphantha vivipara	purple pincushion cactus	0.50											
Croton texensis	Texas croton	1.53	0.50			0.50				2.77			
Cyclachaena xanthiifolia	giant marsh-elder		0.50										
Dalea candida	eastern white prairie-clover										1.00		
Dalea purpurea	purple prairie-clover		0.50							0.03	2.50		2.69
Dalea villosa	silky prairie-clover										1.00		
Descurainia pinnata	pinnate tansy mustard	0.50											
Desmanthus illinoensis	Illinois bundleflower		0.89			3.46				0.40	1.00	0.50	0.53
Echinacea angustifolia	narrow-leaf purple coneflower												0.50

NATIVE FORB SPECIES	COMMON NAME	JHNS_N	JHNS_S	NGPC	SLWD	McC_S	McC_N	BLESS	WY_S	SPN	SPS	FOX	HOST
Eclipta prostrata	yerba de tajo	0.50											
Equisetum laevigatum	smooth scouring-rush	0.33	0.33	0.58		0.75			1.18	1.48			
Erigeron strigosus	daisy fleabane										0.50		
Eupatorium altissimum	tall boneset										0.50		
Eupatorium perfoliatum	clasping-leaf boneset	0.01											
Euphorbia davidii	western toothed spurge	1.51				0.19				1.74			
Euphorbia maculata	spotted spurge	0.08				0.13	0.33						
Euphorbia marginata	snow-on-the-mountain									2.00	0.57		
Euphorbia nutans	eyebane	0.25					0.17						
Euphorbia serpyllifolia	thyme-leaf spurge	0.44					0.17			0.03			
Eustoma russellianum	prairie-gentian		1.00			0.50					0.50		
Fraxinus pennsylvanica	green ash	3.17											
Geum canadense	white avens									0.50			
Gleditsia triacanthos	honey-locust									0.50			
Glycyrrhiza lepidota	wild licorice	1.25	0.04	1.77	2.02	1.60				1.35			
Grindelia squarrosa	curly-top gumweed		0.50		0.50	0.50	0.50						
Halerpestes cymbalaria	shore-buttercup												
Hedeoma hispida	rough false-pennyroyal	0.50				0.13				0.66	0.07		
Helenium autumnale	sneezeweed		0.50										
Helianthus annuus	common sunflower							0.17					1.00
Helianthus grosseserratus	sawtooth sunflower		0.50										
Helianthus maximiliani	Maximilian's sunflower		0.53								1.00		
Helianthus pauciflorus	stiff sunflower		1.46							3.18	1.00		
Helianthus petiolaris	plains sunflower	1.08				0.50			0.06	0.03	0.50		0.50
Heliopsis helianthoides	false-sunflower												2.50
Heterotheca latifolia	camphor-weed	10.03				0.50		0.50		14.63			
Heterotheca villosa	hairy golden-aster											0.50	
Iva annua	annual marsh-elder	0.50							4.75				
Juncus balticus	Baltic rush			0.08									
Juncus dudleyi	Dudley's rush		0.50			0.50	0.50			0.03			
Juncus nodosus	knotted rush	0.50	0.50			0.50	0.50			0.24			
Juncus sp.													
Juncus torreyi	Torrey's rush	0.50				1.00				0.56			
Juniperus virginiana	eastern red-cedar	0.50								3.00			
Lactuca ludoviciana	western wild lettuce									0.77			
Lepidium densiflorum	prairie pepper-grass	2.76				0.50	0.33			0.32	1.50		
Lespedeza capitata	round-head bush-clover										0.50		
Linum sulcatum	grooved flax									0.24			
Lithospermum incisum	fringed puccoon									1.03			

NATIVE FORB SPECIES	COMMON NAME	JHNS_N	JHNS_S	NGPC	SLWD	McC_S	McC_N	BLESS	WY_S	SPN	SPS	FOX	HOST
Lithospermum occidentale	marble-seed									3.50	3.50		
Lycopus americanus	American water-horehound		0.27			0.50							
Lycopus asper	rough bugleweed					0.50							
Lysimachia ciliata	fringed loosestrife	0.50											
Lythrum alatum	winged loosestrife		0.50			1.00	0.50						
Maianthemum stellatum	starry false Solomon's-seal												
Mentha canadensis	Canada mint					3.00							
Mimosa nuttallii	sensitive brier									3.00			
Mirabilis hirsuta	hairy four-o'clock										0.50		
Mirabilis nyctaginea	wild four-o'clock	1.50											
Monarda fistulosa	wild-bergamot									6.80	0.73		
Oenothera biennis	eastern evening-primrose									1.00	0.50		0.03
Oenothera curtiflora	velvet butterfly-plant	1.00	0.77			0.40							
Oenothera laciniata	cut-leaf evening-primrose	0.50											
Oenothera rhombipetala	fourpoint evening-primrose									0.19	1.00		0.50
Opuntia humifusa	eastern prickly-pear	3.71				0.50				0.37			
Oxalis dillenii	gray-green wood-sorrel					0.06							
Oxalis stricta	yellow wood-sorrel	0.03			0.08			0.50		0.53	0.84	0.20	
Parthenocissus quinquefolia	Virginia creeper		0.66										
Penstemon grandiflorus	shell-leaf penstemon										1.00		
Persicaria amphibia	water smartweed	0.50		0.50	2.93	1.00	1.00		1.60				
Persicaria coccinea	swamp smartweed									0.03			
Phyla lanceolata	northern fogfruit	2.49	0.66			0.40			6.00				1.00
Physalis heterophylla	clammy ground-cherry	0.66				0.50				2.44	0.76	3.00	
Physalis longifolia	common ground-cherry	0.50	0.54	1.08	0.50	0.50	0.50	1.00		1.45	1.00	0.05	1.56
Physalis virginiana	Virginia ground-cherry	0.50	0.50		0.70	0.06		0.50		0.72			
Plantago patagonica	woolly plantain	0.05				0.06				0.95	3.57		
Plantago rugelii	black-seed plantain	0.01											
Polygonum ramosissimum	bushy knotweed					0.50							
Populus deltoides	plains cottonwood	1.50	0.04			0.50	0.08				0.50		
Portulaca oleracea	garden purslane	0.01					0.33						
Potentilla norvegica	Norwegian cinquefoil	1.10				1.50	1.07						
Ratibida columnifera	upright prairie-coneflower									0.10	5.50	0.50	2.59
Ratibida pinnata	gray-head prairie-coneflower												0.50
Rosa woodsii	western wild rose	0.33	0.50			0.40					0.50		
Rudbeckia hirta	black-eyed Susan		1.33								4.00		7.30
Salix amygdaloides	peach-leaf willow	0.50											
Silene antirrhina	sleepy catchfly	0.03											
Solanum carolinense	horse-nettle								1.00	6.50	1.00		

NATIVE FORB SPECIES	COMMON NAME	JHNS_N	JHNS_S	NGPC	SLWD	McC_S	McC_N	BLESS	WY_S	SPN	SPS	FOX	HOST
Solanum interius	plains black nightshade												0.50
Solanum rostratum	buffalo-bur												0.50
Solidago canadensis	Canada goldenrod	0.50	6.55							1.16	4.00		1.79
Solidago gigantea	late goldenrod	0.50	7.10			3.00	3.00			0.66	0.50		
Solidago missouriensis	Missouri goldenrod				0.50	0.50	0.50			0.24			0.50
Solidago mollis	ashy goldenrod		5.00										
Solidago rigida	stiff goldenrod									0.31			
Strophostyles leiosperma	slick-seed wild bean									0.50			
Symphoricarpos occidentalis	wolfberry										0.99		
Symphyotrichum ericoides	heath aster		2.04			1.26			2.06	0.05	0.50		
Symphyotrichum falcatum	prairie white aster									0.50			
Symphyotrichum lanceolatum	tall white aster		1.93						1.00				
Teucrium canadense	American germander	1.37	0.04			1.00				0.53			
Toxicodendron radicans	eastern poison ivy	0.51								0.50			
Tradescantia occidentalis	western spiderwort	1.00									0.50		
Triodanis perfoliata	clasping-leaf Venus'-looking-glass									0.50			
Ulmus americana	American elm	0.10				0.13							
Urtica gracilis	stinging nettle												
Verbena bracteata	prostrate vervain		0.50			2.49	0.50			0.03			3.00
Verbena hastata	blue vervain	1.27	1.66		0.50	1.00	0.50			0.19	0.50		
Verbena stricta	hoary vervain	1.80	1.70			1.31	0.25	0.50		2.01	7.37	0.50	
Vernonia baldwinii	western ironweed	0.50		1.00									
Vernonia fasciculata	prairie ironweed	4.00	1.54						2.11		0.50		
Veronica peregrina	purslane speedwell						0.62						
Viola pratincola	meadow violet									0.03			
Vitis riparia	riverbank grape									0.50			
TOTAL NATIVE FORBS		69.13	54.56	6.10	10.15	56.65	20.40	3.25	22.54	91.62	64.58	7.72	35.98
TOTAL ALL FORBS		81.49	57.98	8.68	13.32	66.50	28.60	4.87	27.63	141.88	82.66	18.78	57.79

Table 6C. Native Forb cover for Binfield sites.

NATIVE FORB SPECIES	COMMON NAME	BIN_NM	BIN_NH	BIN_SH	BIN_S	BIN_E	BIN_W	BIN_WH
Achillea millefolium	western yarrow	0.50						
Allium canadense	meadow garlic			11.43			0.50	0.50
Amaranthus retroflexus	redroot pigweed							
Ambrosia artemisiifolia	common ragweed						0.50	
Ambrosia psilostachya	western ragweed	9.28			2.02	10.93	4.80	
Amorpha fruticosa	false indigo-bush	3.00						
Antennaria neglecta	field pussytoes	0.06						
Apocynum cannabinum	hemp dogbane	0.09	0.87	9.07	1.25	0.08	1.72	4.33
Arnoglossum plantagineum	tuberous Indian-plantain							
Artemisia ludoviciana	white sage	11.50			0.17			
Asclepias speciosa	showy milkweed			3.50	0.50	3.50	1.00	1.50
Asclepias syriaca	common milkweed			1.65				0.50
Asclepias verticillata	whorled milkweed	0.03	0.25	1.85	1.73		0.50	
Callirhoe involucrata	purple poppy-mallow	2.21				0.08	0.77	
Cirsium altissimum	tall thistle				3.17			
Cirsium flodmanii	Flodman's thistle	1.50	0.08	0.50	3.00	0.50	0.62	0.50
Cirsium undulatum	wavy-leaf thistle	3.20			0.08			
Conyza canadensis	horseweed	0.16		1.00	0.58			0.50
Cornus drummondii	rough-leaf dogwood				1.93		0.50	
Croton texensis	**Texas croton**	**0.50**						
Dalea candida	eastern white prairie-clover	4.00		0.50	1.00			0.50
Dalea purpurea	purple prairie-clover	0.53		0.75	3.00	0.50	0.14	0.50
Dalea villosa	silky prairie-clover			0.50				
Desmanthus illinoensis	Illinois bundleflower	0.50	5.55	7.32	0.53			4.87
Equisetum arvense	field horsetail		0.17	0.08				
Equisetum laevigatum	smooth scouring-rush	0.96	0.75	10.20	0.67	0.46	0.86	1.47
Erechtites hieraciifolius	burnweed				0.08		0.02	
Erigeron philadelphicus	marsh fleabane	3.00		0.50		0.04	3.00	0.65
Erigeron strigosus	daisy fleabane	3.29		2.35			1.50	0.50
Euphorbia davidii	western toothed spurge	0.03						
Euphorbia geyeri	Geyer's spurge						0.02	
Euphorbia sp.			0.08					
Euphorbia spathulata	warty spurge				0.50			
Eustoma russellianum	prairie-gentian			1.00		0.31	1.52	0.50
Euthamia gymnospermoides	viscid goldentop				0.53	0.50	5.40	
Geum canadense	white avens				0.50		0.50	
Glycyrrhiza lepidota	wild licorice	0.20		3.00	0.62	1.93		

NATIVE FORB SPECIES	COMMON NAME	BIN_NM	BIN_NH	BIN_SH	BIN_S	BIN_E	BIN_W	BIN_WH
Grindelia squarrosa	curly-top gumweed	1.00						
Hedeoma hispida	rough false-pennyroyal	0.53						
Helenium autumnale	sneezeweed					1.53	1.50	
Helianthus maximiliani	Maximilian's sunflower		3.78					5.50
Heterotheca latifolia	camphor-weed						0.02	
Iva annua	annual marsh-elder					1.43	6.38	
Juncus balticus	Baltic rush	3.00						0.05
Juncus dudleyi	Dudley's rush	3.23		0.50	0.50	0.50	4.65	
Juncus nodosus	knotted rush						4.06	0.05
Juncus torreyi	Torrey's rush				0.50		0.77	0.50
Juniperus virginiana	eastern red-cedar	0.50	0.08					
Liatris pycnostachya	thick-spike gayfeather				1.00			
Linum sulcatum	grooved flax		0.25	0.33		1.30	3.04	0.60
Lithospermum incisum	fringed puccoon	0.03						
Lithospermum occidentale	marble-seed	0.50						
Lobelia spicata	pale-spike lobelia	6.50		0.92	0.50		0.50	3.50
Lycopus americanus	American water-horehound			0.50	0.17	0.04	3.16	
Lycopus asper	rough bugleweed					0.62	0.68	
Lysimachia ciliata	fringed loosestrife						0.02	
Lythrum alatum	winged loosestrife			0.50			0.50	
Maianthemum stellatum	starry false Solomon's-seal	0.50		0.50				
Mentha canadensis	Canada mint					0.27	0.02	0.05
Oenothera biennis	eastern evening-primrose	3.00						
Oenothera curtiflora	velvet butterfly-plant	3.00		0.50			0.02	
Oenothera filiformis	long-flower butterfly-plant				0.17			
Oxalis stricta	yellow wood-sorrel			1.32	0.62		0.43	
Packera plattensis	prairie ragwort			0.33				
Persicaria amphibia	water smartweed	0.03				0.54		
Persicaria coccinea	swamp smartweed		0.53					
Phyla lanceolata	northern fogfruit	0.29	0.25	0.50	0.08	7.08	3.26	1.24
Physalis heterophylla	clammy ground-cherry	0.50						
Physalis longifolia	common ground-cherry			3.00				0.50
Physalis virginiana	Virginia ground-cherry			2.75				
Plantago eriopoda	alkali plantain	0.06				5.16	1.36	
Plantago patagonica	woolly plantain	1.62					0.50	
Populus deltoides	plains cottonwood				0.50			
Potentilla norvegica	Norwegian cinquefoil			0.50				0.55
Potentilla paradoxa	bushy cinquefoil				0.08			0.05
Prunella vulgaris	self-heal			8.95			0.50	

NATIVE FORB SPECIES	COMMON NAME	BIN_NM	BIN_NH	BIN_SH	BIN_S	BIN_E	BIN_W	BIN_WH
Pycnanthemum virginianum	Virginia mountain-mint			0.50	4.32	0.13	0.50	0.50
Ratibida columnifera	upright prairie-coneflower	9.86		0.50			1.00	1.00
Rosa arkansana	dwarf prairie rose	5.00			0.53		0.50	0.42
Rosa woodsii	western wild rose	3.73			3.08	0.77	2.71	
Rudbeckia hirta	black-eyed Susan	0.50		0.33	1.00	1.19	1.50	1.00
Silene antirrhina	sleepy catchfly	0.50						
Solanum carolinense	horse-nettle						0.62	
Solanum rostratum	buffalo-bur	0.50			0.50		0.50	
Solidago canadensis	Canada goldenrod	0.03	3.35	3.50	7.48	0.35	0.80	1.50
Solidago gigantea	late goldenrod				1.15		0.50	
Solidago missouriensis	Missouri goldenrod	0.03				0.04		
Solidago rigida	stiff goldenrod	0.06			0.08			
Strophostyles leiosperma	slick-seed wild bean	0.56						0.05
Symphoricarpos occidentalis	wolfberry				1.08		1.47	
Symphyotrichum ericoides	heath aster	7.12		1.03		0.87	5.16	0.05
Symphyotrichum falcatum	prairie white aster	0.50		0.50	1.12	2.72		0.70
Symphyotrichum lanceolatum	tall white aster	3.00		1.00	0.17	2.59	0.71	0.42
Teucrium canadense	American germander	1.06		0.50			0.50	0.50
Toxicodendron radicans	eastern poison ivy				0.50			
Verbena hastata	blue vervain	5.03			0.75	0.50	0.78	
Verbena stricta	hoary vervain	3.72			1.40	0.93	1.24	
Vernonia baldwinii	western ironweed					0.04	0.02	1.00
Vernonia fasciculata	prairie ironweed	3.00		1.00	0.08	6.54	11.12	
Viola pedatifida	prairie violet							0.10
Viola pratincola	meadow viol et	0.26				0.04	0.54	0.05
Xanthium strumarium	cocklebur							0.55
TOTAL NATIVE FORBS		113.31	16.00	85.17	49.23	54.27	89.83	37.25
TOTAL ALL FORBS		121.56	17.03	97.80	52.88	55.87	94.33	39.17

Table 7A. Bare ground and litter for western sites.

SPECIES	COOK	DYER	CWRN1	CWRN2	CWRN3	CWREL	CWR_E	MRS_N	MRS_HN	MRS_M	MRS_HS	MRS_C	MRS_SW	CWR_SW	CWR_NW	CWR_NE
BARE GROUND	5.10	9.85	8.50	2.00	40.23	5.46	9.93	10.29	4.23	16.26	4.18	9.58	35.18	16.31	8.60	5.60
LITTER	79.67	65.76	60.22	65.92	8.00	36.44	21.05	36.82	71.12	9.01	32.23	16.72	30.53	40.99	18.95	6.55

Table 7B. Bare ground and litter for middle 12 sites.

SPECIES	JHNS_N	JHNS_S	NGPC	SLWD	McC_S	McC_N	BLESS	WY_S	SPN	SPS	FOX	HOST
BARE GROUND	27.86	10.59	1.00	1.48	32.51	33.77	18.85	23.40	17.19	21.32	13.61	34.23
LITTER	34.91	81.58	68.95	87.87	31.39	30.70	70.55	66.50	15.03	72.86	77.09	35.62

Table 7C. Bare ground and litter for Binfield sites.

SPECIES	BIN_NM	BIN_NH	BIN_SH	BIN_S	BIN_E	BIN_W	BIN_WH
BARE GROUND	7.89	28.87	10.53	57.97	15.13	24.01	0.67
LITTER	78.33	49.12	24.95	20.97	69.68	60.62	86.90

Table 8. Floristic Quality Assessment Scores.

Species composition is presented as the percent of exotic (non-native) species and the percent of native species. N= total number of species in the plots. Average C is the average of the conservatism value assigned to each native species. Non-native species have no value and are assigned a value of 0 in calculations. Weighted scores include abundance as an additional parameter in calculations.

Code	Site Name			Native only			Both Native and Exotic			Weighted	
		% Exotic	% Native	N	Ave. C	FQI	N	Ave. C	FQI	Ave. C	FQI
COOK	Cook Hay Meadow	30	70	7	2.86	7.56	10	2.00	6.32	9.07	28.68
DYER	Dyer Grassland	39	61	33	2.39	13.75	54	1.46	10.75	3.71	27.27
CWRN1	CWR North 1	27	73	35	3.03	17.92	48	2.21	15.30	3.61	25.00
CWRN2	CWR North 2	28	72	23	2.22	10.63	32	1.59	9.02	3.66	20.68
CWRN3	CWR North 3	24	76	45	2.60	17.44	59	1.98	15.23	5.13	39.38
CWREL	CWR East Lloyd Island	34	66	42	2.52	16.36	64	1.66	13.25	3.27	26.18
CWR_E	CWR East	15	85	33	2.64	15.14	39	2.23	13.93	4.92	30.74
MRS_N	Morse North	21	79	45	2.96	19.83	57	2.33	17.62	5.27	39.79
MRS_HN	Morse Hay North	50	50	10	2.70	8.54	20	1.35	6.04	0.85	3.81
MRS_M	Morse Middle	23	77	46	2.70	18.28	60	2.07	16.01	3.51	27.17
MRS_HS	Morse Hay South	35	65	20	2.50	11.18	31	1.61	8.98	3.08	17.17
MRS_C	Morse Crop	45	55	18	2.89	12.26	33	1.58	9.05	5.98	34.35
MRS_SW	Morse SW	39	61	35	2.40	14.20	57	1.47	11.13	2.47	18.68
CWR_SW	CWR SW	41	59	26	2.23	11.37	44	1.32	8.74	2.50	16.57
CWR_NW	CWR NW	41	59	32	2.50	14.14	54	1.48	10.89	2.67	19.59
CWR_NE	CWR NE	32	68	43	2.47	16.16	63	1.68	13.35	2.06	16.34
JHNS_N	Johns North Wet Meadow	22	78	102	2.69	27.13	131	2.09	23.94	2.71	31.01
JHNS_S	Johns South Wet Meadow	19	81	66	3.35	27.20	81	2.73	24.56	5.48	49.29
NGPC	NGPC	37	63	12	3.25	11.26	19	2.05	8.95	1.39	6.04
SLWD	Sullwald Hay Meadow	30	70	19	2.68	11.70	27	1.89	9.81	2.05	10.63
McC_S	McCormick Southe Meadow	21	79	81	3.12	28.11	103	2.46	24.93	3.77	38.26
McC_N	McCormick North Island	28	72	41	2.63	16.87	57	1.89	14.30	2.65	19.97
BLESS	Blessing	40	60	15	2.93	11.36	25	1.76	8.80	6.51	32.56
WY_S	WY South Meadow	37	63	27	2.89	15.01	43	1.81	11.89	3.28	21.53
SPN	Speidelll North	19	81	84	3.10	28.37	104	2.50	25.50	4.69	47.79
SPS	Speidelll South	18	82	72	3.19	27.11	88	2.61	24.52	4.56	42.82
FOX	Fox	28	72	26	3.08	15.69	36	2.22	13.33	6.54	39.22
HOST	Hostetler Crop	33	67	36	2.47	14.83	54	1.65	12.11	3.65	26.84
BIN_NM	Binfield North Meadow	11	89	82	3.41	30.92	92	3.04	29.19	7.78	74.65
BIN_NH	Binfield North Hay Meadow	22	78	28	3.71	19.65	36	2.89	17.33	5.21	31.29
BIN_SH	Binfield South Hay Meadow	18	82	56	3.82	28.60	68	3.15	25.95	7.84	64.66
BIN_S	Binfield South Meadow	17	83	59	3.46	26.56	71	2.87	24.21	9.71	81.79
BIN_E	Binfield East Meadow	16	84	54	3.83	28.17	64	3.23	25.88	7.51	60.06
BIN_W	Binfield West Meadow	14	86	80	3.59	32.09	93	3.09	29.76	7.58	73.05
BIN_WH	Binfield West Hay Meadow	13	87	54	3.80	27.90	62	3.31	26.04	7.85	61.85

Table 9. Comparison of Floristic Quality Scores 2013 to 2016.

Differences in each measure of floristic quality can be used to determine factors that produced changes in weighted floristic quality. Two of the sites were first surveyed in 2014 rather than 2013. Those values are in red in the table.

Site		2013 N	2016 N	2013 Ave. C	2016 Ave. C	2013 FQI	2016 FQI	2013 FQIw	2016 FQIw
COOK	Cook Hay Meadow	39	10	1.38	2.00	8.65	6.32	30.52	28.68
DYER	Dyer Grassland	69	54	1.28	1.46	10.59	10.75	43.24	27.27
CWRN1	CWR North 1	40	48	1.83	2.21	11.54	15.30	21.13	25.00
CWRN2	CWR North 2	79	32	2.09	1.59	18.56	9.02	45.29	20.68
CWRN3	CWR North 3		59		1.98		15.23		39.38
CWREL	CWR East Lloyd Island	71	64	1.90	1.66	16.02	13.25	72.63	26.18
CWR_E	CWR East	45	39	1.84	2.23	12.37	13.93	21.40	30.74
MRS_N	Morse North	74	57	2.09	2.33	18.02	17.62	47.43	39.79
MRS_HN	Morse Hay North	31	20	1.10	1.35	6.11	6.04	15.75	3.81
MRS_M	Morse Middle	58	60	2.09	2.07	15.89	16.01	47.84	27.17
MRS_HS	Morse Hay South	50	31	1.60	1.61	11.31	8.98	18.56	17.17
MRS_C	Morse Crop	28	33	1.64	1.58	8.69	9.05	30.73	34.35
MRS_SW	Morse SW	24	57	1.67	1.47	8.16	11.13	12.61	18.68
CWR_SW	CWR SW	55	44	1.45	1.32	10.79	8.74	33.18	16.57
CWR_NW	CWR NW	54	54	1.41	1.48	10.34	10.89	30.15	19.59
CWR_NE	CWR NE	60	63	1.82	1.68	14.07	13.35	40.63	16.34
JHNS_N	Johns N Wet Meadow	112	131	1.95	2.09	20.60	23.94	69.38	31.01
JHNS_S	Johns S Wet Meadow	92	81	2.43	2.73	23.35	24.56	55.17	49.29
NGPC	NE Game and Parks Com		19		2.05		8.95		6.04
SLWD	Sullwald Hay Meadow	37	27	1.81	1.89	11.01	9.81	11.19	10.63
McC_S	McCormick S. Meadow	77	103	1.82	2.46	15.95	24.93	26.89	38.26
McC_N	McCormick North Island	83	57	1.83	1.89	16.68	14.30	17.13	19.97
BLESS	Blessing 2014	37	25	1.70	1.76	10.36	8.80	6.50	32.56
WY_S	WY South Meadow	57	57	1.51	1.81	11.39	11.89	9.72	21.53
SPN	Speidelll North		104		2.50		25.50		47.79
SPS	Speidelll South		88		2.61		24.52		42.57
FOX	Fox 2014	81	36	1.90	2.22	17.11	13.33	20.80	39.22
HOST	Hostetler Crop	52	54	1.29	1.65	9.29	12.11	47.11	26.84
BIN_NM	Binfield North Meadow	92	92	2.46	3.04	23.56	29.19	72.33	74.65
BIN_NH	Binfield North Hay Meadow	50	36	2.48	2.89	17.54	17.33	21.23	31.29
BIN_SH	Binfield S Hay Meadow	49	68	3.35	3.15	23.43	25.95	23.15	64.66
BIN_S	Binfield South Meadow	47	71	2.89	2.87	19.84	24.21	38.84	81.79
BIN_E	Binfield East Meadow	63	64	3.13	3.23	24.82	25.88	132.06	60.06
BIN_W	Binfield West Meadow	74	93	3.18	3.09	27.32	29.76	61.40	73.05
BIN_WH	Binfield W Hay Meadow	56	62	3.34	3.31	24.99	26.04	39.66	61.85

Table 10. Comparison of cool & warm season grass cover from 2013 to 2016.

Data are presented for individual plots comparing native and exotic cool season grasses along with Carex species. This does not include macroplot data. Native warm season data are included for comparison. Fox and Blessing sites were first sampled in 2014. Those percentages are included in the 2013 columns. Warm season exotic species were not included in the table. Annual foxtail is the most common warm season exotic grass and is often found on disturbed or newly seeded areas

PLOT	2016 EXOTIC COOL	2016 NATIVE COOL	2016 CAREX SPECIES	2016 NATIVE WARM	2013 EXOTIC COOL	2013 NATIVE COOL	2013 CAREX SPECIES	2013 NATIVE WARM
BIN_E_16_G127	1.6	20.5	81.55	13.7	0	0	0	5.55
BIN_E_16_G128	28.75	1.85	67.2	1	0	2.1	19.05	16.65
BIN_E_16_G129	0	37.85	53	19	0.25	9.7	51.95	24.6
BIN_E_16_G130	34.5	1	8.75	13.05	33.4	0	1	19.25
BIN_E_16_G131	5.55	2.35	11.85	79.4	11.35	0.5	0	45.75
BIN_E_16_G132	0.75	0	17.5	7.4	5.55	0	12.75	29.2
BIN_NH_16_G118	55	11.5	25.85	17.2	26.5	5.8	21.45	40.2
BIN_NH_16_G119	0.25	2.35	0.5	5.8	41.15	3.95	10.6	26.35
BIN_NH_16_G120	63.2	0	2.6	17.65	59.45	0	16.75	20.6
BIN_NM_16_G110	17.2	12.1	13.25	33.45	4.2	5.3	0	22.95
BIN_NM_16_G111	5.05	8.4	8.9	40.55	0.5	2.35	0	13.7
BIN_NM_16_G112	2.1	6.3	21.1	7.15	0	0.25	0	3.7
BIN_NM_16_G113	33	1	0.5	64.35	63.85	0.25	2.35	44.7
BIN_NM_16_G114	0.25	29.95	0	18.5	15	3.45	0	11.45
BIN_NM_16_G115	22.55	10.8	2.6	59.6	22.95	0.25	0.75	27.25
BIN_NM_16_G116	15.8	3.1	8.4	64.7	5.55	1.85	3.7	69.6
BIN_NM_16_G117	18	26.75	12.7	31	0	0.25	0	3.1
BIN_S_16_G124	13.2	0.75	48.7	76.9	8.75	0	14.35	35.4
BIN_S_16_G125	3.95	6.9	33.15	19.25	34.9	0.25	8	10.25
BIN_S_16_G126	65.5	21.15	7.15	79.8	26.75	0.25	26.4	28.7
BIN_SH_16_G121	48.25	4.7	37.75	47.2	28.4	1.6	10.5	6.2
BIN_SH_16_G122	39.1	5.8	11.6	28.55	31.1	1.5	14.65	24.15
BIN_SH_16_G123	49.8	2.25	3.7	18	37.95	0.75	3.95	22.35
BIN_W_16_G133	1.6	18.25	123.1	20.1	3.7	17.75	0	0.25
BIN_W_16_G134	19.05	9.5	31.2	59.7	9.85	0.5	9.85	53.7
BIN_W_16_G135	0	0.5	9.5	10.6	0	2.35	16.4	39.8
BIN_W_16_G136	18.35	0	23.3	5.3	5.55	0.25	40.3	12.2
BIN_W_16_G137	1.85	0	9	5.2	11.6	1.85	26.95	39.1
BIN_W_16_G138	15.55	18.5	52.5	38.05	6.05	2.6	19.8	18.85
BIN_W_16_G139	20.1	0.25	25.8	12.95	25.75	0.75	10.1	26.4
BIN_W_16_G140	29.8	1	4.2	33.25	33.6	1.6	1.85	13.3
BIN_W_16_G141	3.95	1.6	9.5	37.5	16.9	2.35	4.2	17.9
BIN_W_16_G142	6.65	0	14.8	30.1	25.9	0	6.9	22.8
BIN_W_16_G143	2.1	0.5	41.1	21.25	36.45	0.75	12.8	28.25
BIN_W_16_G144	0	1.85	60.4	68.95	43.4	0	6.65	4.45
BIN_W_16_G145	9.5	8.15	14.3	98.85	32	0	3.2	23.05
BIN_WH_16_G146	50.6	3.7	16.3	9.65	19	0.25	6.9	31.45
BIN_WH_16_G147	33.45	23	33.55	20.9	13.8	3.35	2.85	26.25
BIN_WH_16_G148	40.8	1.85	19.85	37.05	39.05	0.25	6.65	21.45
BIN_WH_16_G149	54.1	0.25	42.65	41.15	26	0	22.25	9
BIN_WH_16_G150	39.75	0	18.2	45.8	31.55	0	4.8	26.2
BLESS_16_G181	68.1	0	0	1.6	2.6	0	0	0
BLESS_16_G182	30.45	0	0.25	33.05	62.75	0	0	6.65

PLOT	2016 EXOTIC COOL	2016 NATIVE COOL	2016 CAREX SPECIES	2016 NATIVE WARM	2013 EXOTIC COOL	2013 NATIVE COOL	2013 CAREX SPECIES	2013 NATIVE WARM
BLESS_16_G183	15.75	0.25	0	36.2	73.4	0	0	13.7
CookHM_16_G1	54.7	0	0	19.85	37.85	3.2	0	33.1
CookHM_16_G2	99.2	0	0	10.55	54.35	0	0	18.1
CookHM_16_G3	90.65	0	0	22.25	40.85	0	0	45.3
CWR_E_16_G25	67.25	1.85	0.25	40.6	25.6	0.25	0.75	16.05
CWR_E_16_G26	85.35	0	0	4.45	31.5	0.5	0.25	2.6
CWR_E_16_G27	37.25	31.8	5.55	11.1	25.5	47.7	8.6	1.6
CWR_NE_16_G64	29.4	0.25	0	10.5	25	0	0	27.55
CWR_NE_16_G65	14.45	0	0	19.85	13.2	0	0	26.3
CWR_NE_16_G66	33.5	0	2.1	0.5	57.35	0.25	0	14.5
CWR_NE_16_G67	19.75	0.25	0	18.5	15.35	6.55	0	33.55
CWR_NE_16_G68	12.1	2.6	0	20.05	5.45	3.1	0	33.75
CWR_NW_16_G59	79.25	0	0	1.6	63.65	0	0	2.1
CWR_NW_16_G60	24.8	0	0	4.2	39.75	0	0	12.15
CWR_NW_16_G61	23.85	0	0	27.05	51.5	0	0.5	32.4
CWR_NW_16_G62	3.35	0	0	30	11.35	0	0	30.1
CWR_NW_16_G63	17.65	0	3.1	5.8	25.55	0	0	10.25
CWR_SW_16_G54	19.85	0	0	24.05	18	0.25	0	32.2
CWR_SW_16_G55	72.7	0	0	17.2	41.5	0.25	1.85	7.4
CWR_SW_16_G56	25.8	0.5	23.9	0	2.1	0	0	0
CWR_SW_16_G57	66.4	1.85	0	10	41.5	0	0	11.1
CWR_SW_16_G58	90.35	0	0	7.4	60.85	0	0	10.3
CWREL_16_G16	8.4	0.5	11.45	13.8	35.65	0	5.3	18.85
CWREL_16_G17	12.7	22.5	1.6	43.6	21.1	2.85	6.35	24
CWREL_16_G18	20.85	6.05	7.9	27.35	23.05	0.25	12.1	22
CWREL_16_G19	25.6	2.35	0.25	25.25	11.6	0.5	0.25	33.9
CWREL_16_G20	18	0.25	21.95	1.6	14.8	0	20.6	2.6
CWREL_16_G21	32.9	0.25	14.55	0.75	18.75	0	15.15	5.8
CWREL_16_G22	36.25	12.4	1.6	23.3	2.85	0.25	13.05	54.3
CWREL_16_G23	56.45	0	0	15.3	7.9	0	3.7	54.7
CWREL_16_G24	20.55	8.7	0.75	24.15	32.85	4.2	0.25	28.95
CWRN1_16_G10	42	2.6	0	31.85	49.15	2.35	1.6	38.05
CWRN1_16_G11	67.05	0	0	0	49.65	0	22.4	0
CWRN1_16_G12	45.2	1	14	2.6	28.15	0	3.7	1.85
CWRN2_16_G13	52.5	1.85	5.55	0	47.45	0	2.1	0
CWRN2_16_G14	50.5	4.45	7.9	0	10.25	0.25	17.5	4.95
CWRN2_16_G15	23.05	20.7	1.25	11.1	36.9	3.95	0.5	18.5
CWRN3_16_G151	1.85	42.65	2.6	3.2				
CWRN3_16_G152	1.6	5.2	9.75	18.8				
CWRN3_16_G153	12.75	15.35	3.45	9.25				
DYER_16_G4					1.6	59	0.25	4.45
DYER_16_G5	20.7	0	0	13.8	13.7	0	0	4.1
DYER_16_G6	29.1	0	0	5.55	15.4	0	35.7	7.15
DYER_16_G7	19.55	0.25	0	22.95	32.1	0	0	23.9
DYER_16_G8	18.1	2.1	66.3	15.65	31.75	0.25	38.9	14.65
DYER_16_G9	21.3	5.05	1.6	0.25	7.15	25.25	1.6	46.1
FOX_16_G174	0	0	0	0	16.9	4.2	0	12.4
FOX_16_G175	87.75	0	0	18.9	7.15	4.2	0	14.3
FOX_16_G176	15.55	3.2	1.6	101.55	14.85	15.05	0	13.35
FOX_16_G177	24.6	20.1	0.25	67.45	9	9.5	0	1.6
FOX_16_G178	56.75	0.25	0	10.75	7.65	1.6	0	2.35
HOST_C_16_G102	0	14.8	0	1.6	3.45	37.9	0	29.3
HOST_C_16_G103	0	9.5	0	0	0	0	0	20.35
HOST_C_16_G104	12.7	39.65	0	7.4	3.2	24.95	0	26.65

PLOT	2016 EXOTIC COOL	2016 NATIVE COOL	2016 CAREX SPECIES	2016 NATIVE WARM	2013 EXOTIC COOL	2013 NATIVE COOL	2013 CAREX SPECIES	2013 NATIVE WARM
HOST_C_16_G105	0	22.45	0	4.7	3.2	14.8	0	24.55
HOST_C_16_G106	45.4	6.05	0	7.65	0	2.1	0	9
HOST_C_16_G107	0	6.3	0	0	0	1.6	0	10.35
HOST_C_16_G108	7.65	41.5	0	5.3	0	8.2	0	26.1
HOST_C_16_G109	0.25	49.05	0	15.1	1.6	3.7	0	38.05
JOHNS_NWM_16_G69	6.9	12.7	5.8	35.15	20.1	0	0	19.5
JOHNS_NWM_16_G70	22.7	18.9	27.05	28.1	23.3	0.5	6.85	8.75
JOHNS_NWM_16_G71	2.1	30.65	40.6	12.3	4.8	25.2	14.8	2.35
JOHNS_NWM_16_G72	9	18	43.05	21.95	17.9	6.05	14.25	15.6
JOHNS_NWM_16_G73	0.75	4.1	3.35	13.35	16.65	1.85	6.05	0.75
JOHNS_NWM_16_G74	16.15	0	17.45	20.7	26.45	1.6	9.55	5.55
JOHNS_NWM_16_G75					26.2	0.5	1.6	3.95
JOHNS_NWM_16_G76	1.85	3.85	25.3	2.6	0	5.45	7.4	0
JOHNS_NWM_16_G77	2.6	2.1	34.4	2.6	18.7	15.85	5.8	7.15
JOHNS_NWM_16_G78	5.3	0.5	0.25	26.5	28.7	0	0	25
JOHNS_NWM_16_G79	40.15	3.7	1.85	10.5	45.2	0	0	6.3
JOHNS_NWM_16_G80	1.85	0.25	78.25	0.25	0	11.6	10.2	23.55
JOHNS_NWM_16_G81	11.1	16.05	3.45	18.6	15.9	16.9	0	26.7
JOHNS_SWM_16_G82	15.6	0.5	10.6	61.45	23.5	0	1.85	7.65
JOHNS_SWM_16_G83	0.75	0.5	14.55	37.65	12.05	14.15	0.75	41.15
JOHNS_SWM_16_G84	20.35	6.05	17.45	9.75	37	6.9	13.45	6.3
JOHNS_SWM_16_G85	34.9	2.85	2.1	24.5	30.6	0	2.85	24.55
JOHNS_SWM_16_G86	9.5	16.95	20.7	52.45	29.8	7.65	1.85	31.65
JOHNS_SWM_16_G87	16.8	11.95	35.1	57.85	1	0.5	7.05	45.6
McC_NI_16_G91	20.25	9.8	51.95	12.7	3.45	7.15	1.85	0
McC_NI_16_G92	0	2.35	5.45	0.25	6.65	8.85	0	0.25
McC_NI_16_G93	4.7	0.5	5.45	2.1	16.8	0	0	28
McC_SM_16_G94	12.2	7.05	11.45	86.7	14.2	1	5.3	19.25
McC_SM_16_G95					6.85	13.45	0	4.2
McC_SM_16_G96	3.95	14.5	17.9	20.1	9.25	1.85	0.25	16.8
McC_SM_16_G97	10.25	6.05	2.35	16.65	21.5	0.25	1.85	3
MORSE_C_16_G45	6.6	14.65	0	10.75	0.25	61.4	0	9
MORSE_C_16_G46	1.6	10.1	0	17.5	0	7.65	0	19.8
MORSE_C_16_G47	1.6	20.85	0	14.55	0	0	0	24.05
MORSE_HS_16_G42	64.7	0	0	5.7	72.9	0	0	7.15
MORSE_HS_16_G43	1.85	5.8	19	24.05	0.25	0	0	13.6
MORSE_HS_16_G44	59.3	33.4	0	1.85	18.5	68.65	0	0
MORSE_SW_16_G48	1.6	0	81.7	25.3	36.45	0	1.85	10.6
MORSE_SW_16_G49	77	0	2.1	5.55	52.65	0	0	0
MORSE_SW_16_G50	12.65	0	3.7	0.5	50.95	0	0	0
MORSE_SW_16_G51	79.5	0	0.75	0	47.45	0	0	0.25
MORSE_SW_16_G52	77.3	0	0	14.7	45.75	0	0	5.55
MORSE_SW_16_G53	102.8	0	0	11.65	80.6	0	0	3.2
MORSEHN_16_G34	85.25	0	0	0	78.15	0	0	0
MORSEHN_16_G35	105.85	0	0	0	75.15	0	0	0
MORSEHN_16_G36	92.25	0	0	0	1	0	0	11.35
MORSEM_16_G37	9.75	1.6	0.5	27.95	51.35	0.25	0.5	46.5
MORSEM_16_G38	71.1	2.1	0	7.4	67.4	3.7	0	20.4
MORSEM_16_G39	10.85	0.25	3.45	21.6	38.95	0	0	23.45
MORSEM_16_G40	49.7	0	2.6	39.95	78.3	0.25	0	24.05
MORSEM_16_G41	26.75	0	0	18.25	58.9	3.45	0	47.75
MORSEN_16_G28	14.05	3.95	10	10	53.55	13.5	21.3	21.35
MORSEN_16_G29	41.8	0	4.45	12.7	22.9	0	0.5	13.7
MORSEN_16_G30	13.7	0	0	33.25	61.5	0	0	45.2

PLOT	2016 EXOTIC COOL	2016 NATIVE COOL	2016 CAREX SPECIES	2016 NATIVE WARM	2013 EXOTIC COOL	2013 NATIVE COOL	2013 CAREX SPECIES	2013 NATIVE WARM
MORSEN_16_G31	9.65	0	0	34.05	51.1	0.25	0	38.05
MORSEN_16_G32	32.8	0	0	21.75	74.5	0	0	4.35
MORSEN_16_G33	21.9	0	0	24.65	54.05	0	0	17.4
NGPC_16_154	98.5	0	0	0.25				
NGPC_16_155	90.2	0	0	0				
NGPC_16_156	87.25	0	0.25	0				
SLWD_HM_16_G88	91.7	0	0	3.45	84.45	0	0	0
SLWD_HM_16_G89	104.85	0	2.35	0	90.1	0	3.2	0
SLWD_HM_16_G90	112.7	0	0	0	58.15	0	0	8.7
SPN_16_164	28.35	0	0	73.45				
SPN_16_165	47.7	8.15	0	44.7				
SPN_16_168	24.6	22.2	0	74.1				
SPN_16_G163	66.9	10.3	0	0				
SPN_16_G166	2.1	24.15	0	29.75				
SPN_16_G167	0	0	0	60.85				
SPN_16_G169	8.4	12.7	1	39.9				
SPN_16_G170	8.5	2.1	0.25	23.5				
SPN_16_G171	31.15	7.15	2.85	39.7				
SPN_16_G172	28.3	6.9	14.4	22.6				
SPN_16_G173	36.95	31.75	7.4	35.95				
SPS_16_G157	32.25	3.7	0	36.4				
SPS_16_G158	53.15	10.85	5.05	10.35				
SPS_16_G159	72.45	5.05	0	17.85				
SPS_16_G160	51.9	5.05	0.25	32.15				
SPS_16_G161	41.5	5.8	1.6	34.7				
SPS_16_G162	26.05	3.95	2.35	48.65				
WY_16_G100	76.25	0	1.6	1.85	68.6	0	0.25	1.6
WY_16_G101	96.4	3.45	10.6	8.75	7.4	0.5	0	0.25
WY_16_G98	0.5	0	0	15.05	3.95	0	0	22.45
WY_16_G99	46.65	16.1	15.8	2.35	32.1	6.65	0	0

APPENDICES

APPENDIX A: SAMPLING PROTOCOL

See attached PDF document

APPENDIX B: PLOT LOCATIONS

Site Location	Number	Latitude	Longitude	y_proj	x_proj	Orientation
Binfield East Meadow	G127N	40.771403	-98.5220535	4513490	540335.4	n
Binfield East Meadow	G127S	40.771134	-98.5220325	4513460	540337.3	s
Binfield East Meadow	G128N	40.770918	-98.518924	4513438	540599.8	n
Binfield East Meadow	G128S	40.770647	-98.5189119	4513408	540601	s
Binfield East Meadow	G129N	40.769975	-98.5260089	4513330	540002.4	n
Binfield East Meadow	G129S	40.769707	-98.5260221	4513300	540001.5	s
Binfield East Meadow	G130N	40.769048	-98.5189208	4513230	540601.2	n
Binfield East Meadow	G130S	40.768778	-98.5189178	4513200	540601.6	s
Binfield East Meadow	G131N	40.766191	-98.5256282	4512910	540036.8	n
Binfield East Meadow	G131S	40.765921	-98.5256293	4512880	540036.9	s
Binfield East Meadow	G132N	40.764116	-98.5241031	4512680	540166.8	n
Binfield East Meadow	G132S	40.763847	-98.5240959	4512650	540167.6	s
Binfield East Meadow	G135S	40.766893	-98.5350464	4512984	539241.5	s
Binfield North Hay Meadow	G118N	40.775465	-98.5130282	4513945	541094.5	n
Binfield North Hay Meadow	G118S	40.775195	-98.5130446	4513915	541093.3	s
Binfield North Hay Meadow	G119N	40.773297	-98.5184825	4513702	540635.6	n
Binfield North Hay Meadow	G119S	40.773028	-98.5184758	4513672	540636.3	s
Binfield North Hay Meadow	G120N	40.773105	-98.5138955	4513683	541022.8	s
Binfield North Hay Meadow	G120S	40.772843	-98.5139646	4513654	541017.1	s
Binfield North Meadow	G110N	40.780277	-98.5123715	4514480	541147	n
Binfield North Meadow	G110S	40.780007	-98.5123708	4514450	541147.2	s
Binfield North Meadow	G111N	40.779977	-98.5189123	4514443	540595.3	n
Binfield North Meadow	G111S	40.779709	-98.5189066	4514414	540595.9	s
Binfield North Meadow	G112E	40.77951	-98.5255972	4514388	540031.5	e
Binfield North Meadow	G112W	40.779509	-98.5259521	4514388	540001.5	w
Binfield North Meadow	G113N	40.779674	-98.5141228	4514412	540999.6	n
Binfield North Meadow	G113S	40.779405	-98.5141032	4514382	541001.4	s
Binfield North Meadow	G114N	40.778749	-98.5121946	4514310	541162.9	n
Binfield North Meadow	G114S	40.778486	-98.512193	4514281	541163.2	s
Binfield North Meadow	G115N	40.778069	-98.5283715	4514227	539798.2	n
Binfield North Meadow	G115S	40.7778	-98.5283708	4514197	539798.4	s
Binfield North Meadow	G116N	40.77712	-98.522855	4514124	540264.3	n
Binfield North Meadow	G116S	40.776851	-98.5228523	4514095	540264.7	s
Binfield North Meadow	G117N	40.776634	-98.520894	4514071	540430.1	n
Binfield North Meadow	G117S	40.776364	-98.5208834	4514041	540431.1	s
Binfield South Hay Meadow	G121N	40.771665	-98.5124856	4513524	541142.7	n
Binfield South Hay Meadow	G121S	40.771395	-98.5124755	4513494	541143.7	s
Binfield South Hay Meadow	G122N	40.771159	-98.5136904	4513467	541041.3	n
Binfield South Hay Meadow	G122S	40.770889	-98.5136769	4513437	541042.6	s
Binfield South Hay Meadow	G123N	40.769818	-98.5159429	4513317	540852	n
Binfield South Hay Meadow	G123S	40.769548	-98.5159492	4513287	540851.7	s
Binfield South Meadow	G124N	40.767435	-98.5128739	4513054	541112.5	N
Binfield South Meadow	G124S	40.767166	-98.5128874	4513024	541111.5	s
Binfield South Meadow	G125N	40.764925	-98.517416	4512773	540730.7	N
Binfield South Meadow	G125S	40.764656	-98.5174244	4512743	540730.2	s
Binfield South Meadow	G126N	40.763258	-98.5209989	4512587	540429.3	N

Binfield South Meadow	G126S	40.762988	-98.5209851	4512557	540430.6	s
Binfield South Meadow	G134S	40.767905	-98.5329249	4513097	539420	s
Binfield West Hay Meadow	G146N	40.756645	-98.552117	4511839	537806.6	n
Binfield West Hay Meadow	G146S	40.756376	-98.5521241	4511809	537806.2	s
Binfield West Hay Meadow	G147N	40.756505	-98.5432484	4511827	538555.3	n
Binfield West Hay Meadow	G147S	40.756235	-98.5432283	4511797	538557.2	s
Binfield West Hay Meadow	G148N	40.755959	-98.5470381	4511765	538235.7	n
Binfield West Hay Meadow	G148S	40.755689	-98.5470285	4511735	538236.7	s
Binfield West Hay Meadow	G149N	40.754736	-98.5492443	4511628	538050.2	n
Binfield West Hay Meadow	G149S	40.754467	-98.5492498	4511598	538049.9	s
Binfield West Hay Meadow	G150N	40.754708	-98.5433907	4511627	538544.3	n
Binfield West Hay Meadow	G150S	40.754437	-98.5433864	4511597	538544.9	n
Binfield West Meadow	G133N	40.769453	-98.5283126	4513271	539808.3	n
Binfield West Meadow	G133S	40.769183	-98.5283139	4513241	539808.4	s
Binfield West Meadow	G134N	40.768175	-98.5329378	4513127	539418.7	n
Binfield West Meadow	G135N	40.767163	-98.5350617	4513014	539240.1	n
Binfield West Meadow	G136N	40.765406	-98.5308649	4512821	539595.3	n
Binfield West Meadow	G136S	40.765137	-98.5308734	4512791	539594.8	s
Binfield West Meadow	G137N	40.765303	-98.5351095	4512807	539237.2	n
Binfield West Meadow	G137S	40.765033	-98.5351057	4512777	539237.6	s
Binfield West Meadow	G138N	40.763809	-98.5378423	4512640	539007.4	n
Binfield West Meadow	G138S	40.763538	-98.5378459	4512610	539007.2	s
Binfield West Meadow	G139N	40.763702	-98.5296096	4512632	539702.3	n
Binfield West Meadow	G139S	40.763433	-98.5296228	4512602	539701.3	s
Binfield West Meadow	G140N	40.762039	-98.533293	4512446	539392.4	n
Binfield West Meadow	G140S	40.76177	-98.5332981	4512416	539392.1	s
Binfield West Meadow	G141N	40.761872	-98.5366433	4512426	539109.7	n
Binfield West Meadow	G141S	40.761602	-98.5366545	4512396	539108.9	s
Binfield West Meadow	G142N	40.761041	-98.5273172	4512338	539897.4	n
Binfield West Meadow	G142S	40.760771	-98.5273281	4512308	539896.6	s
Binfield West Meadow	G143N	40.760057	-98.5379688	4512224	538998.9	n
Binfield West Meadow	G143S	40.759788	-98.5379759	4512194	538998.4	s
Binfield West Meadow	G144N	40.759281	-98.5343848	4512139	539301.9	n
Binfield West Meadow	G144S	40.759011	-98.5344035	4512109	539300.4	s
Binfield West Meadow	G145N	40.756972	-98.5377719	4511881	539017.3	n
Binfield West Meadow	G145S	40.756703	-98.5377861	4511851	539016.3	s
Blessing	G181N	40.664495	-99.044955	4501514	496200.8	n
Blessing	G181S	40.664226	-99.044956	4501484	496200.7	s
Blessing	G182N	40.665486	-99.048504	4501624	495900.9	n
Blessing	G182S	40.665215	-99.048506	4501594	495900.7	s
Blessing	G183N	40.666434	-99.050993	4501730	495690.6	n
Blessing	G183S	40.66616	-99.050991	4501699	495690.7	s
Cook Hay Meadow	G1E	40.676722	-99.5681442	4503026	451986.1	e
Cook Hay Meadow	G1W	40.676732	-99.5684943	4503027	451956.5	w
Cook Hay Meadow	G2N	40.676123	-99.5706905	4502960	451770.5	n
Cook Hay Meadow	G2S	40.675853	-99.5706941	4502931	451770	s
Cook Hay Meadow	G3E	40.675702	-99.5783088	4502918	451126.3	e
Cook Hay Meadow	G3W	40.675693	-99.5786743	4502917	451095.5	w
CWR East	G25N	40.67425	-99.456435	4502696	461425.4	n
CWR East	G25S	40.67398	-99.4564431	4502666	461424.6	s

CWR East	G26N	40.67316	-99.4598805	4502577	461133.6	n
CWR East	G26S	40.67289	-99.459891	4502547	461132.6	s
CWR East	G27N	40.671324	-99.4630002	4502374	460868.9	n
CWR East	G27S	40.671056	-99.4629959	4502344	460869.1	s
CWR East Lloyd Island	G16N	40.689478	-99.4545935	4504386	461589.8	n
CWR East Lloyd Island	G16S	40.689208	-99.4545772	4504356	461591	s
CWR East Lloyd Island	G17N	40.688663	-99.437738	4504288	463013.6	n
CWR East Lloyd Island	G17S	40.688394	-99.4377651	4504258	463011.1	s
CWR East Lloyd Island	G18N	40.688619	-99.4404746	4504284	462782.3	n
CWR East Lloyd Island	G18S	40.68835	-99.4404839	4504254	462781.4	s
CWR East Lloyd Island	G19N	40.688245	-99.4548132	4504249	461570.5	n
CWR East Lloyd Island	G19S	40.687978	-99.4547854	4504219	461572.7	s
CWR East Lloyd Island	G20N	40.687691	-99.4470796	4504184	462223.7	n
CWR East Lloyd Island	G20S	40.687421	-99.4470813	4504154	462223.4	s
CWR East Lloyd Island	G21N	40.687561	-99.4493844	4504171	462028.9	n
CWR East Lloyd Island	G21S	40.687292	-99.4493511	4504141	462031.5	s
CWR East Lloyd Island	G22N	40.687414	-99.4607196	4504159	461071	n
CWR East Lloyd Island	G22S	40.687144	-99.4606973	4504129	461072.7	s
CWR East Lloyd Island	G23N	40.687058	-99.4545593	4504117	461591.3	n
CWR East Lloyd Island	G23S	40.686787	-99.4545546	4504087	461591.5	s
CWR East Lloyd Island	G24N	40.686404	-99.4548149	4504045	461569.3	n
CWR East Lloyd Island	G24S	40.686134	-99.4547976	4504015	461570.6	s
CWR North 1	G10E	40.692475	-99.4752825	4504728	459843.5	e
CWR North 1	G10W	40.692467	-99.4756372	4504727	459813.5	w
CWR North 1	G11E	40.692479	-99.4827381	4504732	459213.5	e
CWR North 1	G11W	40.692459	-99.4830925	4504729	459183.6	w
CWR North 1	G12E	40.692468	-99.4767472	4504727	459719.7	e
CWR North 1	G12W	40.692471	-99.4771021	4504728	459689.7	w
CWR North 2	G13N	40.690079	-99.4792047	4504463	459510.6	n
CWR North 2	G13S	40.689808	-99.4792046	4504433	459510.5	s
CWR North 2	G14N	40.689942	-99.4898906	4504453	458607.6	n
CWR North 2	G14S	40.689671	-99.489904	4504423	458606.3	s
CWR North 2	G15N	40.689931	-99.4747405	4504445	459887.7	n
CWR North 3	G151N	40.684954	-99.4920062	4503900	458425.8	n
CWR North 3	G151S	40.684678	-99.4920028	4503870	458425.9	s
CWR North 3	G152N	40.685826	-99.4896096	4503996	458628.8	n
CWR North 3	G152S	40.685551	-99.4896072	4503966	458628.9	s
CWR North 3	G153N	40.68626	-99.4830742	4504041	459181.3	n
CWR North 3	G153S	40.685985	-99.4830716	4504011	459181.4	s
CWR North 3	G15S	40.689662	-99.4747165	4504415	459889.6	s
CWR NW	G59N	40.670533	-99.4912072	4502299	458484.4	n
CWR NW	G59S	40.670263	-99.4912053	4502269	458484.4	s
CWR NW	G60N	40.669401	-99.4906945	4502173	458527	n
CWR NW	G60S	40.669132	-99.4906809	4502144	458528	s
CWR NW	G61N	40.668061	-99.4868147	4502023	458854.1	n
CWR NW	G61S	40.667791	-99.4868292	4501993	458852.7	s
CWR NW	G62N	40.665581	-99.4888444	4501749	458681	n
CWR NW	G62S	40.665311	-99.4888442	4501719	458680.9	s
CWR NW	G63N	40.664959	-99.4915354	4501681	458453.2	n
CWR NW	G63S	40.664689	-99.4915228	4501651	458454.1	s

CWR SW	G54N	40.662696	-99.4909624	4501429	458500.2	n
CWR SW	G54S	40.662426	-99.4909459	4501399	458501.4	s
CWR SW	G55N	40.660915	-99.4849633	4501229	459006.2	n
CWR SW	G55S	40.660645	-99.48496	4501199	459006.3	s
CWR SW	G56N	40.660853	-99.4920893	4501225	458403.8	n
CWR SW	G56S	40.660583	-99.4920774	4501195	458404.6	s
CWR SW	G57N	40.658107	-99.4909594	4500920	458497.6	n
CWR SW	G57S	40.657851	-99.491073	4500892	458487.8	s
CWR SW	G58N	40.657357	-99.4865609	4500835	458869	n
CWR SW	G58S	40.657087	-99.4865726	4500805	458867.8	s
Dyer Grassland	G4N	40.681018	-99.5539384	4503495	453189.7	n
Dyer Grassland	G4S	40.680745	-99.5539339	4503464	453189.9	s
Dyer Grassland	G5N	40.679532	-99.5524859	4503329	453311.4	n
Dyer Grassland	G5S	40.679263	-99.5524827	4503299	453311.5	s
Dyer Grassland	G6N	40.679341	-99.5498718	4503306	453532.2	n
Dyer Grassland	G6S	40.679076	-99.5498085	4503277	453537.3	s
Dyer Grassland	G7N	40.677765	-99.5595477	4503137	452713.4	n
Dyer Grassland	G7S	40.677492	-99.5595812	4503106	452710.3	s
Dyer Grassland	G8N	40.67721	-99.5638815	4503077	452346.7	n
Dyer Grassland	G8S	40.676941	-99.5638458	4503048	452349.6	s
Dyer Grassland	G9N	40.676515	-99.5642396	4503000	452316	n
Dyer Grassland	G9S	40.676246	-99.5642311	4502971	452316.5	s
Fox	FOX5E	40.667797	-98.982233	4501880	501502.4	e
Fox	FOX5W	40.667864	-98.982584	4501887	501472.8	w
Fox	FOX6N	40.671353	-98.982036	4502275	501519	n
Fox	FOX6S	40.67111	-98.982044	4502248	501518.3	s
Fox	G174N	40.67293	-98.981074	4502450	501600.3	n
Fox	G174S	40.672656	-98.981069	4502419	501600.7	s
Fox	G175N	40.673195	-98.985923	4502479	501190.5	n
Fox	G175S	40.672927	-98.98592	4502449	501190.7	s
Fox	G176N	40.671393	-98.98728	4502279	501075.8	n
Fox	G176S	40.671126	-98.987281	4502249	501075.7	s
Fox	G177E	40.670492	-98.987812	4502179	501030.8	e
Fox	G177W	40.670495	-98.988168	4502179	501000.8	w
Fox	G178N	40.66644	-98.986985	4501729	501100.8	n
Fox	G178S	40.666171	-98.986986	4501699	501100.7	s
Hostetler Crop	G102N	40.668309	-98.961361	4501937	503266.6	n
Hostetler Crop	G102S	40.668042	-98.9613326	4501908	503269	s
Hostetler Crop	G103N	40.667921	-98.9660062	4501894	502874	n
Hostetler Crop	G103S	40.667651	-98.9660034	4501864	502874.2	s
Hostetler Crop	G104N	40.667421	-98.9715862	4501838	502402.3	n
Hostetler Crop	G104S	40.667152	-98.9715715	4501809	502403.6	s
Hostetler Crop	G105N	40.666156	-98.9662305	4501698	502855.1	n
Hostetler Crop	G105S	40.665885	-98.9662274	4501668	502855.4	s
Hostetler Crop	G106N	40.665648	-98.9792739	4501641	501752.6	n
Hostetler Crop	G106S	40.665378	-98.9792831	4501611	501751.8	s
Hostetler Crop	G107N	40.665503	-98.9617226	4501626	503236.1	n
Hostetler Crop	G107S	40.665234	-98.961727	4501596	503235.8	s
Hostetler Crop	G108N	40.665151	-98.9714864	4501586	502410.9	n
Hostetler Crop	G108S	40.66488	-98.9714838	4501556	502411.1	s

Hostetler Crop	G109N	40.664763	-98.9794654	4501543	501736.4	n
Hostetler Crop	G109S	40.664493	-98.9794417	4501513	501738.5	s
Johns North Wet Meadow	G69N	40.682611	-99.3378664	4503579	471449.8	n
Johns North Wet Meadow	G69S	40.682341	-99.3378699	4503549	471449.4	s
Johns North Wet Meadow	G70N	40.682508	-99.3349014	4503567	471700.3	n
Johns North Wet Meadow	G70S	40.682239	-99.3348748	4503537	471702.4	s
Johns North Wet Meadow	G71E	40.681378	-99.3317644	4503440	471964.9	e
Johns North Wet Meadow	G71W	40.68137	-99.3321183	4503439	471935	w
Johns North Wet Meadow	G72N	40.680947	-99.3339277	4503393	471781.9	n
Johns North Wet Meadow	G72S	40.680678	-99.3339157	4503363	471782.8	s
Johns North Wet Meadow	G73N	40.680384	-99.3386388	4503332	471383.5	n
Johns North Wet Meadow	G73S	40.680113	-99.3386328	4503302	471383.9	s
Johns North Wet Meadow	G74N	40.679867	-99.3313122	4503272	472002.5	n
Johns North Wet Meadow	G74S	40.679597	-99.3312892	4503242	472004.3	s
Johns North Wet Meadow	G75N	40.678292	-99.3235992	4503095	472653.6	n
Johns North Wet Meadow	G75S	40.678024	-99.3236131	4503065	472652.3	s
Johns North Wet Meadow	G76N	40.677856	-99.3395892	4503052	471302.1	n
Johns North Wet Meadow	G76S	40.677586	-99.3395823	4503022	471302.6	s
Johns North Wet Meadow	G77N	40.677665	-99.3311949	4503028	472011.5	n
Johns North Wet Meadow	G77S	40.677399	-99.3311875	4502998	472012	s
Johns North Wet Meadow	G78N	40.677304	-99.3364037	4502989	471571.1	n
Johns North Wet Meadow	G78S	40.677034	-99.3364098	4502959	471570.5	s
Johns North Wet Meadow	G79N	40.677133	-99.3388797	4502971	471361.8	n
Johns North Wet Meadow	G79S	40.676863	-99.3388776	4502941	471361.9	s
Johns North Wet Meadow	G80E	40.676025	-99.3255233	4502844	472490.1	e
Johns North Wet Meadow	G80W	40.676038	-99.325877	4502845	472460.2	w
Johns North Wet Meadow	G81E	40.673271	-99.3257247	4502538	472471.9	e
Johns North Wet Meadow	G81W	40.673274	-99.326078	4502539	472442.1	w
Johns South Wet Meadow	G82N	40.672827	-99.3278896	4502490	472288.8	n
Johns South Wet Meadow	G82S	40.672549	-99.3278981	4502459	472288	s
Johns South Wet Meadow	G83N	40.672463	-99.3383649	4502453	471403.3	n
Johns South Wet Meadow	G83S	40.672193	-99.3383814	4502423	471401.8	s
Johns South Wet Meadow	G84N	40.672037	-99.3238629	4502401	472628.8	n
Johns South Wet Meadow	G84S	40.67177	-99.3238896	4502371	472626.4	s
Johns South Wet Meadow	G85N	40.671912	-99.3360414	4502391	471599.4	n
Johns South Wet Meadow	G85S	40.671641	-99.3360436	4502361	471599.1	s
Johns South Wet Meadow	G86N	40.671038	-99.3412756	4502295	471156.7	n
Johns South Wet Meadow	G86S	40.670777	-99.3413712	4502267	471148.5	s
Johns South Wet Meadow	G87N	40.669101	-99.3385887	4502079	471382.9	n
Johns South Wet Meadow	G87S	40.668831	-99.338605	4502050	471381.5	s
McCormick North Island	G91N	40.679512	-99.3201228	4503229	472947.9	n
McCormick North Island	G91S	40.679241	-99.3201153	4503199	472948.4	s
McCormick North Island	G92N	40.678296	-99.3135642	4503092	473501.7	n
McCormick North Island	G92S	40.678026	-99.3135651	4503062	473501.5	s
McCormick North Island	G93N	40.678025	-99.3150099	4503063	473379.4	n
McCormick North Island	G93S	40.677755	-99.3150093	4503033	473379.3	s
McCormick South Island	G94N	40.672709	-99.31968	4502474	472982.6	n
McCormick South Island	G94S	40.67244	-99.3196812	4502444	472982.4	s
McCormick South Island	G95E	40.674526	-99.3131409	4502674	473536	e
McCormick South Island	G95W	40.674535	-99.3135025	4502675	473505.4	w

McCormick South Island	G96N	40.673368	-99.3173339	4502547	473181.1	n
McCormick South Island	G96S	40.673093	-99.3173505	4502516	473179.6	s
McCormick South Island	G97N	40.672769	-99.3141052	4502479	473453.8	n
McCormick South Island	G97S	40.6725	-99.314105	4502449	473453.7	s
Morse Crop	G44N	40.660512	-99.4725179	4501178	460058	n
Morse Crop	G44S	40.660244	-99.4724957	4501149	460059.7	s
Morse Crop	G45N	40.659314	-99.4708748	4501045	460196.2	n
Morse Crop	G45S	40.659045	-99.4708636	4501015	460197	s
Morse Crop	G46N	40.658286	-99.4702526	4500930	460248.2	n
Morse Crop	G46S	40.658017	-99.4702497	4500900	460248.2	s
Morse Crop	G47N	40.657571	-99.472029	4500852	460097.6	n
Morse Crop	G47S	40.6573	-99.4720525	4500822	460095.4	s
Morse Hay North	G34N	40.670135	-99.4739373	4502247	459943.8	n
Morse Hay North	G34S	40.66986	-99.4739115	4502217	459945.8	s
Morse Hay North	G35N	40.670112	-99.4723845	4502244	460075	n
Morse Hay North	G35S	40.669836	-99.4723618	4502213	460076.7	s
Morse Hay North	G36N	40.670034	-99.4709683	4502235	460194.6	n
Morse Hay North	G36S	40.669762	-99.4709568	4502204	460195.5	s
Morse Hay South	G42E	40.663374	-99.4708997	4501495	460196.5	e
Morse Hay South	G42W	40.663394	-99.4712594	4501498	460166.1	w
Morse Hay South	G43N	40.66207	-99.4705035	4501350	460229.2	n
Morse Hay South	G43S	40.6618	-99.4704987	4501320	460229.4	s
Morse Middle	G37N	40.669595	-99.4665589	4502184	460567.1	n
Morse Middle	G37S	40.669327	-99.4665434	4502154	460568.2	s
Morse Middle	G38N	40.669171	-99.4722746	4502139	460083.7	n
Morse Middle	G38S	40.668904	-99.4722568	4502110	460085.1	s
Morse Middle	G39N	40.667254	-99.465584	4501924	460648.1	n
Morse Middle	G39S	40.666984	-99.4655883	4501894	460647.6	s
Morse Middle	G40N	40.66596	-99.4724355	4501783	460068.2	n
Morse Middle	G40S	40.665693	-99.4724424	4501753	460067.5	s
Morse Middle	G41E	40.663824	-99.4720614	4501546	460098.6	e
Morse Middle	G41W	40.663808	-99.4724124	4501544	460068.9	w
Morse Middle	G64N	40.66883	-99.4750573	4502103	459848.3	n
Morse Middle	G64S	40.668561	-99.4750287	4502073	459850.6	s
Morse Middle	G65N	40.668713	-99.4769459	4502091	459688.6	n
Morse Middle	G65S	40.66845	-99.4768704	4502061	459694.8	s
Morse Middle	G66N	40.666619	-99.475351	4501858	459822.2	n
Morse Middle	G66S	40.66635	-99.4753413	4501828	459822.8	s
Morse Middle	G67N	40.666013	-99.4773668	4501791	459651.4	n
Morse Middle	G67S	40.665743	-99.4773692	4501761	459651.1	s
Morse Middle	G68N	40.664913	-99.4809208	4501671	459350.3	n
Morse Middle	G68S	40.664644	-99.4809195	4501641	459350.3	s
Morse North	G28N	40.673978	-99.4666822	4502670	460559.2	n
Morse North	G28S	40.673705	-99.4666905	4502640	460558.4	s
Morse North	G29N	40.673575	-99.4798232	4502632	459448.4	s
Morse North	G29N	40.673844	-99.4798171	4502662	459449.1	n
Morse North	G30N	40.672245	-99.4730419	4502481	460020.7	n
Morse North	G30S	40.67197	-99.4730479	4502450	460020	s
Morse North	G31N	40.671943	-99.4689516	4502446	460366.2	n
Morse North	G31S	40.671668	-99.4689645	4502415	460365	s

Morse North	G32N	40.672	-99.4834819	4502459	459138.2	n
Morse North	G32S	40.67173	-99.4834778	4502429	459138.4	s
Morse North	G33N	40.67152	-99.4754946	4502402	459813	n
Morse North	G33S	40.671251	-99.4754985	4502372	459812.5	s
Morse SW	G48N	40.66277	-99.4803467	4501433	459397.6	n
Morse SW	G48S	40.662503	-99.480291	4501403	459402.1	s
Morse SW	G49N	40.661269	-99.480101	4501266	459417.4	n
Morse SW	G49S	40.661	-99.4800761	4501236	459419.4	s
Morse SW	G50N	40.661064	-99.4757434	4501241	459785.7	n
Morse SW	G50S	40.660793	-99.4757509	4501211	459784.9	s
Morse SW	G51N	40.659332	-99.4753888	4501049	459814.6	n
Morse SW	G51S	40.659062	-99.4753883	4501019	459814.5	s
Morse SW	G52N	40.657397	-99.4814425	4500837	459301.7	n
Morse SW	G52S	40.657127	-99.4814602	4500807	459300	s
Morse SW	G53N	40.657301	-99.4753763	4500823	459814.4	n
Morse SW	G53S	40.65703	-99.4753796	4500793	459814	s
NGPC	G154E	40.685386	-99.3265901	4503883	472403.8	e
NGPC	G154W	40.685386	-99.3269505	4503883	472373.3	w
NGPC	G155N	40.685442	-99.3247265	4503889	472561.3	n
NGPC	G155S	40.685166	-99.3247242	4503858	472561.4	s
NGPC	G156N	40.68513	-99.3233293	4503854	472679.2	n
NGPC	G156S	40.684856	-99.3233274	4503823	472679.3	s
Speidelll North	G164N	40.665428	-99.0041538	4501617	499649.6	n
Speidelll North	G164S	40.665154	-99.0041534	4501586	499649.7	s
Speidelll North	G165N	40.664657	-99.0028757	4501531	499757.7	n
Speidelll North	G165S	40.664382	-99.0028748	4501501	499757.7	s
Speidelll North	G166E	40.666655	-99.004169	4501753	499648.4	e
Speidelll North	G166W	40.666618	-99.004493	4501749	499621	w
Speidelll North	G167N	40.668707	-99.0021983	4501981	499814.9	n
Speidelll North	G167S	40.668432	-99.0021992	4501950	499814.8	s
Speidelll North	G168N	40.664977	-98.9953437	4501567	500394.3	n
Speidelll North	G168S	40.664702	-98.995344	4501536	500394.3	s
Speidelll North	G169E	40.666194	-98.994223	4501702	500489	e
Speidelll North	G169W	40.666197	-98.994573	4501702	500459.4	w
Speidelll North	G170N	40.668321	-98.99586	4501938	500350.7	s
Speidelll North	G170S	40.668049	-98.99585	4501908	500351.5	n
Speidelll North	G171N	40.671243	-98.9921437	4502262	500664.7	n
Speidelll North	G171S	40.670968	-98.9921433	4502232	500664.8	s
Speidelll North	G172N	40.672113	-98.9913843	4502359	500728.9	n
Speidelll North	G172S	40.671838	-98.9913833	4502328	500729	s
Speidelll North	G173N	40.665013	-98.9901045	4501571	500837.2	n
Speidelll North	G173S	40.66474	-98.9901055	4501540	500837.1	s
Speidelll South	G157N	40.662044	-99.0130183	4501241	498900.3	n
Speidelll South	G157S	40.661768	-99.0130167	4501211	498900.4	s
Speidelll South	G158N	40.664627	-99.0101251	4501528	499144.9	n
Speidelll South	G158S	40.664352	-99.0101248	4501497	499144.9	s
Speidelll South	G159N	40.662987	-99.0073002	4501346	499383.7	n
Speidelll South	G159S	40.662713	-99.0072994	4501315	499383.7	s
Speidelll South	G160N	40.66214	-99.0033171	4501252	499720.3	n
Speidelll South	G160S	40.661866	-99.0033185	4501221	499720.2	s

Speidelll South	G161N	40.662314	-98.9963409	4501271	500310	n
Speidelll South	G161S	40.662039	-98.996341	4501241	500310	s
Speidelll South	G162N	40.6633	-98.9906429	4501380	500791.7	n
Speidelll South	G162S	40.663026	-98.9906432	4501350	500791.6	s
Speidelll South	G163N	40.663457	-98.9889148	4501398	500937.7	n
Speidelll South	G163S	40.663182	-98.9889149	4501368	500937.7	s
Sullwald Hay Meadow	G88N	40.685239	-99.3219395	4503866	472796.7	n
Sullwald Hay Meadow	G88S	40.684971	-99.3219565	4503836	472795.2	s
Sullwald Hay Meadow	G89N	40.684984	-99.3208586	4503837	472887.9	n
Sullwald Hay Meadow	G89S	40.684713	-99.3208556	4503807	472888.1	s
Sullwald Hay Meadow	G90N	40.683996	-99.3166506	4503726	473243.1	n
Sullwald Hay Meadow	G90S	40.683729	-99.3166639	4503696	473241.9	s
Wyoming South Meadow	G100N	40.650389	-99.0389055	4499948	496711.5	n
Wyoming South Meadow	G100S	40.650118	-99.0389187	4499918	496710.4	s
Wyoming South Meadow	G101N	40.649841	-99.0420702	4499887	496443.9	n
Wyoming South Meadow	G101S	40.649571	-99.0420772	4499857	496443.3	s
Wyoming South Meadow	G98E	40.653419	-99.0388314	4500284	496717.9	e
Wyoming South Meadow	G98W	40.653438	-99.0391843	4500287	496688.1	w
Wyoming South Meadow	G99N	40.65139	-99.0431056	4500059	496356.4	n
Wyoming South Meadow	G99S	40.651119	-99.0431067	4500029	496356.3	s

APPENDIX C: LIST OF VASCULAR PLANTS

P-SYMBOL	SPECIES	COMMON NAME	FAMILY	PHYSIO	WETNESS	C
ABTH	ABUTILON THEOPHRASTI	velvet-leaf	MALVACEAE	A-HERB	UPL/FACU	
ACMIO	Achillea millefolium	western yarrow	ASTERACEAE	P-HERB	FACU	2
[ACAM4]	Acmispon americanus	prairie trefoil	FABACEAE	A-HERB	FACU	3
AGTEP2	Agalinis tenuifolia	narrow-leaf false foxglove	OROBANCHACEAE	A-HERB	FAC/FACW	5
AGGI2	AGROSTIS GIGANTEA	redtop	POACEAE	P-HERB	FACW	
AGSTP	AGROSTIS STOLONIFERA	creeping bentgrass	POACEAE	P-HERB	FACW	
ALCAC	Allium canadense	meadow garlic	AMARYLLIDACEAE	P-HERB	FACU	3
AMRE	Amaranthus retroflexus	redroot pigweed	AMARANTHACEAE	A-HERB	FACU	0
AMAR2	Ambrosia artemisiifolia	common ragweed	ASTERACEAE	A-HERB	FACU	0
AMPS	Ambrosia psilostachya	western ragweed	ASTERACEAE	P-HERB	FACU	1
AMTR	Ambrosia trifida	giant ragweed	ASTERACEAE	A-HERB	/FAC	0
AMRO3	Ammannia robusta	stout toothcup	LYTHRACEAE	A-HERB	OBL	4
AMFR	Amorpha fruticosa	false indigo-bush	FABACEAE	SHRUB	FACW	5
ANGE	Andropogon gerardii	big bluestem	POACEAE	P-HERB	FACU/FAC	5
ANNE	Antennaria neglecta	field pussytoes	ASTERACEAE	P-HERB	FACU/UPL	3
APCA	Apocynum cannabinum	hemp dogbane	APOCYNACEAE	P-HERB	FAC	2
AROL	Aristida oligantha	old field three-awn	POACEAE	A-HERB		2
ARPUP4	Aristida purpurascens	arrowfeather three-awn	POACEAE	P-HERB	UPL/FACU	7
ARPL4	Arnoglossum plantagineum	tuberous Indian-plantain	ASTERACEAE	P-HERB	FAC	7
[ARLUL2]	Artemisia ludoviciana	white sage	ASTERACEAE	P-HERB	UPL	4
[ASINI]	Asclepias incarnata	swamp milkweed	APOCYNACEAE	P-HERB	FACW/OBL	4
Asclepias sp.	Asclepias sp.					
ASSP	Asclepias speciosa	showy milkweed	APOCYNACEAE	P-HERB	FAC	1
ASSY	Asclepias syriaca	common milkweed	APOCYNACEAE	P-HERB	UPL/FACU	1
ASVE	Asclepias verticillata	whorled milkweed	APOCYNACEAE	P-HERB	FACU	3
ASVI	Asclepias viridiflora	green milkweed	APOCYNACEAE	P-HERB		6
ASOF	ASPARAGUS OFFICINALIS	garden asparagus	ASPARAGACEAE	P-HERB	FACU	
ATPA4	ATRIPLEX PATULA	common spearscale	CHENOPODIACEAE	A-HERB	FACW/FAC	
ATPR	ATRIPLEX PROSTATA	thin-leaf spearscale	CHENOPODIACEAE	A-HERB	FACW	
BOFL3	Bolboschoenus fluviatilis	river bulrush	CYPERACEAE	P-HERB	OBL	3
BOMAP2	Bolboschoenus maritimus	salt-marsh bulrush	CYPERACEAE	P-HERB	OBL	5
BOCUC2	Bouteloua curtipendula	sideoats grama	POACEAE	P-HERB		5
BODA2	Bouteloua dactyloides	buffalo grass	POACEAE	P-HERB	FACU	2
BOGR2	Bouteloua gracilis	blue grama	POACEAE	P-HERB		4
BOHIH	Bouteloua hirsuta	hairy grama	POACEAE	P-HERB		6
BREUC	Brickellia eupatorioides	false-boneset	ASTERACEAE	P-HERB		4

P-SYMBOL	SPECIES	COMMON NAME	FAMILY	PHYSIO	WETNESS	C
BRIN2	BROMUS INERMIS	smooth brome	POACEAE	P-HERB	UPL/FACU	
BRJA	BROMUS JAPONICUS	Japenese brome	POACEAE	A-HERB		
BRTE	BROMUS TECTORUM	downy brome	POACEAE	A-HERB		
CAST36	Calamagrostis stricta	northern reedgrass	POACEAE	P-HERB	FACW	6
CALOL2	Calamovilfa longifolia	prairie sandreed	POACEAE	P-HERB		5
CAAL	Callirhoe alcaeoides	pale poppy-mallow	MALVACEAE	A-HERB		5
CAINI4	Callirhoe involucrata	purple poppy-mallow	MALVACEAE	P-HERB		2
CASA3	CANNABIS SATIVA	hemp	CANNABACEAE	A-HERB	FACU	
CANU4	CARDUUS NUTANS	musk thistle	ASTERACEAE	B-HERB	FACU	
CABL	Carex blanda	woodland sedge	CYPERACEAE	P-HERB	FAC	2
CABR28	Carex brachyglossa	yellow-fruit sedge	CYPERACEAE	P-HERB	FACW	7
CABR10	Carex brevior	short-beak sedge	CYPERACEAE	P-HERB	FAC	4
CACR3	Carex crawei	Crawe's sedge	CYPERACEAE	P-HERB	FACW	6
CAEM2	Carex emoryi	Emory's sedge	CYPERACEAE	P-HERB	OBL	5
CAGR4	Carex gravida	heavy-fruit sedge	CYPERACEAE	P-HERB	FACW/FACU	4
CAGR24	Carex grisea	gray wood sedge	CYPERACEAE	P-HERB	FACW/FAC	3
CAHA3	Carex hallii	deer sedge	CYPERACEAE	P-HERB	FAC/FACW	7
CAHE5	Carex heliophila	sun sedge	CYPERACEAE	P-HERB		5
CAME2	Carex meadii	Mead's sedge	CYPERACEAE	P-HERB	FAC	6
CAPE42	Carex pellita	woolly sedge	CYPERACEAE	P-HERB	OBL	4
CAPR5	Carex praegracilis	clustered field sedge	CYPERACEAE	P-HERB	FACW	4
CASCS	Carex scoparia	broom sedge	CYPERACEAE	P-HERB	FACW	5
CAREX SP.	Carex spp.					4
CAVU2	Carex vulpinoidea	fox sedge	CYPERACEAE	P-HERB	FACW	4
CEOC	Celtis occidentalis	hackberry	CANNABACEAE	TREE	FACU/FAC	4
CELO3	Cenchrus longispinus	field sandbur	POACEAE	A-HERB	UPL	0
CHAL7	CHENOPODIUM ALBUM	lamb's-quarters	CHENOPODIACEAE	A-HERB	FACU	
CHBEZ	Chenopodium berlandieri	pitseed goosefoot	CHENOPODIACEAE	A-HERB		0
CHGL3	CHENOPODIUM GLAUCUM	oak-leaf goosefoot	CHENOPODIACEAE	A-HERB	FAC/FACW	
CHPR5	Chenopodium pratericola	desert goosefoot	CHENOPODIACEAE	A-HERB		1
CHSU2	Chenopodium subglabrum	smooth goosefoot	CHENOPODIACEAE	A-HERB		6
CHVE2	Chloris verticillata	tumble windmill grass	POACEAE	P-HERB		0
CIAL2	Cirsium altissimum	tall thistle	ASTERACEAE	P-HERB		1
CIAR4	CIRSIUM ARVENSE	Canada thistle	ASTERACEAE	P-HERB	FACU	
CICA11	Cirsium canescens	Platte thistle	ASTERACEAE	B-HERB		4
CIFL	Cirsium flodmanii	Flodman's thistle	ASTERACEAE	P-HERB	FAC	4
CIUN	Cirsium undulatum	wavy-leaf thistle	ASTERACEAE	P-HERB	UPL/FACU	4
CIVU	CIRSIUM VULGARE	bull thistle	ASTERACEAE	B-HERB	FACU	
COMA2	CONIUM MACULATUM	poison-hemlock	APIACEAE	B-HERB	FACW	

P-SYMBOL	SPECIES	COMMON NAME	FAMILY	PHYSIO	WETNESS	C
COAR4	CONVOLVULUS ARVENSIS	field bindweed	CONVOLVULACEAE	P-HERB		
COCA5	Conyza canadensis	horseweed	ASTERACEAE	A-HERB	FACU	0
COTI3	Coreopsis tinctoria	plains coreopsis	ASTERACEAE	A-HERB	FAC/FACU	1
CODR	Cornus drummondii	rough-leaf dogwood	CORNACEAE	SHRUB	FAC	3
COVI9	Coryphantha vivipara	purple pincushion cactus	CACTACEAE	P-HERB		6
CRTET	Croton texensis	Texas croton	EUPHORBIACEAE	A-HERB		1
CYXA	Cyclachaena xanthiifolia	giant marsh-elder	ASTERACEAE	A-HERB	FAC	0
CYAT	Cycloloma atriplicifolium	winged-pigweed	CHENOPODIACEAE	A-HERB	FACU	2
CYAC2	Cyperus acuminatus	short-point flatsedge	CYPERACEAE	A-HERB	OBL	3
CYESL	Cyperus esculentus	yellow nut-sedge	CYPERACEAE	P-HERB	FACW	0
CYFU3	CYPERUS FUSCUS	brown flatsedge	CYPERACEAE	A-HERB	FACW/FAC	
CYLUL	Cyperus lupulinus	Great Plains flatsedge	CYPERACEAE	P-HERB	FACU	1
CYSC3	Cyperus schweinitzii	sand flatsedge	CYPERACEAE	P-HERB	FACU	4
CYSQ	Cyperus squarrosus	awned flatsedge	CYPERACEAE	A-HERB	OBL	2
CYST	Cyperus strigosus	straw-colored flatsedge	CYPERACEAE	P-HERB	FACW	4
DAGL	DACTYLIS GLOMERATA	orchard grass	POACEAE	P-HERB	FACU	
DACA7	Dalea candida	eastern white prairie-clover	FABACEAE	P-HERB		6
DAPUP	Dalea purpurea	purple prairie-clover	FABACEAE	P-HERB		6
DAVI	Dalea villosa	silky prairie-clover	FABACEAE	P-HERB		5
DAST	DATURA STRAMONIUM	jimson-weed	SOLANACEAE	A-HERB		
DEPIO6	Descurainia pinnata	pinnate tansy mustard	BRASSICACEAE	A-HERB		4
DESO2	DESCURAINIA SOPHIA	flix-weed tansy mustard	BRASSICACEAE	A-HERB		
DEIL	Desmanthus illinoensis	Illinois bundleflower	FABACEAE	P-HERB	FACU	5
DEIL2	Desmodium illinoense	Illinois tick-clover	FABACEAE	P-HERB		6
DIACF	Dichanthelium acuminatum	western spring-panicum	POACEAE	P-HERB	FAC	6
DIOLS	Dichanthelium oligosanthes	Scribner's spring-panicum	POACEAE	P-HERB	FACU	4
DICO6	Digitaria cognata	fall witchgrass	POACEAE	P-HERB		4
DISP	Distichlis spicata	saltgrass	POACEAE	P-HERB	FACW	3
ECANA	Echinacea angustifolia	narrow-leaf purple coneflower	ASTERACEAE	P-HERB		5
ECCR	ECHINOCHLOA CRUS-GALLI	barnyard grass	POACEAE	A-HERB	FAC/FACW	
ECMUM	Echinochloa muricata	rough barnyard grass	POACEAE	A-HERB	FACW/OBL	0
ECPR	Eclipta prostrata	yerba de tajo	ASTERACEAE	A-HERB	FACW	2
ELAN	ELAEAGNUS ANGUSTIFOLIA	Russian-olive	ELAEAGNACEAE	TREE	FACU	
ELCOC2	Eleocharis compressa	flat-stem spikerush	CYPERACEAE	P-HERB	FACW	6
ELPA3	Eleocharis palustris	marsh spikerush	CYPERACEAE	P-HERB	OBL	4
Eleocharis sp.	Eleocharis sp.					4
[ELCA4]	Elymus canadensis	Canada wild-rye	POACEAE	P-HERB	FACU	5

P-SYMBOL	SPECIES	COMMON NAME	FAMILY	PHYSIO	WETNESS	C
ELRE4	ELYMUS REPENS	quackgrass	POACEAE	P-HERB	FACU	
ELYMUS SP.	Elymus sp.					4
[ELTRT]	Elymus trachycaulus	slender wheatgrass	POACEAE	P-HERB	FACU	5
ELVIV	Elymus virginicu	Virginia wild-rye	POACEAE	P-HERB	FAC/FACW	4
EQAR	Equisetum arvense	field horsetail	EQUISETACEAE	P-HERB	FAC	4
EQLA	Equisetum laevigatum	smooth scouring-rush	EQUISETACEAE	P-HERB	FAC/FACW	4
ERCI	ERAGROSTIS CILIANENSIS	stinkgrass	POACEAE	A-HERB	FACU	
ERPEP2	Eragrostis pectinacea	tufted lovegrass	POACEAE	A-HERB	FAC	0
ERSP	Eragrostis spectabilis	purple lovegrass	POACEAE	P-HERB	UPL	3
ERHIH	Erechtites hieraciifolius	burnweed	ASTERACEAE	A-HERB	FACU/FAC	1
ERPHP	Erigeron philadelphicus	marsh fleabane	ASTERACEAE	B-HERB	FAC/FACW	3
ERSTS2	Erigeron strigosus	daisy fleabane	ASTERACEAE	A-HERB	FACU	2
EUAL3	Eupatorium altissimum	tall boneset	ASTERACEAE	P-HERB		3
EUPE3	Eupatorium perfoliatum	clasping-leaf boneset	ASTERACEAE	P-HERB	FACW/OBL	5
EUPS2	EUPHORBIA VIRGATA	hybrid leafy spurge	EUPHORBIACEAE	P-HERB		
EUDA5	Euphorbia davidii	western toothed spurge	EUPHORBIACEAE	A-HERB		0
EUDE4	Euphorbia dentata	eastern toothed spurge	EUPHORBIACEAE	A-HERB		0
[CHGEG]	Euphorbia geyeri	Geyer's spurge	EUPHORBIACEAE	A-HERB		5
EUMA7	Euphorbia maculata	spotted spurge	EUPHORBIACEAE	A-HERB	FACU	0
EUMA8	Euphorbia marginata	snow-on-the-mountain	EUPHORBIACEAE	A-HERB	FACU	0
EUNU	Euphorbia nutans	eyebane	EUPHORBIACEAE	A-HERB		0
[CHSES]	Euphorbia serpyllifolia	thyme-leaf spurge	EUPHORBIACEAE	A-HERB		2
EUPHORBIA SP.	Euphorbia sp.					0
EUSP	Euphorbia spathulata	warty spurge	EUPHORBIACEAE	A-HERB	FACU	2
EUVI7	EUPHORBIA VIRGATA	leafy spurge	EUPHORBIACEAE	P-HERB		
EURU4	Eustoma russellianum	prairie-gentian	GENTIANACEAE	A-HERB	FACW	4
EUGY	Euthamia gymnospermoides	viscid goldentop	ASTERACEAE	P-HERB	FAC/FACW	4
FASC	Fallopia scandens	climbing false-buckwheat	POLYGONACEAE	P-VINE	FACU/FAC	1
FEOC3	Festuca octoflora	six-weeks fescue	POACEAE	A-HERB	FACU	3
FIPUI	Fimbristylis puberula	hairy fimbry	CYPERACEAE	P-HERB	OBL	7
FRPE	Fraxinus pennsylvanica	green ash	OLEACEAE	TREE	FAC/FACW	2
GAAP2	Galium aparine	catch-weed bedstraw	RUBIACEAE	A-HERB	FACU	0
GECA7	Geum canadense	white avens	ROSACEAE	P-HERB	FAC	3
GLTR	Gleditsia triacanthos	honey-locust	FABACEAE	TREE	FACU	1
GLMA4	GLYCINE MAX	soybean	FABACEAE	A-HERB		
GLLE3	Glycyrrhiza lepidota	wild licorice	FABACEAE	P-HERB	FACU	4
GRSQ	Grindelia squarrosa	curly-top gumweed	ASTERACEAE	B-HERB	UPL/FACU	1
HACY2	Halerpestes cymbalaria	shore-buttercup	RANUNCULACEAE	P-HERB	OBL	3
HEHI	Hedeoma hispida	rough false-pennyroyal	LAMIACEAE	A-HERB		2
HEAU	Helenium autumnale	sneezeweed	ASTERACEAE	P-HERB	FACW	6

P-SYMBOL	SPECIES	COMMON NAME	FAMILY	PHYSIO	WETNESS	C
HEAN3	Helianthus annuus	common sunflower	ASTERACEAE	A-HERB	FACU	0
HEGR4	Helianthus grosseserratus	sawtooth sunflower	ASTERACEAE	P-HERB	FACW	4
HEMA2	Helianthus maximiliani	Maximilian's sunflower	ASTERACEAE	P-HERB	FACU/UPL	4
HEPAS2	Helianthus pauciflorus	stiff sunflower	ASTERACEAE	P-HERB		5
[HEPEP]	Helianthus petiolaris	plains sunflower	ASTERACEAE	A-HERB		1
HEHEO	Heliopsis helianthoides	false-sunflower	ASTERACEAE	P-HERB	FACU	4
HECOC9	Hesperostipa comata	needle-and-thread	POACEAE	P-HERB		6
HELA5	Heterotheca latifolia	camphor-weed	ASTERACEAE	A-HERB		2
HEVIV	Heterotheca villosa	hairy golden-aster	ASTERACEAE	P-HERB		4
[HOJUJ]	Hordeum jubatum	foxtail barley	POACEAE	P-HERB	FACW/FAC	1
HOPU	Hordeum pusillum	little barley	POACEAE	A-HERB	FACU/FAC	1
IVAN2	Iva annua	annual marsh-elder	ASTERACEAE	A-HERB	FAC	1
JUBAL	Juncus balticus	Baltic rush	JUNCACEAE	P-HERB	FACW/OBL	6
JUDU2	Juncus dudleyi	Dudley's rush	JUNCACEAE	P-HERB	FACW	5
JUNON	Juncus nodosus	knotted rush	JUNCACEAE	P-HERB	OBL	6
JUNCUS SP.	Juncus sp.					
JUTO	Juncus torreyi	Torrey's rush	JUNCACEAE	P-HERB	FACW	4
JUVIV	Juniperus virginiana	eastern red-cedar	CUPRESSACEAE	TREE	UPL/FACU	1
[SATR12]	KALI TRAGUS	prickly Russian-thistle	CHENOPODIACEAE	A-HERB	FACU	
KOMA	Koeleria macrantha	Junegrass	POACEAE	P-HERB		6
LALU	Lactuca ludoviciana	western wild lettuce	ASTERACEAE	B-HERB	FACU	3
LASE	LACTUCA SERRIOLA	prickly lettuce	ASTERACEAE	A-HERB	FAC/FACU	
LEOR	Leersia oryzoides	rice cutgrass	POACEAE	P-HERB	OBL	4
LEDE	Lepidium densiflorum	prairie pepper-grass	BRASSICACEAE	A-HERB	FAC	0
LELA2	LEPIDIUM LATIFOLIUM	broad-leaf pepper-grass	BRASSICACEAE	P-HERB	FACW	
LECA8	Lespedeza capitata	round-head bush-clover	FABACEAE	P-HERB	UPL/FACU	5
LIGL4	Liatris glabrata	plains gayfeather	ASTERACEAE	P-HERB		5
LIPUP	Liatris punctata	dotted gayfeather	ASTERACEAE	P-HERB		5
LIPYP	Liatris pycnostachya	thick-spike gayfeather	ASTERACEAE	P-HERB	FAC	7
LISU4	Linum sulcatum	grooved flax	LINACEAE	A-HERB		6
LICA12	Lithospermum canescens	hoary puccoon	BORAGINACEAE	P-HERB		5
LIIN2	Lithospermum incisum	fringed puccoon	BORAGINACEAE	P-HERB		5
[ONOC]	Lithospermum occidentale	marble-seed	BORAGINACEAE	P-HERB		4
LOSP	Lobelia spicata	pale-spike lobelia	CAMPANULACEAE	P-HERB	FAC	6
LYAM	Lycopus americanus	American water-horehound	LAMIACEAE	P-HERB	OBL	4
LYAS	Lycopus asper	rough bugleweed	LAMIACEAE	P-HERB	OBL	5
LYCI	Lysimachia ciliata	fringed loosestrife	PRIMULACEAE	P-HERB	FACW	5
LYALA4	Lythrum alatum	winged loosestrife	LYTHRACEAE	P-HERB	OBL	6
LYSA2	LYTHRUM SALICARIA	purple loosestrife	LYTHRACEAE	P-HERB	OBL	

P-SYMBOL	SPECIES	COMMON NAME	FAMILY	PHYSIO	WETNESS	C
MAST4	Maianthemum stellatum	starry false Solomon's-seal	RUSCACEAE	P-HERB	FACU/FAC	4
MACH2	MATRICARIA CHAMOMILLA	German chamomile	ASTERACEAE	A-HERB		
MELU	MEDICAGO LUPULINA	black medick	FABACEAE	A-HERB	FACU	
MESAS	MEDICAGO SATIVA	alfalfa	FABACEAE	P-HERB	UPL/VACU	
MEAL2	MELILOTUS ALBUS	white sweet-clover	FABACEAE	B-HERB	FACU	
MEOF	MELILOTUS OFFICINALIS	yellow sweet-clover	FABACEAE	B-HERB	FACU	
MECA7	Mentha canadensis	Canada mint	LAMIACEAE	P-HERB	FACW	4
MINU6	Mimosa nuttallii	sensitive brier	FABACEAE	P-HERB		6
MIHI	Mirabilis hirsuta	hairy four-o'clock	NYCTAGINACEAE	P-HERB		5
MILIL	Mirabilis linearis	narrow-leaf four-o'clock	NYCTAGINACEAE	P-HERB		4
MINY	Mirabilis nyctaginea	wild four-o'clock	NYCTAGINACEAE	P-HERB	UPL	1
MOVE	MOLLUGO VERTICILLATA	green carpet-weed	MOLLUGINACEAE	A-HERB	FAC	
MOFIM3	Monarda fistulosa	wild-bergamot	LAMIACEAE	P-HERB	UPL/FACU	4
MOAL	MORUS ALBA	white mulberry	MORACEAE	TREE	FACU/FAC	
MURA	Muhlenbergia racemosa	marsh muhly	POACEAE	P-HERB	FACW	4
MUHLENBERGIA SP.	MUHLENBERGIA SP.		POACEAE			3
NECA2	NEPETA CATARIA	catnip	LAMIACEAE	P-HERB	FACU	
OEBI	Oenothera biennis	eastern evening-primrose	ONAGRACEAE	B-HERB	FACU	1
[GAPA6]	Oenothera curtiflora	velvet butterfly-plant	ONAGRACEAE	A-HERB		1
[GALO3]	Oenothera filiformis	long-flower butterfly-plant	ONAGRACEAE	B-HERB		3
OELA	Oenothera laciniata	cut-leaf evening-primrose	ONAGRACEAE	A-HERB	FACU	1
OERH	Oenothera rhombipetala	fourpoint evening-primrose	ONAGRACEAE	B-HERB	FACU	2
OESE3	Oenothera serrulata	plains yellow-primrose	ONAGRACEAE	P-HERB		5
[GACO5]	Oenothera suffrutescens	scarlet butterfly-plant	ONAGRACEAE	P-HERB		4
OPFR	Opuntia fragilis	brittle prickly-pear	CACTACEAE	P-HERB		3
OPHUH	Opuntia humifusa	eastern prickly-pear	CACTACEAE	P-HERB		5
OXDI2	Oxalis dillenii	gray-green wood-sorrel	OXALIDACEAE	A-HERB	FACU	0
OXST	Oxalis stricta	yellow wood-sorrel	OXALIDACEAE	A-HERB	FACU	0
PAPL12	Packera plattensis	prairie ragwort	ASTERACEAE	B-HERB	FACU	5
[PACA6]	Panicum capillare	common witchgrass	POACEAE	A-HERB	FAC	0
PADID	Panicum dichotomiflorum	fall panicum	POACEAE	A-HERB	FAC/FACW	0
PAVI2	Panicum virgatum	switchgrass	POACEAE	P-HERB	FAC	4
PAQU2	Parthenocissus quinquefolia	Virginia creeper	VITACEAE	W-VINE	FACU	5
PASM	Pascopyrum smithii	western wheatgrass	POACEAE	P-HERB	FACU	3
PASES	Paspalum setaceum	yellow sand paspalum	POACEAE	A-HERB	FAC/FACU	2
PEGR7	Penstemon grandiflorus	shell-leaf penstemon	PLANTAGINACEAE	P-HERB		5

P-SYMBOL	SPECIES	COMMON NAME	FAMILY	PHYSIO	WETNESS	C
PEAM8	Persicaria amphibia	water smartweed	POLYGONACEAE	P-HERB	OBL	6
PECO23	Persicaria coccinea	swamp smartweed	POLYGONACEAE	P-HERB	OBL	2
PELA22	Persicaria lapathifolia	nodding smartweed	POLYGONACEAE	A-HERB	OBL/FACW	2
PHAR3	Phalaris arundinacea	reed canary grass	POACEAE	P-HERB	FACW	0
PHPR3	PHLEUM PRATENSE	timothy	POACEAE	P-HERB	FACU	
[PHAU7]	Phragmites australis	common reed	POACEAE	P-HERB	FACW	3
PHLA3	Phyla lanceolata	northern fogfruit	VERBENACEAE	P-HERB	FACW/OBL	3
PHHE5	Physalis heterophylla	clammy ground-cherry	SOLANACEAE	P-HERB		4
PHLO4	Physalis longifolia	common ground-cherry	SOLANACEAE	P-HERB		0
PHVI5	Physalis virginiana	Virginia ground-cherry	SOLANACEAE	P-HERB		6
PLER	Plantago eriopoda	alkali plantain	PLANTAGINACEAE	P-HERB	FAC	5
[PLPA2]	Plantago patagonica	woolly plantain	PLANTAGINACEAE	A-HERB		1
PLRU	Plantago rugelii	black-seed plantain	PLANTAGINACEAE	P-HERB	FACU/FAC	0
PLVI	Plantago virginica	pale-seed plantain	PLANTAGINACEAE	A-HERB	FACU	2
POCO	POA COMPRESSA	Canada bluegrass	POACEAE	P-HERB	FACU	
POPR	POA PRATENSIS	Kentucky bluegrass	POACEAE	P-HERB	FACU	
PODOT2	Polanisia dodecandra	sandy-seed clammy-weed	CLEOMACEAE	A-HERB	FACU/UPL	0
[POAV]	POLYGONUM AVICULARE	yard knotweed	POLYGONACEAE	A-HERB	FACU	
PORA3	Polygonum ramosissimum	bushy knotweed	POLYGONACEAE	A-HERB	FACW/FACU	1
POMO5	POLYPOGON MONSPELIENSIS	rabbitfoot grass	POACEAE	A-HERB	FACW/OBL	
PODEO	Populus deltoides	plains cottonwood	SALICACEAE	TREE	FAC	3
POOL	Portulaca oleracea	garden purslane	PORTULACACEAE	A-HERB	FAC/FACU	0
PONO3	Potentilla norvegica	Norwegian cinquefoil	ROSACEAE	P-HERB	FAC	2
POPA15	Potentilla paradoxa	bushy cinquefoil	ROSACEAE	A-HERB	FACW	4
PRVUL3	Prunella vulgaris	self-heal	LAMIACEAE	P-HERB	FAC	4
PYVI	Pycnanthemum virginianum	Virginia mountain-mint	LAMIACEAE	P-HERB	FAC/FACW	6
RACO3	Ratibida columnifera	upright prairie-coneflower	ASTERACEAE	P-HERB		4
RAPI	Ratibida pinnata	gray-head prairie-coneflower	ASTERACEAE	P-HERB		4
RIOD	Ribes odoratum	buffalo currant	GROSSULARIACEAE	SHRUB	FACU/FAC	4
ROPS	ROBINIA PSUEDOACAIA	black locust	FABACEAE	TREE	UPL/FACU	
ROAR3	Rosa arkansana	dwarf prairie rose	ROSACEAE	SHRUB	FACU	4
ROWOW	Rosa woodsii	western wild rose	ROSACEAE	SHRUB	FACU	4
RUHIP	Rudbeckia hirta	black-eyed Susan	ASTERACEAE	B-HERB	FACU	4
RUAL4	Rumex altissimus	pale dock	POLYGONACEAE	P-HERB	FAC	0
RUCR	RUMEX CRISPUS	curly dock	POLYGONACEAE	P-HERB	FACW	
SAAM2	Salix amygdaloides	peach-leaf willow	SALICACEAE	TREE	FACW	4
[SAEX]	Salix exigua var. exigua	coyote willow	SALICACEAE	SHRUB	FACW	3
SAAZG	Salvia azurea	Pitcher's sage	LAMIACEAE	P-HERB		6

P-SYMBOL	SPECIES	COMMON NAME	FAMILY	PHYSIO	WETNESS	C
SCPA	Schedonnardus paniculatus	tumblegrass	POACEAE	P-HERB		0
SCAR7	SCHEDONORUS ARUNDINACEUS	tall fescue	POACEAE	P-HERB	FACU	
SCPR4	SCHEDONORUS PRATENSIS	meadow fescue	POACEAE	P-GRASS	FACU	
SCSCS	Schizachyrium scoparium	little bluestem	POACEAE	P-HERB	FACU	4
SCPU10	Schoenoplectus pungens	three-square bulrush	CYPERACEAE	P-HERB	OBL	4
SEFA	SETARIA FABERI	Chinese foxtail	POACEAE	A-HERB	UPL/FACU	
SEPUP2	SETARIA PUMILA	yellow foxtail	POACEAE	A-HERB	FACU/FAC	
SEVE3	SETARIA VERTICILLATA	bristly foxtail	POACEAE	A-HERB	FAC	
SEVIV	SETARIA VIRIDIS	green foxtail	POACEAE	A-HERB		
SIAN2	Silene antirrhina	sleepy catchfly	CARYOPHYLLACEAE	A-HERB		2
SIINI	Silphium integrifolium	rosinweed	ASTERACEAE	P-HERB		4
SILO3	SISYMBRIUM LOESELII	tall hedge mustard	BRASSICACEAE	A-HERB		
SIMOM	Sisyrinchium montanum	strict blue-eyed-grass	IRIDACEAE	P-HERB	FAC	5
SOCAC4	Solanum carolinense	horse-nettle	SOLANACEAE	P-HERB	UPL/FACU	2
SOIN2	Solanum interius	plains black nightshade	SOLANACEAE	P-HERB		1
SORO	Solanum rostratum	buffalo-bur	SOLANACEAE	A-HERB		0
SOCAH	Solidago canadensis	Canada goldenrod	ASTERACEAE	P-HERB	FACU	2
SOGI	Solidago gigantea	late goldenrod	ASTERACEAE	P-HERB	FAC/FACW	3
SOMI2	Solidago missouriensis	Missouri goldenrod	ASTERACEAE	P-HERB		5
SOMO	Solidago mollis	ashy goldenrod	ASTERACEAE	P-HERB		4
SORIH	Solidago rigida	stiff goldenrod	ASTERACEAE	P-HERB	FACU	3
SOLIDAGO SP.	Solidago sp.					3
SOAS	SONCHUS ASPER	prickly sow-thistle	ASTERACEAE	A-HERB	FAC/FACU	
SOOL	SONCHUS OLERACEUS	store-front sow-thistle	ASTERACEAE	A-HERB	UPL/FACU	
SONU2	Sorghastrum nutans	Indian grass	POACEAE	P-HERB	FACU	5
SOHA	SORGHUM HALEPENSE	Johnson grass	POACEAE	P-HERB	FACU	
SPPE	Spartina pectinata	prairie cordgrass	POACEAE	P-HERB	FACW	5
[SPOB]	Sphenopholis obtusata	prairie wedge grass	POACEAE	P-HERB	FACW	5
SPAI	Sporobolus airoides	alkali sacaton	POACEAE	P-HERB	FAC	5
SPCOC2	Sporobolus compositus	tall dropseed	POACEAE	P-HERB	FACU	3
SPCR	Sporobolus cryptandrus	sand dropseed	POACEAE	P-HERB	FACU	2
SPHE	Sporobolus heterolepis	prairie dropseed	POACEAE	P-HERB	UPL/FACU	7
STLE6	Strophostyles leiosperma	slick-seed wild bean	FABACEAE	A-VINE		4
SUCA2	Suaeda calceoliformis	western sea-blite	CHENOPODIACEAE	A-HERB	FACW	5
SYOC	Symphoricarpos occidentalis	wolfberry	CAPRIFOLIACEAE	SHRUB	UPL	2
SYERE	Symphyotrichum ericoides	heath aster	ASTERACEAE	P-HERB	FACU	3
SYFAC	Symphyotrichum falcatum	prairie white aster	ASTERACEAE	P-HERB	FACU/FAC	4

P-SYMBOL	SPECIES	COMMON NAME	FAMILY	PHYSIO	WETNESS	C
SYLAL4	Symphyotrichum lanceolatum	tall white aster	ASTERACEAE	P-HERB	FACW/FAC	2
TAOF	TARAXACUM OFFICINALE	common dandelion	ASTERACEAE	P-HERB	FACU	
TECAC	Teucrium canadense	American germander	LAMIACEAE	P-HERB	FACW	4
THPO7	THINOPYRUM PONTICUM	tall wheatgrass	POACEAE	P-HERB		
THAR5	THLASPI ARVENSE	field penny cress	BRASSICACEAE	A-HERB	FACU	
TORAN2	Toxicodendron radicans	eastern poison ivy	ANACARDIACEAE	W-VINE	FACU	2
TRBR	Tradescantia bracteata	long-bract spiderwort	COMMELINACEAE	P-HERB	FACU	5
TROCO	Tradescantia occidentalis	western spiderwort	COMMELINACEAE	P-HERB	UPL	5
TRDU	TRAGOPOGON DUBIUS	yellow goat's-beard	ASTERACEAE	B-HERB		
TRFLF	Tridens flavus var. flavus	purpletop	POACEAE	P-HERB	UPL	2
TRFR2	TRIFOLIUM FRAGIFERUM	strawberry clover	FABACEAE	P-HERB	FAC/FACU	
TRPR2	TRIFOLIUM PRATENSE	red clover	FABACEAE	P-HERB	FACU	
TRRE3	TRIFOLIUM REPENS	white clover	FABACEAE	P-HERB	FACU	
TRMA20	Triglochin maritima	shore arrow-grass	JUNCAGINACEAE	P-HERB	OBL	5
TRPE4	Triodanis perfoliata	clasping-leaf Venus'-looking-glass	CAMPANULACEAE	A-HERB	FAC	2
TRAE	TRITICUM AESTIVUM	bread wheat	POACEAE	A-HERB		
TYAN	TYPHA ANGUSTIFOLIA	narrow-leaf cattail	TYPHACEAE	P-HERB	OBL	
ULAM	Ulmus americana	American elm	ULMACEAE	TREE	FAC/FACW	3
ULPU	ULMUS PUMILA	Siberian elm	ULMACEAE	TREE	UPL	
UNK	Unknown Forb					
[URGR3]	Urtica gracilis	stinging nettle	URTICACEAE	P-HERB	FAC/FACW	1
VETH	VERBASCUM THAPSUS	common mullein	SCROPHULARIACEAE	B-HERB	UPL	
VEBR	Verbena bracteata	prostrate vervain	VERBENACEAE	A-HERB	FACU	0
VEHA2	Verbena hastata	blue vervain	VERBENACEAE	P-HERB	FACW	4
VEST	Verbena stricta	hoary vervain	VERBENACEAE	P-HERB		2
[VEBAI2]	Vernonia baldwinii	western ironweed	ASTERACEAE	P-HERB	FACU/UPL	3
[VEFAF]	Vernonia fasciculata	prairie ironweed	ASTERACEAE	P-HERB	FAC/FACW	4
VEAN2	VERONICA ANAGALLIS-AQUATICA	water speedwell	PLANTAGINACEAE	P-HERB	OBL	
[VEPEP]	Veronica peregrina	purslane speedwell	PLANTAGINACEAE	A-HERB	FACW	1
VIAMM	Vicia americana	American vetch	FABACEAE	P-HERB	FACU	6
VIPE2	Viola pedatifida	prairie violet	VIOLACEAE	P-HERB	FACU	6
VIPR5	Viola pratincola	meadow violet	VIOLACEAE	P-HERB	FACW	1
VIRI	Vitis riparia	riverbank grape	VITACEAE	W-VINE	FAC/FACW	3
XASTC	Xanthium strumarium	cocklebur	ASTERACEAE	A-HERB	FAC	1