Chiwaukee Prairie Wetland Restoration

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The Wisconsin Department of Natural Resource's Bureau of Endangered Resources describes Chiwaukee Prairie as a State Natural Area situated on gently undulating ridge and swale topography created when the level of glacial Lake Michigan was lowered in stages. It is one of the largest prairie complexes in the state and the most intact coastal wetland in southeastern Wisconsin. The prairie contains an exceptional diversity of plants and animals -- more than 400 species of vascular plants have been found here. The natural area features a mosaic of plant communities, ranging from southern sedge meadow, wet prairie, and wet-mesic prairie in the low areas, to dry-mesic prairie on the slightly elevated sandy ridges. Portions of the site are classified as calcareous fen, inhabited by calcium-loving plants. Oak opening dominated by bur and black oaks occupies higher, drier ground along the southern and western parts of the preserve. The northernmost portion, Kenosha Dunes, contains open and stabilized sand dunes. This variety of habitats, coupled with their location in the extreme southeastern corner of the state, allows several rare and geographically restricted plants, amphibians, reptiles, birds, invertebrates, and mammals to thrive here. Twenty-six rare plant species, 10 of which are listed as endangered or threatened grow in the prairie. Rare plants include smooth phlox (*Phlox glaberrima ssp. interior*), ohio goldenrod (*Solidago ohiensis*), and marsh blazing star (*Liatris spicata*). Rare animals include Blanding's turtle (*Emydoidea blandingii*), silphium borer moth (*Papaipema silphii*), and Franklin's ground squirrel (*Spermophilus franklinii*). More than 75 species of grassland and wetland birds have been observed during the breeding season. Chiwaukee Prairie is a cooperative project of the Wisconsin Chapter of The Nature Conservancy (TNC), UW-Parkside (UWP), Chiwaukee Prairie Preservation Fund (CPPF) and the DNR. The area was subdivided into hundreds of small residential lots many years ago, making land acquisition a challenge. Chiwaukee Prairie is recognized as a National Natural Landmark by the National Park Service and was designated a State Natural Area in 1967.

The Wisconsin Department of Natural Resources secured a grant from the USFWS Great Lakes Fish and Wildlife Restoration Act for general management; conducting surveys; doing outreach; monitoring of management efforts; and research on habitat. Work was done primarily by the WDNR natural area crew and wildlife staff, but with the help from several partners as well- TNC staff, CPPF volunteers, UWP professors and students, and general volunteers. Habitat management was done primarily on WDNR lands, but did involve some work on TNC/UWP lands as well. (Attachment A1 & A2) The original grant period was the October of 2009 to September of 2010; however, due to a delay with the paperwork the funds were not available to the natural area crew until the late winter of 2010. As a result an extension was granted for the project until June of 2011. The following is a summary of the work tasks outlined in the grant proposal.

Section A. General Management

Invasive Plant Treatment

The main list of herbaceous invasives that the crew manages includes: Garlic Mustard, Cypress Spurge, Hairy Willow Herb, Purple Loosestrife, White Sweet Clover, Oriental Bittersweet, Black Swallow-wort, Cypress Spurge, Spotted Knapweed, and Reed Canary Grass. Populations of these plants are scattered throughout the lake plain prairie. WDNR Crew and volunteers spend the summer monitoring and managing the known invasive populations and looking for new hot spots. At the known locations the following management practices are applied:

Garlic Mustard- Pull and bag plants or treat with herbicide in the spring/fall outside growing season. Also using a blow torch with propane tank to scorch plants outside growing season in the spring or late fall.
Cypress Spurge- Mow with Dr. Brush Mower and spot treat plants with Tordon K.
Purple Loosestrife- Cut the flowering heads off and bag, then treat stems with rodeo. (Low number of plants.)
Sweet Clover- Mow plants prior to going to seed or pull plants and bag.
Reed Canary Grass- Tie the plants together, cut the heads off and treat the stems with rodeo.
Hairy Willow-Herb- Treat plants with Rodeo.
Oriental Bittersweet- Cut plant and treat the stump with Rodeo.
Spotted Knapweed- Pulling plants during wet periods.
Black Swallow-wort- Treat plants with foliar spray of Rodeo.
(WDNR Terrestrial Invasives 2010)

During the fall of 2009, spring-summer-fall of 2010, and spring of 2011 our crew treated 35-acres of herbaceous invasives. This was done over 16 management units. Much of the time was spent with the following plants: White Sweet Clover, Cypress Spurge, Reed Canary Grass, and Garlic Mustard. Fortunately the other invasives populations are smaller and required less time - Oriental Bittersweet, Hairy Willow Herb, Spotted Knapweed, and Purple Loosestrife.

Management of herbaceous invasives will always be an issue in the Chiwaukee Prairie complex. Communication amongst partners needs to continue and increase relating to management of and identification of new invasives in the complex and in Illinois. Increased efforts are needed for monitoring of new invasives coming into the complex throughout the season. Educating of neighbors on invasives on private lands is also something that should be investigated.

Brushing

Over the years with the suppression of fires in the Carol Beach area woody vegetation has increased in the area. In many cases brush was and is either too dense or too tall for fire to have any effect, requiring the use of equipment to knock back the brush to a more

manageable size. Early on the management focus was to mow shrubby brush and control through controlled burning. At times conducting controlled burns at Chiwaukee Prairie can be sporadic due to weather and the urban interface, so it has not possible to keep up with the brush in many cases. In recent years changes have been made to try and address this through the use of herbicides on cut stems and re-sprouts and mowing with DR Brush Mower.

The main brushing season is during the winter months when the ground is frozen and impacts to the area are minimal. Winter mowing is done with tract vehicles with 6 ft mower decks- Komatsu and John Deere tract machines. These machines do the bulk of the mowing on Chiwaukee Prairie.

The use of a DR Brush Mower has been a recent addition to the mowing program dealing mainly with light brush. Using the DR Brush mower allows us to mow more frequently and to keep the brush at a more manageable size. It also affords us the chance to do stump treatment of the shrubs after mowing with the smaller mower. Both these tools have helped to keep shrub patches on some of our smaller blocks at a more manageable level.

During the 2009-2010 and 2011 winter brushing seasons we were able to remove 30 acres of brush affecting 13 management blocks. (Attachment A5 and A4)

There will always be a need for heavy mowing, but the hope is to be able to replace heaving mowing through the increased used of the DR Brush Mower and herbicide treatment. If the brush can be kept at a smaller size and with an increased herbaceous cover, controlled burns will be more effective in controlling the brush. The use of the DR Brush mower is also less costly, which will help in reducing overall operating costs.

Chain Sawing

In addition to removing brush with equipment, the natural area crew also spends time chain sawing trees. The main focus is removing Green Ash and Black Locust trees, with a few other species: poplar, Tree of Heaven, and Box Elders. All trees cut are stump treated and the trunks chipped and hauled off site. (Attachment A4) During the fall-winter of 2009, 2010, and 2011 the crew removed approximately 4 acres of trees.

The removal of the trees helps to get more sunlight to these spots, allowing herbaceous plants shaded out to return. It is important to monitor these areas to see what returns, but to also to watch out for invasive plants (e.g., White Sweet Clover, Garlic Mustard, etc.) from establishing themselves.

Over the years the crews have been able to reduce the number of lots that were heavily wooded. The need for chain sawing and chipping is declining, and will mainly occur on newly purchased lots.

Problem Tree Removal (Match)

As match to this grant state funds were used to hire a contractor to cut down large trees throughout the prairie. The targeted trees were small groupings of trees or individual trees that were too tall for our crew to handle and ones that posed a safety hazard to neighbors. Trees species included poplar, cottonwood and willow. Eighteen trees and one partially girdled tree were cut down and removed. Trees will be monitored for re-sprouts and treated. The main issue with Eastern Cottonwood trees is the spread of seeds throughout the prairie. One cottonwood tree has the ability to produce up to 48 million seeds in a year. The Carol Beach Subdivision area has a number of cottonwood trees, so any attempt to reduce seed production in the area is a benefit to the prairie. Funds were also used by crews to cut trees (e.g., ash, box elder, etc.) in other areas of Chiwaukee Prairie.

Match: Tree Removal Costs

$10950	Remove 17 trees and topped a girdled tree
$4807	Natural Area Crew Salary
$4087	Supplies- equipment, trucks, misc. supplies.
$15,037	

Burning

Burning on Chiwaukee can be a difficult process. The urban interface with the subdivision, wet nature of the site and the lake affect when and how burning can occur. During 2010 the burn season was fairly successful in the spring and fall- burning 8.7 acres in the spring on 4 management units and 104 acres on two units in the fall. (Attachment A3) All the burns were successful in setting back brush and stimulating new growth. During the fall a 92 acre burn was conducted on The Nature Conservancy lands. This was a new burn unit had not been burned for at least 25+ years, possibly longer. The spring of 2011 was too wet to burn.

Controlled burning is the most efficient and cost effective means to manage the wet-prairie. At Chiwaukee burning has been sporadic over the years, allowing for the encroachment of woody vegetation. Since 2000 average number of burns on the Chiwaukee Prairie has been around 3 per year. There is a need to try to expand the window of opportunity to burn at Chiwaukee. A couple possible ways to do this include burning more in the fall and partners working together to fill in burn crew gaps to complete burns jointly.

Other Items

The annual report was not completed for the project, a goal under the grant proposal. A report has been done in past years, but it has been missing in recent years. Workload amongst partners played a role in not completing the report. An annual report gives a clear picture of what is happening with all the partners on Chiwaukee Prairie and also where shortfalls may be occurring.

Over the grant period the partners met in the field or held conference calls five times to discuss grant work, current management efforts, and future funding opportunities. (1/20/10, 5/26, 6/14, 8/11, and 10/12) The most involved meeting occurred in August 6, 2010 when all the partners met at UW-Parkside for a roundtable. The purpose of the roundtable was for each partner to update others on projects, survey results, funding options, needs, land acquisition, and future goals for the lake plain prairie in Illinois and Wisconsin. It is hoped that the roundtable event will occur again, possibly in two years.

Outreach for Chiwaukee Prairie consisted of public and college class tours; a talk at a subdivision meeting; an article in the local paper; and annual informational management handouts given to residents. During the course of the year and a half the WDNR and the CPPF conducted tours with the Natural Resource Foundation (NRF) and UW-Parkside (UWP) Classes. The NRF tours were conducted in the spring and the fall. The spring tour was sponsored by the WDNR and covered a wide variety topics relating to Chiwaukee- history, management, acquisition, surveys (e.g., small mammal surveys, plants, etc.) and funding sources (e.g., Great Lakes Fish and Wildlife Restoration Fund, etc.). The fall tour was sponsored by the CPPF and focused more on the Plants of Concern work and identifying plants on the prairie.

The WDNR and CPPF also helped with Geography classes at Chiwaukee Prairie. The one fall class helped the CPPF with Plants of Concern survey of Greater and Lesser Fringed Gentian. The same class participated in the cover study for the WDNR at Chiwaukee Prairie as well. As the partnership at Chiwaukee Prairie continues to develop is envisioned that CPPF, WDNR, and TNC will be working more closely with UWP with classes, surveys, management, and outreach.

The one article relating to Chiwaukee was in regards to an on going Sustain Our Great Lakes Grant that involves partners in Wisconsin and Illinois. The article was in the Kenosha News and covered the scope of the grant which was for management (e.g., brush removal, invasive plant treatment, road removal, etc.) and groundwater study for the lake plain prairie.

As part of our management, the WDNR natural area crew hands out flyers to neighbors prior to the prescribed burn and brushing season. These flyers explain the scope proposed work, the purpose, and the areas being affected by the work. It also tells the residents why it is occurring and tips on for avoiding to be impacted by things such as smoke. We have found this has been helpful in keeping our neighbors informed and prepared. It has also given a face to the WDNR in the area when we interact with residents when handing out the flyers.

During the scope of the 1.5 year project the Chiwaukee Prairie Natural Area Crew also worked with the Student Conservation Association (SCA). The SCA sent crews from Milwaukee, mainly inner city kids, to help with management on Chiwaukee. The crews worked at Chiwaukee Prairie one day a week for a 5-6 week period. These crews helped with herbaceous invasive plants- pulling White Sweet Clover and Queen Annes lace- , cut Glossy Buckthorn, and participated in a small mammal survey. As part of their time

at Chiwaukee Prairie they were taught about the importance of the area as a SNA and also how the property work is funded. The crew helped out during the summer of 2010 and 2011, and it is planned for them to return next year. Next year the hope is to expand their scope of work to include surveys for plants, etc. It is hoped that these experiences will help young people, who are not normally exposed to areas like this, to develop a deeper appreciation for them and instill the need to protection them.

Section B. Eastern White Fringed Prairie Orchid (*Platanthera leucophaea*)

The Eastern White Fringed Prairie Orchid (EWFPO) is one of five state endangered plant species found at Chiwaukee Prairie. (It is also list as Federally Threatened.) The orchid is found on moist, undisturbed, deep-soiled prairies and blooms from early June – August. The range for the plant covers 16 counties in Southern Wisconsin, including Kenosha County. (WDNR- Prairie White-fringed Orchid 2011) Chiwaukee Prairie is an important site in the Federal Recovery Plan (Bowles 1999), as it is recognized as a high value site. In the lake plain prairie of the Lake Michigan basin it is the only high viability population. (High viable populations have: 1) more than 50 flowering plants; 2) population trend that is stable or increasing over a monitoring period of 5 years or more; 3) available habitat of at least 125 acres in size; and 4) ongoing management assurances of long term protection.) Other important factors regarding this population include its large population size; large habitat size; and moderate management needs.

Formal surveys for the orchid started in 1997 and were organized by Ursula Peterson, from the Department of Agriculture, Trade and Consumer Protection (DACTP). These surveys were part of DATCP assessment program for federally listed species in Wisconsin, the Endangered Species Habitat Program. The goal of this program was to assess the status of the federally listed species in the state so that a work plan could be developed. As part of the program, counts were carried out on 18 sites in 8 counties in Southern Wisconsin, with not all sites being counted each year. Searches were conducted in the first two weeks of July. (Peterson 2004)

As one of the 18 sites, the Chiwaukee Prairie Project area was counted every year since 1997. Coverage of the Chiwaukee Prairie complex has varied over the years. Counts have occurred on the majority if not all of TNC and UW-Parkside ownership each year. (Attachment B1) Count coverage on WDNR lands has varied over the years. Reasons for this variation include that the fact UWP and TNC lands are the largest block of contiguous habitat and fluctuating levels of volunteer efforts. The count is carried out by staff from the WDNR, TNC, DATCP, UW-Parkside staff and students, Chiwaukee Prairie Preservation Fund volunteers, and various other volunteers. The survey method involves volunteers walking transects and counting all orchids seen. The locations of the orchids are mapped and in more recent years have been recorded with a GPS unit. Under the grant proposal the goal was to conduct the orchid count, which occurred in July of 2010 and 2011.

In 2010 the count was held on July 6 and a total of 62 orchids were counted- fifty-five orchids on TNC/UWP lands and seven on WDNR lands (4 sites searched). In 2011 the main count was held on July 14 and a total of 134 orchids were counted- 130 on TNC/UWP and 4 on WDNR (8 sites searched).

Table B1. White Fringed Orchid Survey Results- 2008- 11

Year	2008	2009	2010	2011
WDNR				
# of Sites Searched	18	7	4	8
# of Orchids Counted	14	25	7	4
TNC				
# of Sites Searched	2	2	2	2
# of Orchids Counted	71	135	55	130
Total Orchids Counted	85	160	62	134

Implications

Current management efforts and annual counts have helped Chiwaukee Prairie to continue to be a high viability site under the recovery plan. In the last four years the average number of orchids counted per year is 110.25, doubling the minimum of 50 flowering plants needed for this designation.

For the EWFPO to mature and flower it takes up to five years, so it is difficult to see an immediate response to management by the plant in a years' time. General observations from a 60 acre burn in 2007 on TNC/UWP lands, north of 122nd Street, would seem to indicate some benefits to the plant. Counts on the TNC/UWP lands of Chiwaukee showed a healthy number of orchids over the following 2 years after the burn- 2008 seventy-one orchids and 2009 135 orchids. (The majority of these plants were found in the area burned.) While it can't be said that burning had a direct impact on the plants flowering in 2008 & 2009, the burn helped to maintain and improve habitat which may have created better conditions for flowering plants. Count data needs to be looked at over a longer period of time when considering management impacts.

Another opportunity to see how the orchids respond to management is available on TNC land south of 122nd St., where a burned occurred in the fall of 2010. Over the last few years only a few orchids have been counted in this area. It will be interesting to see what the orchid counts will be in 4 to 5 years after the burn, and with continued management (e.g., brush control, herbaceous invasives control, etc.) in this area.

Future

Over the years efforts have been made to do a seed-set check on located plants to see if they have been pollinated and are producing seeds. These efforts have not been consistent in recent years and more effort is needed to do these follow-ups. The information gathered from these checks is important to provide the full picture of the health of plant's populations and for the continued viability of the population. Doing these checks will

indicate if the plants are being successfully pollinated and are producing or if more work is needed to see why they are not being pollinated or not producing seed (e.g., lack of pollinators, fungi issues, etc.).

In the early years of the orchid surveys more of the Chiwaukee Prairie complex, TNC/UWP and WDNR lands, were covered. In recent years WDNR lands have not been covered as well. While the WDNR lands are more fragmented, there is still quality habitat for the orchid. In the year 2000 46 orchids were counted on 12 management blocks. Reasons for the reduction of coverage have been due to more focus put on TNC/UWP lands; Ursula no longer leading field surveys; and smaller WDNR crews. A more concerted effort is needed by the partners to expand the searches to include more of the WDNR lands to provide a broader picture of the plant population.

With the difficulties in the application of prescribed fire (e.g., wet site conditions, urban interface, crew logistics, etc.), the use of herbicides is increasing to handle woody and herbaceous invasives. Steps are taken to avoid impacting the orchid and other rare plants, but caution is still needed when applying herbicides to avoid impacts. Increasing the area covered by the survey and better record keeping of orchid locations will help to avoid or minimize impact of the herbicides on orchids and their pollinators.

In the grant proposal surveys for rare plants, under the Plants of Concern (POC) program, would be conducted on Chiwaukee Prairie. The POC surveys were carried out during the spring-summer-fall of 2010 and spring of 2011; however, the results have not been provided at this time. The program is part of the Chicago Wilderness Organization and focuses on training volunteers to identify rare targeted plants species. (Attachment B1) The volunteers, under the direction of an area coordinator, search for these specific plants during the blooming periods. The surveys help to confirm the presence of rare plant species; to identify and map plant populations; and determine population sizes. The surveys have confirmed the presence of several rare species and also located a few new plant species. If funding is available it is hoped that the program will continue and possibly expand to cover locations on WDNR lands.

Section C. Red-Tailed Leafhopper (*Aflexia rubranuara*)

The Red-tailed leafhopper is an Endangered Species in Wisconsin. The small flightless insect, less than 4.0 mm in length, is found in only 10 counties in Wisconsin including Kenosha County where Chiwaukee Prairie SNA is located. The host plant for this insect is the Prairie Dropseed, which is found in dry to wet-mesic prairies. The Red-tailed Leafhopper uses the host plant for its whole life cycle. The insect has two hatches during the summer, one mid-June to mid-July and the second mid-August to Mid-September, and then lays eggs on dropseed stems that overwinter. (WDNR Red-tailed Prairie leafhopper 2011)

Prairie Dropseed is a short bunch grass that forms dense groupings of grass blades. The plant is infrequent in the southern and western parts of Wisconsin, dominant or prevalent in dry to wet-medium prairies, often towards the bottom of hills and on river terraces

where conditions are more medium than dry; usually an indicator of relict prairies. (Cochrane, Elliot, Lipke 2006) In Wisconsin plants have been sited or recorded in 32 counties, including two locations in Kenosha County.

Under the grant proposal the goal was to increase the knowledge of Red-tailed Leafhopper's presence on state lands in Chiwaukee Prairie to improve management for this species. First step in doing this is to determine the location and abundance of the leafhopper's host plant, Prairie Dropseed. In carrying out habitat work (e.g., invasive plant management, posting, etc.) and plant/animal surveys on various management units, staff has been documenting dropseed locations. (Table C1) At this point dropseed has been located in 3 new management blocks on the DNR's portion of the Chiwaukee. (There are Prairie Dropseed clusters on TNC/UW-Parkside lands as well, but the locations have not been mapped to date.)

Red-tailed Leafhopper surveying involves determining the presence or absence of the small insect. Survey methods involve two strategies- use of a sweep net or vacuuming (reversing of a leaf blower). The Chiwaukee Natural Area Crew has used the vacuuming method previously and continued to use it for the most recent survey efforts. A mesh bag is placed over the leaf blower and then operating the leaf blower in reverse the tube is put into the heart of the dropseed. In reverse the leaf blower pulls in any insects that are in the dropseed. With the machine off, the mesh bag is slowly pulled out to examine what has been caught. A small catch bottle, a sample jar with a suction tube and an extraction tube, is used to pluck individual leafhoppers for closer examination. (Attachment C2)

Table C1. Prairie Dropseed Locations (Host Plant)

Management Unit	Latitude	Longitude	Populations Levels	Distance From Other Known Populations
Unit 2 Block 14	42.509194	-87.812639	Common	1,307 ft
Unit 3 Block 31	42.519306	-87.813	Common	595 ft
Unit 3 Block 26	42.518278	-87.81475	Abundant	595 ft
Unit 4 Block 37	42.522528	-87.814167	Abundant	?

A survey was conducted on September 22, 2010 for Red-tailed Leafhoppers in two management units- block 37 and block 26. (Attachment C1) Weather conditions were within survey parameters- partly cloudy, light breeze (0-5 mph), and 72 degrees. On block 37 six dropseed plants in a large cluster were searched and four leafhoppers were captured, but two got away before getting a closer look. The two that were examined were not Red-tailed Leafhoppers, assumed to be likely Memnonia nr. grandis. On block 26 four dropseed plants in a cluster were searched and two leafhoppers were captured and examined in the catch bottle. One was a Green leafhopper and the other was a Red-tailed leafhopper.

Implications

The survey has at a minimum determined that the Red-tailed leafhoppers are present on the WDNR portion of Chiwaukee Prairie, but it is yet to be determined to what extent. As

a result, when burning in units with Prairie Dropseed clusters, portions of the populations need to be left unburned creating refuges for the insects. (WDNR protocol calls for leaving 1/3 of the Dropseed population in an area for at least two consecutive seasons and there is no more than 500 ft separating burned and unburned host plant populations.)

Research indicates that Red-tailed Leafhopper is susceptible to fire impacts in the spring and fall. The insect lays their eggs in the stems of the grass and over winter. In Minnesota leafhoppers were only found in the unburned areas and not in areas managed with a 1 -2 year fire frequency. (Kirk 1996) According to Panzer most leafhoppers, including the Red-tailed Leafhopper, appear to recover completely from burns within 2-3 years. (Kirk 1996) With the limited knowledge of Prairie Dropseed population locations and their proximity to other Prairie Dropseed populations, it is critical that portions of documented populations be left unburned.

Future

As for additional work, more effort is needed to locate and map Prairie Dropseed populations and to develop better consistency with the Red-tailed leafhopper survey. This is a need for the entire Chiwaukee Prairie complex- WDNR, TNC, and UW-Parkside lands. The Red-tailed leafhopper has been documented on TNC lands, but little is known about the size or location of the leafhopper or host plant populations.

With the additional knowledge of dropseed locations more effort can be made to ensure that entire populations are not consumed in prescribed burns. This can be done by installing additional firebreaks around host plant populations.

All partners struggle with the use of prescribed fire management and minimizing impacts to rare species on Chiwaukee Prairie. Due to the wet nature of the site and surrounding urban interface the window for burning is limited. (In the past 6 years the average number of burns per year conducted by all partners in the entire complex was 2.) As a result there is a big need to burn as much as possible to maintain the wet prairie/wet-Mesic prairie habitat and keep ahead of brush encroachment. Prescribed burning is the most efficient way to maintain the prairie and to control brush and the most cost effective. At times restrictions placed on management of species limits the ability to manage on a larger scale, which is always preferable. However, increasing our knowledge of the presence and location of the leafhopper and dropseed populations will open the door for more flexible management options through consultation with Bur. of Endangered Resources staff.

Section D. Glossy Buckthorn Management

Glossy Buckthorn is a major invasive problem at Chiwaukee Prairie. The WDNR portion of Chiwaukee Prairie has pockets of buckthorn thickets so dense that native vegetation has been shaded out. Past management practices focused on using mowing and prescribed burning as control measures. Herbicide application was used minimally and

mainly for cut-stump treatment of trees. Broadcast spraying of these large thickets is not an option due to potential impacts on the flora. Mowing and burning was effective for a period of time, but changes in site conditions, sporadic burning (e.g., weather, urban interface issues, etc.) and increased mowing saw the buckthorn thickets increase in size and density. In the early part of the 2000 decade lake levels dropped making the dune-swale complex drier. From general observations it appeared that under these conditions shrubs were putting on more growth in a single season than in previous years. As a result a new strategy was needed to control the buckthorn which involved a combination of increased mowing, herbicide treatment, and burning when possible.

Under the grant the proposal was to use a DR Brush Mower to mow just buckthorn thickets and spot treat with herbicide (e.g., Rodeo, Garlon 3A, etc.) the stumps or re-sprouts. The vegetation at the selected sites would be monitored in created study plots to document response to management. The DR Brush Mower is in-expensive to operate and can be used on a more frequent basis at different time of the year on the smaller plots without impacting the flora. As outlined, the plan was to mow two management blocks with the DR Brush Mower twice in a season and spot treat with herbicide in the late summer or fall to treat re-sprouts.

Monitoring of these plots would involve creating study plots and documenting the size of the patches, species, number of shrubs, number of stems, average size of stems, and herbaceous species present prior to mowing in the fall and posting-mowing/treating in the spring or summer. The two sites selected for this monitoring were block 31 and block 47, both smaller blocks with fairly dense patches of buckthorn. More intense management has already been applied to these blocks in recent years to address the buckthorn problems. When the intense management started on these areas the buckthorn thickets shaded out all native vegetation, with basically bare ground as an understory.

Block 47 is located on the north end of the WDNR ownership in Unit 5. (Attachment D1) The management unit has a glossy buckthorn thicket on the east side in a mapped wetland. This buckthorn thicket has been mowed and burned in the past, but now management includes spot herbicide treatment (e.g., stump treatment, foliar spray, etc.) with Garlon 3A. This patch was mowed in the spring of 2009; treated with a foliar spray in the fall of 2009; mowed and stump spot treated in the spring of 2010; and mowed and stump treated in the spring of 2011.

Block 31 is located in the middle of the WDNR ownership in Unit 3. (Attachment D2) This management block has three distinct patches of glossy buckthorn that are located in mapped wetland areas. Intense management of these buckthorn patches began in 2008. The three different buckthorn patches were divided into 3 areas and each were managed differently: Area A was mowed, treated and burned; Area B was mowed and treated; and Area C was just mowed. The 3 unit were mowed and Area A and B was stump treated in the fall of 2009; all 3 were mowed in the spring of 2010; and Areas A and B re-sprout treatment in mid-summer of 2010; and Areas A and B were mowed and stump treated in the spring of 2011. To increase the application fire to the re-sprouts a hand torch with a

propane tank was used to burn the buckthorn re-sprouts in early spring of 2010 in Area A.

The monitoring aspect of this project fell short of the proposed plan. Prior to management the shrub layer was documented, but the herbaceous vegetation layer was not. On Block 47 the area was dominated by Glossy Buckthorn, with small patches of Red-osier dogwood, willow, Box Elder, and Green Ash trees. On Block 31 the shrub layer was dominated by Glossy Buckthorn, with some small patches of Red-osier dogwood, raspberry, and Green Ash trees. Both the blocks were looked at once to document plant cover during the grant period. In doing the monitoring on Block 47 two 5 foot x 5 foot plots were created and on Block 31 the buckthorn patches as a whole were looked at.

Block 47 was surveyed on 12/3/2010. The buckthorn patch was looked at overall and within two 5 foot x 5 foot plots. Overall vegetation found included: Red-osier dogwood, Joe-Pye Weed, Grassleaf Goldenrod, Sawtooth Sunflower, fern species, Prairie Cord Grass, Blue joint Grass, Horse Mint, New England Aster, Glossy Buckthorn, Red-Osier Dogwood, and Prairie Wild Rose.

Within the 5 ft x 5 ft plots:

- Plot I- Vegetation: 19 Glossy Buckthorn shrubs, 5 prairie wild rose shrubs, sedges; Stems counted on 5 shrubs for a total 68 stems for a 13.6 average.
- Plot II- Vegetation: 11 Glossy Buckthorn shrubs, sedges; Stems counted on 8 shrubs for a total of 45 stems, 5.6 average.

In September of 2011 the Glossy Buckthorn patches on Block 31 were surveyed for vegetation. The entire buckthorn thickets were looked at for species composition versus the shrub level and density. Vegetation present in the three areas was:

- Area A (.11 acres): Cattails, goldenrod species, Queen Annes Lace, Evening Primrose, Fleabane, Joe-Pye Weed, Prairie Cord Grass, Green Ash, Bull Thistle, Glossy Buckthorn, Boneset, Canada Anemone, New England Aster, Red-osier Dogwood, sedges, Common Milkweed, Nodding Wild Onion, Saw-tooth Sunflower, Prairie Wild Rose, fern species, Grassleaf Goldenrod, and Showy Goldenrod.

- Area B (.13 acres): Sawtooth Sunflower, sedges, Nodding Wild Onion, Evening Primrose, mint species, raspberry, goldenrod species, New England Aster, Grassleaf Goldenrod, Black-eyed Susan, Joe-Pye Weed, Glossy Buckthorn, and Canada Anemone.

- Area C (.35 acres): goldenrod species, fern species, Red-osier dogwood, New England Aster, Prairie Cord Grass, mint species, Indian Grass, and Glossy Buckthorn.

Table D1. Species Count in study areas on Block 31

	Overall Species	Forb Species	Grass Species	Woody Species
Area A	22	17	1	4
Area B	13	11		2
Area C	8	4	2	2

On Block 47 the shrubs still have a strong presence. There was not much diversity in the plots, just shrubs, a few sedges, and bare ground. Other herbaceous vegetation is starting to move in, but it is still spotty due to competition with the woody vegetation.

On Block 31 the shrubs have a presence in all three study areas, but at differing levels. Area C has the most dense shrub layer, but is developing a good understory of herbaceous vegetation, much of it being grasses. Its plant composition is the least diverse of the three areas. In Area B the shrub layer forms clumps, but at a lighter density than in Area C. Area B has more herbaceous vegetation than Area C and its plant composition is more diverse- 13 and 8 species respectively. The area does have more bare ground than in Area C. Area A has scattered shrubs, with the least shrub layer of the three areas. The area also has the most diverse plant composition of the three areas, with 22 species. (Table D1)

Implications

One year does not provide detailed results to determine impact of management, but it has provided a small glimpse that the more intense management is having a positive impact. In general increased mowing is stimulating herbaceous plant growth in the buckthorn patches on Block 31 & 47. (Attachment D3 and D4) The use of herbicide application and controlled burning has helped to thin the buckthorn thickets and increased the density and diversity of the herbaceous vegetation. The increased herbaceous vegetation will provide fuel to help carry fire that can control the Glossy Buckthorn and other woody species. While none of these results are un-expected they do show that more intense management, that is also less costly, is effective in dealing with small to medium sized patches of buckthorn.

On Block 31, where the most intense management has been applied, there has been the most progress. From the general species survey in each study area all the management practices have been shown too beneficial, but the most effective management is occurring in Area A (mowing-herbicide treatment- burning). The species diversity increases with each additional management applied to the area. (Table D1) In Area A there were 22 species present- 17 forbs, one grass, and four woody. In Area B there were 13 species present- 11 forbs and 2 woody. An Area C with just mowing there were 8 species present- 4 forbs, 2 grasses, and 2 woody. The woody vegetation is still present, but it is reduced in density and size. While this intensive management may not be practical for larger blocks (10- 20 acres), it appears to be suitable for the smaller blocks (2-8 acres).

Future

The practice of more intense management of the buckthorn thickets on the smaller management blocks must be expanded. On the WDNR portion of the Chiwaukee Prairie complex there are several smaller blocks of habitat ranging from 2- 8 acres in size. Mowing of these blocks can occur more frequently, with less impact on the flora and fauna and at a lower cost by using the DR Brush Mower. (Larger Tract Mowers run around $55 hour to operate.) Putting more stress on the shrubs through increased mowing will force shrubs to use more of the plant's reserves making it more susceptible to herbicide and burning.

The application of herbicide on mowed shrubs has shown promise and it must be incorporated with the large scale mowing. The larger mowers are used in the winter time, when the ground is frozen, for large scale mowing (10 – 25 acres). During winter months treatment of woody stumps after mowing is not very practical. Follow-up can be made though to re-sprouts in the early spring when the buckthorn comes up before other herbaceous plants.

In addition to treating mowed buckthorn, efforts need to be made to eliminate fruit bearing buckthorns to reduce seed production and potential spread. Buckthorn seeds are viable for approximately 5 years. If there number can be reduced and eventually eliminated, this would help in the battle of the buckthorn.

The need to monitor management efforts is a major shortfall and needs to be improved upon. Without monitoring (e.g., photo record, vegetation monitoring, etc.) there is not a clear picture on the impacts of management practices and whether changes are needed. Over the years several attempts have been made, but have never become routine due to changes in crew or workload of full time staff. Future monitoring of the buckthorn management work will involve the use transects measuring of vegetative cover (e.g., grass, forb, shrub, etc.) to .1 meter and identifying vegetation species in transects to monitor buckthorn management.

All Chiwaukee Prairie partners need to look at ways to expand the window of opportunity for prescribed burning. The weather, the urban interface, burn workload, and crew logistics affect the ability to apply fire to Chiwaukee Prairie consistently. The WDNR crew has thousands of acres to burn on other state lands in addition to Chiwaukee Prairie in the spring and only so many burns days in the spring. TNC is limited mainly by few burn bosses in the state and a burn crew centrally located in Madison 2 hours away. More cooperation is also needed amongst partners to assist each other with prescribed burns. Steps have been taken this fall with the WDNR, TNC, the Chiwaukee Prairie Preservation Fund, and the Lake County Forest Preserve assisting with falls burns on WDNR and TNC lands. Expanding the fall burn program is something that must be looked at more closely as an option also. (Must take into consideration the forb: grass ratio when selecting fall sites.)

It may be necessary to reduce the scope of woody vegetation work in a given year to make sure that all areas mowed can also be treated with herbicide (e.g., stump treatment, re-sprout treatment, etc.). Mowing large patches of woody vegetation, especially Glossy

Buckthorn, and not following up with herbicide treatment only stimulates the buckthorn to grow back more vigorously. It should be the goal to make sure that the woody vegetation has been controlled or is being actively managed before moving on to the next large block.

Section E. Chiwaukee Prairie Bird Blitz

The Chiwaukee Prairie State Natural Area (SNA) landscape supports habitat for many different bird species. There are some 75 bird species that have been documented using the SNA during the breeding season. The lake plain area is dominated by a ridge - swale complex that helps to create various habitat types- ***southern sedge meadow, wet prairie, wet-Mesic prairie, dry-Mesic prairie, and calcareous fen. Other habitat types in the surrounding area include Oak opening and sand dunes.*** Breeding bird surveys were conducted on TNC/UWP lands with varied habitat types- southern sedge meadow, wet prairie, wet-mesic prairie, calcareous fen, and dry mesic prairie. Surveys were conducted by TNC volunteers 6 years from 1994 – 2002. (Attachment E1) During these surveys five grassland obligate songbird species were seen and/or heard- Bobolink, Henslow's Sparrow, Eastern Meadowlark, Upland Sandpiper, and Sedge Wren. (Grassland songbirds considered to be obligate species require grasslands for most or all parts of their breeding life cycle.) During those surveys it was noticed that several of these 5 species disappeared, with only the Eastern Meadowlark and the Sedge Wren remaining. This raised questions why were several of the 5 songbird species disappearing? Also, what kind of bird use was occurring throughout the entire Chiwaukee Prairie complex? So in 2003 a decision was made to conduct a comprehensive songbird survey on Chiwaukee to get a better idea of what species were using Chiwaukee, which could be used to determine future management decisions. In 2004 the first bird blitz was held at Chiwaukee.

The Bird Blitz survey was developed at Richard Bong Recreation Area to help in gathering songbird data a property wide basis. This survey method was very successful in gathering baseline data on bird species presence and numbers at Richard Bong. The survey involves dividing a property into territories and having volunteers comb these areas early in the morning, recording every bird species and individual bird seen or heard and the habitat type the bird was in. The survey is conducted in June when birds are assumed be nesting and on territory. The survey is conducted over a 5 year period to gather a good baseline data on bird species present. Under the grant proposal the plan was to conduct the 3rd year of the bird blitz survey in 2010. (Because of the grant extension the 3rd and 4th year of the blitz were conducted.) Chiwaukee Prairie SNA was divided into 7 territories that include Wisconsin DNR, UW-Parkside and The Nature Conservancy lands. (Attachment E2) Habitat types in the area include: upland brush, lowland brush, open water, emergent marsh (e.g., cattails, bulrush, etc.), prairie (e.g., big bluestem, Indian grass, forbs, etc.), lowland grass/sedge meadows, wooded wetland, deciduous forest (e.g., oak/hickory/maple/cherry, black locust, etc.), savanna, dunes, and developed (e.g., mowed lawns, buildings, roads, etc.).

In 2010 the survey was conducted on June 19, 2010 under good weather conditions- partly cloudy, light winds (5- 10 mph), and 76 degrees. Volunteers covered 6 of the 7 territories, with territory 5 being not covered. (The habitat in territory 5 is a mixture of dry and wet-Mesic-prairie, grasslands with woody encroachment, and deciduous forest.) Results from the 2010 survey include 50 species being seen or heard and 1,256 individuals counted. The most abundant species was the Red-winged Blackbird with 291 individuals counted. (Red-winged Blackbirds have been the most abundant species in the previous two years as well.) Of the obligate grassland species only the Sedge Wren was seen or heard. (Attachment E3)

In 2011 the survey was conducted on June 18 again under good weather conditions- clear, light winds (0 -5 mph), and 64 degrees. Volunteers covered all 7 of the territories. Results include 64 species being seen or heard and 1,685 individuals counted- highest species count and second highest individual count in the 4 years of the survey. (Table E1 and Chart E3) Once again Red-Winged Blackbirds were the most abundant species in the count- 467 individuals. Of the grassland obligate species only the Sedge Wren was seen or heard during the survey. (Attachment E4)

Table E1. Species and Individual Totals for Bird Blitz –'08- '11

	2008	2009*	2010*	2011
Species	59	56	50	64
Individuals	2211	897	1256	1685

Table E2. Obligate Grassland Songbirds Seen/Heard in Bird Blitzes

	2008	2009*	2010*	2011
Henslow's Sparrow	- -	- -	- -	- -
Bobolink	- -	1	- -	- -
Eastern Meadowlark	- -	1	- -	- -
Sedge Wren	11	3	9	10
Upland Sandpiper	- -	- -	- -	- -

* In 2009 & 2010 only 6 territories were covered during the survey.

The entire Breeding Bird survey route falls within territories 6 & 7 of the Bird Blitz survey; however, the Bird Blitz Territories cover a larger area. (Attachment E1) In comparing the data from these two surveys the mean for species and individuals is basically the same. (Tables E3 & E4) The real difference is looking at the presence of the 5 obligate grassland species. (Chart E1) The survey data in the charts shows that in the breeding bird surveys all five species were counted at some point, but in the bird blitzes only two of the five species have been counted- the Sedge Wren and Bobolink. (Table E2 and Chart E2)

Table E3. Bird Blitz Totals for Territories 6 and 7- 2008 - 11

	2008	2009	2010	2011	**Mean**

Total Species	48	47	43	53	47.8
Total Individuals	485	515	468	656	531

Table E4. Breeding Bird Survey Totals- 1991, 1994-95, 1997, 2001-02

	1991	1994	1995	1997	2001	2002	**Mean**
Total Species	48	47	43	53	48	47	47.6
Total Individuals	485	515	468	656	485	515	520.7

The surveys have helped to document several priority bird species from a couple conservation plans- the Wisconsin's Wildlife Action Plan- Species of Greatest Conservation Need (SGCN) and Partners In Flight (PIF). There have been twenty-three species identified at Chiwaukee Prairie: Upland Sandpiper (SGCN), American Woodcock (SGCN), Black-billed Cuckoo (SGCN), Yellow-billed Cuckoo (SGCN), Chimney Swift (PIF), Red-headed Woodpecker (SGCN, PIF), Northern Flicker (PIF), Willow Flycatcher (SGCN, PIF), Least Flycatcher (SGCN, PIF), Northern Rough-winged Swallow (PIF), Bank Swallow (PIF), Barn Swallow (PIF), Sedge Wren (PIF), Marsh Wren (PIF), Common Yellowthroat (PIF), Field Sparrow (SGCN, PIF), Henslow's Sparrow (SGCN, PIF), Swamp Sparrow (PIF), Bobolink (SGNC, PIF), Eastern Meadowlark (SGCN, PIF), Brown Thrasher (SGCN, PI F), and Rose-Breasted Grosbeak (PIF). (WBCI Priority Species 2007)

Implications

The decline in grassland obligates started in the later part of the breeding bird survey. (Chart E1) During the 90's there were 3 to 4 obligate grassland species showing up in the survey, but as the 2000's began it dropped to two species- the Eastern Meadowlark and Sedge Wren. The trend has continued in the Bird Blitzes with only three of the five species showing up in the entire complex, and two of these species only once. The most prevalent species of the grassland obligate group is the Sedge Wren. The decline in grassland obligate species would suggest that the landscape is changing, making the area less suitable for these songbirds. The primary thought for change is in the cover type- an increase in the brush cover and/or possibly an increase in the forb cover. (The question of forb cover will be addressed in next section in more detail.)

Survey Data from the Bird Blitz has shown that species associated with shrubby habitats make up a large number of birds counted. WDNR Conservation Biologist Randy Hoffman (1989) looked at shrub-carr communities- communities dominated by Red-osier dogwood, willow, or invasive shrubs such as buckthorn- in southern Wisconsin and developed a list of species associated with this community type. The list includes Ring-necked pheasant, Willow Flycatcher, Veery, Robin, Gray Catbird, Cedar Waxwing, Yellow Warbler, Common Yellowthroat, Song Sparrow, Red-winged Blackbird, Swamp Sparrow, and Common Grackle. All of these bird species are species that have been counted in the bird blitz, and many in good numbers. Looking at the four year mean of shrub-carr species and all bird species, shrub-carr species make up 22.5% of the bird

species. This may provide support that the shrub cover at Chiwaukee Prairie is becoming a major issue and is favoring shrub-carr species. It must be also noted that 7 of shrub-carr species mentioned by Hoffman (1989) were also mentioned by Hoffman and Sample (1988) to be species that use Wet-Mesic and/or Wet Prairie communities to some extent. Wet-Mesic and Wet Prairies are the dominant community types on the TNC/UWP portions of Chiwaukee. The overlap species include Common Yellowthroat, Swamp Sparrow, Red-Winged Blackbird, Song Sparrow, Willow Flycatcher, Yellow Warbler, and American Robin.

Future

The next step is to carry out the 5th and final year of the survey. At that point the data will be analyzed in more detail. Areas of focus include bird use by habitat types; wet/wet-Mesic prairie species vs. shrub-carr species overall and per territory; and prevalence of the 23 priority species. It is hoped that the analyzed data will be used to set up a point count survey for the entire Chiwaukee Prairie complex and to help to prioritize work in management units for the most benefit to grassland songbirds and also priority species.

The lake plain prairie extends several miles into Illinois with the Illinois State Beach Park and Spring Bluff Prairie (Lake County Forest Preserve). Efforts to implement bird blitz surveys in the Illinois portion of the lake plain complex would create a better picture of bird use. This could help determine management efforts on a landscape scale to benefit bird species (e.g., savanna species, grassland obligate species, area sensitive species, etc.) as well as other wildlife species.

Conducting a fall/spring survey for migrating birds is another step that needs to be taken to provide a more complete picture of bird use at Chiwaukee Prairie. This was one of the goals under the grant proposal that was not completed due to workload. Chiwaukee Prairie is located on the Lake Michigan shoreline, which is a major migratory corridor for many bird species. Conducting the survey will provide a list of the migrating species using Chiwaukee Prairie and how management practices can be directed to help some of those species. Chiwaukee Prairie is one of the few locations in Southeast Wisconsin on the Lake Michigan shoreline that still has substantial undeveloped open space that birds can use, making it an important location for migrating birds.

From a landscape standpoint Chiwaukee Prairie may never be an ideal location for breeding grassland songbirds. Several factors affect the ability of the area to support large breeding populations of grassland songbirds: acreage under protection (approximately 600-700 acres); its' linear layout; proximity to adjacent urban development; and fragmentation of protected lands. This does not however, mean that it cannot still provide important habitat for smaller populations of grassland songbirds as well as the 17 other priority species. While areas of 250 – 1,000 acres of contiguous grassland habitat are the most ideal situation, management for grassland songbirds can occur on smaller scale of 40 acres and more. The key is to having smaller grassland blocks adjacent or in close proximity to each other, keeping them interconnected. (Sample and Mossman 1997)

Section F. Cover Study

As noted in the previous section Chiwaukee Prairie supports some 75 grassland and wetland bird species. Some of these species include grassland songbirds, whose guild is on the decline. Breeding Bird Surveys conducted on TNC/UWP lands have shown that several obligate grassland species were using Chiwaukee Prairie- Henslow's Sparrow, Bobolink, Eastern Meadowlark, Sedge Wren, and Upland Sandpiper. In reviewing the 6 years of data a decline was seen in the number of species and individuals from this group. What was causing the decline? The primary thought was that the cover type on Chiwaukee Prairie was changing, making the area less suitable for grassland songbirds. To address this question the Eastern Meadowlark was selected as a species of focus. It was selected because it is a fairly common grassland species and one that occurred in all 6 of the Breeding Bird surveys. In being considered a grassland obligate species it shares the same or similar needs as other grassland songbirds and so would be a good example.

To start to address the question the Habitat Suitability Index Model: Eastern Meadowlark. (FWS 1982) was reviewed. The Habitat Suitability Index Model (HSI) indicated ideal cover habitat for the Eastern Meadowlark would be an area with a forb percentage of 20% or lower, grass percentage of 80% or higher, and a shrub density of 5% or less. In areas where the forb percentage is above 20% the suitability of the area for the Eastern Meadowlark declines as the percentage of forbs increases. Also, shrub densities greater than 35% will make an area unsuitable. It was also noted that regardless of quality of herbaceous cover if the shrub density was over 5%, the overall habitat value will decrease. After reviewing this one question raised was if the forb density was too high? Chiwaukee Prairie supports over 400 plant species, which includes several grass species, but is overwhelmingly dominated by forb species.

To help determine if the percentage of forbs was too high at Chiwaukee Prairie a cover type study was presented in the grant proposal. The plan was to create several survey plots on TNC and WDNR lands and measure the percentage of grass and forb species in these plots over the course of the summer. In these plots the plant species would be recorded and the data from the plots would be statistically analyzed. Part of this plan also involved enlisting the help of a UW-Parkside Professor to help with this study. The professor consulted was Dr. Joy Wolf. After discussing the goal of the study Dr. Wolf recommended using transects to measure cover types- grass, forbs, shrubs, trees- which she felt would present a clearer picture of cover percentage over a larger area. As a result the study approach was changed from survey plots to using 150m transects. In these transects the dominant vegetation cover type was measured to the nearest .1 m along with the distance it persisted along the transect line. Another aspect added to the project was comparing cover types on two different state lands with grasslands as a dominant cover type- the Chiwaukee Prairie SNA and the Richard Bong State Recreation Area (RBSRA), a 4,515 acre recreational area in western Kenosha County. RBSRA is the largest managed grassland in Southeastern Wisconsin and is an Important Bird Area. The property supports a variety of grassland obligate songbirds- Bobolink, Eastern

Meadowlark, Savannah Sparrow, Henslow's Sparrow, Upland Sandpiper, and Grasshopper Sparrow.

Transects were conducted at Chiwaukee Prairie and RBSRA (Attachment F1 and F2) at different times, September 22 and October 13 respectively. Dr. Wolf's students from a Field Methods Class and CPPF volunteers assisted WDNR staff with the data collection. Six transects lines, 150m in length, were run both at Chiwaukee and RBSRA. The only difference between the transect layouts was there orientation. Transects at Chiwaukee were run east – west to accommodate the ridge – swale topography and the vegetation differences. Transects at RBSRA were run north – south to capture the greater diversity of cover type which had a larger variance from north to south. Vegetative cover type categories were basically the same at each site- grass, forb, and shrubs, except for the wet matrix and 50/50 grass/forb. The wet matrix cover type was at Chiwaukee and consisted of Typha and carex species that were found in swales. The 50/50 grass/forb cover type was at RBSRA and consisted of a basic even mixture of grasses and forbs.

The RBSRA site was chosen because the study area is part of the 500 acre grassland refuge and is a survey point for the grassland songbird survey conducted. In past years this survey point had 1-2 pairs of Henslow's sparrows, but in recent years the Henslow's have not been heard. The Chiwaukee Prairie site was chosen because it is on TNC/UWP lands, the largest block of contiguous habitat on Chiwaukee. The site also has a fairly good representation of the varied landscape- the ridge swale complex.

Dr. Wolf's class analyzed the transect data and R. Baker and E. Reed drafted a report. (Attachment F3) Analysis of the data indicates that Chiwaukee is dominated by grasses (40.87%), more so than RBSRA (29.23%). The forb percent cover is also higher at Chiwaukee (31.13%) than RBSRA (22.57%) and higher than 20% upper level mentioned in the Eastern Meadowlark HSI. Between the cover types there is more uniformity of distribution at RBSRA than Chiwaukee, where the cover types tend to be more clustered. Both sites had high shrub percent cover, well above the desired 5% level mentioned in the HSI.

Table F1. Density of Cover Type at Chiwaukee Prairie and RBSRA

	Density* (Chiwaukee)	Density* (RBSRA)
Grasses	40.87	29.23
Forbs	31.13	22.57
Shrubs	20.97	25.72
50/50 GF	- -	22.37
Wet Matrix	5.75	- -
No Cover	- -	.11
Trees	1.28	- -

* Density is the same as the percent cover.

Implications

The data from the Chiwaukee Prairie site indicates that the forb percent cover, as well as shrub percent cover, are above the suitable levels mentioned in the Eastern Meadowlark HSI, meaning that the area is becoming increasingly less suitable for the Eastern Meadowlark as well as other grassland songbirds. (FWS 1982) (Chart F1) Chiwaukee Prairie is a forb rich environment so it is not likely that forb percent cover can be dropped dramatically, but some management steps can be taken to enhance warm season grasses. (The goal would be to bring the forb percent cover closer to 20% than 35%.) In recent years the majority of the prescribed burns on TNC/UWP lands have been done in the fall due to crew logistics, weather conditions, and the urban interface. Fall burns tend to favor forb regeneration and growth and reduce warm-season grass dominance. Burns on TNC/UWP lands have been occurring at intervals of at least one burn every 6- 12 years, which should not have a dramatic affect on cover type; however, efforts should still be made to try to burn more in the spring to stimulate warm season grass cover. One way spring burns could increase would be for the Chiwaukee Prairie partners- WDNR, Chiwaukee Prairie Preservation Fund, Lake County Forest Preserve- to help in conducting burns on TNC/UWP lands, an effort that was started this fall and hope to be continued.

The shrub thickets have always been considered a problem and been a main focus of management efforts, but they were not necessarily viewed as a limiting factor on TNC/UWP lands for grassland songbirds. Looking at the cover study data it would appear that shrub cover percentage maybe more of problem for grassland obligates than the forb percentage cover (Chart F1). Both are high and need to be reduced, but shrub cover percentage is a little higher above the desired level of 5% than forb cover.

The bird blitz data may lend additional support to the shrub intrusion with the high number of species in the count, throughout the Chiwaukee Prairie complex, that prefer shrub habitat (22.5%). The presence of the high shrub percent cover and the high forb percent cover only increases the area unsuitable for grassland songbirds. A consistent combination of continued mowing, herbicide application and prescribed burning is needed by all partners to dramatically reduce shrub cover.

Future

To monitor cover type response to management (e.g., prescribed burns, mowing, herbicide treatment, etc,) the running of transects will need to continue. Transects will also need to be established on WDNR lands and on other locations on TNC/UWP lands in the Chiwaukee Prairie complex. Existing and new transects will also need to continue at the RBSRA to help with management of grassland songbirds at RBSRA and provide a good comparison for management purposes on Chiwaukee Prairie.

The Chiwaukee Bird Blitz data will need to be incorporated with the cover type data to look at bird use in these monitoring areas. During the final year of the blitz an effort will need to be made to record birds seen and/or heard at the transect locations. Also, as the

Bird Blitz wraps up in 2012 the next step will be to setup survey points for a Breeding Bird Survey. Setting up points in or near cover study transect sites should be a priority.

Other factors that could be considered in transects would be plant species, vegetation height, site soils, topography, management practices, and conducting transects at different points in the growing season. These additional factors all have some influence on the cover types, as well as bird species that would use the area.

Since Chiwaukee Prairie has such a rich forb species presence, many listed species; it is likely that not all areas will have the forb: grass ratio suitable for some grassland songbirds. As a result areas that have dominate grass cover need to be identified and mapped. If suitable in size for grassland songbirds, management efforts to reduce woody vegetation and enhance grassland cover will need to be implemented. The goal would not be to eliminate forbs, but to bring the forb percent cover to 20% or less if possible.

Finally what also must be considered when looking at songbird use on Chiwaukee Prairie is the surrounding landscape at Chiwaukee Prairie. Unlike RBSRA, which has a rural surrounding dominated by farmland, Chiwaukee is a mixture of urban and semi-rural. The immediate area is housing mixed in with open space, with some farming and subdivisions in neighboring lands. Farmland areas provide additional areas for songbirds to use, unlike the more urban areas. The size and shape of the area is also a factor affecting grassland bird use. RBSRA is 4,515 acres in a semi-block nature, with of a grassland core area. While Chiwaukee Prairie is long and somewhat narrow, and fragmented by residential development. Several of the grassland obligate species require large patches of grassland habitat for populations.

Summary

In working on this final report it is evident that a fair amount of work is accomplished at Chiwaukee Prairie and that the applied management practices are making progress. And while progress is being made there is still room for improvement.

- The intense management of buckthorn appears to be a viable option on smaller management blocks and is a practice that can be used by the WDNR and TNC/UWP, who both own a DR Brush mower. Monitoring of management practices is something that must become a regular part of the management work to document changes; impacts to flora and fauna; and to continually confirm that the management practices are working.
- Completion of the Bird Blitz survey will provide an excellent baseline database of bird species for the entire Wisconsin lake plain complex. In combination with the cover study work, it may be able to focus management efforts on areas that will benefit obligate grassland species, as well as other priority bird species.
- The Prairie White Fringed Orchid appears to be doing very well at Chiwaukee Prairie, but current survey efforts need to be expanded to cover the entire Chiwaukee Prairie complex. This will provide a complete picture of the plants

health on Chiwaukee Prairie. Fruit seed checks need to become a regular part of the survey process to ensure that the plant is re-producing and will continue to thrive at Chiwaukee Prairie.

Management of invasives can seem to be an uphill battle at times, so it is encouraging to see some progress being made. The continued and expanded cooperation amongst the partners is vital to the success of the management at Chiwaukee Prairie. Recent interactions and joint projects are showing promise that the cooperation and communication between partners in Wisconsin and Illinois is growing.

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