# PRRIP GRASSLAND VEGETATION ASSESSMENT FINAL REPORT

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

**Prepared for Platte River Recovery Implementation Program**
**October 2013**

**Prairie Legacy Inc.**

# GRASSLAND VEGETATION ASSESSMENT

## TABLE OF CONTENTS

## 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. Vegetation surveys on native and restored grassland areas are necessary 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. Systematic ground surveys and plot data will be used to map vegetation communities and plant species density, respectively.
2) Identify and locate invasive and noxious plant species and program species of concern. Noxious plant species will be located in order to help with eradication and control. The locations of other species of concern including invasive species and rare or threatened and endangered species will be recorded to inform future management decisions.
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 in vegetative communities and dominant species.

### 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.

A total of 3,629 grassland acres on 30 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 survey. These sites and their acreage are listed in table 1 along with the number of plots that were placed at each site and the management at the time of the survey in June of 2013.

## METHODS

Surveys were conducted during the three weeks beginning on July 22,, 2013. 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

Macroplot sites were chosen by looking at soil maps and choosing an appropriate number of sites spread among these soil types in order to get samples from potential differences in community types caused by soil changes. Plot Locations were marked by GPS using UTM NAD 83. These locations are listed in Appendix B. Plots were marked with 2 foot sections of rebar as per request.

### PHOTOS

Photos were taken at each macroplot showing the trasect and the quadrat and labled with the site name, plot number, year, and T (transect) or Q (quadrat). Additional photos were taken at some locations showing outlying areas and were labeled as to direction from the south or east stake.

### PLANT COMMUNITIES

Most sites had similar community types within swell and swale topography. A few had clear areas of changes in vegetation dominance. These areas were delineated as separate communities even if the perceived differences were due to current management rather than soil type.

## FINDINGS

### PLANT SPECIES OF CONCERN

No threatened or endangered plant species were encountered during the surveys. Musk thistle was very prevalent in many areas. Reed canarygrass and Phalaris were found along stream channels and along the Platte River edges. No salt cedar was found within the sites, however, it was present nearby. Purple loosestrife was found at a few sites, but not in prolific numbers. The locations of these species were mapped with gps waypoints. Appendix Maps

### 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 Code used by field botanists to list the plants as well as the 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 speces in a 20x50 cm frame. This measure can exceed 100 percent for the

frame as some species overlap each other. Tables 2 through 14 summarize the average percent cover of all species by site. The tables are separated by west and east region. The species are separated by cool and warm season, grasslike species, litter and bare ground, and forb species. 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 2013, which can be compared to similar measures in subsequent years.

## FQI AND CONDITION

Evaluations based on 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). Plant species area 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 15). 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; 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.

In the past, FQI had been used for native species only, as exotic species are not given any value of conservatism. Currently the exotic species are often added to the calculation for comparison. This gives a more complete picture of the overall condition of a prairie. 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 15. The best use of these results is as a comparison of species richness and abundance in successional years. For reference, sites with Native FQI above 30 are considered very good from a conservation standpoint. The Binfield sites come close to that.

It should be noted that FQI is most accurate when a complete list of species is available. This was the impetus behind using macroplots, as there is a greater chance of including more rare species within larger plots. FQI is a good measure for assessing a site over time, especially when weighted measures are used to include species abundance. The higher the FQI numbers, the better the species composition. Weighted FQI ($FQI_w$) will vary considerably from site to site. Note from Table 15, that Binfield West Hay and Binfield East sites have nearly identical FQI, however, $FQI_w$ puts Binfield East far ahead of Binfield West Hay. This will be a value indicative of the increase or decrease in the abundance of exotic species, including exotic cool-season grasses, such as smooth brome or tall wheatgrass.

Additionally, weighted FQI can illustrate the importance of abundance data. Binfield West Hay at first sight instantly stood out as the best overall site for species composition. This is reflected in percent native composition, and average C values, however, native species are not as abundant here as they are in Binfield East Meadow. This meadow has abundant cordgrass and other native wet meadow species. Even though it has a greater number of exotic species, they are not as abundant as the native species. Each value of floristic quality assessment (FQA) has meaning and all should be considered (Table 15).

These measures reveal some interesting insights to the overall health of each of these communities. For instance John's Wet Meadow sites are far more diverse than they appear at first glance. The desirable (higher C value) plants which are present, are present in quantities that boost the FQI. Figure 7 gives a visual comparison of FQI and $FQI_w$. The southern Binfield sites have the highest FQI, but other sites exceed them in weighted FQI. Those sites with weighted FQI scores below un-weighted scores indicate a high percentage of cover in exotic species. It should be noted that figure 7 does not indicate that Binfield East Meadow is an exceptional standout among average sites. On the contrary, the majority of these sites are underachievers. All of these sites will need careful management. Those sites with both scores below 20 are of low quality and in the most drastic need of intervention.

These differences in FQA values indicate that disturbance level, frequency, and duration at some of these sites have exceeded natural levels for which native species can adapt and recover. In such instances, native taxa which cannot adapt are lost allowing non-native taxa to invade (Cohen et.al., 1995), further extirpating native species and diminishing the self-correcting properties, restoration potential, and integrity of the natural community (Taft et.al, 1997). Non-native, adventive species become more prevalent and those native taxa, which can take advantage of disturbance (lower C values), or those that are left undisturbed become over-abundant.

## VEGETATION COMMUNITIES

Vegetation communities can be defined very broadly as in forest vs. grassland or in varying degrees of more narrow definition. Because plant species do not distribute themselves evenly amongst each other in a homogenous fashion, one or more species will be dominant in different areas. This dominance can be caused naturally with elevation, available water, flooding, soil types, or other

biotic factors, or they can be caused by management history or disturbances. Clearly marked boundaries from one dominant species to another are more apt to exist in wetlands or in clearly marked elevation changes rather than in in-tact grasslands without manipulation.

In some instances there are clear lines between one vegetation type and another. In examples of such cases, soil type or moisture regimes allow monocultures of aggressive species such as cattails or saline tolerant soils impose restrictions on surrounding vegetation. These restrictions do not exist in the majority of cases at these sites. An illustration of the more gradual changes in species composition is shown well in the photo of Wood's Rose dotting the landscape (Figure 8). Tall wheatgrass (*Thinopyrum ponticum* syn. *Elymus elongatus*; Figure9) behaves similarly to cattails in that it tends to shade out and exclude all other plant species. One difference is that it is not as particular about soil type or water availability and so the plant will spread out in degrees, allowing somewhat less defined edges of this community.

At many of these sites, reed canary grass is found along waterways. Areas of delineation were possible where land parcels had clear differences in soil moisture regimes. Some parcels had infestations of tall wheatgrass and others had disturbances caused by former fencing or grazing patterns. The result can be areas where one former community type has become three overlapping community types. Overall, the gradual swell and swale topography in these parcels lends itself to a patchwork of species that integrate and blend well. Given the time constraints, our chief concern was to delineate areas of reed canary grass and Phalaris with gps tracking. In addition, we mapped other areas which lent themselves well to clear delineation. Given that these plant species blend and integrate among themselves, the lines drawn are not necessarily boundaries. In many instances the boundaries of reed canary grass were along a shoreline or waterway which could not be crossed. In these cases, the width of the line of reed canary grass was noted and later simulated on Quantum GIS.

## VEGETATION MAPS AND SITE DESCRIPTIONS

Vegetation communities are complex assemblages of plants which share a particular area at one time. The vegetation maps are simplified to address one of the major management goals of the Program; that of controlling cool-season grasses. All mapped vegetation communities are shown with borders. It should be noted that the dominant species in these communities are NOT indicated on the maps. These are described in the text and given in the attribute tables along with the shapefiles. Dominant species may be cool or warm-season grasses or forbs. The maps (Figures 2-7) are colored to depict the percent cover of introduced cool-season grasses in 5 classes. Table 16 shows the total cover of exotic cool-season, native cool-season, warm-season grasses and grass-like species for each plot. These were averages for plots within each vegetation type in order to come up with the 5 calsses of cover for each of these communities. The classes are 0–20, 21–40, 41–60, 61-80, 81-100 percent cover. Darker colors indicate a larger percentage of cool-season grasses. Dominant species are listed in the attribute table of each site. Full descriptions of the vegetative communities are as follows.

These sites in general are within the Western Greatplains Floodplain (Steinhauer and Rolfsmeier, 2010). Most of the site can be further categorized as Northern Cordgrass Wet Prairie. Several sites

are wet prairies within or near Cottonwood Riparian Woodland or Mixed Deciduous Hardwood woodland or were reclaimed from these advancing woody systems.

**PLUM CREEK COMPLEX SITES**

COOK

Cook Hay Meadow was divided into two plant communities. The original single community was likely dominated by big bluestem and other warm season grasses. Currently big bluestem is the single most prominent species in both halves. However, collectively, cool-season introduced species cover more area (46%) in the eastern half. The western half is still dominated by warm season grasses with 45% cover vs 41% cover of total cool season species. Collectively, total cover of introduced cool-season species (55%) is greater on the entire Cook site than cover of all warm-season species (38%). The River edge and the channel running through Cook are both well-covered with reed canarygrass and Phalaris. Overall the implications are that smooth brome and other cool-season introduced species need to be controlled on both halves. Spring and Fall burns may be the best option here.

DYER

Dyer grassland was characterized by weedy forb species and annual and smooth brome. Annual brome is the dominant grass species (23% cover) on the northern half of the Dyer grassland. Carex species were well represented (19% cover); though these were not identifiable to species. A large number of Carex species were included in the seeding mix. Tall dropseed was also found here. On the southwestern portion, annual foxtail and Canada wildrye were the dominants species. As one moves east along the road from here smooth brome becomes more dominant, as does annual sunflower to the north of the road. Sandy soil and sparse vegetation here would make burns difficulut to carry out in most areas of this site. Control of annual brome can be attempted by mowing before it goes to seed and by additional seeding of desirable species.

**ELM CREEK COMPLEX SITES**

JOHNS NORTH

Disturbance is obvious at this site. Annual brome, dropseed and sedges were dominants. Plenty of noxious weeds and reed canarygrass were also present. That said, the number of species identified was greater here than at most of the other sites. If not of high value, the forbs were native for the most part (90% cover native forbs, vs. 30% exotic). Exotic cool-season grass cover was 18%, 6% native cool-season, and 11% warm-season. Sedge cover was 7%. This area is very sandy and has sparse vegetation similar to Dyer.

JOHNS SOUTH

Sampling produced cover averages of 27% exotic cool-season grasses in the northern section of Johns south wet meadow. Warm-season grasses averaged 22%. In the smaller south section, one plot was placed to produce 1% cool-season exotics and 45% warm-season natives (chiefly

cordgrass). The northern section was dominated by annual bromes, sand dropseed and sedges. Closer to the creek at the southern edge of the tract, tall wheatgrass becomes more prominent. Along the creek is a troublesome mat of reed canarygrass, Phalaris, and a tangle of trees including Russian olive, cottonwood, and eastern red cedar. The trees cover three large areas along the creek and are designated with 0-20% cool-season exotic grasses. South of the creek is a heavy stand of tall wheatgrass which gives way to wet meadow species on the south and east. In this area are some small, isolated patches of Phalaris. This appears to be an area which had been scraped and reseeded at one time. Tall wheatgrass should not be allowed to reseed. Cutting this prior to flowering and then painting the stems or boom spraying with a non-selective herbicide is an option for this area.

SULLWALD

Sullwald meadow is dominated by smooth brome and bluegrass. The exotic cool-season grass species cover is 77%. There are very few other species of note. One recommendation would be herbicide application in the spring and/or fall followed by seeding.

MCCORMICK NORTH

This site has more bare ground than vegetation. The cover of warm-season grasses and cool-season exotic grasses are both about 9%. Cool season native grasses in sampled areas had a cover of 5%. Native forbs have over 60% cover, while exotic forbs had 15% cover. Dominants were ragweed, downy brome, bulrush and blue grama. In drainages, reed canarygrass dominates and can be found throughout the parcel. A large area of leafy spurge is found in the western end of this parcel.

MCCORMICK SOUTH

This parcel 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. The remaining area also was in that category with 15% cover of introduced cool-season grasses. Warm-season grass cover was just under 10%. Native forb cover was over 70%, half of which was ragweed.

**FORT KEARNEY COMPLEX SITES**

WYOMING SOUTH

The Wyoming site had a holding area in the southeastern corner that was well worn by cattle. It was not sampled. A change in elevation and soil type on the northern edge held a vegetation community of its own. Cool-season grasses here had only 4% cover. The dominant species here was a native warm-season grass (sand dropseed) with 21% cover. The dominant species overall was tall fescue. Total tall and meadow fescue cover was just over 27%. Tall wheatgrass was also present here, but cover was only 4%. Cover of smooth and annual bromes was 2.5% collectively. Overall this site had 42% exotic cool-season grass cover.

HOSTETLER

This seeded site had very few exotic cool-season grasses. It was forb- dominated, however, warm-season natives accounted for 35% of cover. Native forb cover was 82%. Exotic forb cover was 58%. Lines of species were quite evident where the seed drill had dropped a single species in each furrow.

**Cottonwood Ranch (CWR) Complex Sites**

MORSE NORTH

This parcel is divided into two major community types with annual bromes, ragweed, and marijuana dominating much of the northern section. This degraded northern area contains musk thistle in swales. The cover of introduced cool-season grasses is 38 percent. Warm-season cover is 16 percent. The southern section is dominated by smooth brome and is more thickly vegetated. Introduced cool season cover and warm-season grass cover are 48% and 28%, respectively. Areas of trees include cottonwood, black walnut, eastern red cedar and smooth sumac in the center of the parcel. Russian olive is found on the western fenceline. Overall, the exotic cool-season grasses have nearly 60% cover at this site to the 33% of native warm-season grasses. Exotic forbs cover 34% vs. 25% native forbs.

Cool season grasses dominate over warm-season grasses on all of these sites except one. That is CWR East Lloyd Island where saltgrass and cordgrass are the dominant warm-season grasses and bluegrass varieties are the dominant cool-season grasses. The largest component of cool season species are exotics. Of those, Japanese brome, tall wheatgrass and downy brome are the largest players. Where exotic cool season grasses dominate, native cool season grasses are less diverse. Tall wheatgrass has nearly or greater than 20 percent cover at two of these sites. Japanese brome has greater than 20 percent cover at two additional sites. At CWR East, Foxtail barley is the only native cool-season grass with cover of greater than 10 percent; however, Japanese brome is more prominent here.

CWR EAST

The major division in community type is the northern portion which is dominated by annual brome, giant marsh-elder and dogwood. In the north patches of annual brome can be clearly delineated by aerial photographs. The southern area is dominated by a mix of mesic grasses. The plot area was dominated equally by introduced and native cool-season grasses, each with about 30% cover. For the site as a whole, exotic cool season grasses (30%) out compete native cool season grasses (17%) and cover of native and exotic forbs is equal at 30% each. The old homestead in the southeastern corner was not sampled.

CWR NORTHEAST

The eastern third of this parcel is degraded along the fenceline. Overall the site is dominated by annual and smooth brome in the northeast, but includes more native species as one moves to the southwest. Slender wheatgrass is also found throughout this parcel. The total cover of warm-season grasses is 34% and of introduced cool season grasses is 26%. There is just slightly more cover of native forbs (17%) than exotic forbs (14%) overall.

CWR NORTHWEST

This parcel is divided north from south by a small creek with both Phragmites and Reed Canary grass. Cattails and phragmites are also present in a swale on the southern portion of the tract. The northern portion had 43% exotic cool-season grasses. Tall wheatgrass and smooth brome were species of record here. These decreased in the southern portion to about half that (22%). The southern half was also a more mesic mix of species, particularly in the southwest. Of note here is the presence of an annual prairie gentian. Sweetclover was found to be a problem in several large patches in the far north and again in the south. Cover of native vs. exotic forb species for the site as a whole was equal at about 21% each.

MORSE HAY NORTH

This hay field is dominated by smooth brome and bindweed. Two of the plots had 50% introduced cool-season cover. One had only 4% cool season grasses. Some big bluestem, sand dropseed and little bluestem was present. Bindweed was a dominant throughout the field contributing greatly to a 50% cover of exotic forbs compared with 30% cover of native forbs.

MORSE MIDDLE

Morse Middle, like Morse Hay North is dominated by smooth brome. Cool-season exotic grasses have 46% cover. However, unlike Morse Hay North, Morse Middle has greater than 35% cover of native warm-season grasses. A stretch of Reed Canary grass is found in the center of the western edge of the tract and musk thistle is frequent. Both sites have an abundance of purple poppy mallow. The exotic forbs out-cover the native forbs 2 to 1 (40% and 20%, respectively).

MORSE HAY SOUTH

This parcel is dominated by Reed Canarygrass. The southern half of this tract in particular is dominated by undesirable species. However, since reed canary is a native species and since tall fescue is a warm-season grass, the maps show a more desirable designation. A section on the south was planted in Fescue and was not sampled. It therefore is designated as 0-20% introduced cool season. It is, however, greater than 60% introduced warm-season and thus may need to be managed for a return to native grasses. The northern portion of the tract is dominated by smooth brome (48% exotic cool season), but has a few warm-season native species present. It also has an abundance of musk thistle. There is a drainage along the northern border of this parcel that is almost 100% Reed Canarygrass. A wetland in the center of this tract has a section dominated by cattails and the eastern edge is lined by reed canarygrass. Between the wetland and the patch of planted fescue is an area of wheatgrass, reed canarygrass and tall fescue. This wheatgrass from plot 44 is recorded as western wheatgrass. The entrance to this parcel on the west appears to have been disturbed and/or planted with a few native forbs. The greatest portion of this area is dominated by a combination of tall wheatgrass and reed canarygrass. Native forbs had 30% cover, while exotic forbs had 20% cover at this parcel.

CWR SOUTHWEST

Plot 54 in the northern area of this parcel has the greatest cover of native warm-seaon grass species (32%). Warm-season grasses give way to cool-season dominance and you move south within this parcel. Cool-season cover was 10% in the north and 48% in the southern half. Warm-season cover was 16% in the north and 10% in the south. Phragmites was present in the drainage in the northwest.

MORSE SOUTHWEST

The cool-season community map for this site (Fig. 2 ) needs some explanation. 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). Cool-season grass cover is 47%. Bare ground accounts for much of the remaining cover. The southern portion of this site has cool-season cover of 63%, but it includes additional species and so has a higher diversity. The dominant species in this area is smooth brome.

MORSE CROP

This is a fairly recently seeded site. Cool-season exotic species cover is negligable (0.08%). Dominant grass species here are native cool season grasses (28% cover). Warm-season grasses have 16% cover of exotics and 6% cover of natives. Forb cover is 18% exotic and 38% native.

**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 Alkalai meadow in Binfield West Meadow including saltgrass, alkalai arrowgrass and foxtail barley.

Binfield North Hay includes areas of Reed Canary grass along the drainage area that extends into the road ditches on the south and into Bindfield East Meadow. Reed canary is invading these areas but is not yet pervasive.

BINFIELD EAST MEADOW

Northern areas are dominated by Carex spp., cordgrass, and bulrush transitioning in the southeastern half to switchgrass, bluegrass, bluestem and smooth brome. Areas of the southwest and along the southern fenceline are degraded by cattle hoof action on occasionally wet uplands dominated by Japanese brome, cheatgrass, saltgrass and large areas of buffalo bur. The road ditches include reed canary grass.

BINFIELD NORTH

This parcel is heavily grazed with areas used as holding areas for livestock. Two areas were designated as differing vegetation types although they would originally have been similar. The small area on the south is so heavily used by cattle that ragweed is the dominant species. There was no exotic cool-season cover recorded and only 3% warm –season cover. The remainder of the tract has exotic cool-season grass cover of 16% and 28% warm.

BINFIELD NORTH HAY

Redtop is the dominant grass here. It and other cool season grasses have a combined cover of 42%. Warm-season grasses are well represented, however, with 29% cover. Cordgrass is the dominant warm-season grass with Indiangrass and big bluestem as co-dominants. Sedges are also very important cool-season components (16%). Reed canarygrass is found in the road ditch and invading on the southern end and in the north along the east fenceline.

BINFIELD SOUTH HAY

Exotic cool-season grasses (24% cover) and native warm-season grasses are co-dominantes in this hay field. Smooth brome is the chief component of the cool-season and big bluestem and indiangrass account for the warm-season cover.

BINFIELD EAST MEADOW

There are clear north and south components to this tract with a division diagonally down the center. The northern edge is a wetter area dominated by sedges (26%cover) and field mint. Warm-season grasses (northern reed and cordgrass) are important components with 16% cover.

The southern half is somewhat dryer with a transition zone in between. This transition zone is dominated by sedges (20% cover) and spikerush. Switchgrass, a warm-season, wet meadow species, is a codominant (17% cover).

South of this zone, cool season exotics again dominate with 32% cover. In the sampled areas, the dominant exotic cool season grass was bluegrass. The warm season co-dominants (17% cover) were saltgrass and cordgrass.

Mint and fogfruit are wet meadow species which share dominance with cordgrass and contribute to higher values of conservatism as discussed earlier. Reed canarygrass is invading from the road and can be found in the wetter drainages toward the north. It is also advancing along the drainage into the pasture and can be found scattered in with the northern reedgrass.

BINFIELD WEST MEADOW

Switchgrass dominates the northern half of this parcel. Warm-season species have a cover of 27%. Sedges have 19% cover. Cool-season exotics cover only 6%. Smooth brome and bluegrass are co-dominant (32% cover combined) cool-season grass species in the southeast quarter. The southeastern 1/8 is also dominated by these exotic cool-season grasses (53% cover). In addition, this area includes Wood's rose as a major dominant species (30% cover). The west central area next to the entrance is dominated by redtop and bluegrass (53%) but is co-dominated by big bluestem and swithgrass 46%.

BINFIELD WEST HAY MEADOW

The swell and swale topography accommodated some slightly wetter areas within this site, similar to the other Binfield sites. At first glance, this hay meadow appears to be the most diverse and one

of the best sites of the 30 visited. Sampling suggests that other sites are as diverse. Here introduced cool-season grasses were just slightly more domiant (26% cover) than warm-season grasses (23% cover); however, species diversity was more evident here overall.

BINFIELD SOUTH HAY MEADOW

Dogwood and coral-berry are abundant in the eastern half of this parcel. Community boundaries were drawn between the western ¼ and the eastern ¾. In the east, cool-season exotics collectively had 31% cover. Sedges were the single most dominant species (26%), followed closely by smooth brome (21%). In the west big bluestem (19%) and smooth brome (18%) were the individual dominant species. Overall, native warm-season grasses were just slightly more dominant (29% cover) than cool-season exotics (27%).

**General Recommendations**

The reseeded sites can be compared with the planted species list to determine whether the intended species are present. The presence of annuals should not be considered a failure at such sites. These are to be expected for the first few years. Typically dominant species will change from year to year and it may take 5 or more years for a seeded area to become dominated by the intended native grasses and forbs. Mowing can remove flowering stems of unwanted species during the establishment phase. Seeded areas can be mowed to 4 to 5 inches in the first season anytime weed species reach 8 to 10 inches high. In the second season, weeds can be controlled with a mowing once or twice to a height of 8 to 12 inches. Mowing in subsequent years can be done if the removed vegetation is baled and taken off. The timing of the mowing and baling will affect the overall species composition. If warm-season species are desired, early season mowing is best. Leaving bales on the seeded area for more than a couple of days will result in areas of open ground where invasive species and noxious weeds can invade.

Grass physiology is an important consideration when control is needed for certain types of species. Cordgrass begins growing early in the spring, even though it is a warm-season grass. Fescues are cool-season grasses that have very deep roots and do a lot of summer growing. As bunch-type grasses, they are more easily controlled than are the rhizomatous grasses, such as smooth brome. Annual bromes need to have flowering stems removed prior to setting seed in mid to late June.

There are several sites dominated by exotic cool season grasses. These species can be controlled, though not eliminated with fire, mowing, intense grazing, or if necessary herbicide at the right time of year. The recommended time for fire would be mid- to late April or early May. Burning too early can warm the soil and encourage the growth of cool season species to the detriment of warm season species. Burning or chemical treatment during the late fall when cool season species are still active, but warm season species are dormant can also be an effective tool. Mowing before seed-set is another option that is particularly effective for annuals such as downy and Japanese brome. Where burning is not an option, mowing in mid to late June may be helpful.

Intense grazing for a short period of time, such as a few weeks to one month in spring can also set back perennial cool-season species. Cattle should be removed before June 1 so warm-season

grasses can recover and begin to dominate. Cattle hoof action on wet soil, however, can have a detrimental effect to the soil structure, can cause the release of an overabundance of nutrients, and can bring in unwanted species from other areas. Also, too frequent, or intense grazing can also create bare ground allowing annual bromes and weedy forbs to advance. For this reason, stocking rates and seasons have to be managed carefully. The sites which are dominated by ragweed have likely been overgrazed. Those dominated by annual bromes may have heavy grazing pressure or may have been mechanically scraped or herbicided to remove other undesireable species.

Burned areas were not noted on the management table (Table 1). Burning is likely to produce a more favorable result for abundance of warn-season vs cool-season grasses, particularly in the year in which it occurs. For this reason, comparing this management practice with the Floristic quality indexes for those years when sampling and burning occur in the same year would be informative.

Varying the treatment of areas should be a management goal if plant species diversity is desired, as it is possible to favor certain species over others with no variation in treatment. Continual grazing tends to favor cool season species. Areas managed in this way will typically move toward a dominance of brome, bluegrass, or wheatgrass. The Binfield sites currently have some of the best plant diversity and the greater dominance of native species; however, even these sites do not have a high conservatism value as measured by FQI. They will need careful management in order to maintain or improve diversity measures. Sites which are hayed rather than grazed can be more diverse because cattle tend to prefer certain species over others.

Chemically treating or scraping reed canary dominated areas are two effective treatment options. Such areas are often more wet and typically have a good seed bank to help them recover after treatment. While I have not seen effective treatment by grazing with cattle on such areas, heavy grazing by horses has been effective in some sites. This does not guarantee species diversity upon recovery, however, and requires continual grazing pressure to keep the reed canarygrass suppressed.

Musk thistle was abundant at many sites. Several of these had been sprayed, however, they were seeding out. Musk thistle is a biennial. As such, it produces a rosette one year, then a large flowering stalk the next and abundant seed. Spraying this plant while in flower will only encourage it to produce seed, though many of the seeds will be damaged, much of the seed will still produce offspring. Also, it takes a large amount of herbicide to kill a mature plant. Killing this plant with herbicide requires a two-step approach. If herbicide is used, rosettes should be sprayed and mature plants should have all flowering heads removed. Spraying or digging just below the soil line can then be an effective control measure. Boom spraying or aerial spraying of entire pastures should be avoided if plant diversity is desired. Concentrated efforts to find and treat this plant in late May and early June for two years will reduce the population to very low and manageable population levels.

## CITATIONS

Cohen, A.L., B.M.P. Singhakumara, and P.S. Ashton. 1995. Releasing rain forest succession: a case study in the *Dicranopteris linearis* fernlands of Sri Lanka. Restoration Ecology 3:261-270.

Kaul, R.B., D.M. Sutherland, S.B. Rolfsmeier, 2011. The flora of Nebraska. Second Edition. School of Natural Resources. University of Nebraska-Lincoln.

Lichvar, R.W. 2013. *The National Wetland Plant List: 2013 wetland ratings.* *Phytoneuron* 2013-49: 1-241. (See also the official website of the National Wetland Plant List.)

NRCS National Plant Database, 2013. Online http://plants.usda.gov/about_plants.html

Steinhauer, Gerry and S. Rolfsmeier, 2010. Terrestrial Ecological Systems and Natural Communities of Nebraska, Version IV. Nebraska Natural Heritage Program. Nebraska Game and Parks Commission.

Steinhauer, Gerry and S. Rolfsmeier, 2013. Natural Heritage Plant Database, Nebraska Game and Parks Commission.

Taft, J. B. , G.S. Wilhelm, D.M. Ladd, and L.A. Masters, 1997. Floristic quality assessment for vegetation in Illinois: A method for assessing vegetation integrity. Illinois Native Plant Society. Assessed from http:// http://conservationtools.org/libraries/1/library_items/588-Floristic-Quality-Assessment-For-Vegetation-in-Illinois-a-Method-for-Assessing-Vegetation-Integrity

## FIGURES

**Figure 1. Plum Creek Complex Plots, Weeds, Cool-season Exotic Grasses**

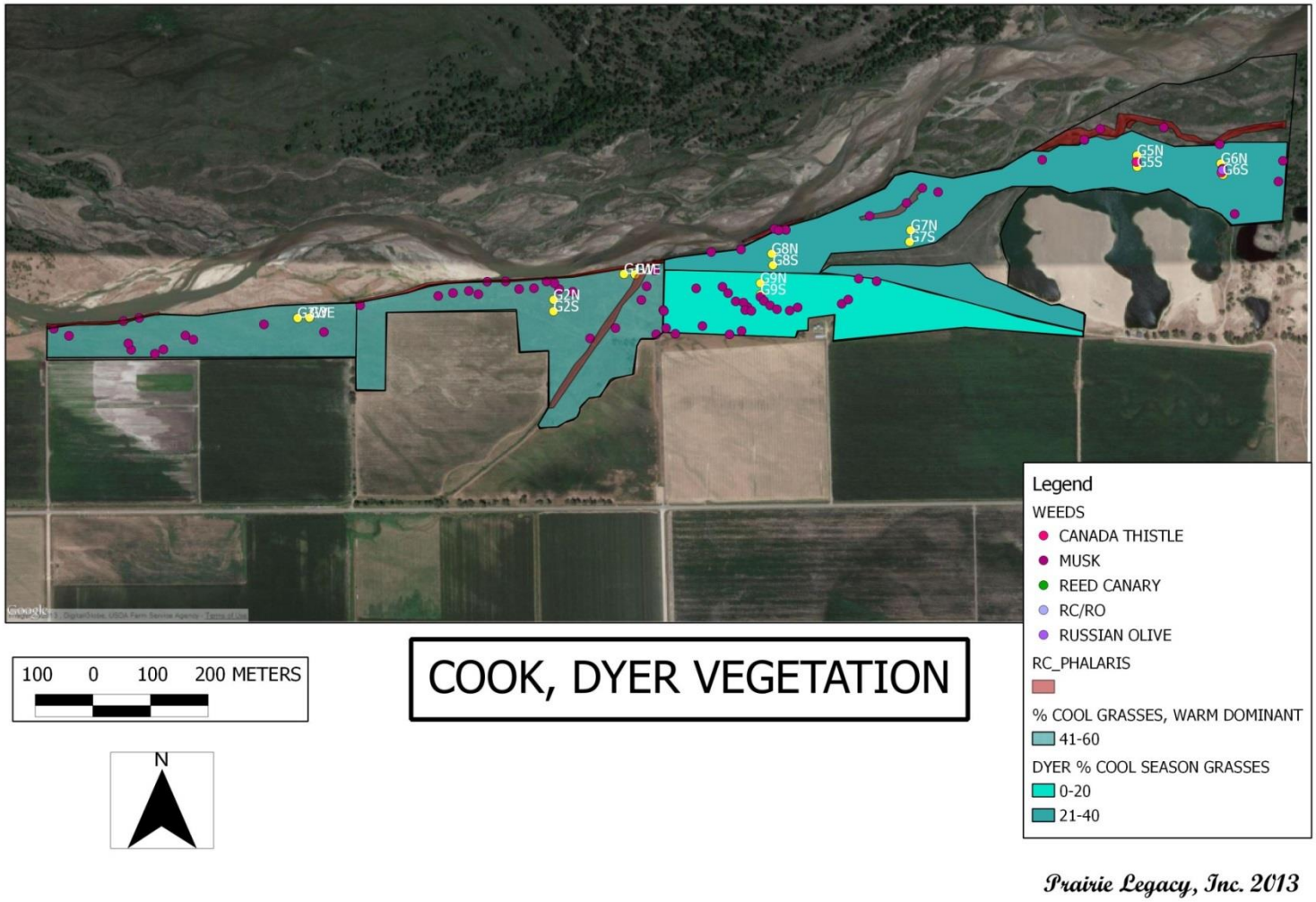


**Figure 2. Cottonwood Ranch Complex. Plots, Weeds, Cool-Season Exotic Grasses**

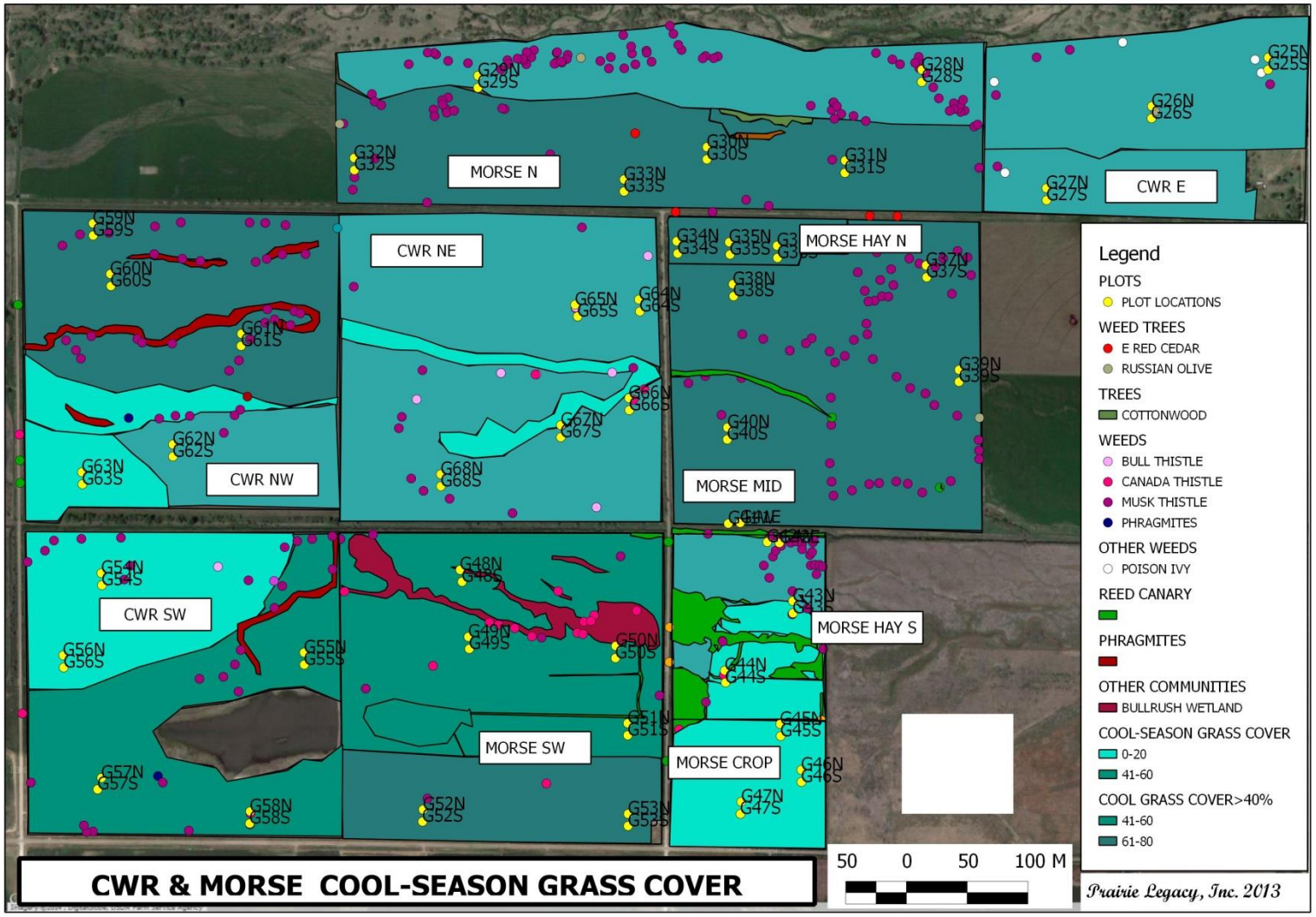


**Figure 3 . Elm Creek Complex Plots, Weeds and Cool-Season Exotic Grasses**

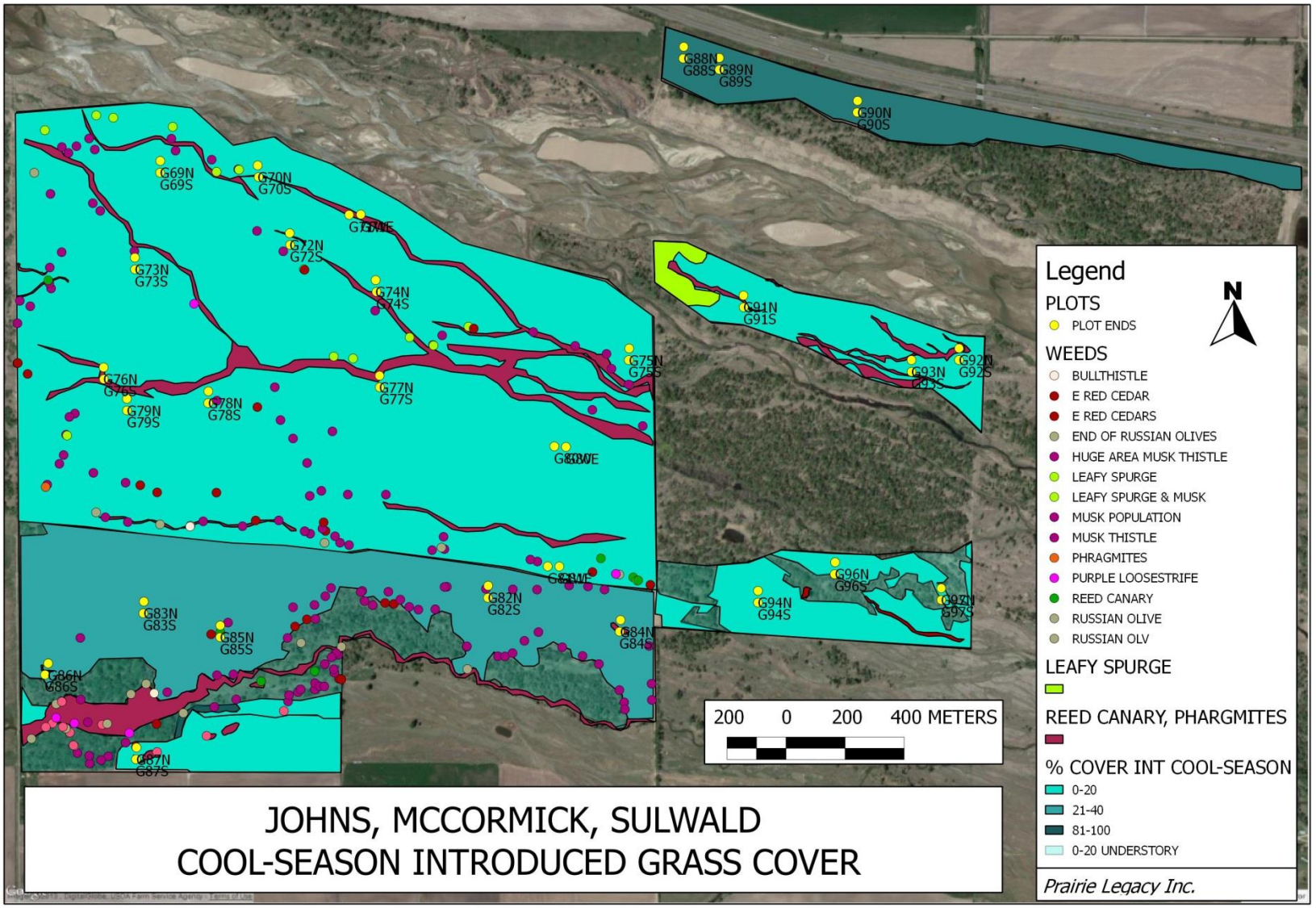


**Figure 4 . Wyoming Plots, Weeds and Cool-Season Exotic Grasses**

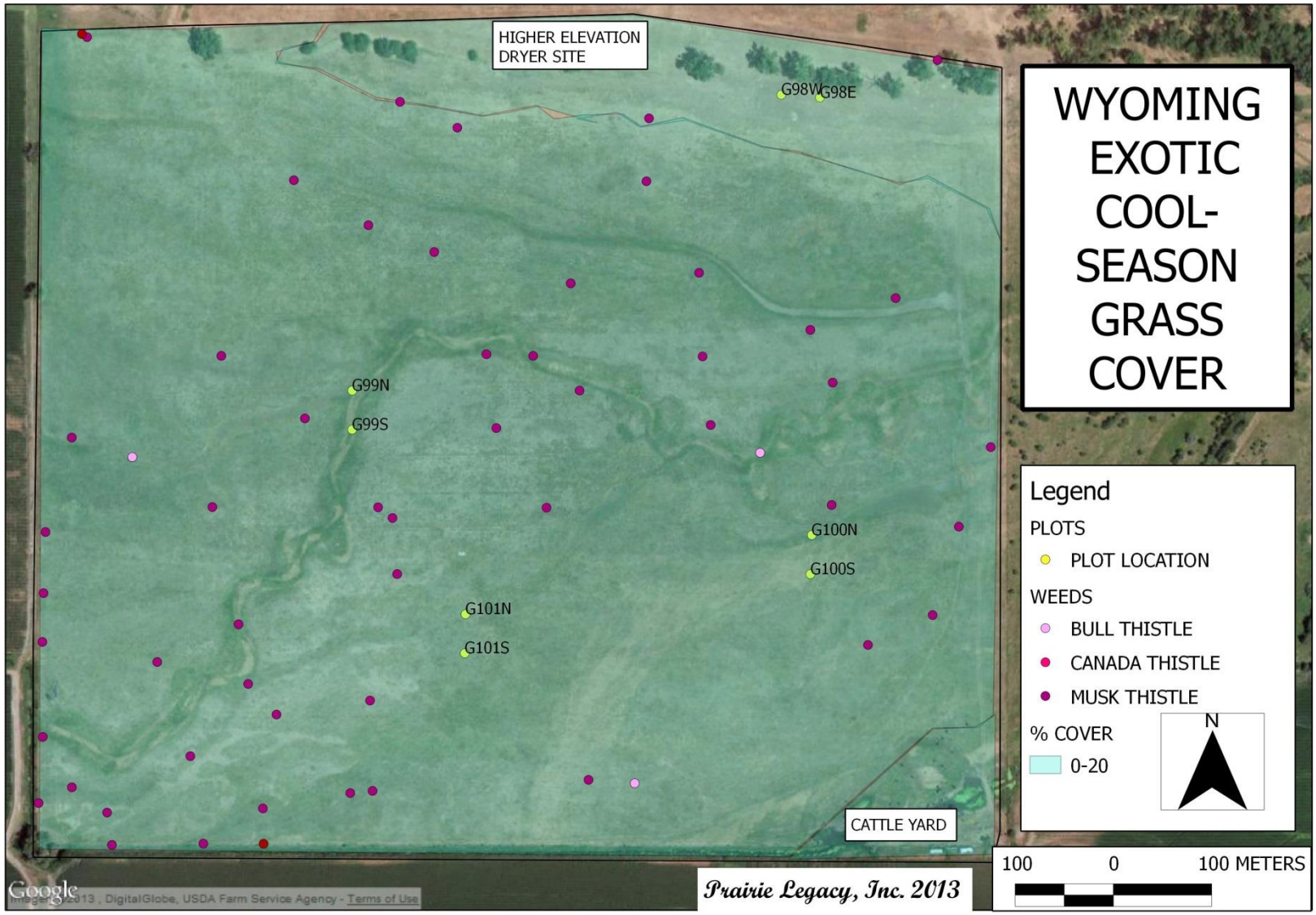
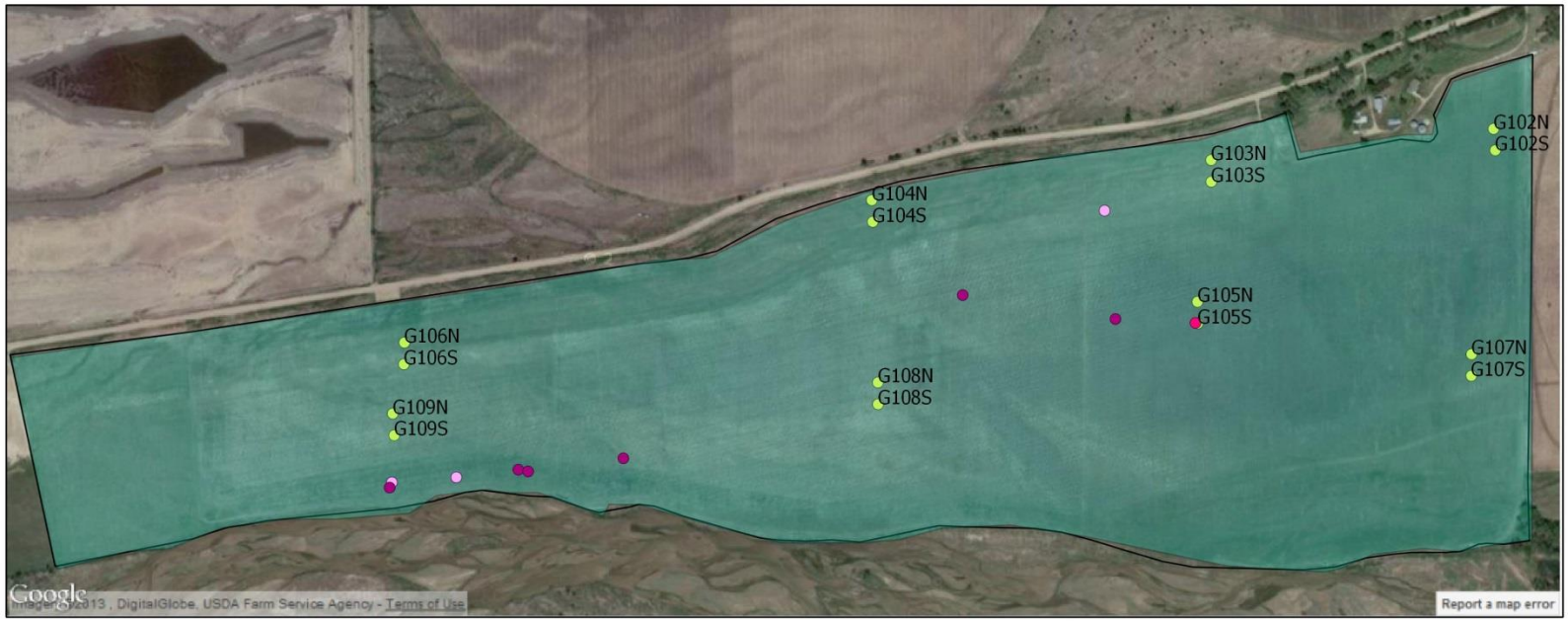


**Figure 5. Hostetler Plots, Weeds and Cool-Season Exotic Grasses**




HOSTETLER
EXOTIC COOL-SEASON GRASS COVER

Legend
WEEDS
BULL THISTLE
CANADA THISTLE
MUSK THISTLE
% COVER
0-20
PLOTS
PLOT LOCATIONS

100 0 100 200 METERS

N

*Prairie Legacy, Inc. 2013*

**Figure 6. Shoemaker Island Complex Plots, Weeds and Cool-Season Exotic Grasses**

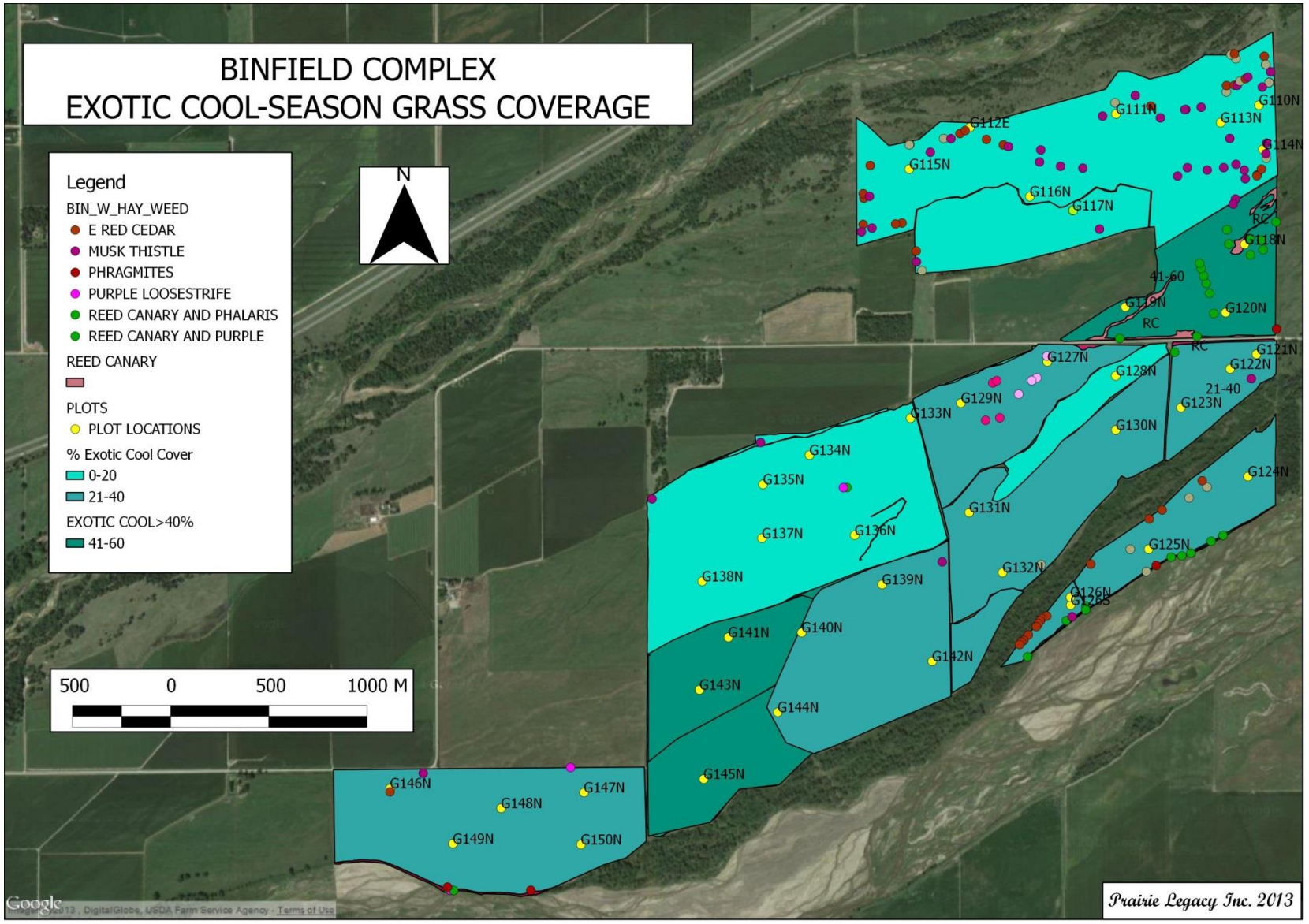


**Figure 7: Comparison of weighted and unweighted FQI values.** This chart demonstrates the additional information provided by the abundance data as well as a visual illustration of which sites may need intervention.

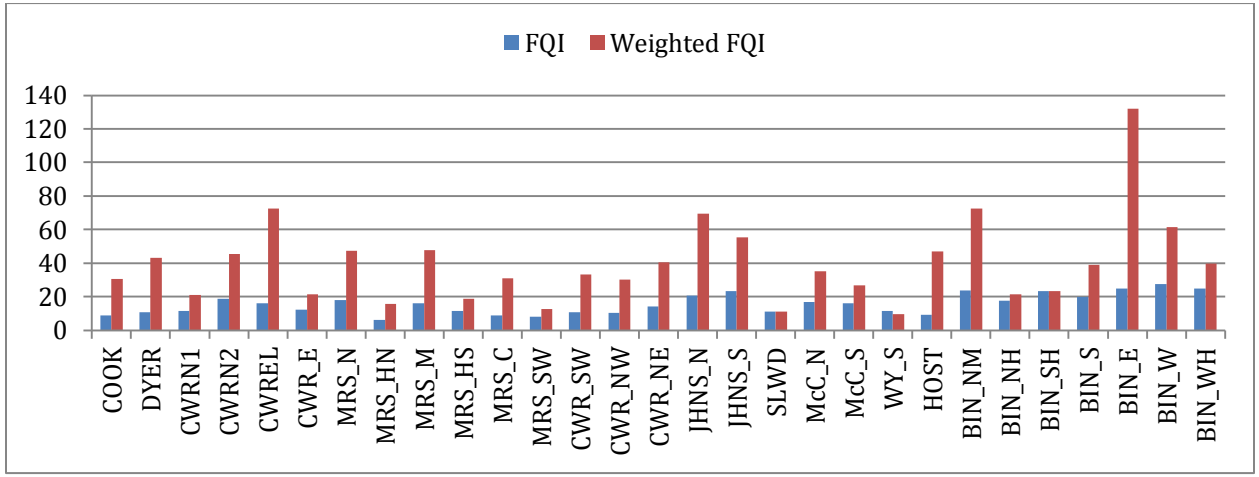
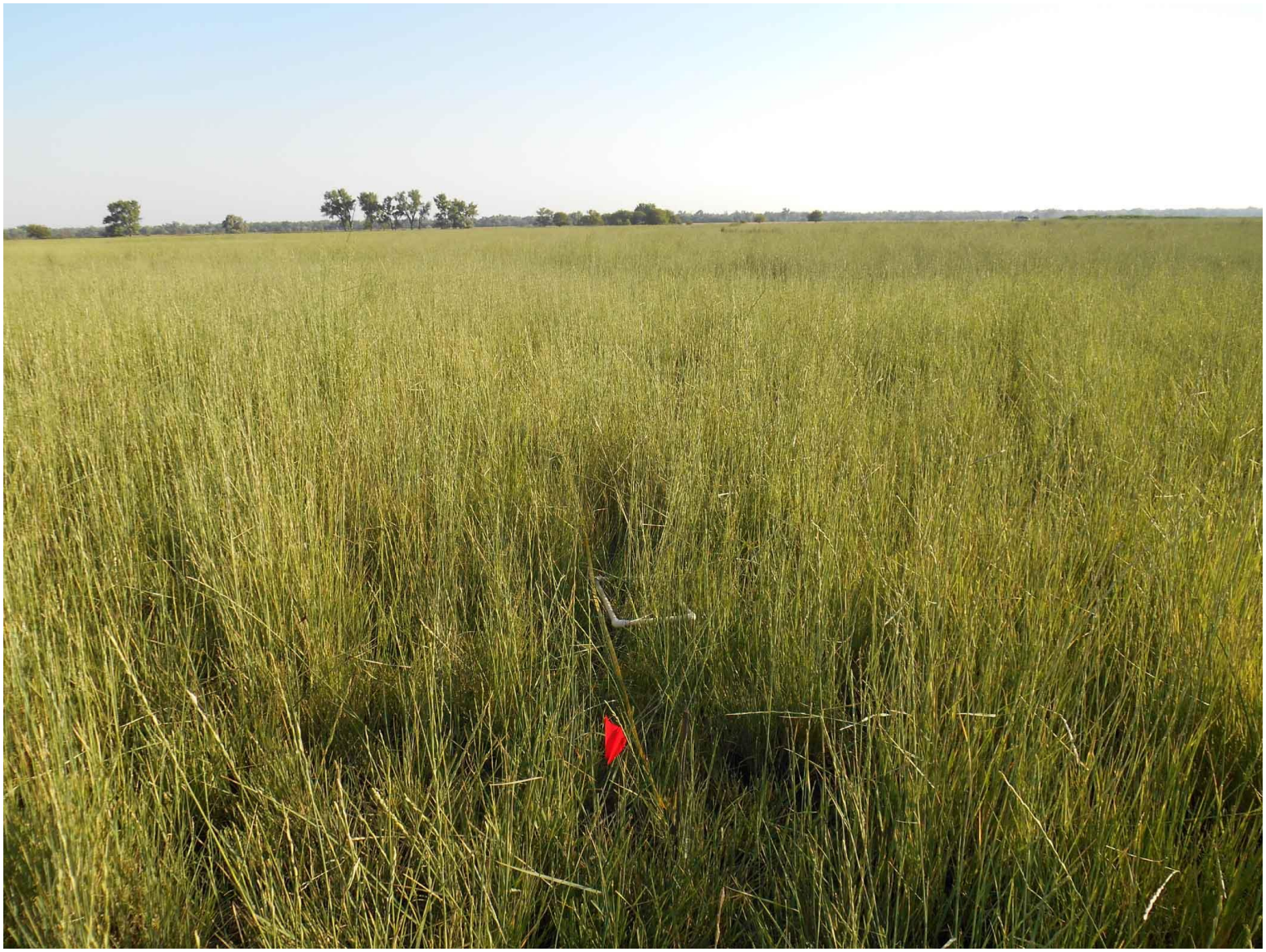


**Figure 8. Wood's Rose dotting the landscape.**

**Figure 9. Tall wheatgrass monoculture.**



## TABLES

**Table 1. Site names**, acres, management at the time of survey in 2013 and the number of plots placed at each location.

| SITE NAME | ACRES | MANAGEMENT | # PLOTS |
|---|---|---|---|
| Cook Hay Meadow | 61 | Hay | 3 |
| Dyer Grassland | 125 | Seeded 2010 | 6 |
| CWR North 1 & 2 | 81 | Grazed | 6 |
| CWR East Lloyd Island | 252 | Grazed | 9 |
| CWR East | 92 | Grazed | 3 |
| Morse North | 166 | Hay | 6 |
| Morse Hay North | 12 | Grazed | 3 |
| Morse Middle | 135 | Grazed | 5 |
| Morse Hay South | 44 | Hay | 3 |
| Morse Crop | 30 | Seeded, hay | 3 |
| Morse SW | 153 | Grazed | 6 |
| CWR SW | 128 | Grazed | 5 |
| CWR NW | 145 | Grazed | 5 |
| CWR NE | 150 | Grazed | 5 |
| Johns North Wet Meadow | 381 | Grazed | 13 |
| Johns South Wet Meadow | 182 | Grazed | 6 |
| Sullwald Hay Meadow | 36 | Hay | 3 |
| McCormick North Island | 34 | Grazed | 3 |
| McCormick South Meadow | 42 | Grazed | 4 |
| WY South Meadow | 118 | Grazed | 4 |
| Hostetler Crop | 222 | Seeded | 8 |
| Binfield North Meadow | 223 | Grazed | 8 |
| Binfield North Hay Meadow | 66 | Hay | 6 |
| Binfield South Hay Meadow | 30 | Hay | 3 |
| Binfield South Meadow | 57 | Grazed | 3 |
| Binfield East Meadow | 179 | Grazed | 6 |
| Binfield West Meadow | 361 | Grazed | 13 |
| Binfield West Hay Meadow | 124 | Hay | 5 |

**Table 2. Cool-season grass cover of the western 15 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 | COOK | DYER | CWRN1 | CWRN2 | CWREL | CWR_E | MRS_N | MRS_HN | MRS_M | MRS_HS | MRS_C | MRS_SW | CWR_SW | CWR_NW | CWR_NE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EXOTIC COOL-SEASON | | | | | | | | | | | | | | | | |
| AGROSTIS GIGANTEA | redtop | | | | 1.07 | 1.00 | | | | | | | | | | |
| AGROSTIS STOLONIFERA | creeping bentgrass | | | | 3.40 | 0.58 | | | | | | | | | 0.53 | |
| BROMUS INERMIS | smooth brome | 25.48 | 1.50 | 14.95 | 1.57 | 14.35 | 6.68 | 98.23 | 56.17 | 87.10 | 27.78 | | 13.20 | 1.03 | 16.72 | 7.52 |
| BROMUS JAPONICUS | Japenese brome | | 13.73 | 26.23 | 9.85 | 10.10 | 21.90 | 9.92 | | 13.60 | | | | 0.17 | 5.50 | 11.50 |
| BROMUS TECTORUM | downy brome | 5.97 | 24.98 | 3.25 | 9.15 | 8.17 | 2.88 | 3.78 | | | | | | 0.08 | 0.08 | 18.82 |
| PHLEUM PRATENSE | timothy | | | | | | | | | | | | | | | |
| POA COMPRESSA | Canada bluegrass | 12.52 | 2.02 | 2.18 | 22.80 | 16.48 | | 3.28 | | 10.62 | 0.17 | | 1.32 | 7.27 | 0.50 | 1.20 |
| POA PRATENSIS | Kentucky bluegrass | 3.62 | | 1.15 | 19.35 | 18.53 | 0.25 | 1.20 | 0.75 | 1.62 | | | | 19.80 | 3.05 | 1.15 |
| SCHEDONORUS ARUNDINACEUS | tall fescue | | | | | | 0.50 | | | | | 0.08 | 0.62 | 2.20 | | 0.17 |
| SCHEDONORUS PRATENSIS | meadow fescue | | | | | | | 1.60 | | | 5.55 | | | | | |
| THINOPYRUM PONTICUM | tall wheatgrass | | | 0.53 | | 1.67 | | 0.50 | | | | | 69.03 | 30.70 | 43.22 | 1.50 |
| TRITICUM AESTIVUM | bread wheat | | | | | | | | | | | | | | | |
| TOTAL EXOTIC COOL-SEASON | | 47.58 | 42.23 | 48.30 | 67.18 | 70.88 | 32.22 | 118.5 | 56.92 | 112.9 | 33.50 | 0.08 | 84.17 | 61.25 | 69.60 | 41.85 |
| | | | | | | | | | | | | | | | | |
| NATIVE COOL-SEASON | | | | | | | | | | | | | | | | |
| Calamagrostis stricta | northern reedgrass | | | | | | | | | | | | | | | |
| Dichanthelium acuminatum | western panicum | | | | 0.62 | | | | | | | | | | | |
| Dichanthelium oligosanthes | Scribner's panicum | | 0.50 | 0.08 | 1.48 | 0.83 | | 2.73 | | 0.75 | | | | 0.58 | | |
| Elymus sp. | | | | | | 0.50 | | | | | | | | 3.82 | | |
| Elymus canadensis | Canada wild-rye | | 8.42 | | 0.08 | | 3.40 | | | | | 0.58 | | | | 3.47 |
| Elymus virginicus | Virginia wild-rye | | | | | | | | | | | | | | | |
| Hordeum jubatum | foxtail barley | | 16.20 | | 0.08 | 3.63 | 12.50 | 0.50 | | | 1.00 | 25.80 | 3.00 | 1.58 | 0.50 | 2.70 |
| Hordeum pusillum | little barley | 1.60 | 0.50 | | 1.07 | 0.58 | 0.25 | | | | | | | | | |
| Koeleria macrantha | Junegrass | | | | | | 1.32 | | | | | | | | | |
| Leersia oryzoides | rice cutgrass | | | | | | | | | | | | | | | |
| Panicum dichotomiflorum | fall panicum | | | | | | | | | 0.08 | | | | | | 0.08 |
| Pascopyrum smithii | western wheatgrass | | 0.08 | 1.20 | 0.08 | 1.78 | | 1.77 | | 1.07 | 13.03 | | 3.00 | | | 1.17 |
| Phalaris arundinacea | reed canary grass | | 6.08 | | | | | 0.08 | | 1.15 | 13.63 | | | | | |
| Sphenopholis obtusata | prairie wedge grass | | | | | | | | | | | | | | | 0.50 |
| TOTAL NATIVE COOL-SEASON | | 1.60 | 31.78 | 1.28 | 3.42 | 7.33 | 17.47 | 5.08 | 0.00 | 3.05 | 27.67 | 26.38 | 6.00 | 5.98 | 0.50 | 7.92 |
| TOTAL ALL COOL- SEASON | | 49.18 | 74.02 | 49.58 | 70.60 | 78.22 | 49.68 | 123.6 | 56.92 | 115.9 | 61.17 | 26.47 | 90.17 | 67.23 | 70.10 | 49.77 |

**Table 3. Warm-season grass cover of the western 15 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 | COOK | DYER | CWRN1 | CWRN2 | CWREL | CWR_E | MRS_N | MRS_HN | MRS_M | MRS_HS | MRS_C | MRS_SW | CWR_SW | CWR_NW | CWR_NE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EXOTIC COOL-SEASON | | | | | | | | | | | | | | | | |
| ECHINOCHLOA CRUS-GALLI | barnyard grass | 0.50 | | | | 7.73 | | 0.25 | | | 3.05 | | | 0.25 | 0.17 | |
| ERAGROSTIS CILIANENSIS | stinkgrass | | | | | | | | | | | | | | | |
| SETARIA FABERI | Chinese foxtail | 0.50 | 1.07 | | | | | | | | 1.40 | | | | | |
| SETARIA PUMILA | yellow foxtail | | 1.48 | | | | | | | | | | | | 0.08 | |
| SETARIA VERTICILLATA | bristly foxtail | | 16.60 | | | | | | | 0.50 | | 7.67 | | | 0.50 | |
| SETARIA VIRIDIS | green foxtail | | 4.53 | | 0.53 | 0.50 | 0.50 | 0.50 | 0.50 | 1.32 | | 7.93 | | 0.50 | 1.32 | 0.53 |
| TOTAL EXOTIC WARM-SEASON | | 1.00 | 23.68 | 0.00 | 0.53 | 8.23 | 0.50 | 0.75 | 0.50 | 1.82 | 4.45 | 15.60 | 0.00 | 0.75 | 2.07 | 0.53 |
| | | | | | | | | | | | | | | | | |
| NATIVE WARM-SEASON | | | | | | | | | | | | | | | | |
| Andropogon gerardii | big bluestem | 29.12 | | 2.38 | 19.40 | 28.88 | 3.25 | 38.42 | 3.00 | 37.07 | 0.53 | 3.83 | 3.17 | 14.63 | 16.05 | 10.17 |
| Aristida purpurascens | three-awn | | | | 1.65 | | | | | | | | | | | |
| Bouteloua curtipendula | sideoats grama | | | | | 0.25 | 0.08 | 0.78 | | 2.10 | | | | 0.62 | 0.53 | 13.73 |
| Bouteloua dactyloides | buffalo grass | 3.00 | 0.50 | | | | | | | 2.38 | | | | | | |
| Bouteloua gracilis | blue grama | 1.48 | | 0.50 | | | | 0.50 | | 1.65 | | | | | | 2.20 |
| Bouteloua hirsuta | hairy grama | | | 0.50 | 0.08 | 0.08 | | | | | | | | | | |
| Chloris verticillata | windmill grass | 1.00 | | | 4.32 | 0.75 | | 0.53 | | 0.53 | | | | | | |
| Digitaria cognata | fall witchgrass | | | | | 2.18 | | | | 0.08 | | | | | | |
| Distichlis spicata | saltgrass | 0.62 | | 7.97 | | 30.72 | 0.17 | 1.00 | | | 3.50 | | 2.22 | 0.08 | 1.48 | 0.53 |
| Eragrostis pectinacea | tufted lovegrass | | | | 0.25 | | | | | | | | | | | |
| Eragrostis spectabilis | purple lovegrass | | | | 0.08 | | | | | | | | | | | |
| Hesperostipa comata | needle-n-thread | | | | 0.08 | | | 3.50 | | | | | | | | |
| Panicum capillare | witchgrass | | | | | | 0.08 | 0.08 | | 0.25 | | | | | | |
| Panicum virgatum | switchgrass | 0.08 | 3.50 | | 10.88 | 4.57 | 3.00 | 0.42 | | 9.70 | 2.38 | 1.00 | 0.08 | 0.17 | 3.62 | 6.70 |
| Paspalum setaceum | sand paspalum | | 0.08 | | 0.08 | 0.95 | | | | | | | | | | 1.32 |
| Schizachyrium scoparium | little bluestem | | | 0.62 | 7.67 | | 0.58 | 1.07 | 2.38 | 4.00 | | | | | 0.70 | 2.57 |
| Sorghastrum nutans | Indian grass | | | | 3.62 | 0.53 | | 5.90 | | 1.77 | | 1.03 | | 6.70 | 6.62 | 16.52 |
| Spartina pectinata | prairie cordgrass | 0.50 | 0.50 | | 1.60 | 17.07 | | 0.50 | | 0.50 | 2.20 | | | | | |
| Sporobolus airoides | alkali sacaton | 0.50 | | 4.18 | | | | | | | | | | | | |
| Sporobolus compositus | tall dropseed | 0.08 | 9.47 | | 1.23 | 0.50 | | 5.65 | | 1.90 | 0.50 | | | | | 0.08 |
| Sporobolus cryptandrus | sand dropseed | | 5.22 | | 4.82 | 3.47 | 0.25 | 0.33 | 1.40 | 0.08 | 0.50 | | | 0.50 | 0.08 | 0.08 |
| TOTAL NATIVE WARM-SEASON | | 36.38 | 19.27 | 16.15 | 55.77 | 89.95 | 7.42 | 58.68 | 6.78 | 62.02 | 9.62 | 5.87 | 5.47 | 22.70 | 29.08 | 53.90 |
| TOTAL WARM-SEASON | | 36.38 | 19.27 | 16.15 | 55.77 | 89.95 | 7.42 | 58.68 | 6.78 | 62.02 | 9.62 | 5.87 | 5.47 | 22.70 | 29.08 | 53.90 |

**Table 4. Grass-like species for western 15 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 | CWRN1 | CWRN2 | 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 | | | | | | | | | | 0.08 | | | 0.50 | | |
| Bolboschoenus maritimus | salt-marsh bulrush | | | | | | | | | | | | | | | |
| Carex blanda | woodland sedge | | | | | | | | | | | | | | | |
| Carex brevior | short-beak sedge | | | 1.12 | 4.37 | 1.62 | | 0.50 | | | | | | 0.58 | | |
| Carex gravida | heavy-fruit sedge | | | | | | | | | | | | | | | |
| Carex grisea | gray wood sedge | | | | | 0.50 | | | | | | | | | | |
| Carex pellita | woolly sedge | | | | | | | | | | | | | | | |
| Carex praegracilis | clustered field sedge | | | | 2.97 | 11.97 | | | | | | | 1.15 | | | |
| Carex spp. | sedge | | 28.12 | 9.23 | 3.95 | 15.85 | 3.20 | 7.88 | | 0.17 | 0.08 | | | 0.53 | 0.67 | 0.50 |
| Carex vulpinoidea | fox sedge | | | | | | | | | | | | | | | |
| Cyperus lupulinus | Great Plains flatsedge | | | | | | | | | | | | | 0.50 | | |
| Cyperus schweinitzii | sand flatsedge | | | | 0.50 | | | | | | | | | | | |
| Eleocharis compressa | flat-stem spikerush | | | | 5.92 | | | 0.53 | | 2.13 | | | | | | |
| Eleocharis palustris | marsh spikerush | | 0.53 | | | | | | | | | | | 1.40 | | |
| Eleocharis sp. | spikerush | | | | | | | | | | | | | | | |
| Schoenoplectus pungens | three-square bulrush | | | | | 1.23 | | | | | 5.22 | | 3.75 | 18.73 | 0.17 | 0.17 |
| **TOTAL GRASS-LIKE** | | **0.00** | **28.65** | **10.35** | **17.70** | **31.17** | **3.20** | **8.92** | **0.00** | **2.30** | **5.38** | **0.00** | **4.90** | **22.25** | **0.83** | **0.67** |

## Table 5. Bare ground and litter for western 15 sites.

| SPECIES | COOK | DYER | CWRN1 | CWRN2 | CWREL | CWR_E | MRS_N | MRS_HN | MRS_M | MRS_HS | MRS_C | MRS_SW | CWR_SW | CWR_NW | CWR_NE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BARE GROUND | 27.47 | 67.70 | 6.80 | 33.52 | 56.13 | 22.52 | 16.02 | 2.90 | 4.72 | 12.22 | 35.88 | 31.85 | 60.70 | 73.07 | 15.22 |
| LITTER | 66.60 | 92.55 | 81.47 | 157.48 | 115.22 | 58.75 | 173.37 | 89.75 | 138.03 | 51.53 | 24.08 | 47.42 | 44.05 | 28.20 | 112.43 |

## Table 6. Cover of exotic forb species on western 15 sites.

| EXOTIC FORB SPECIES | COMMON NAME | COOK | DYER | CWRN 1 | CWRN 2 | CWREL | CWR_E | MRS_ N | MRS_H N | MRS_ M | MRS_H S | MRS_C | MRS_S W | CWR_S W | CWR_ NW | CWR_ NE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ATRIPLEX PATULA | common spearscale | | | | | | | | | | 1.48 | | | | | |
| CANNABIS SATIVA | hemp | 4.98 | 5.03 | 0.50 | 1.08 | 3.57 | 28.22 | 3.50 | 1.00 | | 0.50 | 0.50 | | 0.50 | 1.28 | 1.28 |
| CARDUUS NUTANS | musk thistle | 0.50 | 2.98 | 0.67 | 1.00 | 6.98 | 0.50 | 1.00 | 0.58 | 1.82 | 0.17 | | | 0.50 | 1.00 | 0.08 |
| CHENOPODIUM ALBUM | lamb's-quarters | 2.10 | 3.70 | | 0.08 | 0.08 | 1.12 | 1.57 | 6.08 | 1.82 | 1.48 | 14.93 | | 0.70 | 0.58 | 0.08 |
| CHENOPODIUM GLAUCUM | oak-leaf goosefoot | 0.50 | | | | | | | | | 10.62 | | | | | |
| CIRSIUM ARVENSE | Canada thistle | | 1.00 | | | | | | | | 3.00 | | 3.50 | 0.50 | | 1.25 |
| CIRSIUM VULGARE | bull thistle | 3.00 | | | | | | | | 0.08 | | 0.62 | 0.08 | 0.08 | | 0.62 |
| CONIUM MACULATUM | poison-hemlock | | | | | | | | | | | | | 0.50 | | 0.50 |
| CONVOLVULUS ARVENSIS | field bindweed | | | | | | | | 32.45 | 0.08 | | | 0.08 | 0.17 | | 0.53 |
| DESCURAINIA SOPHIA | flix-weed tansy mustard | | | | | | | | | 0.50 | | | | | | |
| KALI TRAGUS | prickly Russian-thistle | 0.08 | 4.25 | | | | | | | | | | | | | |
| LACTUCA SERRIOLA | prickly lettuce | | 0.58 | 0.50 | 0.08 | | | | | | 0.08 | 0.08 | | | | |
| LEPIDIUM LATIFOLIUM | broad-leaf pepper-grass | | 1.00 | | | | | | | | | | | | | |
| MEDICAGO LUPULINA | black medick | 3.53 | 6.25 | 3.13 | 24.85 | 34.50 | 0.58 | 25.88 | | 53.07 | 1.85 | | 2.43 | 3.00 | 6.42 | 2.60 |
| MEDICAGO SATIVA | alfalfa | 0.50 | 0.53 | | | | | 0.50 | 1.50 | | | | | | | |
| MELILOTUS ALBUS | white sweet-clover | | 10.45 | | | 1.00 | | 1.32 | 0.50 | 1.65 | | | | 1.03 | 11.27 | 0.50 |
| MELILOTUS OFFICINALIS | yellow sweet-clover | | | | | 1.00 | | 2.35 | 1.25 | 1.75 | 1.62 | | 0.42 | 1.08 | 6.78 | 8.77 |
| MOLLUGO VERTICILLATA | green carpet-weed | | | | 0.08 | | | | | | | | | | | |
| MORUS ALBA | white mulberry | | 3.50 | | | | | | 0.50 | | | | | | 1.00 | |
| NEPETA CATARIA | catnip | | 1.08 | | | 0.50 | | | | | | 2.12 | | | 0.50 | 0.50 |
| POLYGONUM AVICULARE | yard knotweed | | | | 0.08 | | | | 0.50 | | | | | | | |
| RUMEX CRISPUS | curly dock | | 1.03 | 0.50 | | 0.50 | 0.50 | | | | 0.50 | | | 1.00 | 0.50 | |
| SISYMBRIUM LOESELII | tall hedge mustard | 0.50 | 6.17 | | 0.50 | | | | 0.50 | 0.50 | | | | 1.50 | 0.53 | 1.82 |
| SONCHUS ASPER | prickly sow-thistle | | | | | | | | | | | 0.50 | | | | |
| TARAXACUM OFFICINALE | common dandelion | | 0.58 | | 0.50 | 0.58 | 0.08 | 0.50 | 0.50 | 0.50 | 1.40 | | | 5.18 | 0.78 | 2.18 |
| THLASPI ARVENSE | field penny cress | 0.50 | 0.58 | 0.08 | 0.50 | 0.50 | | 0.08 | 4.00 | 0.67 | 0.08 | | | 0.08 | | |
| TRAGOPOGON DUBIUS | yellow goat's-beard | 0.50 | 2.25 | 1.00 | 1.57 | 0.50 | | 2.50 | 1.08 | 1.03 | 0.50 | | | | | |
| TRIFOLIUM REPENS | white clover | | | | 0.08 | | | | | | | | | | 0.08 | 0.08 |
| Ukn Forb | forb | | | | | | | | 0.08 | | | | | | | |
| ULMUS PUMILA | Siberian elm | | | | | | | | | | | | | | 0.50 | |
| VERBASCUM THAPSUS | common mullein | | 1.00 | 0.08 | 0.33 | 0.67 | | 0.50 | | | | | | 1.00 | 1.00 | |
| TOTAL EXOTIC FORBS | | 16.70 | 51.98 | 6.47 | 30.75 | 50.38 | 31.00 | 39.70 | 50.53 | 63.47 | 23.28 | 18.75 | 6.52 | 16.83 | 32.23 | 20.80 |

## Table 7. Cover of native forb species on western 15 sites.

| NATIVE FORB SPECIES | COMMON NAME | COOK | DYER | CWRN 1 | CWRN 2 | CWREL | CWR_E | MRS_N | MRS_H N | MRS_ M | MRS_H S | MRS_C | MRS_S W | CWR_S W | CWR_ NW | CWR_ NE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Achillea millefolium | western yarrow | | | | | 0.50 | | 0.50 | | 0.50 | | | | | | |
| Acmispon americanus | prairie trefoil | | | 0.17 | | | | | | | | | | | | |
| Amaranthus retroflexus | redroot pigweed | | | | | | | | | | | 0.08 | | | | |
| Ambrosia artemisiifolia | common ragweed | 4.02 | 16.42 | | | | | 10.07 | | 0.92 | 9.33 | 0.50 | | 0.53 | | |
| Ambrosia psilostachya | western ragweed | 0.42 | 4.05 | 2.18 | 37.10 | 61.12 | 5.18 | 1.12 | | | 0.50 | | 0.33 | 0.92 | 3.95 | 1.08 |
| Ambrosia trifida | giant ragweed | | | | 0.62 | | | | 0.50 | | | 1.68 | | 1.00 | | |
| Amorpha fruticosa | false indigo-bush | | | 0.17 | | | | | | | | | | | | |
| Antennaria neglecta | field pussytoes | | | | 0.62 | | | | | | | | | | | |
| Apocynum cannabinum | hemp dogbane | | 0.50 | 0.58 | | | 0.50 | | | | 2.22 | | 0.08 | 0.50 | 0.50 | 0.58 |
| Arnoglossum plantagineum | Indian-plantain | | | | | | | | | | | | | | | |
| Artemisia ludoviciana | white sage | | | | | | | 0.50 | | | | | | | | |
| Asclepias sp. | milkweed | | | 0.78 | 0.08 | | | | | | | | | | | |
| Asclepias speciosa | showy milkweed | | 1.08 | | | 0.50 | 0.50 | 0.50 | | | 0.50 | 0.50 | | 2.00 | | |
| Asclepias syriaca | common milkweed | | 0.08 | 0.50 | | 0.50 | | | 3.00 | | | | | | | 1.00 |
| Asclepias verticillata | whorled milkweed | 1.00 | | | 0.25 | 1.00 | | 0.08 | 3.00 | 1.17 | 0.50 | | | | | |
| Asclepias viridiflora | green milkweed | | | | | | | 1.00 | | 1.00 | | | | 1.00 | | |
| ATRIPLEX PROSTATA | thin-leaf spearcale | | | | | | | | | | | | | 2.38 | | |
| Callirhoe involucrata | purple poppy-mallow | 1.28 | 9.50 | 1.00 | 5.52 | 2.78 | 0.75 | 4.82 | 6.00 | 12.93 | 3.88 | | | | | |
| Chenopodium berlandieri | pitseed goosefoot | 0.50 | 2.82 | | | | | | | | | | | | | |
| Chenopodium pratericola | desert goosefoot | | 0.78 | | 0.08 | | | 1.00 | | | | | | 0.50 | | |
| Cirsium altissimum | tall thistle | | | | | | | | | | | | | | 1.00 | |
| Cirsium canescens | Platte thistle | | | | | 0.50 | | | | | | | | | | |
| Cirsium flodmanii | Flodman's thistle | 0.53 | | | | 0.08 | | 2.00 | 3.50 | 0.08 | | | | | | |
| Cirsium undulatum | wavy-leaf thistle | | | | 0.08 | | | 0.50 | | 1.03 | 0.50 | | | | | 0.50 |
| Conyza canadensis | horseweed | | 0.58 | 0.50 | 0.17 | 0.08 | | 0.50 | 0.25 | 1.00 | | 2.15 | | 0.17 | 0.50 | |
| Cornus drummondii | rough-leaf dogwood | | | | | | 7.88 | | | | | | | | | |
| Croton texensis | Texas croton | | 0.50 | | | | | 2.55 | | | | | | | | |
| Cyclachaena xanthiifolia | giant marsh-elder | | | | | | 3.00 | 0.50 | | | 0.58 | | | | | |
| Dalea purpurea | purple prairie-clover | | | | | | | 1.12 | | | | | | | | 0.50 |
| Dalea villosa | silky prairie-clover | | | | | | | | | | | | | | | |
| Desmanthus illinoensis | Illinois bundleflower | | | | | | | 0.08 | | | | | | | 10.43 | 0.25 |
| Desmodium illinoense | Illinois tick-clover | | | | | 1.50 | | | | | | | | | | |
| Equisetum arvense | field horsetail | 0.50 | | | | | | 0.50 | | 1.20 | | | | | | |
| Equisetum laevigatum | smooth scouring-rush | | | | 0.33 | | 0.62 | | | 1.08 | 0.17 | | 0.50 | | | |

| NATIVE FORB SPECIES | COMMON NAME | COOK | DYER | CWRN 1 | CWRN 2 | CWREL | CWR_E | MRS_N | MRS_H N | MRS_ M | MRS_H S | MRS_C | MRS_S W | CWR_S W | CWR_ NW | CWR_ NE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Erigeron strigosus | daisy fleabane | | | | | | | | | | | | | | | |
| Eupatorium altissimum | tall boneset | | | 0.50 | | | | | | | | 13.47 | | | 0.50 | |
| Euphorbia davidii | western toothed spurge | | | | 0.75 | | | | | | | | | | | |
| Euphorbia maculata | spotted spurge | | | | 0.08 | 0.17 | | | | 0.70 | | | | | | |
| Euphorbia marginata | snow-on-the-mountain | 0.62 | 0.17 | 1.00 | 3.92 | 1.83 | | 0.42 | | | | | | | | |
| Euphorbia serpyllifolia | thyme-leaf spurge | | | | 0.08 | | | 0.25 | | | | | | | | |
| Eustoma russellianum | prairie-gentian | | | | 0.50 | | | | | | | | | | | |
| Euthamia gymnospermoides | viscid goldentop | | | | | | | | | | | 2.55 | | | | |
| Fallopia scandens | climbing false-buckwheat | | 0.50 | | | | 1.32 | | | | | | | | | |
| Fraxinus pennsylvanica | green ash | | | | | | 0.53 | | | | | | | | | |
| Galium aparine | catch-weed bedstraw | | | | | | 0.08 | | | | | | | | | |
| Glycyrrhiza lepidota | wild licorice | | | | 0.08 | | | | | | | | 0.08 | | 0.62 | |
| Grindelia squarrosa | curly-top gumweed | | | | 0.17 | | 0.17 | | | | | | | | | |
| Hedeoma hispida | rough false-pennyroyal | | | | 0.70 | | | 0.50 | | | | | | | | |
| Helianthus annuus | common sunflower | 0.50 | 4.20 | | | | 3.17 | 1.00 | | 0.50 | 0.17 | 4.02 | 0.58 | 1.17 | 5.37 | 2.25 |
| Helianthus grosseserratus | sawtooth sunflower | | | | | | | | | | | | | | | 0.33 |
| Helianthus maximiliani | Maximilian's sunflower | | | | | | | | | | | 10.17 | | | 1.65 | |
| Helianthus pauciflorus | stiff sunflower | | | | | | | | | | | 1.23 | | | | |
| Helianthus petiolaris | plains sunflower | | 5.00 | | | 0.67 | | | | | | 0.62 | | | | 0.17 |
| Iva annua | annual marsh-elder | | 3.40 | | | 0.50 | | | | | | | 2.12 | 1.00 | | 0.67 |
| Juncus balticus | Baltic rush | | | | | | | | | 0.08 | | | | | | |
| Juncus dudleyi | Dudley's rush | | | | | 0.08 | | | | | | | | | | |
| Juncus nodosus | knotted rush | | 3.72 | | | 0.50 | | | | | | | | | | |
| Juncus sp. | rush | | 0.08 | | | | | | | | | | | | | |
| Juniperus virginiana | eastern red-cedar | | | | | | | | | | | | | | | 0.50 |
| Lactuca ludoviciana | western wild lettuce | | | | | | | | | | | | | | | |
| Lepidium densiflorum | prairie pepper-grass | | 0.50 | | 0.17 | | 1.00 | 0.50 | | | | | | | | |
| Liatris glabrata | plains gayfeather | | | | | | | | | 0.50 | | | | | | |
| Liatris punctata | dotted gayfeather | | | | | | | | | 0.50 | | | | | | |
| Linum sulcatum | grooved flax | | | | | | | | | | | | | | | |
| Lithospermum incisum | fringed puccoon | | | | 0.62 | | | 0.50 | | | | | | | | |
| Lithospermum occidentale | marble-seed | | | | | | | | | 0.50 | | | | | | |
| Mentha canadensis | Canada mint | | 0.53 | | | | | | | | | | | | | |
| Mirabilis linearis | narrow-leaf four-o'clock | | | | | | | 1.32 | | | | | | | | |
| Monarda fistulosa | wild-bergamot | | | | | | | | | | | | | | | |
| Oenothera curtiflora | velvet butterfly-plant | | | | | 1.00 | | | 3.00 | | | | | | | |
| Oenothera serrulata | plains yellow-primrose | | | | | | | 0.50 | | | | | | | | |
| Oxalis dillenii | gray-green wood-sorrel | | | | | | | | | | | | | | 0.70 | |
| Oxalis stricta | yellow wood-sorrel | | 0.33 | | 0.95 | 0.58 | 0.08 | 0.25 | 0.92 | 1.48 | 0.50 | | | 1.37 | | |

| NATIVE FORB SPECIES | COMMON NAME | COOK | DYER | CWRN 1 | CWRN 2 | CWREL | CWR_E | MRS_N | MRS_H N | MRS_ M | MRS_H S | MRS_C | MRS_S W | CWR_S W | CWR_ NW | CWR_ NE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Packera plattensis | prairie ragwort | | | | 0.62 | | | | | | | | | | | |
| Parthenocissus quinquefolia | Virginia creeper | | | | | | | | | | | | | | | |
| Persicaria amphibia | water smartweed | | | | 0.08 | | | | | | | | | | | |
| Phyla lanceolata | northern fogfruit | | | | | 0.50 | | | | | 0.50 | | | | | |
| Physalis heterophylla | clammy ground-cherry | | | | | | | 0.50 | 3.00 | | | | | | | |
| Physalis longifolia | common ground-cherry | | | 0.08 | | | | | | | | | | | | 3.60 |
| Physalis virginiana | Virginia ground-cherry | 29.70 | 1.00 | | | | 2.62 | 1.17 | 1.20 | 0.08 | 0.50 | 1.00 | | 1.00 | 0.67 | |
| Plantago patagonica | woolly plantain | | | | 0.75 | | | 1.20 | | | | | | | | |
| Plantago virginica | pale-seed plantain | | | | 0.17 | | | | | | | | | | | |
| Populus deltoides | plains cottonwood | | 13.68 | | | | | | | | 0.53 | | | | 0.50 | |
| Portulaca oleracea | garden purslane | | | | 0.17 | 0.53 | | | | | | | | | | |
| Potentilla paradoxa | bushy cinquefoil | | 2.12 | | | | | | | | | | | | | |
| Ratibida columnifera | upright prairie-coneflower | | | | | | | | | 1.00 | | | | | | 0.50 |
| Ribes odoratum | buffalo currant | | | | | | | 0.50 | | | | | | | | |
| Rosa arkansana | dwarf prairie rose | | | | 0.50 | | 0.53 | 0.53 | | | | | | | | |
| Rosa woodsii | western wild rose | | | 2.30 | 1.48 | | 0.50 | | | | | | | | | |
| Rudbeckia hirta | black-eyed Susan | | | | | | | 0.50 | | | | | | | | |
| Silene antirrhina | sleepy catchfly | | | 0.50 | 0.62 | | | | | | 0.50 | 0.50 | | | | |
| Sisyrinchium montanum | strict blue-eyed-grass | | | | | | | | | | 0.50 | | | | | |
| Solanum rostratum | buffalo-bur | 1.40 | 1.00 | | 1.08 | 2.25 | | 0.50 | | 0.50 | 0.70 | | | | 0.50 | 0.50 |
| Solidago canadensis | Canada goldenrod | | | | | | 0.17 | | | | 0.50 | | 0.70 | 0.50 | 0.58 | 5.60 |
| Solidago gigantea | late goldenrod | | | | | | | | | | | | | | | 0.53 |
| Solidago missouriensis | Missouri goldenrod | | 1.00 | | | | 0.08 | | | | | | | | | 0.08 |
| Solidago mollis | ashy goldenrod | | | | | 1.00 | | | | | | | | | | |
| Solidago rigida | stiff goldenrod | | 0.08 | 0.08 | | | | | | | | | | | | |
| Symphyotrichum ericoides | heath aster | | | 0.67 | 0.78 | | 0.53 | | | | 1.50 | | | | 0.78 | 0.70 |
| Symphyotrichum lanceolatum | tall white aster | | | | | | | | 0.08 | | | | | 1.00 | 0.17 | 0.58 |
| Toxicodendron radicans | eastern poison ivy | | 0.50 | | | | | | | | | | | | | |
| Tradescantia bracteata | long-bract spiderwort | | | | | 0.50 | | | | | | | | | | |
| Triglochin maritima | shore arrow-grass | | | | | | | | | | | | | | | |
| Verbena bracteata | prostrate vervain | | | | | 1.08 | | | | | | | | | | |
| Verbena stricta | hoary vervain | 0.50 | 2.48 | 1.50 | 4.03 | 3.85 | 1.03 | 2.87 | | 1.58 | 0.50 | | 0.50 | | 0.67 | 0.58 |
| Vernonia baldwinii | western ironweed | | | | | 1.00 | | | | | | | | 1.00 | | 0.53 |
| Vernonia fasciculata | prairie ironweed | | | | | 0.50 | | | | | | | | | | |
| Viola pedatifida | prairie violet | | | | 0.17 | | | | | | | | | | | |
| Xanthium strumarium | cocklebur | | 0.50 | | | | | | | | | | | | 0.50 | |
| TOTAL NATIVE FORBS | | 40.97 | 77.12 | 12.52 | 63.32 | 85.12 | 30.25 | 40.33 | 24.45 | 28.35 | 24.58 | 38.47 | 4.90 | 16.03 | 29.58 | 21.05 |

**Table 8. Cool-season grass cover of the eastern 15 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 | SLWD | McC_N | McC_S | WY_S | HOST | BIN_NM | BIN_NH | BIN_SH | BIN_S | BIN_E | BIN_W | BIN_WH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EXOTIC COOL-SEASON | | | | | | | | | | | | | | | |
| AGROSTIS GIGANTEA | redtop | | 1.23 | | | 0.50 | | | 1.65 | 16.88 | 0.83 | | 0.17 | 3.28 | |
| AGROSTIS STOLONIFERA | creeping bentgrass | | | | | | 0.53 | | 3.40 | | | 3.50 | 6.92 | | 6.62 |
| BROMUS INERMIS | smooth brome | 21.28 | 6.70 | 74.50 | 1.93 | 5.43 | 2.55 | | 1.57 | | 21.10 | 6.08 | 2.67 | | 4.85 |
| BROMUS JAPONICUS | Japenese brome | 20.02 | 3.33 | | 11.70 | 6.77 | 0.62 | 1.62 | 10.33 | | 0.50 | 2.92 | | | |
| BROMUS TECTORUM | downy brome | 30.13 | 1.00 | 0.50 | 14.17 | 9.07 | 0.08 | 3.00 | 3.02 | 0.53 | | 0.50 | 0.53 | 0.50 | |
| PHLEUM PRATENSE | timothy | | 0.50 | | | | | | | 0.62 | | | | | |
| POA COMPRESSA | Canada bluegrass | 0.25 | 34.35 | 4.55 | 0.78 | 0.78 | 3.00 | | 4.48 | 4.68 | 0.08 | | 2.63 | | |
| POA PRATENSIS | Kentucky bluegrass | 15.22 | 3.67 | 8.68 | 0.58 | 0.08 | 2.83 | | 20.38 | | | 8.18 | 11.60 | 1.23 | |
| SCHEDONORUS ARUNDINACEUS | tall fescue | | | | | | 17.12 | | | 1.15 | | | | | |
| SCHEDONORUS PRATENSIS | meadow fescue | | | | | | 10.78 | | | | | | | | 0.08 |
| THINOPYRUM PONTICUM | tall wheatgrass | | 7.83 | | 0.50 | 0.62 | 4.87 | | | | | | | | |
| TRITICUM AESTIVUM | bread wheat | | | | | | | 5.02 | | | | | | | |
| TOTAL EXOTIC COOL-SEASON | | 86.90 | 58.62 | 88.23 | 29.67 | 23.25 | 42.38 | 9.63 | 44.83 | 23.87 | 22.52 | 21.18 | 24.52 | 5.02 | 11.55 |
| | | | | | | | | | | | | | | | |
| NATIVE COOL-SEASON | | | | | | | | | | | | | | | |
| Calamagrostis stricta | northern reedgrass | 1.32 | | | | | | | | 0.50 | | 0.50 | 11.47 | 7.28 | |
| Dichanthelium acuminatum | western panicum | | | | | | | | 0.70 | | 0.62 | | | 0.08 | |
| Dichanthelium oligosanthes | Scribner's panicum | 8.63 | 2.38 | | 1.40 | 1.37 | 0.50 | | 3.38 | | 0.50 | | | | 0.08 |
| Elymus sp. | | 0.50 | | | | | | 15.03 | | | | | | | |
| Elymus canadensis | Canada wild-rye | 0.83 | 0.17 | | 1.00 | | | | | | | 0.50 | | | |
| Elymus virginicus | Virginia wild-rye | | | | | 0.50 | | | | 0.62 | | | | | |
| Hordeum jubatum | foxtail barley | 3.58 | 4.62 | | 0.08 | 0.58 | 2.10 | | 1.58 | | | | 4.25 | 4.97 | |
| Hordeum pusillum | little barley | 0.70 | | | 6.42 | 6.92 | 1.00 | | 1.07 | | | | | 0.50 | |
| Koeleria macrantha | Junegrass | | | | | | | | | | | | | | 0.50 |
| Leersia oryzoides | rice cutgrass | | | | | | | | | | | | 1.03 | | |
| Panicum dichotomiflorum | fall panicum | | | | | | | | | 3.78 | | | | | |
| Pascopyrum smithii | western wheatgrass | 0.25 | 1.23 | | 0.75 | 0.17 | 0.78 | 20.35 | 0.08 | | | 0.08 | | 1.70 | |
| Phalaris arundinacea | reed canary grass | 23.82 | 6.42 | | 5.22 | 3.00 | | | 0.50 | 3.00 | | | | | |
| Sphenopholis obtusata | prairie wedge grass | 0.08 | | | | | | | | | | | 0.08 | 0.08 | |
| TOTAL NATIVE COOL-SEASON | | 39.72 | 14.82 | 0.00 | 14.87 | 12.53 | 4.38 | 35.3 | 7.32 | 7.90 | 1.12 | 1.08 | 16.83 | 14.62 | 0.58 |
| TOTAL ALL COOL- SEASON | | 126.62 | 73.43 | 88.23 | 44.53 | 35.78 | 46.77 | 45.0 | 52.15 | 31.77 | 23.63 | 22.27 | 41.35 | 19.63 | 12.13 |

**Table 9. Grass-like species for eastern 15 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 | SLWD | McC_N | McC_S | WY_S | HOST | BIN_NM | BIN_NH | BIN_SH | BIN_S | BIN_E | BIN_W | BIN_WH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bolboschoenus fluviatilis | river bulrush | | | | | | | | | | | | | | |
| Bolboschoenus maritimus | salt-marsh bulrush | | 1.20 | | | | | | | | | | | | |
| Carex blanda | woodland sedge | | 0.17 | | | | | | | | 0.50 | | | | |
| Carex brevior | short-beak sedge | 5.85 | 5.52 | 1.07 | 1.23 | 1.73 | 0.08 | | 0.50 | | 0.50 | 0.50 | 0.50 | | 0.50 |
| Carex gravida | heavy-fruit sedge | | | | | | | | | | 0.08 | | | | |
| Carex grisea | gray wood sedge | 0.58 | | | | | | | | | | | | | 0.08 |
| Carex pellita | woolly sedge | | 0.62 | | | | | | | 3.95 | | | | | 0.53 |
| Carex praegracilis | clustered field sedge | | 2.18 | | | | | | | 7.23 | | | | | |
| Carex spp. | sedge | 26.00 | 1.28 | | 2.38 | 2.27 | | | 3.52 | | 8.92 | 10.08 | 25.73 | 13.40 | 2.02 |
| Carex vulpinoidea | fox sedge | | 0.50 | | | | | | | | | | 20.18 | | |
| Cyperus lupulinus | Great Plains flatsedge | 0.50 | | | | | | | | | | | | | |
| Cyperus schweinitzii | sand flatsedge | 0.95 | | | | | | | | | | | | | |
| Eleocharis compressa | flat-stem spikerush | | 0.62 | | 0.70 | 0.70 | | | 17.93 | | 0.67 | 3.17 | 14.08 | 7.40 | 0.70 |
| Eleocharis palustris | marsh spikerush | 4.40 | 0.50 | | 2.63 | 2.63 | 0.50 | | | | | | 8.38 | | |
| Eleocharis sp. | spikerush | | | | | | | | 0.08 | | | | 1.07 | | |
| Schoenoplectus pungens | three-square bulrush | 11.10 | 1.28 | | 6.95 | 1.93 | 1.03 | | | | | | 6.67 | 1.82 | |
| **TOTAL GRASS-LIKE** | | **49.38** | **13.87** | **1.07** | **13.90** | **9.27** | **1.62** | **0.00** | **22.03** | **11.18** | **10.67** | **13.75** | **76.62** | **22.62** | **3.83** |

**Table 10. Bare ground and litter for eastern 15 sites.**

| SPECIES | JHNS_N | JHNS_S | SLWD | McC_N | McC_S | WY_S | HOST | BIN_NM | BIN_NH | BIN_SH | BIN_S | BIN_E | BIN_W | BIN_WH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BARE GROUND | 126.82 | 16.43 | 0.08 | 125.53 | 68.07 | 18.92 | 196.98 | 64.65 | 8.37 | 2.07 | 2.40 | 17.40 | 5.65 | |
| LITTER | 220.10 | 168.17 | 97.25 | 62.95 | 36.40 | 77.03 | 20.45 | 134.32 | 44.87 | 57.17 | 80.08 | 137.15 | 43.38 | 43.13 |

**Table 11. Warm-season grass cover of the eastern 15 sites**. Cover of individual cool-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 cool-season cover. Cover is given as canopy cover therefore, the total cover may exceed 100%.

| SPECIES | COMMON NAME | JHNS_N | JHNS_S | SLWD | McC_N | McC_S | WY_S | HOST | BIN_NM | BIN_NH | BIN_SH | BIN_S | BIN_E | BIN_W | BIN_WH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EXOTIC COOL-SEASON | | | | | | | | | | | | | | | |
| ECHINOCHLOA CRUS-GALLI | barnyard grass | | 0.08 | | 1.90 | 1.65 | 0.50 | | | | | | | | |
| ERAGROSTIS CILIANENSIS | stinkgrass | 0.08 | | | 3.33 | 3.33 | 0.70 | | | | | | | | |
| SETARIA FABERI | Chinese foxtail | | | | | | | 0.62 | | | | | | | |
| SETARIA PUMILA | yellow foxtail | | | 0.50 | 0.17 | 0.17 | | 0.53 | | | | | | | |
| SETARIA VERTICILLATA | bristly foxtail | 0.50 | | | | | | 28.87 | | | | | | | |
| SETARIA VIRIDIS | green foxtail | 5.22 | | | 0.67 | 0.50 | 0.25 | 27.50 | 0.53 | | | | | | |
| TOTAL EXOTIC WARM-SEASON | | 5.80 | 0.08 | 0.50 | 6.07 | 5.65 | 1.45 | 57.52 | 0.53 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | | | | | | | | | | | | | |
| NATIVE WARM-SEASON | | | | | | | | | | | | | | | |
| Andropogon gerardii | big bluestem | | 8.10 | | 0.50 | | | | 35.85 | 1.15 | 4.60 | 5.02 | 3.70 | 5.00 | 5.92 |
| Aristida purpurascens | three-awn | 0.50 | | | | | 0.50 | | | | | | | | |
| Bouteloua curtipendula | sideoats grama | | | | | 0.50 | | 5.18 | 0.58 | | | | | 5.00 | 2.10 |
| Bouteloua dactyloides | buffalo grass | | | | | | | | | | | | | | |
| Bouteloua gracilis | blue grama | | 0.08 | | 5.43 | 2.77 | | 6.58 | | | | | | | |
| Bouteloua hirsuta | hairy grama | | | | | | | | | 0.62 | | | | | |
| Chloris verticillata | windmill grass | | | 0.50 | 0.95 | 0.95 | 1.15 | | 1.85 | 0.53 | | | | | |
| Digitaria cognata | fall witchgrass | | 0.25 | | | | | | | | | | | 0.17 | |
| Distichlis spicata | saltgrass | | 0.78 | | 0.62 | 0.62 | 1.03 | | | | | 0.53 | 16.63 | 6.37 | |
| Eragrostis pectinacea | tufted lovegrass | | | | | 0.50 | | | 0.25 | | | | | | |
| Eragrostis spectabilis | purple lovegrass | | | | | | | | 0.58 | | | | | | |
| Hesperostipa comata | needle-and-thread | | | | | | | 0.53 | 0.08 | | | | | | |
| Panicum capillare | common witchgrass | 0.42 | | | | | | 2.38 | | | | | | | |
| Panicum virgatum | switchgrass | 4.85 | 4.12 | 0.50 | 5.92 | 2.60 | 0.50 | 1.08 | 12.62 | | 0.78 | 5.02 | 15.83 | 13.57 | 1.15 |
| Paspalum setaceum | sand paspalum | 5.07 | 0.62 | | 0.50 | | 0.58 | 0.08 | 0.08 | | | | | | |
| Schizachyrium scoparium | little bluestem | | | 0.50 | | | | | 10.75 | | | 0.33 | | | 0.42 |
| Sorghastrum nutans | Indian grass | | 0.58 | | 0.17 | 0.17 | | | 3.87 | 5.37 | 0.17 | | 0.08 | | 3.90 |
| Spartina pectinata | prairie cordgrass | 17.70 | 39.75 | | 4.00 | | | | 5.60 | | 1.90 | 6.17 | 20.82 | 1.58 | 7.07 |
| Sporobolus airoides | alkali sacaton | | | | | | | | | | | | | | |
| Sporobolus compositus | tall dropseed | 3.97 | 1.68 | 2.90 | 3.33 | 3.33 | | | 3.70 | | | 0.50 | | 0.50 | |
| Sporobolus cryptandrus | sand dropseed | 24.65 | | | 2.27 | 2.27 | 7.23 | | 1.23 | | | | | | |
| TOTAL NATIVE WARM-SEASON | | 57.15 | 55.97 | 4.40 | 23.68 | 13.70 | 11.0 | 15.8 | 77.05 | 7.67 | 7.45 | 17.57 | 57.07 | 32.18 | 20.55 |
| TOTAL WARM-SEASON | | 57.15 | 55.97 | 4.40 | 23.68 | 13.70 | 11.0 | 15.8 | 77.05 | 7.67 | 7.45 | 17.57 | 57.07 | 32.18 | 20.55 |

## Table 12. Cover of exotic forbs on eastern sites.

| EXOTIC FORB SPECIES | COMMON NAME | JHNS_N | JHNS_S | SLWD | McC_N | McC_S | WY_S | HOST | BIN_NM | BIN_NH | BIN_SH | BIN_S | BIN_E | BIN_W | BIN_WH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ASPARAGUS OFFICINALIS | garden asparagus | 1.58 | | | | | | | | | | | | | |
| CANNABIS SATIVA | hemp | 7.70 | 6.47 | | 0.08 | 0.58 | 0.78 | 2.08 | 0.50 | | | | | | |
| CARDUUS NUTANS | musk thistle | 5.68 | 1.53 | 0.50 | 1.08 | 0.08 | 1.03 | | 1.83 | | | 0.50 | | | |
| CHENOPODIUM ALBUM | lamb's-quarters | 0.67 | | | 0.33 | 0.75 | | 39.00 | | | | | | | |
| CIRSIUM ARVENSE | Canada thistle | | | | | | | 0.50 | | | | | | | |
| CIRSIUM VULGARE | bull thistle | | | | | | | 0.58 | | | | | | | |
| CONIUM MACULATUM | poison-hemlock | 0.50 | 0.50 | | 0.50 | | | | | | | | | | |
| CONVOLVULUS ARVENSIS | field bindweed | 3.18 | 0.78 | | | | | | | | | | | | |
| DESCURAINIA SOPHIA | tansy mustard | | | | | | | 1.62 | | 2.22 | | | | | |
| ELAEAGNUS ANGUSTIFOLIA | Russian-olive | | | | 0.08 | 0.58 | | | | 1.32 | | | | | |
| EUPHORBIA VIRGATA | leafy spurge | 3.93 | | | | | | | 0.50 | | | | | | |
| KALI TRAGUS | Russian-thistle | | | | | | | 1.58 | | | | | | | |
| LACTUCA SERRIOLA | prickly lettuce | 0.08 | 0.50 | 0.50 | 0.50 | | | 0.50 | | | | | | | |
| LYTHRUM SALICARIA | purple loosestrife | 0.50 | | | | | | | | 0.33 | | | | 0.50 | |
| MEDICAGO LUPULINA | black medick | 5.80 | 1.37 | 0.17 | 16.95 | 16.95 | 6.17 | 0.17 | 20.47 | | 1.53 | 0.50 | 2.10 | 0.50 | 0.67 |
| MEDICAGO SATIVA | alfalfa | | | 0.50 | | | 0.62 | | | 0.08 | | | | | |
| MELILOTUS ALBUS | white sweet-clover | 1.85 | 0.50 | | 1.15 | 1.15 | 2.20 | 3.65 | | 3.00 | 1.00 | 0.50 | 0.08 | 1.00 | 5.53 |
| MELILOTUS OFFICINALIS | yellow sweet-clover | 1.00 | 0.50 | 0.50 | 0.17 | 0.17 | 0.33 | 1.53 | | 0.50 | | 0.50 | | | |
| MOLLUGO VERTICILLATA | green carpet-weed | 1.23 | | | | | | | | | | | | | |
| MORUS ALBA | white mulberry | 4.58 | 3.00 | 0.50 | | 3.00 | | | | | 0.50 | | | | |
| NEPETA CATARIA | catnip | | 0.58 | | 0.08 | | | | | | | | | | |
| POLYGONUM AVICULARE | yard knotweed | | | | 0.53 | 0.53 | 0.08 | 2.72 | | | | | | | |
| ROBINIA PSUEDOACAIA | black locust | | 1.00 | | | | | | | | | | | | |
| RUMEX CRISPUS | curly dock | 4.00 | | | 0.50 | 0.50 | 0.50 | | 0.50 | 0.50 | 1.00 | | 1.50 | 1.50 | |
| SISYMBRIUM LOESELII | tall hedge mustard | 0.08 | | | | | 0.50 | | | | | | | | |
| SONCHUS ASPER | prickly sow-thistle | | | | | | | 1.00 | | 6.35 | | | | | |
| TARAXACUM OFFICINALE | common dandelion | 0.50 | 1.50 | 0.50 | | | 0.08 | 1.00 | | 0.50 | 0.08 | 0.08 | 2.30 | 1.50 | |
| THLASPI ARVENSE | field penny cress | 1.83 | 0.50 | | | 3.00 | 1.00 | | 0.50 | | | | | | |
| TRAGOPOGON DUBIUS | yellow goat's-beard | 4.00 | | 0.50 | 0.50 | | | | 1.00 | | | 0.50 | | 1.00 | 1.50 |
| TRIFOLIUM FRAGIFERUM | strawberry clover | | | | | | 3.97 | | | 0.08 | | | | 0.50 | |
| TRIFOLIUM PRATENSE | red clover | | | | | | 1.03 | | | | | | | 0.50 | 1.00 |
| TRIFOLIUM REPENS | white clover | | | | | | 0.78 | | 0.08 | | | | | | |
| TYPHA ANGUSTIFOLIA | narrow-leaf cattail | 2.35 | | | 0.50 | 0.50 | | | | | | | | | |
| ULMUS PUMILA | Siberian elm | 0.50 | 0.50 | | | 0.50 | | 1.65 | | | | | 0.50 | | |
| VERBASCUM THAPSUS | common mullein | 11.08 | 1.32 | | 4.03 | 1.00 | | | | | | | | | |
| TOTAL EXOTIC FORBS | | 62.65 | 20.55 | 3.67 | 27.00 | 29.30 | 19.08 | 57.58 | 25.38 | 14.88 | 4.12 | 2.58 | 6.48 | 7.00 | 8.70 |

## Table 13. Native Forb cover for eastern sites.

| NATIVE FORB SPECIES | COMMON NAME | JHNS_N | JHNS_S | SLWD | McC_N | McC_S | WY_S | HOST | BIN_NM | BIN_NH | BIN_SH | BIN_S | BIN_E | BIN_W | BIN_WH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Achillea millefolium | western yarrow | | | | | | | | | | | | | | |
| Acmispon americanus | prairie trefoil | | | | | | | | 0.50 | | | | | | |
| Allium canadense | meadow garlic | | | | | | | | | | 0.17 | | | | 1.00 |
| Amaranthus retroflexus | redroot pigweed | | | | | | | 2.48 | | | | | | 0.50 | |
| Ambrosia artemisiifolia | common ragweed | 13.53 | | 6.17 | 11.12 | | 0.53 | | | | | | 0.08 | | |
| Ambrosia psilostachya | western ragweed | 13.20 | 18.75 | | 65.47 | 61.15 | 2.80 | 0.50 | 34.43 | 0.08 | | 1.15 | 20.35 | 4.78 | |
| Ambrosia trifida | giant ragweed | | 0.62 | | | | | 0.53 | | | | | | | |
| Amorpha fruticosa | false indigo-bush | 5.97 | | | 1.65 | | | | | | | | | | |
| Antennaria neglecta | field pussytoes | | | | | | | | 0.62 | | | | | | |
| Apocynum cannabinum | hemp dogbane | 2.17 | 0.58 | 0.58 | 1.00 | | | | 0.17 | 1.37 | 0.33 | 1.08 | 0.58 | 1.00 | 1.33 |
| Arnoglossum plantagineum | Indian-plantain | | | | | | | | | 0.50 | | | 1.32 | 3.98 | 3.50 |
| Artemisia ludoviciana | white sage | | | | | | | | 1.62 | | | | | | |
| Asclepias sp. | milkweed | | | | | | | | | | | | | | |
| Asclepias speciosa | showy milkweed | 2.50 | 1.00 | 0.50 | 0.08 | 1.00 | | 0.50 | | 0.50 | | | | | 0.50 |
| Asclepias syriaca | common milkweed | | | 1.00 | | | | | | | 0.25 | | | | 0.50 |
| Asclepias verticillata | whorled milkweed | 1.50 | | 0.50 | 0.87 | 0.87 | | | 0.75 | | 0.33 | 0.08 | | 1.50 | 0.58 |
| Asclepias viridiflora | green milkweed | | | 0.50 | | | | | | | | | | | 1.00 |
| ATRIPLEX PROSTATA | thin-leaf spearcale | | | | | | | | | | | | | | |
| Callirhoe involucrata | purple poppy-mallow | | 1.25 | | 0.17 | 0.67 | | | 3.93 | | 0.50 | | 0.87 | 0.50 | |
| Chenopodium berlandieri | pitseed goosefoot | | | | | | | | | | | | | | |
| Chenopodium pratericola | desert goosefoot | 8.08 | | | 4.82 | 0.70 | | 14.70 | | | | | | | |
| Cirsium altissimum | tall thistle | | | | 0.53 | | | 0.50 | | | | 0.50 | | | |
| Cirsium canescens | Platte thistle | | | | | | 0.50 | | | 0.53 | 0.50 | | | | |
| Cirsium flodmanii | Flodman's thistle | 0.58 | | | | 0.50 | | | 1.00 | 0.50 | | 1.00 | | 1.00 | 1.08 |
| Cirsium undulatum | wavy-leaf thistle | | | | | 0.50 | 0.50 | | 0.58 | | 0.50 | | | 0.50 | |
| Conyza canadensis | horseweed | 2.28 | 0.50 | | 9.08 | 7.23 | 0.50 | 4.05 | 1.00 | 1.07 | | | | 0.50 | |
| Cornus drummondii | rough-leaf dogwood | 4.78 | | | | | | | | | | 11.83 | | | |
| Croton texensis | Texas croton | 1.45 | | | 0.62 | 0.62 | | | | | | | | | |
| Cyclachaena xanthiifolia | giant marsh-elder | | | | | | | | | | | | | | |
| Cycloloma atriplicifolium | winged-pigweed | | | | | | 0.50 | 3.58 | | | | | | | |
| Dalea candida | white prairie-clover | | | | | | | | 0.75 | | | | | | 0.50 |
| Dalea purpurea | purple prairie-clover | | 0.08 | | 0.50 | | | 2.08 | 1.12 | 0.50 | 0.53 | 0.50 | | 1.00 | 2.00 |
| Dalea villosa | silky prairie-clover | | | | | | | | | | 0.50 | 0.50 | | 0.50 | |
| Desmanthus illinoensis | Illinois bundleflower | | 1.32 | | 0.70 | 0.17 | | | | | 0.70 | | 0.53 | | |
| Desmodium illinoense | Illinois tick-clover | 1.00 | 0.50 | | | 1.50 | | | | 0.83 | 0.50 | 1.00 | | 1.00 | 1.00 |

| NATIVE FORB SPECIES | COMMON NAME | JHNS_N | JHNS_S | SLWD | McC_N | McC_S | WY_S | HOST | BIN_NM | BIN_NH | BIN_SH | BIN_S | BIN_E | BIN_W | BIN_WH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Equisetum arvense | field horsetail | | | | | | | | | 0.33 | | | | | |
| Equisetum laevigatum | smooth scouring-rush | 4.87 | 1.17 | | 2.15 | 1.65 | 1.28 | | 2.15 | | 1.12 | 0.95 | 1.45 | 0.83 | 0.50 |
| Erigeron strigosus | daisy fleabane | | | | | | | | 1.50 | 0.50 | 1.08 | 0.50 | | 2.50 | 2.00 |
| Eupatorium altissimum | tall boneset | | | | | | | | | | | | | | |
| Euphorbia davidii | w. toothed spurge | 1.03 | | | | | 0.50 | | | | | | | 0.50 | |
| Euphorbia dentata | e. toothed spurge | 0.25 | | | | | | | | | | | | | |
| Euphorbia maculata | spotted spurge | 0.08 | | | 0.17 | 0.17 | | | | | | | | | |
| Euphorbia marginata | snow-on-the-mountain | 0.50 | 1.00 | | 0.08 | 0.58 | | | 0.08 | | | | | | |
| Euphorbia nutans | eyebane | 0.25 | | | 0.17 | | | | | | | | | | |
| Euphorbia serpyllifolia | thyme-leaf spurge | 0.95 | 0.50 | 0.33 | | | | 0.08 | 0.87 | | | | | | |
| Euphorbia sp. | spurge | 0.50 | | | | | | | | | | | | | 0.50 |
| Eustoma russellianum | prairie-gentian | | | | | | 1.00 | | | 1.00 | | 0.62 | 1.00 | 0.50 | 1.00 |
| Euthamia gymnospermoides | viscid goldentop | | | | | | | | | | | | | 3.08 | |
| Fallopia scandens | false-buckwheat | 0.50 | | | | | | | | | | | | | |
| Fraxinus pennsylvanica | green ash | 3.70 | 0.08 | | | 3.00 | | | 0.50 | | | | | | |
| Galium aparine | catch-weed bedstraw | | | | | | | | | | | | | | 0.08 |
| Glycyrrhiza lepidota | wild licorice | 1.68 | 1.57 | 1.07 | 0.58 | 0.58 | | | 0.08 | | 0.50 | | 1.73 | | |
| Grindelia squarrosa | curly-top gumweed | | | | | | | | 3.58 | | | | | | |
| Hedeoma hispida | rough false-pennyroyal | | | | 1.73 | 1.73 | | | 0.87 | | | | | | 0.87 |
| Helianthus annuus | common sunflower | 0.70 | 0.50 | 0.50 | | | | 16.78 | 0.50 | | | | | | |
| Helianthus grosseserratus | sawtooth sunflower | | | | | | | 1.12 | | 0.08 | | | | | |
| Helianthus maximiliani | Maximilian's sunflower | | 1.85 | | | | | | | 0.50 | | | | | 8.00 |
| Helianthus pauciflorus | stiff sunflower | | | | | | | | | | | | | | |
| Helianthus petiolaris | plains sunflower | 6.38 | | | | 0.50 | 6.07 | | | | | | | | |
| Heliopsis helianthoides | false-sunflower | | | | | | | 5.00 | | | | | | | |
| Heterotheca latifolia | camphor-weed | 10.35 | | | | | | | | 1.07 | | | | | |
| Iva annua | annual marsh-elder | 0.50 | | | | | 0.87 | | | 0.50 | | | 6.65 | 4.53 | |
| Juncus balticus | Baltic rush | | 0.50 | | | | | | | | | | | 1.03 | |
| Juncus dudleyi | Dudley's rush | 0.62 | 0.75 | | 0.17 | 1.08 | | | 1.12 | | | 0.50 | 1.08 | 1.50 | |
| Juncus nodosus | knotted rush | 0.87 | 0.08 | | | 0.50 | | | 0.50 | | | | 0.50 | 1.50 | |
| Juncus sp. | rush | | | | | | | | | | | | | | |
| Juncus torreyi | Torrey's rush | | | | | | | | 0.50 | 0.08 | | | 0.50 | 0.50 | |
| Juniperus virginiana | eastern red-cedar | 1.00 | 0.50 | 3.00 | | | | | | | | | | | 0.50 |
| Lactuca ludoviciana | western wild lettuce | | | | | | | | | | 0.50 | | | | 0.08 |
| Lepidium densiflorum | prairie pepper-grass | 1.08 | | | 1.40 | 2.40 | | | 0.50 | | | | | | |
| Liatris glabrata | plains gayfeather | | 0.08 | | | | | | | | | | | | |
| Liatris punctata | dotted gayfeather | | 0.08 | | | | | | | 0.08 | | | | | 0.50 |
| Linum sulcatum | grooved flax | | | | | | | | | 0.50 | 0.08 | | 1.23 | 2.63 | |

| NATIVE FORB SPECIES | COMMON NAME | JHNS_N | JHNS_S | SLWD | McC_N | McC_S | WY_S | HOST | BIN_NM | BIN_NH | BIN_SH | BIN_S | BIN_E | BIN_W | BIN_WH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lithospermum incisum | fringed puccoon | | | | | | | | 1.62 | | 0.50 | | | 1.50 | |
| Lithospermum occidentale | marble-seed | | | | | | | | | | | | | | |
| Lobelia spicata | pale-spike lobelia | | | | | | | | | | 1.00 | 0.50 | | 0.50 | 1.50 |
| Lycopus americanus | American horehound | 0.58 | 0.67 | | | | | | | | | | 3.08 | 0.08 | |
| Lycopus asper | rough bugleweed | | | | | | | | | | | | 8.80 | 0.53 | |
| Lythrum alatum | winged loosestrife | | 0.50 | | | | | | | | | | 3.00 | 0.50 | |
| Mentha canadensis | Canada mint | 0.50 | 1.00 | | 0.53 | | | | | | | | 22.43 | 1.57 | |
| Mirabilis linearis | narrow-leaf four-o'clock | 0.50 | | | | | | | | | | | | | |
| Monarda fistulosa | wild-bergamot | 0.50 | | 0.50 | | | | | | | | | | | |
| Oenothera curtiflora | velvet butterfly-plant | | 0.50 | | | | | | 3.50 | | | | | 0.50 | |
| Oenothera rhombipetala | fourpoint eve-primrose | 0.58 | | | | | | | | | | | | | |
| Oenothera serrulata | plains yellow-primrose | | | | | | | | 0.50 | | | | | | |
| Oenothera suffrutescens | scarlet butterfly-plant | | | | | | | | | | | | | 0.50 | |
| Opuntia humifusa | eastern prickly-pear | 1.25 | | | | 0.50 | | | | | | | | | |
| Oxalis dillenii | gray-green wood-sorrel | | | | 0.08 | 0.08 | | | 0.08 | | | | | | |
| Oxalis stricta | yellow wood-sorrel | 0.25 | 0.58 | 0.17 | 0.25 | 0.25 | | | 1.12 | | | | | | |
| Packera plattensis | prairie ragwort | | | | | | | | 1.12 | | | | | | 0.08 |
| Parthenocissus quinquefolia | Virginia creeper | | 0.62 | | | | | | | | | | | | |
| Persicaria amphibia | water smartweed | | | 2.35 | | | 0.42 | | 0.08 | 3.00 | | | 0.50 | | |
| Phyla lanceolata | northern fogfruit | 5.10 | 0.50 | | 0.08 | | | 1.00 | | | | | 13.38 | 1.78 | 0.50 |
| Physalis heterophylla | clammy ground-cherry | 4.58 | | | | | | | | | | | | | |
| Physalis longifolia | common ground-cherry | 0.08 | | | | | | 0.58 | 0.50 | | | | | | 0.08 |
| Physalis virginiana | Virginia ground-cherry | 1.33 | 0.08 | 1.32 | 0.08 | 0.08 | 0.58 | | | | 0.08 | | | | 0.50 |
| Plantago patagonica | woolly plantain | | | | 1.68 | 1.68 | | | 1.20 | | | | 9.47 | | |
| Plantago virginica | pale-seed plantain | | | | | | | | 0.83 | | | | | | |
| Polygonum ramosissimum | bushy knotweed | | | | 0.50 | | | | 3.00 | | | | | | |
| Populus deltoides | plains cottonwood | 1.12 | | | 0.50 | | | | | | | | | | |
| Portulaca oleracea | garden purslane | 0.25 | | | | | | | | | | | | | |
| Potentilla paradoxa | bushy cinquefoil | | | | | | | | | | | | 0.58 | | |
| Prunella vulgaris | self-heal | | | | | | | | 1.00 | | 1.08 | | | 0.50 | 0.50 |
| Pycnanthemum virginianum | Virginia mtn-mint | | | | | | | | | | 1.00 | 1.82 | 1.03 | 0.50 | |
| Ratibida columnifera | prairie-coneflower | | | | | | | 11.70 | 5.00 | | 3.58 | 0.50 | 0.50 | 1.00 | 1.08 |
| Ribes odoratum | buffalo currant | | 0.50 | | | | | | | | | | | | |
| Rosa arkansana | dwarf prairie rose | | | | | | | | 0.50 | | | | 0.50 | | 1.00 |
| Rosa woodsii | western wild rose | 3.00 | 4.12 | | | 0.50 | | | 0.58 | 0.50 | | 2.88 | 10.27 | 3.50 | |
| Rudbeckia hirta | black-eyed Susan | | 0.53 | | | | | 4.78 | 1.00 | 0.50 | 0.50 | 1.00 | 0.50 | 5.00 | 7.50 |
| Salix amygdaloides | peach-leaf willow | 1.08 | | | | | | | | | | | | | |
| Silene antirrhina | sleepy catchfly | | | | 0.58 | 0.58 | | | 1.20 | | | | | | |

| NATIVE FORB SPECIES | COMMON NAME | JHNS_N | JHNS_S | SLWD | McC_N | McC_S | WY_S | HOST | BIN_NM | BIN_NH | BIN_SH | BIN_S | BIN_E | BIN_W | BIN_WH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sisyrinchium montanum | strict blue-eyed-grass | | | | | | | | | | 0.50 | | | 0.50 | 0.08 |
| Solanum interius | black nightshade | | | | | | | 6.75 | | | | | | | |
| Solanum rostratum | buffalo-bur | | | | | 1.50 | | 1.42 | 1.00 | | | | | | |
| Solidago canadensis | Canada goldenrod | 1.08 | 5.07 | 0.50 | 0.08 | | | 0.58 | 0.50 | | 0.50 | 3.70 | 1.00 | 0.50 | |
| Solidago gigantea | late goldenrod | 0.17 | 7.28 | | 3.00 | | | | | | | 1.23 | | | |
| Solidago missouriensis | Missouri goldenrod | 2.38 | | 0.50 | | | | | 1.50 | | | | | | |
| Solidago mollis | ashy goldenrod | | | | | | | | 3.00 | | | | 0.50 | | |
| Solidago rigida | stiff goldenrod | | | | | | | | | | | 1.60 | | | |
| Solidago sp. | golgenrod | | | | | | | | | | | | | 0.50 | 0.50 |
| Symphoricarpos occidentalis | wolfberry | 1.07 | 1.82 | | | | | | | | | 2.63 | 0.50 | 3.00 | |
| Symphyotrichum ericoides | heath aster | | 6.35 | 1.82 | 2.92 | 2.92 | 0.50 | | 4.37 | 1.37 | 0.17 | | 8.42 | 1.98 | 0.67 |
| Symphyotrichum lanceolatum | tall white aster | 1.08 | 1.33 | 0.53 | 0.53 | | 0.50 | | 0.50 | 0.78 | 0.50 | 0.58 | 5.30 | 2.07 | |
| Teucrium canadense | American germander | 1.58 | | | 0.50 | | | | 0.08 | | 0.50 | | | | |
| Toxicodendron radicans | eastern poison ivy | 2.13 | 2.07 | | | | | | | | | | | 0.50 | 0.50 |
| Tradescantia bracteata | long-bract spiderwort | 1.77 | | | | | | | | | | | | | |
| Triglochin maritima | shore arrow-grass | | | | | | | | | | | | 1.40 | | |
| Verbena bracteata | prostrate vervain | | | | | | | 0.50 | | | | | | | |
| Verbena hastata | blue vervain | 2.78 | 2.90 | 0.50 | 1.87 | 0.87 | | | | | | | | | |
| Verbena stricta | hoary vervain | 4.17 | 2.40 | | 6.63 | 6.13 | 0.50 | 3.08 | 3.77 | | | 0.08 | 0.53 | 0.50 | |
| Vernonia baldwinii | western ironweed | 0.50 | 1.00 | | | | 0.50 | | 0.50 | | | | 0.17 | 1.08 | 0.50 |
| Vernonia fasciculata | prairie ironweed | 1.50 | 1.50 | | | | 0.08 | | 0.50 | 0.50 | 1.00 | | 1.50 | 1.50 | |
| Veronica peregrina | purslane speedwell | 0.17 | | | | | | | | | | | | | |
| Viola pedatifida | prairie violet | | | | | | | | 0.17 | | | | | | 0.62 |
| Xanthium strumarium | cocklebur | | | | | | | | | | | | | | |
| TOTAL NATIVE FORBS | | 1 | 74.58 | 22.33 | 122.88 | 102.20 | 18.13 | 82.3 | 97.93 | 17.18 | 19.02 | 36.75 | 131.25 | 65.98 | 42.65 |

**Table 14. 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 conservation value assigned to each species. Non-native species have no value and are assigned a value of 0 in calculations. Weighted values include abundance as an additional parameter in calculations.

| Code | Site Name | Species Composition | | Native only | | | Both Native and Exotic | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Weighted | |
| | | % Exotic | % Native | N | Ave. C | FQI | N | Ave. C | FQI | Ave. C | FQI |
| COOK | Cook Hay Meadow | 44 | 56 | 22 | 2.45 | 11.51 | 39 | 1.38 | 8.65 | 4.89 | 30.52 |
| DYER | Dyer Grassland | 38 | 62 | 43 | 2.05 | 13.42 | 69 | 1.28 | 10.59 | 5.21 | 43.24 |
| CWRN1 | CWR North 1 | 35 | 65 | 26 | 2.81 | 14.32 | 40 | 1.83 | 11.54 | 3.34 | 21.13 |
| CWRN2 | CWR North 2 | 27 | 73 | 58 | 2.84 | 21.67 | 79 | 2.09 | 18.56 | 5.10 | 45.29 |
| CWREL | CWR East Lloyd Island | 31 | 69 | 49 | 2.76 | 19.29 | 71 | 1.90 | 16.02 | 8.62 | 72.63 |
| CWR_E | CWR East | 27 | 73 | 33 | 2.52 | 14.45 | 45 | 1.84 | 12.37 | 3.19 | 21.40 |
| MRS_N | Morse North | 27 | 73 | 54 | 2.87 | 21.09 | 74 | 2.09 | 18.02 | 5.51 | 47.43 |
| MRS_HN | Morse Hay North | 55 | 45 | 14 | 2.43 | 9.09 | 31 | 1.10 | 6.11 | 2.83 | 15.75 |
| MRS_M | Morse Middle | 31 | 69 | 40 | 3.03 | 19.13 | 58 | 2.09 | 15.89 | 6.28 | 47.84 |
| MRS_HS | Morse Hay South | 36 | 64 | 32 | 2.50 | 14.14 | 50 | 1.60 | 11.31 | 2.62 | 18.56 |
| MRS_C | Morse Crop | 36 | 64 | 18 | 2.56 | 10.84 | 28 | 1.64 | 8.69 | 5.81 | 30.73 |
| MRS_SW | Morse SW | 38 | 63 | 15 | 2.67 | 10.33 | 24 | 1.67 | 8.16 | 2.57 | 12.61 |
| CWR_SW | CWR SW | 44 | 56 | 31 | 2.58 | 14.37 | 55 | 1.45 | 10.79 | 4.47 | 33.18 |
| CWR_NW | CWR NW | 48 | 52 | 28 | 2.71 | 14.36 | 54 | 1.41 | 10.34 | 4.10 | 30.15 |
| CWR_NE | CWR NE | 37 | 63 | 38 | 2.87 | 17.68 | 60 | 1.82 | 14.07 | 5.25 | 40.63 |
| JHNS_N | Johns North Wet Meadow | 26 | 74 | 83 | 2.63 | 23.93 | 112 | 1.95 | 20.60 | 6.56 | 69.38 |
| JHNS_S | Johns South Wet Meadow | 27 | 73 | 67 | 3.34 | 27.37 | 92 | 2.43 | 23.35 | 5.75 | 55.17 |
| SLWD | Sullwald Hay Meadow | 35 | 65 | 24 | 2.79 | 13.68 | 37 | 1.81 | 11.01 | 1.84 | 11.19 |
| McC_N | McCormick North Island | 30 | 70 | 58 | 2.62 | 19.96 | 83 | 1.83 | 16.68 | 3.84 | 34.94 |
| McC_S | McCormick South Meadow | 32 | 68 | 52 | 2.69 | 19.41 | 77 | 1.82 | 15.95 | 3.06 | 26.89 |
| WY_S | WY South Meadow | 46 | 54 | 31 | 2.77 | 15.45 | 57 | 1.51 | 11.39 | 1.29 | 9.72 |
| HOST | Hostetler Crop | 42 | 58 | 30 | 2.23 | 12.23 | 52 | 1.29 | 9.29 | 6.53 | 47.11 |
| BIN_NM | Binfield North Meadow | 17 | 83 | 76 | 2.97 | 25.92 | 92 | 2.46 | 23.56 | 7.54 | 72.33 |
| BIN_NH | Binfield North Hay Meadow | 30 | 70 | 35 | 3.54 | 20.96 | 50 | 2.48 | 17.54 | 3.00 | 21.23 |
| BIN_SH | Binfield South Hay Meadow | 18 | 82 | 40 | 4.10 | 25.93 | 49 | 3.35 | 23.43 | 3.31 | 23.15 |
| BIN_S | Binfield South Meadow | 23 | 77 | 36 | 3.78 | 22.67 | 47 | 2.89 | 19.84 | 5.67 | 38.84 |
| BIN_E | Binfield East Meadow | 17 | 83 | 52 | 3.79 | 27.32 | 63 | 3.13 | 24.82 | 16.64 | 132.06 |
| BIN_W | Binfield West Meadow | 15 | 85 | 63 | 3.73 | 29.61 | 74 | 3.18 | 27.32 | 7.14 | 61.40 |
| BIN_WH | Binfield West Hay Meadow | 13 | 88 | 49 | 3.82 | 26.71 | 56 | 3.34 | 24.99 | 5.30 | 39.66 |

## Table 15. Percent cover of cool and warm season grasses by plot

| Plot | Exotic Cool | Native Cool | Carex | Native Warm |
|---|---|---|---|---|
| CookHM_13_G1 | 37.85 | 3.2 | 0 | 33.1 |
| CookHM_13_G2 | 54.35 | 0 | 0 | 18.1 |
| CookHM_13_G3 | 40.85 | 0 | 0 | 45.3 |
| Dyer_13_G4 | 1.6 | 59 | 0.25 | 4.45 |
| Dyer_13_G5 | 13.7 | 0 | 0 | 4.1 |
| Dyer_13_G6 | 15.4 | 0 | 35.7 | 7.15 |
| Dyer_13_G7 | 32.1 | 0 | 0 | 23.9 |
| Dyer_13_G8 | 31.75 | 0.25 | 38.9 | 14.65 |
| Dyer_13_G9 | 7.15 | 25.25 | 1.6 | 46.1 |
| CWRN1_13_G10 | 49.15 | 2.35 | 1.6 | 38.05 |
| CWRN1_13_G11 | 49.65 | 0 | 22.4 | 0 |
| CWRN1_13_G12 | 28.15 | 0 | 3.7 | 1.85 |
| CWRN2_13_G13 | 47.45 | 0 | 2.1 | 0 |
| CWRN2_13_G14 | 10.25 | 0.25 | 17.5 | 4.95 |
| CWRN2_13_G15 | 36.9 | 3.95 | 0.5 | 18.5 |
| CWREL_13_G16 | 35.65 | 0 | 5.3 | 18.85 |
| CWREL_13_G17 | 21.1 | 2.85 | 6.35 | 24 |
| CWREL_13_G18 | 23.05 | 0.25 | 12.1 | 22 |
| CWREL_13_G19 | 11.6 | 0.5 | 0.25 | 33.9 |
| CWREL_13_G20 | 14.8 | 0 | 20.6 | 2.6 |
| CWREL_13_G21 | 18.75 | 0 | 15.15 | 5.8 |
| CWREL_13_G22 | 2.85 | 0.25 | 13.05 | 54.3 |
| CWREL_13_G23 | 7.9 | 0 | 3.7 | 54.7 |
| CWREL_13_G24 | 32.85 | 4.2 | 0.25 | 28.95 |
| CWR_E_13_G25 | 25.6 | 0.25 | 0.75 | 16.05 |
| CWR_E_13_G26 | 31.5 | 0.5 | 0.25 | 2.6 |
| CWR_E_13_G27 | 25.5 | 47.7 | 8.6 | 1.6 |
| MORSEN_13_G28 | 53.55 | 13.5 | 21.3 | 21.35 |
| MORSEN_13_G29 | 22.9 | 0 | 0.5 | 13.7 |
| MORSEN_13_G30 | 61.5 | 0 | 0 | 45.2 |
| MORSEN_13_G31 | 51.1 | 0.25 | 0 | 38.05 |
| MORSEN_13_G32 | 74.5 | 0 | 0 | 4.35 |
| MORSEN_13_G33 | 54.05 | 0 | 0 | 17.4 |
| MORSEHN_13_G34 | 78.15 | 0 | 0 | 0 |
| MORSEHN_13_G35 | 75.15 | 0 | 0 | 0 |
| MORSEHN_13_G36 | 1 | 0 | 0 | 11.35 |
| MORSEM_13_G37 | 51.35 | 0.25 | 0.5 | 46.5 |
| MORSEM_13_G38 | 67.4 | 3.7 | 0 | 20.4 |
| MORSEM_13_G39 | 38.95 | 0 | 0 | 23.45 |
| MORSEM_13_G40 | 78.3 | 0.25 | 0 | 24.05 |
| MORSEM_13_G41 | 58.9 | 3.45 | 0 | 47.75 |
| MORSE_HS_13_G42 | 72.9 | 0 | 0 | 7.15 |
| MORSE_HS_13_G43 | 0.25 | 0 | 0 | 13.6 |
| MORSE_HS_13_G44 | 18.5 | 68.65 | 0 | 0 |
| MORSE_C_13_G45 | 0.25 | 61.4 | 0 | 9 |
| MORSE_C_13_G46 | 0 | 7.65 | 0 | 19.8 |
| MORSE_C_13_G47 | 0 | 0 | 0 | 24.05 |
| MORSE_SW_13_G48 | 36.45 | 0 | 1.85 | 10.6 |
| MORSE_SW_13_G49 | 52.65 | 0 | 0 | 0 |

| | | | | |
|---|---|---|---|---|
| MORSE_SW_13_G50 | 50.95 | 0 | 0 | 0 |
| MORSE_SW_13_G51 | 47.45 | 0 | 0 | 0.25 |
| MORSE_SW_13_G52 | 45.75 | 0 | 0 | 5.55 |
| MORSE_SW_13_G53 | 80.6 | 0 | 0 | 3.2 |
| CWR_SW_13_G54 | 18 | 0.25 | 0 | 32.2 |
| CWR_SW_13_G55 | 41.5 | 0.25 | 1.85 | 7.4 |
| CWR_SW_13_G56 | 2.1 | 0 | 0 | 0 |
| CWR_SW_13_G57 | 41.5 | 0 | 0 | 11.1 |
| CWR_SW_13_G58 | 60.85 | 0 | 0 | 10.3 |
| CWR_NW_13_G59 | 63.65 | 0 | 0 | 2.1 |
| CWR_NW_13_G60 | 39.75 | 0 | 0 | 12.15 |
| CWR_NW_13_G61 | 51.5 | 0 | 0.5 | 32.4 |
| CWR_NW_13_G62 | 11.35 | 0 | 0 | 30.1 |
| CWR_NW_13_G63 | 25.55 | 0 | 0 | 10.25 |
| CWR_NE_13_G64 | 25 | 0 | 0 | 27.55 |
| CWR_NE_13_G65 | 13.2 | 0 | 0 | 26.3 |
| CWR_NE_13_G66 | 57.35 | 0.25 | 0 | 14.5 |
| CWR_NE_13_G67 | 15.35 | 6.55 | 0 | 33.55 |
| CWR_NE_13_G68 | 5.45 | 3.1 | 0 | 33.75 |
| JOHNS_NWM_13_G69 | 20.1 | 0 | 0 | 19.5 |
| JOHNS_NWM_13_G70 | 23.3 | 0.5 | 6.85 | 8.75 |
| JOHNS_NWM_13_G71 | 4.8 | 25.2 | 14.8 | 2.35 |
| JOHNS_NWM_13_G72 | 17.9 | 6.05 | 14.25 | 15.6 |
| JOHNS_NWM_13_G73 | 16.65 | 1.85 | 6.05 | 0.75 |
| JOHNS_NWM_13_G74 | 26.45 | 1.6 | 9.55 | 5.55 |
| JOHNS_NWM_13_G75 | 26.2 | 0.5 | 1.6 | 3.95 |
| JOHNS_NWM_13_G76 | 0 | 5.45 | 7.4 | 0 |
| JOHNS_NWM_13_G77 | 18.7 | 15.85 | 5.8 | 7.15 |
| JOHNS_NWM_13_G78 | 28.7 | 0 | 0 | 25 |
| JOHNS_NWM_13_G79 | 45.2 | 0 | 0 | 6.3 |
| JOHNS_NWM_13_G80 | 0 | 11.6 | 10.2 | 23.55 |
| JOHNS_NWM_13_G81 | 15.9 | 16.9 | 0 | 26.7 |
| JOHNS_SWM_13_G82 | 23.5 | 0 | 1.85 | 7.65 |
| JOHNS_SWM_13_G83 | 12.05 | 14.15 | 0.75 | 41.15 |
| JOHNS_SWM_13_G84 | 37 | 6.9 | 13.45 | 6.3 |
| JOHNS_SWM_13_G85 | 30.6 | 0 | 2.85 | 24.55 |
| JOHNS_SWM_13_G86 | 29.8 | 7.65 | 1.85 | 31.65 |
| JOHNS_SWM_13_G87 | 1 | 0.5 | 7.05 | 45.6 |
| SLWD_HM_13_G88 | 84.45 | 0 | 0 | 0 |
| SLWD_HM_13_G89 | 90.1 | 0 | 3.2 | 0 |
| SLWD_HM_13_G90 | 58.15 | 0 | 0 | 8.7 |
| McC_NI_13_G91 | 3.45 | 7.15 | 1.85 | 0 |
| McC_NI_13_G92 | 6.65 | 8.85 | 0 | 0.25 |
| McC_NI_13_G93 | 16.8 | 0 | 0 | 28 |
| McC_SM_13_G94 | 14.2 | 1 | 5.3 | 19.25 |
| McC_SM_13_G95 | 6.85 | 13.45 | 0 | 4.2 |
| McC_SM_13_G96 | 9.25 | 1.85 | 0.25 | 16.8 |
| McC_SM_13_G97 | 21.5 | 0.25 | 1.85 | 3 |
| WY_SM_13_G98 | 3.95 | 0 | 0 | 22.45 |
| WY_SM_13_G99 | 32.1 | 6.65 | 0 | 0 |
| WY_SM_13_G100 | 68.6 | 0 | 0.25 | 1.6 |
| WY_SM_13_G101 | 7.4 | 0.5 | 0 | 0.25 |
| HOST_C_13_G102 | 3.45 | 37.9 | 0 | 29.3 |
| HOST_C_13_G103 | 0 | 0 | 0 | 20.35 |
| HOST_C_13_G104 | 3.2 | 24.95 | 0 | 26.65 |
| HOST_C_13_G105 | 3.2 | 14.8 | 0 | 24.55 |
| HOST_C_13_G106 | 0 | 2.1 | 0 | 9 |

| | | | | |
|---|---|---|---|---|
| HOST_C_13_G107 | 0 | 1.6 | 0 | 10.35 |
| HOST_C_13_G108 | 0 | 8.2 | 0 | 26.1 |
| HOST_C_13_G109 | 1.6 | 3.7 | 0 | 38.05 |
| BIN_NM_13_G110 | 4.2 | 5.3 | 0 | 22.95 |
| BIN_NM_13_G111 | 0.5 | 2.35 | 0 | 13.7 |
| BIN_NM_13_G112 | 0 | 0.25 | 0 | 3.7 |
| BIN_NM_13_G113 | 63.85 | 0.25 | 2.35 | 44.7 |
| BIN_NM_13_G114 | 15 | 3.45 | 0 | 11.45 |
| BIN_NM_13_G115 | 22.95 | 0.25 | 0.75 | 27.25 |
| BIN_NM_13_G116 | 5.55 | 1.85 | 3.7 | 69.6 |
| BIN_NM_13_G117 | 0 | 0.25 | 0 | 3.1 |
| BIN_NHAY_13_G118 | 26.5 | 5.8 | 21.45 | 40.2 |
| BIN_NHAY_13_G119 | 41.15 | 3.95 | 10.6 | 26.35 |
| BIN_NHAY_13_G120 | 59.45 | 0 | 16.75 | 20.6 |
| BIN_SHAY_13_G121 | 28.4 | 1.6 | 10.5 | 6.2 |
| BIN_SHAY_13_G122 | 31.1 | 1.5 | 14.65 | 24.15 |
| BIN_SHAY_13_G123 | 37.95 | 0.75 | 3.95 | 22.35 |
| BIN_S_13_G124 | 8.75 | 0 | 14.35 | 35.4 |
| BIN_S_13_G125 | 34.9 | 0.25 | 8 | 10.25 |
| BIN_S_13_G126 | 26.75 | 0.25 | 26.4 | 28.7 |
| BIN_E_13_G127 | 0 | 0 | 0 | 5.55 |
| BIN_E_13_G128 | 0 | 2.1 | 19.05 | 16.65 |
| BIN_E_13_G129 | 0.25 | 9.7 | 51.95 | 24.6 |
| BIN_E_13_G130 | 33.4 | 0 | 1 | 19.25 |
| BIN_E_13_G131 | 11.35 | 0.5 | 0 | 45.75 |
| BIN_E_13_G132 | 5.55 | 0 | 12.75 | 29.2 |
| BIN_W_13_G133 | 3.7 | 17.75 | 0 | 0.25 |
| BIN_W_13_G134 | 9.85 | 0.5 | 9.85 | 53.7 |
| BIN_W_13_G135 | 0 | 2.35 | 16.4 | 39.8 |
| BIN_W_13_G136 | 5.55 | 0.25 | 40.3 | 12.2 |
| BIN_W_13_G137 | 11.6 | 1.85 | 26.95 | 39.1 |
| BIN_W_13_G138 | 6.05 | 2.6 | 19.8 | 18.85 |
| BIN_W_13_G139 | 25.75 | 0.75 | 10.1 | 26.4 |
| BIN_W_13_G140 | 33.6 | 1.6 | 1.85 | 13.3 |
| BIN_W_13_G141 | 16.9 | 2.35 | 4.2 | 17.9 |
| BIN_W_13_G142 | 25.9 | 0 | 6.9 | 22.8 |
| BIN_W_13_G143 | 36.45 | 0.75 | 12.8 | 28.25 |
| BIN_W_13_G144 | 43.4 | 0 | 6.65 | 4.45 |
| BIN_W_13_G145 | 32 | 0 | 3.2 | 23.05 |
| BIN_WH_13_G146 | 19 | 0.25 | 6.9 | 31.45 |
| BIN_WH_13_G147 | 13.8 | 3.35 | 2.85 | 26.25 |
| BIN_WH_13_G148 | 39.05 | 0.25 | 6.65 | 21.45 |
| BIN_WH_13_G149 | 26 | 0 | 22.25 | 9 |
| BIN_WH_13_G150 | 31.55 | 0 | 4.8 | 26.2 |

# APPENDICES

## APPENDIX A: SAMPLING PROTOCOL

See attached PDF document

## APPENDIX B: PLOT LOCATIONS

| Site Name | Name | Easting | Northing | Elevation | UTM_X | UTM_Y |
|---|---|---|---|---|---|---|
| Binfield East Meadow | G127N | 2049662 | 345200.9 | 1932.898 | 540335.4 | 4513490 |
| Binfield East Meadow | G127S | 2049669 | 345103.1 | 1933.397 | 540337.3 | 4513460 |
| Binfield East Meadow | G128N | 2050531 | 345039.0 | 1932.477 | 540599.8 | 4513438 |
| Binfield East Meadow | G128S | 2050536 | 344940.4 | 1932.836 | 540601.0 | 4513408 |
| Binfield East Meadow | G129N | 2048575 | 344662.0 | 1933.976 | 540002.4 | 4513330 |
| Binfield East Meadow | G129S | 2048573 | 344564.2 | 1934.14 | 540001.5 | 4513300 |
| Binfield East Meadow | G130N | 2050544 | 344357.9 | 1934.354 | 540601.2 | 4513230 |
| Binfield East Meadow | G130S | 2050546 | 344259.5 | 1934.539 | 540601.6 | 4513200 |
| Binfield East Meadow | G131N | 2048704 | 343285.7 | 1935.347 | 540036.8 | 4512910 |
| Binfield East Meadow | G131S | 2048706 | 343187.4 | 1936.243 | 540036.9 | 4512880 |
| Binfield East Meadow | G132N | 2049140 | 342537.3 | 1935.372 | 540166.8 | 4512680 |
| Binfield East Meadow | G132S | 2049143 | 342439.2 | 1936.016 | 540167.6 | 4512650 |
| Binfield North Hay Meadow | G118N | 2052135 | 346722.9 | 1929.183 | 541094.5 | 4513945 |
| Binfield North Hay Meadow | G118S | 2052132 | 346624.4 | 1929.467 | 541093.3 | 4513915 |
| Binfield North Hay Meadow | G119N | 2050639 | 345907.6 | 1930.646 | 540635.6 | 4513702 |
| Binfield North Hay Meadow | G119S | 2050642 | 345809.6 | 1930.834 | 540636.3 | 4513672 |
| Binfield North Hay Meadow | G120N | 2051910 | 345859.3 | 1930.559 | 541022.8 | 4513683 |
| Binfield North Hay Meadow | G120S | 2051892 | 345763.5 | 1930.647 | 541017.1 | 4513654 |
| Binfield North Hay Meadow | G121N | 2052309 | 345341.6 | 1930.093 | 541142.7 | 4513524 |
| Binfield North Hay Meadow | G121S | 2052314 | 345243.5 | 1930.526 | 541143.7 | 4513494 |
| Binfield North Hay Meadow | G122N | 2051979 | 345151.5 | 1931.465 | 541041.3 | 4513467 |
| Binfield North Hay Meadow | G122S | 2051984 | 345053.4 | 1930.158 | 541042.6 | 4513437 |
| Binfield North Hay Meadow | G123N | 2051364 | 344652.5 | 1932.212 | 540852.0 | 4513317 |
| Binfield North Hay Meadow | G123S | 2051363 | 344554.2 | 1935.96 | 540851.7 | 4513287 |
| Binfield North Meadow | G110N | 2052287 | 348478.5 | 1929.59 | 541147.0 | 4514480 |
| Binfield North Meadow | G110S | 2052289 | 348380.2 | 1930.278 | 541147.2 | 4514450 |
| Binfield North Meadow | G111N | 2050478 | 348338.0 | 1930.64 | 540595.3 | 4514443 |
| Binfield North Meadow | G111S | 2050481 | 348240.7 | 1930.769 | 540595.9 | 4514414 |
| Binfield North Meadow | G112E | 2048630 | 348136.4 | 1932.703 | 540031.5 | 4514388 |
| Binfield North Meadow | G112W | 2048532 | 348134.6 | 1931.782 | 540001.5 | 4514388 |
| Binfield North Meadow | G113N | 2051806 | 348250.6 | 1931.135 | 540999.6 | 4514412 |
| Binfield North Meadow | G113S | 2051813 | 348152.7 | 1930.611 | 541001.4 | 4514382 |
| Binfield North Meadow | G114N | 2052345 | 347922.9 | 1931.084 | 541162.9 | 4514310 |
| Binfield North Meadow | G114S | 2052347 | 347827.3 | 1929.731 | 541163.2 | 4514281 |
| Binfield North Meadow | G115N | 2047871 | 347598.5 | 1935.288 | 539798.2 | 4514227 |
| Binfield North Meadow | G115S | 2047873 | 347500.7 | 1935.655 | 539798.4 | 4514197 |
| Binfield North Meadow | G116N | 2049404 | 347279.1 | 1934.915 | 540264.3 | 4514124 |
| Binfield North Meadow | G116S | 2049407 | 347181.0 | 1934.052 | 540264.7 | 4514095 |
| Binfield North Meadow | G117N | 2049950 | 347111.2 | 1933.267 | 540430.1 | 4514071 |
| Binfield North Meadow | G117S | 2049955 | 347013.1 | 1932.99 | 540431.1 | 4514041 |
| Binfield South Meadow | G124N | 2052228 | 343799.4 | 1931.168 | 541112.5 | 4513054 |
| Binfield South Meadow | G124S | 2052226 | 343701.1 | 1931.396 | 541111.5 | 4513024 |
| Binfield South Meadow | G125N | 2050986 | 342863.7 | 1933.212 | 540730.7 | 4512773 |
| Binfield South Meadow | G125S | 2050986 | 342765.4 | 1934.233 | 540730.2 | 4512743 |
| Binfield South Meadow | G126N | 2050005 | 342239.6 | 1935.746 | 540429.3 | 4512587 |
| Binfield South Meadow | G126S | 2050010 | 342141.4 | 1935.882 | 540430.6 | 4512557 |
| Binfield West Hay Meadow | G146N | 2041428 | 339685.4 | 1946.808 | 537806.6 | 4511839 |
| Binfield West Hay Meadow | G146S | 2041428 | 339587.1 | 1946.398 | 537806.2 | 4511809 |
| Binfield West Hay Meadow | G147N | 2043885 | 339675.4 | 1943.348 | 538555.3 | 4511827 |
| Binfield West Hay Meadow | G147S | 2043892 | 339577.1 | 1943.622 | 538557.2 | 4511797 |
| Binfield West Hay Meadow | G148N | 2042839 | 339459.1 | 1945.544 | 538235.7 | 4511765 |
| Binfield West Hay Meadow | G148S | 2042843 | 339360.8 | 1944.820 | 538236.7 | 4511735 |
| Binfield West Hay Meadow | G149N | 2042235 | 339003.2 | 1946.301 | 538050.2 | 4511628 |
| Binfield West Hay Meadow | G149S | 2042235 | 338905.2 | 1946.511 | 538049.9 | 4511598 |
| Binfield West Hay Meadow | G150N | 2043857 | 339020.4 | 1945.394 | 538544.3 | 4511627 |
| Binfield West Hay Meadow | G150S | 2043859 | 338921.8 | 1944.230 | 538544.9 | 4511597 |
| Binfield West Meadow | G133N | 2047941 | 344461.2 | 1935.025 | 539808.3 | 4513271 |
| Binfield West Meadow | G133S | 2047942 | 344362.7 | 1934.817 | 539808.4 | 4513241 |
| Binfield West Meadow | G134N | 2046668 | 343973.9 | 1936.702 | 539418.7 | 4513127 |
| Binfield West Meadow | G134S | 2046673 | 343875.6 | 1936.722 | 539420.0 | 4513097 |
| Binfield West Meadow | G135N | 2046086 | 343595.4 | 1937.622 | 539240.1 | 4513014 |
| Binfield West Meadow | G135S | 2046092 | 343497.2 | 1937.801 | 539241.5 | 4512984 |

| Site Name | Name | Easting | Northing | Elevation | UTM_X | UTM_Y |
|---|---|---|---|---|---|---|
| Binfield West Meadow | G136N | 2047259 | 342975.4 | 1936.780 | 539595.3 | 4512821 |
| Binfield West Meadow | G136S | 2047259 | 342877.0 | 1936.824 | 539594.8 | 4512791 |
| Binfield West Meadow | G137N | 2046085 | 342917.6 | 1937.777 | 539237.2 | 4512807 |
| Binfield West Meadow | G137S | 2046087 | 342819.3 | 1937.772 | 539237.6 | 4512777 |
| Binfield West Meadow | G138N | 2045337 | 342360.6 | 1939.252 | 539007.4 | 4512640 |
| Binfield West Meadow | G138S | 2045338 | 342262.3 | 1939.098 | 539007.2 | 4512610 |
| Binfield West Meadow | G139N | 2047617 | 342360.7 | 1937.011 | 539702.3 | 4512632 |
| Binfield West Meadow | G139S | 2047615 | 342262.3 | 1937.725 | 539701.3 | 4512602 |
| Binfield West Meadow | G140N | 2046608 | 341737.6 | 1940.145 | 539392.4 | 4512446 |
| Binfield West Meadow | G140S | 2046608 | 341639.7 | 1941.078 | 539392.1 | 4512416 |
| Binfield West Meadow | G141N | 2045681 | 341661.0 | 1940.609 | 539109.7 | 4512426 |
| Binfield West Meadow | G141S | 2045680 | 341562.6 | 1940.580 | 539108.9 | 4512396 |
| Binfield West Meadow | G142N | 2048269 | 341402.3 | 1937.991 | 539897.4 | 4512338 |
| Binfield West Meadow | G142S | 2048267 | 341303.8 | 1938.757 | 539896.6 | 4512308 |
| Binfield West Meadow | G143N | 2045325 | 340993.9 | 1941.590 | 538998.9 | 4512224 |
| Binfield West Meadow | G143S | 2045325 | 340895.6 | 1940.773 | 538998.4 | 4512194 |
| Binfield West Meadow | G144N | 2046322 | 340728.1 | 1940.183 | 539301.9 | 4512139 |
| Binfield West Meadow | G144S | 2046319 | 340629.4 | 1940.613 | 539300.4 | 4512109 |
| Binfield West Meadow | G145N | 2045399 | 339871.1 | 1942.978 | 539017.3 | 4511881 |
| Binfield West Meadow | G145S | 2045396 | 339773.1 | 1941.979 | 539016.3 | 4511851 |
| Cook Hay Meadow | G1E | 1760177 | 307515.4 | 2316.086 | 451986.1 | 4503026 |
| Cook Hay Meadow | G1W | 1760080 | 307518.3 | 2316.264 | 451956.5 | 4503027 |
| Cook Hay Meadow | G2N | 1759472 | 307293.6 | 2316.847 | 451770.5 | 4502960 |
| Cook Hay Meadow | G2S | 1759472 | 307195.3 | 2315.377 | 451770.0 | 4502931 |
| Cook Hay Meadow | G3E | 1757360 | 307129.9 | 2319.304 | 451126.3 | 4502918 |
| Cook Hay Meadow | G3W | 1757259 | 307125.9 | 2319.829 | 451095.5 | 4502917 |
| CWR East | G25N | 1791161 | 306789.7 | 2276.036 | 461425.4 | 4502696 |
| CWR East | G25S | 1791159 | 306691.4 | 2276.468 | 461424.6 | 4502666 |
| CWR East | G26N | 1790208 | 306386.5 | 2276.856 | 461133.6 | 4502577 |
| CWR East | G26S | 1790206 | 306288.3 | 2276.235 | 461132.6 | 4502547 |
| CWR East | G27N | 1789347 | 305712.6 | 2278.587 | 460868.9 | 4502374 |
| CWR East | G27S | 1789349 | 305614.7 | 2276.851 | 460869.1 | 4502344 |
| CWR East Lloyd Island | G16N | 1791637 | 312339.3 | 2275.134 | 461589.8 | 4504386 |
| CWR East Lloyd Island | G16S | 1791642 | 312241.1 | 2275.398 | 461591.0 | 4504356 |
| CWR East Lloyd Island | G17N | 1796312 | 312072.6 | 2268.060 | 463013.6 | 4504288 |
| CWR East Lloyd Island | G17S | 1796305 | 311974.4 | 2269.172 | 463011.1 | 4504258 |
| CWR East Lloyd Island | G18N | 1795553 | 312051.6 | 2270.368 | 462782.3 | 4504284 |
| CWR East Lloyd Island | G18S | 1795551 | 311953.3 | 2270.565 | 462781.4 | 4504254 |
| CWR East Lloyd Island | G19N | 1791578 | 311890.0 | 2276.226 | 461570.5 | 4504249 |
| CWR East Lloyd Island | G19S | 1791587 | 311792.5 | 2275.493 | 461572.7 | 4504219 |
| CWR East Lloyd Island | G20N | 1793724 | 311701.8 | 2272.578 | 462223.7 | 4504184 |
| CWR East Lloyd Island | G20S | 1793724 | 311603.4 | 2273.327 | 462223.4 | 4504154 |
| CWR East Lloyd Island | G21N | 1793085 | 311650.2 | 2273.056 | 462028.9 | 4504171 |
| CWR East Lloyd Island | G21S | 1793095 | 311552.5 | 2273.927 | 462031.5 | 4504141 |
| CWR East Lloyd Island | G22N | 1789943 | 311576.8 | 2277.668 | 461071.0 | 4504159 |
| CWR East Lloyd Island | G22S | 1789950 | 311478.6 | 2278.057 | 461072.7 | 4504129 |
| CWR East Lloyd Island | G23N | 1791652 | 311457.9 | 2275.826 | 461591.3 | 4504117 |
| CWR East Lloyd Island | G23S | 1791653 | 311359.3 | 2276.274 | 461591.5 | 4504087 |
| CWR East Lloyd Island | G24N | 1791582 | 311219.3 | 2274.237 | 461569.3 | 4504045 |
| CWR East Lloyd Island | G24S | 1791588 | 311121.2 | 2274.518 | 461570.6 | 4504015 |
| CWR NE | G65N | 1785485 | 304737.8 | 2283.257 | 459688.6 | 4502091 |
| CWR NE | G65S | 1785507 | 304642.1 | 2284.199 | 459694.8 | 4502061 |
| CWR NE | G66N | 1785932 | 303977.7 | 2281.013 | 459822.2 | 4501858 |
| CWR NE | G66S | 1785935 | 303879.7 | 2282.789 | 459822.8 | 4501828 |
| CWR NE | G67N | 1785374 | 303753.4 | 2282.889 | 459651.4 | 4501791 |
| CWR NE | G67S | 1785374 | 303655.2 | 2282.128 | 459651.1 | 4501761 |
| CWR NE | G68N | 1784391 | 303346.9 | 2283.101 | 459350.3 | 4501671 |
| CWR NE | G68S | 1784392 | 303249.0 | 2284.026 | 459350.3 | 4501641 |
| CWR North 1 | G10E | 1785894 | 313395.4 | 2284.154 | 459843.5 | 4504728 |
| CWR North 1 | G10W | 1785795 | 313392.1 | 2284.323 | 459813.5 | 4504727 |
| CWR North 1 | G11E | 1783827 | 313384.6 | 2286.292 | 459213.5 | 4504732 |
| CWR North 1 | G11W | 1783729 | 313376.5 | 2286.491 | 459183.6 | 4504729 |
| CWR North 1 | G12E | 1785488 | 313390.4 | 2282.406 | 459719.7 | 4504727 |
| CWR North 1 | G12W | 1785389 | 313390.9 | 2282.478 | 459689.7 | 4504728 |

| Site Name | Name | Easting | Northing | Elevation | UTM_X | UTM_Y |
|---|---|---|---|---|---|---|
| CWR North 2 | G13N | 1784812 | 312516.1 | 2284.968 | 459510.6 | 4504463 |
| CWR North 2 | G13S | 1784812 | 312417.6 | 2283.766 | 459510.5 | 4504433 |
| CWR North 2 | G14N | 1781849 | 312448.6 | 2287.769 | 458607.6 | 4504453 |
| CWR North 2 | G14S | 1781846 | 312350.1 | 2288.033 | 458606.3 | 4504423 |
| CWR North 2 | G15N | 1786050 | 312469.8 | 2284.141 | 459887.7 | 4504445 |
| CWR North 3 | G15S | 1786057 | 312372.0 | 2283.456 | 459889.6 | 4504415 |
| CWR NW | G59N | 1781526 | 305377.2 | 2288.726 | 458484.4 | 4502299 |
| CWR NW | G59S | 1781527 | 305278.7 | 2288.414 | 458484.4 | 4502269 |
| CWR NW | G60N | 1781670 | 304965.6 | 2288.269 | 458527.0 | 4502173 |
| CWR NW | G60S | 1781675 | 304867.5 | 2287.431 | 458528.0 | 4502144 |
| CWR NW | G61N | 1782749 | 304483.7 | 2287.132 | 458854.1 | 4502023 |
| CWR NW | G61S | 1782746 | 304385.3 | 2287.621 | 458852.7 | 4501993 |
| CWR NW | G62N | 1782192 | 303577.1 | 2287.056 | 458681.0 | 4501749 |
| CWR NW | G62S | 1782192 | 303478.9 | 2287.142 | 458680.9 | 4501719 |
| CWR NW | G63N | 1781447 | 303346.2 | 2287.482 | 458453.2 | 4501681 |
| CWR NW | G63S | 1781451 | 303247.9 | 2287.179 | 458454.1 | 4501651 |
| CWR SW | G54N | 1781611 | 302522.7 | 2289.487 | 458500.2 | 4501429 |
| CWR SW | G54S | 1781616 | 302424.7 | 2289.507 | 458501.4 | 4501399 |
| CWR SW | G55N | 1783278 | 301884.0 | 2288.687 | 459006.2 | 4501229 |
| CWR SW | G55S | 1783280 | 301785.8 | 2288.853 | 459006.3 | 4501199 |
| CWR SW | G56N | 1781302 | 301849.8 | 2288.321 | 458403.8 | 4501225 |
| CWR SW | G56S | 1781306 | 301751.4 | 2288.717 | 458404.6 | 4501195 |
| CWR SW | G57N | 1781621 | 300851.3 | 2293.403 | 458497.6 | 4500920 |
| CWR SW | G57S | 1781590 | 300757.9 | 2294.315 | 458487.8 | 4500892 |
| CWR SW | G58N | 1782843 | 300585.4 | 2291.546 | 458869.0 | 4500835 |
| CWR SW | G58S | 1782840 | 300487.0 | 2292.226 | 458867.8 | 4500805 |
| Dyer Grassland | G4N | 1764109 | 309100.0 | 2304.192 | 453189.7 | 4503495 |
| Dyer Grassland | G4S | 1764110 | 309000.5 | 2305.229 | 453189.9 | 4503464 |
| Dyer Grassland | G5N | 1764514 | 308561.0 | 2309.707 | 453311.4 | 4503329 |
| Dyer Grassland | G5S | 1764516 | 308462.7 | 2309.745 | 453311.5 | 4503299 |
| Dyer Grassland | G6N | 1765240 | 308495.1 | 2307.850 | 453532.2 | 4503306 |
| Dyer Grassland | G6S | 1765258 | 308398.4 | 2307.742 | 453537.3 | 4503277 |
| Dyer Grassland | G7N | 1762559 | 307907.0 | 2311.345 | 452713.4 | 4503137 |
| Dyer Grassland | G7S | 1762551 | 307807.6 | 2311.954 | 452710.3 | 4503106 |
| Dyer Grassland | G8N | 1761359 | 307698.8 | 2313.868 | 452346.7 | 4503077 |
| Dyer Grassland | G8S | 1761369 | 307601.0 | 2313.396 | 452349.6 | 4503048 |
| Dyer Grassland | G9N | 1761261 | 307445.4 | 2314.745 | 452316.0 | 4503000 |
| Dyer Grassland | G9S | 1761263 | 307347.2 | 2314.481 | 452316.5 | 4502971 |
| Hostetler Crop | G102N | 1928476 | 305882.0 | 2099.253 | 503266.6 | 4501937 |
| Hostetler Crop | G102S | 1928485 | 305785.0 | 2099.149 | 503269.0 | 4501908 |
| Hostetler Crop | G103N | 1927189 | 305725.3 | 2100.931 | 502874.0 | 4501894 |
| Hostetler Crop | G103S | 1927191 | 305627.1 | 2101.773 | 502874.2 | 4501864 |
| Hostetler Crop | G104N | 1925644 | 305524.8 | 2101.888 | 502402.3 | 4501838 |
| Hostetler Crop | G104S | 1925649 | 305426.9 | 2101.942 | 502403.6 | 4501809 |
| Hostetler Crop | G105N | 1927135 | 305081.5 | 2100.879 | 502855.1 | 4501698 |
| Hostetler Crop | G105S | 1927137 | 304983.1 | 2101.204 | 502855.4 | 4501668 |
| Hostetler Crop | G106N | 1923520 | 304853.7 | 2104.812 | 501752.6 | 4501641 |
| Hostetler Crop | G106S | 1923518 | 304755.3 | 2106.819 | 501751.8 | 4501611 |
| Hostetler Crop | G107N | 1928388 | 304858.8 | 2100.098 | 503236.1 | 4501626 |
| Hostetler Crop | G107S | 1928388 | 304760.9 | 2100.651 | 503235.8 | 4501596 |
| Hostetler Crop | G108N | 1925682 | 304698.1 | 2103.729 | 502410.9 | 4501586 |
| Hostetler Crop | G108S | 1925683 | 304599.5 | 2103.994 | 502411.1 | 4501556 |
| Hostetler Crop | G109N | 1923470 | 304530.8 | 2106.724 | 501736.4 | 4501543 |
| Hostetler Crop | G109S | 1923478 | 304432.4 | 2106.381 | 501738.5 | 4501513 |
| Johns North Wet Meadow | G69N | 1824018 | 310064.3 | 2231.507 | 471449.8 | 4503579 |
| Johns North Wet Meadow | G69S | 1824018 | 309965.7 | 2232.300 | 471449.4 | 4503549 |
| Johns North Wet Meadow | G70N | 1824841 | 310033.2 | 2230.330 | 471700.3 | 4503567 |
| Johns North Wet Meadow | G70S | 1824849 | 309935.2 | 2229.506 | 471702.4 | 4503537 |
| Johns North Wet Meadow | G71E | 1825714 | 309628.3 | 2228.817 | 471964.9 | 4503440 |
| Johns North Wet Meadow | G71W | 1825616 | 309624.5 | 2230.648 | 471935.0 | 4503439 |
| Johns North Wet Meadow | G72N | 1825115 | 309466.4 | 2231.088 | 471781.9 | 4503393 |
| Johns North Wet Meadow | G72S | 1825119 | 309368.6 | 2230.226 | 471782.8 | 4503363 |
| Johns North Wet Meadow | G73S | 1823810 | 309251.4 | 2232.798 | 471383.5 | 4503332 |

| Site Name | Name | Easting | Northing | Elevation | UTM_X | UTM_Y |
|---|---|---|---|---|---|---|
| Johns North Wet Meadow | G74N | 1825843 | 309078.7 | 2229.721 | 472002.5 | 4503272 |
| Johns North Wet Meadow | G74S | 1825851 | 308980.6 | 2229.180 | 472004.3 | 4503242 |
| Johns North Wet Meadow | G75N | 1827987 | 308521.8 | 2226.042 | 472653.6 | 4503095 |
| Johns North Wet Meadow | G75S | 1827984 | 308423.9 | 2226.836 | 472652.3 | 4503065 |
| Johns North Wet Meadow | G76N | 1823554 | 308328.6 | 2229.169 | 471302.1 | 4503052 |
| Johns North Wet Meadow | G76S | 1823557 | 308230.4 | 2229.674 | 471302.6 | 4503022 |
| Johns North Wet Meadow | G77N | 1825882 | 308277.0 | 2226.668 | 472011.5 | 4503028 |
| Johns North Wet Meadow | G77S | 1825885 | 308179.9 | 2229.683 | 472012.0 | 4502998 |
| Johns North Wet Meadow | G78N | 1824439 | 308134.3 | 2231.876 | 471571.1 | 4502989 |
| Johns North Wet Meadow | G78S | 1824438 | 308036.0 | 2232.378 | 471570.5 | 4502959 |
| Johns North Wet Meadow | G79N | 1823753 | 308066.9 | 2236.485 | 471361.8 | 4502971 |
| Johns North Wet Meadow | G79S | 1823754 | 307968.6 | 2233.609 | 471361.9 | 4502941 |
| Johns North Wet Meadow | G80E | 1827460 | 307692.0 | 2225.968 | 472490.1 | 4502844 |
| Johns North Wet Meadow | G80W | 1827361 | 307695.7 | 2226.058 | 472460.2 | 4502845 |
| Johns North Wet Meadow | G81E | 1827412 | 306688.5 | 2233.901 | 472471.9 | 4502538 |
| Johns North Wet Meadow | G81W | 1827314 | 306688.7 | 2232.080 | 472442.1 | 4502539 |
| Johns South Wet Meadow | G82N | 1826812 | 306522.1 | 2227.937 | 472288.8 | 4502490 |
| Johns South Wet Meadow | G82S | 1826811 | 306420.7 | 2227.686 | 472288.0 | 4502459 |
| Johns South Wet Meadow | G83N | 1823908 | 306366.9 | 2231.948 | 471403.3 | 4502453 |
| Johns South Wet Meadow | G83S | 1823905 | 306268.5 | 2232.294 | 471401.8 | 4502423 |
| Johns South Wet Meadow | G84N | 1827931 | 306242.9 | 2226.891 | 472628.8 | 4502401 |
| Johns South Wet Meadow | G84S | 1827925 | 306145.6 | 2226.936 | 472626.4 | 4502371 |
| Johns South Wet Meadow | G85N | 1824554 | 306171.1 | 2231.173 | 471599.4 | 4502391 |
| Johns South Wet Meadow | G85S | 1824555 | 306072.6 | 2231.855 | 471599.1 | 4502361 |
| Johns South Wet Meadow | G86N | 1823105 | 305841.7 | 2233.399 | 471156.7 | 4502295 |
| Johns South Wet Meadow | G86S | 1823079 | 305746.6 | 2234.965 | 471148.5 | 4502267 |
| Johns South Wet Meadow | G87N | 1823856 | 305141.8 | 2234.373 | 471382.9 | 4502079 |
| Johns South Wet Meadow | G87S | 1823852 | 305043.6 | 2232.093 | 471381.5 | 4502050 |
| McCormick North Island | G91N | 1828947 | 308973.7 | 2224.841 | 472947.9 | 4503229 |
| McCormick North Island | G91S | 1828950 | 308875.0 | 2224.203 | 472948.4 | 4503199 |
| McCormick North Island | G92N | 1830769 | 308545.2 | 2222.091 | 473501.7 | 4503092 |
| McCormick North Island | G92S | 1830770 | 308446.6 | 2222.587 | 473501.5 | 4503062 |
| McCormick North Island | G93N | 1830369 | 308443.4 | 2224.058 | 473379.4 | 4503063 |
| McCormick North Island | G93S | 1830370 | 308344.8 | 2223.584 | 473379.3 | 4503033 |
| McCormick South Island | G94N | 1829090 | 306496.8 | 2225.330 | 472982.6 | 4502474 |
| McCormick South Island | G94S | 1829090 | 306398.6 | 2226.554 | 472982.4 | 4502444 |
| McCormick South Island | G96N | 1829738 | 306742.0 | 2225.621 | 473181.1 | 4502547 |
| McCormick South Island | G96S | 1829734 | 306641.7 | 2225.642 | 473179.6 | 4502516 |
| McCormick South Island | G97N | 1830635 | 306530.9 | 2223.363 | 473453.8 | 4502479 |
| McCormick South Island | G97S | 1830636 | 306433.0 | 2223.956 | 473453.7 | 4502449 |
| Morse Crop | G45N | 1787190 | 301324.6 | 2282.099 | 460196.2 | 4501045 |
| Morse Crop | G45S | 1787193 | 301226.4 | 2283.725 | 460197.0 | 4501015 |
| Morse Crop | G46N | 1787365 | 300951.0 | 2284.528 | 460248.2 | 4500930 |
| Morse Crop | G46S | 1787366 | 300853.0 | 2284.332 | 460248.2 | 4500900 |
| Morse Crop | G47N | 1786873 | 300687.6 | 2285.212 | 460097.6 | 4500852 |
| Morse Crop | G47S | 1786868 | 300589.0 | 2285.442 | 460095.4 | 4500822 |
| Morse Hay North | G34N | 1786316 | 305260.7 | 2282.001 | 459943.8 | 4502247 |
| Morse Hay North | G34S | 1786324 | 305160.6 | 2282.547 | 459945.8 | 4502217 |
| Morse Hay North | G35N | 1786747 | 305255.2 | 2282.594 | 460075.0 | 4502244 |
| Morse Hay North | G35S | 1786754 | 305154.6 | 2282.091 | 460076.7 | 4502213 |
| Morse Hay North | G36N | 1787140 | 305229.0 | 2282.035 | 460194.6 | 4502235 |
| Morse Hay North | G36S | 1787144 | 305130.0 | 2281.754 | 460195.5 | 4502204 |
| Morse Hay South | G42E | 1787174 | 302803.4 | 2281.324 | 460196.5 | 4501495 |
| Morse Hay South | G42W | 1787074 | 302810.1 | 2280.783 | 460166.1 | 4501498 |
| Morse Hay South | G43N | 1787287 | 302328.9 | 2279.603 | 460229.2 | 4501350 |
| Morse Hay South | G43S | 1787288 | 302230.5 | 2278.984 | 460229.4 | 4501320 |
| Morse Hay South | G44N | 1786731 | 301758.1 | 2282.937 | 460058.0 | 4501178 |
| Morse Hay South | G44S | 1786738 | 301660.5 | 2282.412 | 460059.7 | 4501149 |
| Morse Middle | G37N | 1788364 | 305076.4 | 2279.451 | 460567.1 | 4502184 |
| Morse Middle | G37S | 1788369 | 304978.9 | 2279.695 | 460568.2 | 4502154 |
| Morse Middle | G38N | 1786780 | 304912.3 | 2282.188 | 460083.7 | 4502139 |
| Morse Middle | G39S | 1788639 | 304127.3 | 2277.430 | 460647.6 | 4501894 |

| Site Name | Name | Easting | Northing | Elevation | UTM_X | UTM_Y |
|---|---|---|---|---|---|---|
| Morse Middle | G40N | 1786742 | 303742.5 | 2281.119 | 460068.2 | 4501783 |
| Morse Middle | G40S | 1786741 | 303645.3 | 2280.576 | 460067.5 | 4501753 |
| Morse Middle | G41E | 1786851 | 302965.4 | 2281.044 | 460098.6 | 4501546 |
| Morse Middle | G41W | 1786753 | 302958.7 | 2279.848 | 460068.9 | 4501544 |
| Morse North | G28N | 1788320 | 306672.9 | 2279.474 | 460559.2 | 4502670 |
| Morse North | G28S | 1788318 | 306573.2 | 2282.362 | 460558.4 | 4502640 |
| Morse North | G29N | 1784677 | 306601.8 | 2284.338 | 459449.1 | 4502662 |
| Morse North | G29S | 1784676 | 306503.7 | 2284.335 | 459448.4 | 4502632 |
| Morse North | G30N | 1786560 | 306030.9 | 2283.560 | 460020.7 | 4502481 |
| Morse North | G30S | 1786559 | 305930.7 | 2282.481 | 460020.0 | 4502450 |
| Morse North | G31N | 1787695 | 305927.5 | 2280.874 | 460366.2 | 4502446 |
| Morse North | G31S | 1787692 | 305827.5 | 2280.777 | 460365.0 | 4502415 |
| Morse North | G32N | 1783665 | 305924.0 | 2286.385 | 459138.2 | 4502459 |
| Morse North | G32S | 1783667 | 305825.8 | 2286.485 | 459138.4 | 4502429 |
| Morse North | G33N | 1785881 | 305762.6 | 2283.380 | 459813.0 | 4502402 |
| Morse North | G33S | 1785881 | 305664.6 | 2283.212 | 459812.5 | 4502372 |
| Morse SW | G48N | 1784555 | 302567.5 | 2282.140 | 459397.6 | 4501433 |
| Morse SW | G48S | 1784571 | 302470.3 | 2282.726 | 459402.1 | 4501403 |
| Morse SW | G49N | 1784626 | 302021.1 | 2284.185 | 459417.4 | 4501266 |
| Morse SW | G49S | 1784634 | 301923.1 | 2284.494 | 459419.4 | 4501236 |
| Morse SW | G50N | 1785835 | 301953.7 | 2282.007 | 459785.7 | 4501241 |
| Morse SW | G50S | 1785834 | 301855.0 | 2283.169 | 459784.9 | 4501211 |
| Morse SW | G51N | 1785938 | 301323.4 | 2283.664 | 459814.6 | 4501049 |
| Morse SW | G51S | 1785938 | 301225.1 | 2284.242 | 459814.5 | 4501019 |
| Morse SW | G52N | 1784263 | 300608.6 | 2289.948 | 459301.7 | 4500837 |
| Morse SW | G52S | 1784258 | 300510.3 | 2290.307 | 459300.0 | 4500807 |
| Morse SW | G53N | 1785946 | 300583.5 | 2287.000 | 459814.4 | 4500823 |
| Morse SW | G53S | 1785945 | 300485.1 | 2287.316 | 459814.0 | 4500793 |
| Sullwald Hay Meadow | G88N | 1828427 | 311055.8 | 2227.937 | 472796.7 | 4503866 |
| Sullwald Hay Meadow | G88S | 1828423 | 310957.9 | 2228.435 | 472795.2 | 4503836 |
| Sullwald Hay Meadow | G89N | 1828728 | 310965.1 | 2226.628 | 472887.9 | 4503837 |
| Sullwald Hay Meadow | G89S | 1828729 | 310866.5 | 2226.825 | 472888.1 | 4503807 |
| Sullwald Hay Meadow | G90N | 1829897 | 310614.4 | 2225.333 | 473243.1 | 4503726 |
| Sullwald Hay Meadow | G90S | 1829894 | 310517.2 | 2225.946 | 473241.9 | 4503696 |
| Wyoming South Meadow | G100N | 1907043 | 299106.5 | 2124.409 | 496711.5 | 4499948 |
| Wyoming South Meadow | G100S | 1907041 | 299007.8 | 2125.186 | 496710.4 | 4499918 |
| Wyoming South Meadow | G101N | 1906167 | 298897.0 | 2126.308 | 496443.9 | 4499887 |
| Wyoming South Meadow | G101S | 1906167 | 298798.6 | 2126.412 | 496443.3 | 4499857 |
| Wyoming South Meadow | G98E | 1907051 | 300210.2 | 2130.503 | 496717.9 | 4500284 |
| Wyoming South Meadow | G98W | 1906953 | 300216.2 | 2132.398 | 496688.1 | 4500287 |
| Wyoming South Meadow | G99N | 1905874 | 299458.0 | 2126.300 | 496356.4 | 4500059 |
| Wyoming South Meadow | G99S | 1905875 | 299359.6 | 2125.724 | 496356.3 | 4500029 |

## APPENDIX C: LIST OF VASCULAR PLANTS

| CODE | P-SYMBOL | SPECIES | COMMON NAME | FAMILY | PHYSIOG | WETNESS | C |
|---|---|---|---|---|---|---|---|
| ABUTHE | ABTH | ABUTILON THEOPHRASTI | velvet-leaf | MALVACEAE | A-HERB | UPL/FACU | |
| ACHMIO | ACMIO | Achillea millefolium | western yarrow | ASTERACEAE | P-HERB | FACU | 2 |
| LOTUNI | [ACAM4] | Acmispon americanus | prairie trefoil | FABACEAE | A-HERB | FACU | 3 |
| AGRGIG | AGGI2 | AGROSTIS GIGANTEA | redtop | POACEAE | P-HERB | FACW | |
| AGRSTO | AGSTP | AGROSTIS STOLONIFERA | creeping bentgrass | POACEAE | P-HERB | FACW | |
| ALLCAC | ALCAC | Allium canadense | meadow garlic | AMARYLLIDACEAE | P-HERB | FACU | 3 |
| AMARET | AMRE | Amaranthus retroflexus | redroot pigweed | AMARANTHACEAE | A-HERB | FACU | 0 |
| AMBARE | AMAR2 | Ambrosia artemisiifolia | common ragweed | ASTERACEAE | A-HERB | FACU | 0 |
| AMBPSI | AMPS | Ambrosia psilostachya | western ragweed | ASTERACEAE | P-HERB | FACU | 1 |
| AMBTRI | AMTR | Ambrosia trifida | giant ragweed | ASTERACEAE | A-HERB | /FAC | 0 |
| AMOFRU | AMFR | Amorpha fruticosa | false indigo-bush | FABACEAE | SHRUB | FACW | 5 |
| ANDGER | ANGE | Andropogon gerardii | big bluestem | POACEAE | P-HERB | FACU/FAC | 5 |
| ANTNEG | ANNE | Antennaria neglecta | field pussytoes | ASTERACEAE | P-HERB | FACU/UPL | 3 |
| APOCAN | APCA | Apocynum cannabinum | hemp dogbane | APOCYNACEAE | P-HERB | FAC | 2 |
| ARIPUR | ARPUP4 | Aristida purpurascens | arrowfeather three-awn | POACEAE | P-HERB | UPL/FACU | 7 |
| ARNPLA | ARPL4 | Arnoglossum plantagineum | tuberous Indian-plantain | ASTERACEAE | P-HERB | FAC | 7 |
| ARTLUL | [ARLUL2] | Artemisia ludoviciana | white sage | ASTERACEAE | P-HERB | UPL | 4 |
| ASCLEPIAS SP | | Asclepias sp. | | | | | |
| ASCSPE | ASSP | Asclepias speciosa | showy milkweed | APOCYNACEAE | P-HERB | FAC | 1 |
| ASCSYR | ASSY | Asclepias syriaca | common milkweed | APOCYNACEAE | P-HERB | UPL/FACU | 1 |
| ASCVER | ASVE | Asclepias verticillata | whorled milkweed | APOCYNACEAE | P-HERB | FACU | 3 |
| ASCVIF | ASVI | Asclepias viridiflora | green milkweed | APOCYNACEAE | P-HERB | | 6 |
| ASPOFF | ASOF | ASPARAGUS OFFICINALIS | garden asparagus | ASPARAGACEAE | P-HERB | FACU | |
| ATRPAT | ATPA4 | ATRIPLEX PATULA | common spearscale | CHENOPODIACEAE | A-HERB | FACW/FAC | |
| ATRPRO | ATPR | Atriplex prostrata | thin-leaf spearcale | CHENOPODIACEAE | A-HERB | FACW | 2 |
| BOLFLU | BOFL3 | Bolboschoenus fluviatilis | river bulrush | CYPERACEAE | P-HERB | OBL | 3 |
| BOLMAP | BOMAP2 | Bolboschoenus maritimus | salt-marsh bulrush | CYPERACEAE | P-HERB | OBL | 5 |
| BOUCUR | BOCUC2 | Bouteloua curtipendula | sideoats grama | POACEAE | P-HERB | | 5 |
| BUCDAC | BODA2 | Bouteloua dactyloides | buffalo grass | POACEAE | P-HERB | FACU | 2 |
| BOUGRA | BOGR2 | Bouteloua gracilis | blue grama | POACEAE | P-HERB | | 4 |
| BOUHIR | BOHIH | Bouteloua hirsuta | hairy grama | POACEAE | P-HERB | | 6 |
| BROINE | BRIN2 | BROMUS INERMIS | smooth brome | POACEAE | P-HERB | UPL/FACU | |
| BROJAP | BRJA | BROMUS JAPONICUS | Japenese brome | POACEAE | A-HERB | | |
| BROTEC | BRTE | BROMUS TECTORUM | downy brome | POACEAE | A-HERB | | |
| CALSTR | CAST36 | Calamagrostis stricta | northern reedgrass | POACEAE | P-HERB | FACW | 6 |
| CALINV | CAINI4 | Callirhoe involucrata | purple poppy-mallow | MALVACEAE | P-HERB | | 2 |
| CANSAT | CASA3 | CANNABIS SATIVA | hemp | CANNABACEAE | A-HERB | FACU | |
| CARNUT | CANU4 | CARDUUS NUTANS | musk thistle | ASTERACEAE | B-HERB | FACU | |
| CXBLAN | CABL | Carex blanda | woodland sedge | CYPERACEAE | P-HERB | FAC | 2 |

| CODE | P-SYMBOL | SPECIES | COMMON NAME | FAMILY | PHYSIOG | WETNESS | C |
|---|---|---|---|---|---|---|---|
| CXBREV | CABR10 | Carex brevior | short-beak sedge | CYPERACEAE | P-HERB | FAC | 4 |
| CXGRAV | CAGR4 | Carex gravida | heavy-fruit sedge | CYPERACEAE | P-HERB | FACW/FACU | 4 |
| CXGRIS | CAGR24 | Carex grisea | gray wood sedge | CYPERACEAE | P-HERB | FACW/FAC | 3 |
| CXPELL | CAPE42 | Carex pellita | woolly sedge | CYPERACEAE | P-HERB | OBL | 4 |
| CXPRAE | CAPR5 | Carex praegracilis | clustered field sedge | CYPERACEAE | P-HERB | FACW | 4 |
| CAREX sp. | | Carex spp. | | | | | 4 |
| CXVULP | CAVU2 | Carex vulpinoidea | fox sedge | CYPERACEAE | P-HERB | FACW | 4 |
| CHEALB | CHAL7 | CHENOPODIUM ALBUM | lamb's-quarters | CHENOPODIACEAE | A-HERB | FACU | |
| CHEBEZ | CHBEZ | Chenopodium berlandieri | pitseed goosefoot | CHENOPODIACEAE | A-HERB | | 0 |
| CHEGLA | CHGL3 | CHENOPODIUM GLAUCUM | oak-leaf goosefoot | CHENOPODIACEAE | A-HERB | FAC/FACW | |
| CHEPRA | CHPR5 | Chenopodium pratericola | desert goosefoot | CHENOPODIACEAE | A-HERB | | 1 |
| CHLVER | CHVE2 | Chloris verticillata | tumble windmill grass | POACEAE | P-HERB | | 0 |
| CIRALT | CIAL2 | Cirsium altissimum | tall thistle | ASTERACEAE | P-HERB | | 1 |
| CIRARV | CIAR4 | CIRSIUM ARVENSE | Canada thistle | ASTERACEAE | P-HERB | FACU | |
| CIRCAN | CICA11 | Cirsium canescens | Platte thistle | ASTERACEAE | B-HERB | | 4 |
| CIRFLO | CIFL | Cirsium flodmanii | Flodman's thistle | ASTERACEAE | P-HERB | FAC | 4 |
| CIRUND | CIUN | Cirsium undulatum | wavy-leaf thistle | ASTERACEAE | P-HERB | UPL/FACU | 4 |
| CIRVUL | CIVU | CIRSIUM VULGARE | bull thistle | ASTERACEAE | B-HERB | FACU | |
| CONMAC | COMA2 | CONIUM MACULATUM | poison-hemlock | APIACEAE | B-HERB | FACW | |
| CONARV | COAR4 | CONVOLVULUS ARVENSIS | field bindweed | CONVOLVULACEAE | P-HERB | | |
| CONCAN | COCA5 | Conyza canadensis | horseweed | ASTERACEAE | A-HERB | FACU | 0 |
| CORDRU | CODR | Cornus drummondii | rough-leaf dogwood | CORNACEAE | SHRUB | FAC | 3 |
| CROTEX | CRTET | Croton texensis | Texas croton | EUPHORBIACEAE | A-HERB | | 1 |
| IVAXAN | CYXA | Cyclachaena xanthiifolia | giant marsh-elder | ASTERACEAE | A-HERB | FAC | 0 |
| CYCATR | CYAT | Cycloloma atriplicifolium | winged-pigweed | CHENOPODIACEAE | A-HERB | FACU | 2 |
| CYPLUL | CYLUL | Cyperus lupulinus | Great Plains flatsedge | CYPERACEAE | P-HERB | FACU | 1 |
| CYPSCH | CYSC3 | Cyperus schweinitzii | sand flatsedge | CYPERACEAE | P-HERB | FACU | 4 |
| DALCAC | DACA7 | Dalea candida | eastern white prairie-clover | FABACEAE | P-HERB | | 6 |
| DALPUP | DAPUP | Dalea purpurea | purple prairie-clover | FABACEAE | P-HERB | | 6 |
| DALVIL | DAVI | Dalea villosa | silky prairie-clover | FABACEAE | P-HERB | | 5 |
| DESSOP | DESO2 | DESCURAINIA SOPHIA | flix-weed tansy mustard | BRASSICACEAE | A-HERB | | |
| DESAIL | DEIL | Desmanthus illinoensis | Illinois bundleflower | FABACEAE | P-HERB | FACU | 5 |
| DESOIL | DEIL2 | Desmodium illinoense | Illinois tick-clover | FABACEAE | P-HERB | | 6 |
| PANACF | DIACF | Dichanthelium acuminatum | western spring-panicum | POACEAE | P-HERB | FAC | 6 |
| PANOLS | DIOLS | Dichanthelium oligosanthes | Scribner's spring-panicum | POACEAE | P-HERB | FACU | 4 |
| DIGCOG | DICO6 | Digitaria cognata | fall witchgrass | POACEAE | P-HERB | | 4 |
| DISSPS | DISP | Distichlis spicata | saltgrass | POACEAE | P-HERB | FACW | 3 |
| ECHCRU | ECCR | ECHINOCHLOA CRUS-GALLI | barnyard grass | POACEAE | A-HERB | FAC/FACW | |
| ELAANG | ELAN | ELAEAGNUS ANGUSTIFOLIA | Russian-olive | ELAEAGNACEAE | TREE | FACU | |
| ELECOC | ELCOC2 | Eleocharis compressa | flat-stem spikerush | CYPERACEAE | P-HERB | FACW | 6 |

| CODE | P-SYMBOL | SPECIES | COMMON NAME | FAMILY | PHYSIOG | WETNESS | C |
|---|---|---|---|---|---|---|---|
| ELEOCHARIS SP. | | Eleocharis sp. | | | | | |
| ELEPAL | ELPA3 | Eleocharis palustris | marsh spikerush | CYPERACEAE | P-HERB | OBL | 4 |
| ELYMUS SP. | | Elymus sp. | | | | | 4 |
| ELYCAN | [ELCA4] | Elymus canadensis | Canada wild-rye | POACEAE | P-HERB | FACU | 5 |
| ELYVIV | ELVIV | Elymus virginicus | Virginia wild-rye | POACEAE | P-HERB | FAC/FACW | 4 |
| EQUARV | EQAR | Equisetum arvense | field horsetail | EQUISETACEAE | P-HERB | FAC | 4 |
| EQULAE | EQLA | Equisetum laevigatum | smooth scouring-rush | EQUISETACEAE | P-HERB | FAC/FACW | 4 |
| ERACIL | ERCI | ERAGROSTIS CILIANENSIS | stinkgrass | POACEAE | A-HERB | FACU | |
| ERAPEC | ERPEP2 | Eragrostis pectinacea | tufted lovegrass | POACEAE | A-HERB | FAC | 0 |
| ERASPE | ERSP | Eragrostis spectabilis | purple lovegrass | POACEAE | P-HERB | UPL | 3 |
| ERISTR | ERSTS2 | Erigeron strigosus | daisy fleabane | ASTERACEAE | A-HERB | FACU | 2 |
| EUPALT | EUAL3 | Eupatorium altissimum | tall boneset | ASTERACEAE | P-HERB | | 3 |
| EUPDAV | EUDA5 | Euphorbia davidii | western toothed spurge | EUPHORBIACEAE | A-HERB | | 0 |
| EUPDEN | EUDE4 | Euphorbia dentata | eastern toothed spurge | EUPHORBIACEAE | A-HERB | | 0 |
| EUPMAB | EUMA7 | Euphorbia maculata | spotted spurge | EUPHORBIACEAE | A-HERB | FACU | 0 |
| EUPMAR | EUMA8 | Euphorbia marginata | snow-on-the-mountain | EUPHORBIACEAE | A-HERB | FACU | 0 |
| EUPNUT | EUNU | Euphorbia nutans | eyebane | EUPHORBIACEAE | A-HERB | | 0 |
| EUPSEY | [CHSES] | Euphorbia serpyllifolia | thyme-leaf spurge | EUPHORBIACEAE | A-HERB | | 2 |
| EUPHORBIA SP. | | Euphorbia sp. | | | | | 0 |
| EUPESU | EUVI7 | EUPHORBIA VIRGATA | leafy spurge | EUPHORBIACEAE | P-HERB | | |
| EUSGRA | EURU4 | Eustoma russellianum | prairie-gentian | GENTIANACEAE | A-HERB | FACW | 4 |
| EUTGYM | EUGY | Euthamia gymnospermoides | viscid goldentop | ASTERACEAE | P-HERB | FAC/FACW | 4 |
| POLSCA | FASC | Fallopia scandens | climbing false-buckwheat | POLYGONACEAE | P-VINE | FACU/FAC | 1 |
| FRAPEN | FRPE | Fraxinus pennsylvanica | green ash | OLEACEAE | TREE | FAC/FACW | 2 |
| GALAPA | GAAP2 | Galium aparine | catch-weed bedstraw | RUBIACEAE | A-HERB | FACU | 0 |
| GLYLEP | GLLE3 | Glycyrrhiza lepidota | wild licorice | FABACEAE | P-HERB | FACU | 4 |
| GRISQU | GRSQ | Grindelia squarrosa | curly-top gumweed | ASTERACEAE | B-HERB | UPL/FACU | 1 |
| HEDHIS | HEHI | Hedeoma hispida | rough false-pennyroyal | LAMIACEAE | A-HERB | | 2 |
| HELANN | HEAN3 | Helianthus annuus | common sunflower | ASTERACEAE | A-HERB | FACU | 0 |
| HELGRO | HEGR4 | Helianthus grosseserratus | sawtooth sunflower | ASTERACEAE | P-HERB | FACW | 4 |
| HELMAX | HEMA2 | Helianthus maximiliani | Maximilian's sunflower | ASTERACEAE | P-HERB | FACU/UPL | 4 |
| HELPAS | HEPAS2 | Helianthus pauciflorus | stiff sunflower | ASTERACEAE | P-HERB | | 5 |
| HELPET | [HEPEP] | Helianthus petiolaris | plains sunflower | ASTERACEAE | A-HERB | | 1 |
| HELHEO | HEHEO | Heliopsis helianthoides | false-sunflower | ASTERACEAE | P-HERB | FACU | 4 |
| HESCOM | HECOC9 | Hesperostipa comata | needle-and-thread | POACEAE | P-HERB | | 6 |
| HETSUB | HELA5 | Heterotheca latifolia | camphor-weed | ASTERACEAE | A-HERB | | 2 |
| HORJUB | [HOJUJ] | Hordeum jubatum | foxtail barley | POACEAE | P-HERB | FACW/FAC | 1 |
| HORPUS | HOPU | Hordeum pusillum | little barley | POACEAE | A-HERB | FACU/FAC | 1 |
| IVAANN | IVAN2 | Iva annua | annual marsh-elder | ASTERACEAE | A-HERB | FAC | 1 |
| JUNARB | JUBAL | Juncus balticus | Baltic rush | JUNCACEAE | P-HERB | FACW/OBL | 6 |

| CODE | P-SYMBOL | SPECIES | COMMON NAME | FAMILY | PHYSIOG | WETNESS | C |
|---|---|---|---|---|---|---|---|
| JUNCUS SP. | | Juncus sp. | | | | | |
| JUNDUD | JUDU2 | Juncus dudleyi | Dudley's rush | JUNCACEAE | P-HERB | FACW | 5 |
| JUNNOD | JUNON | Juncus nodosus | knotted rush | JUNCACEAE | P-HERB | OBL | 6 |
| JUNTOR | JUTO | Juncus torreyi | Torrey's rush | JUNCACEAE | P-HERB | FACW | 4 |
| JUNVIR | JUVIV | Juniperus virginiana | eastern red-cedar | CUPRESSACEAE | TREE | UPL/FACU | 1 |
| SALTRA | [SATR12] | KALI TRAGUS | prickly Russian-thistle | CHENOPODIACEAE | A-HERB | FACU | |
| KOEMAC | KOMA | Koeleria macrantha | Junegrass | POACEAE | P-HERB | | 6 |
| LACLUD | LALU | Lactuca ludoviciana | western wild lettuce | ASTERACEAE | B-HERB | FACU | 3 |
| LACSER | LASE | LACTUCA SERRIOLA | prickly lettuce | ASTERACEAE | A-HERB | FAC/FACU | |
| LEEORY | LEOR | Leersia oryzoides | rice cutgrass | POACEAE | P-HERB | OBL | 4 |
| LEPDEN | LEDE | Lepidium densiflorum | prairie pepper-grass | BRASSICACEAE | A-HERB | FAC | 0 |
| LEPLAT | LELA2 | LEPIDIUM LATIFOLIUM | broad-leaf pepper-grass | BRASSICACEAE | P-HERB | FACW | |
| LIASQG | LIGL4 | Liatris glabrata | plains gayfeather | ASTERACEAE | P-HERB | | 5 |
| LIAPUN | LIPUP | Liatris punctata | dotted gayfeather | ASTERACEAE | P-HERB | | 5 |
| LINSUL | LISU4 | Linum sulcatum | grooved flax | LINACEAE | A-HERB | | 6 |
| LITINC | LIIN2 | Lithospermum incisum | fringed puccoon | BORAGINACEAE | P-HERB | | 5 |
| ONOMOO | [ONOC] | Lithospermum occidentale | marble-seed | BORAGINACEAE | P-HERB | | 4 |
| LOBSPI | LOSP | Lobelia spicata | pale-spike lobelia | CAMPANULACEAE | P-HERB | FAC | 6 |
| LYCAME | LYAM | Lycopus americanus | American water-horehound | LAMIACEAE | P-HERB | OBL | 4 |
| LYCASP | LYAS | Lycopus asper | rough bugleweed | LAMIACEAE | P-HERB | OBL | 5 |
| LYTALA | LYALA4 | Lythrum alatum | winged loosestrife | LYTHRACEAE | P-HERB | OBL | 6 |
| LYTSAL | LYSA2 | LYTHRUM SALICARIA | purple loosestrife | LYTHRACEAE | P-HERB | OBL | |
| MEDLUP | MELU | MEDICAGO LUPULINA | black medick | FABACEAE | A-HERB | FACU | |
| MEDSAS | MESAS | MEDICAGO SATIVA | alfalfa | FABACEAE | P-HERB | UPL/VACU | |
| MELALB | MEAL2 | MELILOTUS ALBUS | white sweet-clover | FABACEAE | B-HERB | FACU | |
| MELOFF | MEOF | MELILOTUS OFFICINALIS | yellow sweet-clover | FABACEAE | B-HERB | FACU | |
| MENARV | MECA7 | Mentha canadensis | Canada mint | LAMIACEAE | P-HERB | FACW | 4 |
| MIRLIN | MILIL | Mirabilis linearis | narrow-leaf four-o'clock | NYCTAGINACEAE | P-HERB | | 4 |
| MOLVER | MOVE | MOLLUGO VERTICILLATA | green carpet-weed | MOLLUGINACEAE | A-HERB | FAC | |
| MONFIF | MOFIM3 | Monarda fistulosa | wild-bergamot | LAMIACEAE | P-HERB | UPL/FACU | 4 |
| MORALB | MOAL | MORUS ALBA | white mulberry | MORACEAE | TREE | FACU/FAC | |
| MUHLENBERGIA SP. | | | | | | | |
| NEPCAT | NECA2 | NEPETA CATARIA | catnip | LAMIACEAE | P-HERB | FACU | |
| GAUMOL | [GAPA6] | Oenothera curtiflora | velvet butterfly-plant | ONAGRACEAE | A-HERB | | 1 |
| OENRHO | OERH | Oenothera rhombipetala | fourpoint evening-primrose | ONAGRACEAE | B-HERB | FACU | 2 |
| CALSER | OESE3 | Oenothera serrulata | plains yellow-primrose | ONAGRACEAE | P-HERB | | 5 |
| GAUCOC | [GACO5] | Oenothera suffrutescens | scarlet butterfly-plant | ONAGRACEAE | P-HERB | | 4 |
| OPUHUM | OPHUH | Opuntia humifusa | eastern prickly-pear | CACTACEAE | P-HERB | | 5 |
| OXADIL | OXDI2 | Oxalis dillenii | gray-green wood-sorrel | OXALIDACEAE | A-HERB | FACU | 0 |
| OXASTR | OXST | Oxalis stricta | yellow wood-sorrel | OXALIDACEAE | A-HERB | FACU | 0 |

| CODE | P-SYMBOL | SPECIES | COMMON NAME | FAMILY | PHYSIOG | WETNESS | C |
|---|---|---|---|---|---|---|---|
| SENPLA | PAPL12 | Packera plattensis | prairie ragwort | ASTERACEAE | B-HERB | FACU | 5 |
| PANCAC | [PACA6] | Panicum capillare | common witchgrass | POACEAE | A-HERB | FAC | 0 |
| PANDIC | PADID | Panicum dichotomiflorum | fall panicum | POACEAE | A-HERB | FAC/FACW | 0 |
| PANVIR | PAVI2 | Panicum virgatum | switchgrass | POACEAE | P-HERB | FAC | 4 |
| PARQUI | PAQU2 | Parthenocissus quinquefolia | Virginia creeper | VITACEAE | W-VINE | FACU | 5 |
| ELYSMI | PASM | Pascopyrum smithii | western wheatgrass | POACEAE | P-HERB | FACU | 3 |
| PASSES | PASES | Paspalum setaceum | yellow sand paspalum | POACEAE | A-HERB | FAC/FACU | 2 |
| POLAMS | PEAM8 | Persicaria amphibia | water smartweed | POLYGONACEAE | P-HERB | OBL | 6 |
| PHAARU | PHAR3 | Phalaris arundinacea | reed canary grass | POACEAE | P-HERB | FACW | 0 |
| PHLPRA | PHPR3 | PHLEUM PRATENSE | timothy | POACEAE | P-HERB | FACU | |
| PHYLAN | PHLA3 | Phyla lanceolata | northern fogfruit | VERBENACEAE | P-HERB | FACW/OBL | 3 |
| PHYHET | PHHE5 | Physalis heterophylla | clammy ground-cherry | SOLANACEAE | P-HERB | | 4 |
| PHYLON | PHLO4 | Physalis longifolia | common ground-cherry | SOLANACEAE | P-HERB | | 0 |
| PHYVIR | PHVI5 | Physalis virginiana | Virginia ground-cherry | SOLANACEAE | P-HERB | | 6 |
| PLAPAP | [PLPA2] | Plantago patagonica | woolly plantain | PLANTAGINACEAE | A-HERB | | 1 |
| PLAVIR | PLVI | Plantago virginica | pale-seed plantain | PLANTAGINACEAE | A-HERB | FACU | 2 |
| POACOM | POCO | POA COMPRESSA | Canada bluegrass | POACEAE | P-HERB | FACU | |
| POAPRA | POPR | POA PRATENSIS | Kentucky bluegrass | POACEAE | P-HERB | FACU | |
| POLAVI | [POAV] | POLYGONUM AVICULARE | yard knotweed | POLYGONACEAE | A-HERB | FACU | |
| POLRAM | PORA3 | Polygonum ramosissimum | bushy knotweed | POLYGONACEAE | A-HERB | FACW/FACU | 1 |
| POPDEM | PODEO | Populus deltoides | plains cottonwood | SALICACEAE | TREE | FAC | 3 |
| POROLE | POOL | Portulaca oleracea | garden purslane | PORTULACACEAE | A-HERB | FAC/FACU | 0 |
| POTPAR | POPA15 | Potentilla paradoxa | bushy cinquefoil | ROSACEAE | A-HERB | FACW | 4 |
| PRUVUL | PRVUL3 | Prunella vulgaris | self-heal | LAMIACEAE | P-HERB | FAC | 4 |
| PYCVIR | PYVI | Pycnanthemum virginianum | Virginia mountain-mint | LAMIACEAE | P-HERB | FAC/FACW | 6 |
| RATCOL | RACO3 | Ratibida columnifera | upright coneflower | ASTERACEAE | P-HERB | | 4 |
| RIBODO | RIOD | Ribes odoratum | buffalo currant | GROSSULARIACEAE | SHRUB | FACU/FAC | 4 |
| ROBPSU | ROPS | ROBINIA PSUEDOACAIA | black locust | FABACEAE | TREE | UPL/FACU | |
| ROSARS | ROAR3 | Rosa arkansana | dwarf prairie rose | ROSACEAE | SHRUB | FACU | 4 |
| ROSWOO | ROWOW | Rosa woodsii | western wild rose | ROSACEAE | SHRUB | FACU | 4 |
| RUDHIP | RUHIP | Rudbeckia hirta | black-eyed Susan | ASTERACEAE | B-HERB | FACU | 4 |
| RUMCRI | RUCR | RUMEX CRISPUS | curly dock | POLYGONACEAE | P-HERB | FACW | |
| SALAMY | SAAM2 | Salix amygdaloides | peach-leaf willow | SALICACEAE | TREE | FACW | 4 |
| LOLARU | SCAR7 | SCHEDONORUS ARUNDINACEUS | tall fescue | POACEAE | P-HERB | FACU | |
| LOLPRA | SCPR4 | SCHEDONORUS PRATENSIS | meadow fescue | POACEAE | P-GRASS | FACU | |
| SCHSCO | SCSCS | Schizachyrium scoparium | little bluestem | POACEAE | P-HERB | FACU | 4 |
| SCHPUL | SCPU10 | Schoenoplectus pungens | three-square bulrush | CYPERACEAE | P-HERB | OBL | 4 |
| SETFAB | SEFA | SETARIA FABERI | Chinese foxtail | POACEAE | A-HERB | UPL/FACU | |
| SETPUM | SEPUP2 | SETARIA PUMILA | yellow foxtail | POACEAE | A-HERB | FACU/FAC | |
| SETVER | SEVE3 | SETARIA VERTICILLATA | bristly foxtail | POACEAE | A-HERB | FAC | |
| SETVIR | SEVIV | SETARIA VIRIDIS | green foxtail | POACEAE | A-HERB | | |

| CODE | P-SYMBOL | SPECIES | COMMON NAME | FAMILY | PHYSIOG | WETNESS | C |
|---|---|---|---|---|---|---|---|
| SILANT | SIAN2 | Silene antirrhina | sleepy catchfly | CARYOPHYLLACEAE | A-HERB | | 2 |
| SISLOE | SILO3 | SISYMBRIUM LOESELII | tall hedge mustard | BRASSICACEAE | A-HERB | | |
| SISMON | SIMOM | Sisyrinchium montanum | strict blue-eyed-grass | IRIDACEAE | P-HERB | FAC | 5 |
| SOLINT | SOIN2 | Solanum interius | plains black nightshade | SOLANACEAE | P-HERB | | 1 |
| SOLROS | SORO | Solanum rostratum | buffalo-bur | SOLANACEAE | A-HERB | | 0 |
| SOLCAN | SOCAH | Solidago canadensis | Canada goldenrod | ASTERACEAE | P-HERB | FACU | 2 |
| SOLGIG | SOGI | Solidago gigantea | late goldenrod | ASTERACEAE | P-HERB | FAC/FACW | 3 |
| SOLMIF | SOMI2 | Solidago missouriensis | Missouri goldenrod | ASTERACEAE | P-HERB | | 5 |
| SOLMOL | SOMO | Solidago mollis | ashy goldenrod | ASTERACEAE | P-HERB | | 4 |
| SOLIDAGO SP. | | Solidago sp. | | | | | 3 |
| SOLRIG | SORIH | Solidago rigida | stiff goldenrod | ASTERACEAE | P-HERB | FACU | 3 |
| SONASP | SOAS | SONCHUS ASPER | prickly sow-thistle | ASTERACEAE | A-HERB | FAC/FACU | |
| SORNUT | SONU2 | Sorghastrum nutans | Indian grass | POACEAE | P-HERB | FACU | 5 |
| SPAPEC | SPPE | Spartina pectinata | prairie cordgrass | POACEAE | P-HERB | FACW | 5 |
| SPHOBO | [SPOB] | Sphenopholis obtusata | prairie wedge grass | POACEAE | P-HERB | FACW | 5 |
| SPOAIR | SPAI | Sporobolus airoides | alkali sacaton | POACEAE | P-HERB | FAC | 5 |
| SPOCOM | SPCOC2 | Sporobolus compositus | tall dropseed | POACEAE | P-HERB | FACU | 3 |
| SPOCRY | SPCR | Sporobolus cryptandrus | sand dropseed | POACEAE | P-HERB | FACU | 2 |
| SYMOCC | SYOC | Symphoricarpos occidentalis | wolfberry | CAPRIFOLIACEAE | SHRUB | UPL | 2 |
| SYMERE | SYERE | Symphyotrichum ericoides | heath aster | ASTERACEAE | P-HERB | FACU | 3 |
| SYMLAN | SYLAL4 | Symphyotrichum lanceolatum | tall white aster | ASTERACEAE | P-HERB | FACW/FAC | 2 |
| TAROFF | TAOF | TARAXACUM OFFICINALE | common dandelion | ASTERACEAE | P-HERB | FACU | |
| TEUCAC | TECAC | Teucrium canadense | American germander | LAMIACEAE | P-HERB | FACW | 4 |
| ELYELO | THPO7 | THINOPYRUM PONTICUM | tall wheatgrass | POACEAE | P-HERB | | |
| THLARV | THAR5 | THLASPI ARVENSE | field penny cress | BRASSICACEAE | A-HERB | FACU | |
| TOXRYD | TORAN2 | Toxicodendron radicans | eastern poison ivy | ANACARDIACEAE | W-VINE | FACU | 2 |
| TRABRA | TRBR | Tradescantia bracteata | long-bract spiderwort | COMMELINACEAE | P-HERB | FACU | 5 |
| TRADUB | TRDU | TRAGOPOGON DUBIUS | yellow goat's-beard | ASTERACEAE | B-HERB | | |
| TRIFRA | TRFR2 | TRIFOLIUM FRAGIFERUM | strawberry clover | FABACEAE | P-HERB | FAC/FACU | |
| TRIPRA | TRPR2 | TRIFOLIUM PRATENSE | red clover | FABACEAE | P-HERB | FACU | |
| TRIREP | TRRE3 | TRIFOLIUM REPENS | white clover | FABACEAE | P-HERB | FACU | |
| TRIMAR | TRMA20 | Triglochin maritima | shore arrow-grass | JUNCAGINACEAE | P-HERB | OBL | 5 |
| TRIAES | TRAE | TRITICUM AESTIVUM | bread wheat | POACEAE | A-HERB | | |
| TYPANG | TYAN | TYPHA ANGUSTIFOLIA | narrow-leaf cattail | TYPHACEAE | P-HERB | OBL | |
| ULMPUM | ULPU | ULMUS PUMILA | Siberian elm | ULMACEAE | TREE | UPL | |
| UNK FORB | | Ukn Forb | | | | | |
| VERTHA | VETH | VERBASCUM THAPSUS | common mullein | SCROPHULARIACEAE | B-HERB | UPL | |
| VERBRA | VEBR | Verbena bracteata | prostrate vervain | VERBENACEAE | A-HERB | FACU | 0 |
| VERHAS | VEHA2 | Verbena hastata | blue vervain | VERBENACEAE | P-HERB | FACW | 4 |
| VERSTR | VEST | Verbena stricta | hoary vervain | VERBENACEAE | P-HERB | | 2 |

| CODE | P-SYMBOL | SPECIES | COMMON NAME | FAMILY | PHYSIOG | WETNESS | C |
|---|---|---|---|---|---|---|---|
| VERBAI | [VEBAI2] | Vernonia baldwinii | western ironweed | ASTERACEAE | P-HERB | FACU/UPL | 3 |
| VERFAS | [VEFAF] | Vernonia fasciculata | prairie ironweed | ASTERACEAE | P-HERB | FAC/FACW | 4 |
| VERPEP | [VEPEP] | Veronica peregrina | purslane speedwell | PLANTAGINACEAE | A-HERB | FACW | 1 |
| VIOPEF | VIPE2 | Viola pedatifida | prairie violet | VIOLACEAE | P-HERB | FACU | 6 |
| XANSTC | XASTC | Xanthium strumarium | cocklebur | ASTERACEAE | A-HERB | FAC | 1 |