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## **Final Report**

### **Grant LPT-334-09**

*Prepared for*

## **English Lake P&R District**

8525 Carstens Lake Road

Manitowoc, WI. 54220

Project #13750005

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## **INTRODUCTION**

Shortly after the English Lake Protection and Rehabilitation District (ELPRD) purchased a parcel of land located north of the lake, NES Ecological Services, A Division of Robert E. Lee & Associates, Inc., assembled a management plan to establish native vegetation within the northern buffer strip. English Lake, which is located six miles southwest of the City of Manitowoc in Manitowoc County, was experiencing extensive surface water run-off and associated sediment and nutrient loading from the agricultural parcel. In order to reduce the issue, ELPRD worked with NES to remove the land from agricultural production and establish native vegetation within the buffer. The native community was designed to intercept surface water run-off from surrounding agricultural lands, increase the water quality of the lake, beautify the community, increase habitat for wildlife, and reduce long term maintenance costs. This was accomplished through natural processes provided by the vegetated buffer strip, such as deposition, absorption, adsorption, plant uptake and denitrification. The English Lake Northern Buffer Strip Management Plan was submitted with the 2008 Lake Management Protection Grant Application Package.

Since 1996, NES has provided native habitat restoration services to municipalities, lake management districts and associations, various state and federal agencies, individual landowners, and commercial entities. These services have ranged from simply designing restorations to implementing their installation and maintaining them. NES ecologists use their knowledge and experience with Wisconsin's native community types and invasive species to design, implement and maintain plantings that will thrive, provide ecological benefits such as plant diversity and wildlife habitat, and be aesthetically pleasing.

The ecological team at NES brings nearly 60 years of working experience in the natural resources sector. The range of experience is significant. It includes restoration project designing, estimating, project managing, field work, and short to long term maintenance. The team's field experience includes certified and licensed herbicide applicator work, hand and mechanical woody species control, native landscape mowing, prescribed burning in a variety of ecosystems, mechanical site/soil preparation, broadcast and no-till seeding, live plantings in uplands and emergent areas, installation of wide array of erosion control products according to manufacturer's specification, installation and removal of herbivore protection systems, shoreline protections such as biologs, and other practices. Members of the team have a solid background in native nursery seed and plant production systems.

NES ecologists were responsible for implementing and maintaining the native communities designed in the Northern Buffer Strip Management Plan.

## PLAN IMPLEMENTATION ACTIVITIES

### ***Native Planting***

#### Seedbed Preparation

NES contracted with Valder's Coop/Country Visions to conduct the herbicide applications on the parcel to eliminate the existing weeds and agricultural crop – alfalfa. Three herbicide applications (June, August & September 2008) were conducted on the site as outlined in the Buffer Plan; however, a site assessment in late fall indicated one or more additional applications were necessary in 2009 to adequately prepare the site for planting. A fourth application was conducted in May 2009 and later determined to be enough to proceed with the native seeding.

#### Seeding

The need for additional herbicide application delayed seeding from the fall of 2008 until June of 2009. NES rented a no-till seed drill from the Wisconsin Department of Natural Resources (WDNR) and installed the native species outlined in the Buffer Plan at the rate indicated.

#### Tree and Shrub Installation

Woody vegetation was installed during the spring of 2012. NES established locations to scatter plant clusters of native trees and shrubs in the eastern portion of the field to mimic an oak savanna community. The western portion was planted more densely to establish a forested community. NES staff secured the materials and augured the planting pits while volunteers from ELPRD installed the native woody plants and protective tubing to help reduce herbivore damage. Tree and shrub species outlined in the Buffer Plan along with their designated quantities were utilized for the planting.

### ***Biolog Placement***

In an effort to reduce surface water flows from an existing wetland, a coconut-fiber biolog was placed at the outlet of the forested wetland to assist with sediment and water retention. The location and elevation of the biolog placement was determined after a survey was conducted within the surrounding area. The biolog worked for a period of time, but eventually broke down. ELPRD volunteers then installed Envirolok bags in the outlet. The sand/soil filled bags effectively reduced and filtered water flow from the wetland into the lake. Three biologs were also placed within an existing swale that receives overland flow from the newly seeded buffer strip. These logs were placed to reduce erosion potential while the seeded native species become fully established. The establishment of vegetation and continued presence of the biologs have helped reduce erosion issues and slow surface water flow through the area into the lake.

## **Education**

In 2008 ELPRD hosted a bus tour consisting of Manitowoc County Lakes Association members, Town Board officials, and County Supervisors to view the proposed planting area for the native vegetation buffer zone on the north side of the Lake. District volunteers explained to the group which plants were selected and how they will potentially help keep run off from farms from entering English Lake, and thus improve the Lake's water clarity. In the next three years several Garden clubs, including two from Manitowoc and one from Valders, toured the buffer zone. Again District members explained why the buffer zone was planted and answered questions related to the selected plants. In 2012 all Lake District residents were invited to view the buffer zone area and District members explained how the plants will continue to grow and how the buffer zone will be maintained. Periodically members of these groups have returned to view the progress and observe how the plantings have helped the Lake's clarity.

In 2013 the ELPRD had issues with the landowner north of the buffer strip due to herbicide drift occurring during field spraying operations. Carol Entringer of ELPRD spoke with the farmer and also pursued placing the property in the Drift Watch Program to make the farmer and others aware of the properties designation as a natural community. No issues were reported in 2014.

NES staff also helped design "Habitat Restoration" signs explaining the native planting establishment and maintenance process. One metal signs were installed in the summer of 2014.

## **Maintenance Activities**

NES began conducting maintenance activities within the native planting in 2009 and have continued annually since then. Activities included mowing and herbicide applications. NES also attempted to conduct a prescribed burn in 2012, but the planting did not have enough fuel to carry a fire. Although the grant has terminated, the ELPRD continues to work with NES staff to monitor and improve the overall quality of the planting. NES ecologists as well as volunteers pull and spray aggressive native and undesirable non-native species such as box elder (*Acer negundo*), wild parsnip (*Pastinaca sativa*), Dames rocket (*Hesperis matronalis*), thistles (*Cirsium spp.*), burdock (*Arctium minus*), and reed canary grass (*Phalaris arundinacea*) within the native planting. This hands-on work allows the selected native plants to continue to grow and prosper. In addition a lake resident volunteer mows a buffer strip along North Lake Drive and South Union Road. The mowed strip acts as a buffer between the native community and the roadside ditch, which contains undesirable cool season grass and wild parsnip. Upon the Districts request Town of Newton employees have begun spraying and mowing invasive plants along the ditch on South Union Road. The end result of the buffer zone area plantings and maintenance work is that there is less field and farm run off entering English Lake which results in improved water quality and clarity.

Below are activities used to maintain the upland seeding. Species listed below are those most problematic and commonly found invasive plants within native communities.

## Biennial & Annual Broadleaf Weeds

Sweet clovers (*Melilotus spp.*), wild carrot (*Daucus carota*) and burdock (*Arctium minus*), along with other less aggressive yet undesirable annual and biennial species can be controlled and populations reduced through repetitive cutting. For this reason, we suggest conducting spot mowings or cutting when needed. Mowing or hand cutting is typically conducted when the plants are mature and in the beginning stages of flowering to ensure the best control. However, mowing must be done in a timely manner and not too often as the plants will begin growing lower to the ground and be more difficult to control through mowing efforts. In the event that individuals are found with mature seed heads, those plants are manually cut with machetes or loppers prior to them setting seed, bagged, and removed from the site. All noxious/invasive weeds are properly disposed of in a landfill. In rare cases, herbicide maybe applied through spot applications, but there is an increased risk of damaging native species within the planting, which can be avoided through the mechanical removal process.

## Perennial Broadleaf Weeds

Canada and bull thistles (*Cirsium arvense* and *C.vulgare*), red, white and alsike clovers (*Trifolium pratense*, *T. repens*, and *T. hybridum*), crown vetch (*Coronilla varia*), teasel (*Dipsacus spp.*) and bird's-foot trefoil (*Lotus corniculatus*) along with other aggressive perennial weeds can be controlled to some degree through mowing and burning activities prior to seed set, but full control may require herbicide applications. The steps we recommend following include:

- 1) A herbicide solution, including the chemical (AquaNeat®, Habitat®, Transline®, etc.), a surfactant or MSO, ammonium sulfate, and marking dye, is applied through one of the below methods:
  - a) Broadcast spray solution containing a combination of 1% glyphosate or imazapyr and 2/3 to 1 1/3 pint/acre of Transline on the target plants. Backpack sprayers are typically used. If plant densities are relatively low, this method or combination would not be used because there is an increased chance of impacting the surrounding, native vegetation through drift since glyphosate and imazapyr are non-selective herbicides. To reduce impacts with this solution, a spray bottle or hand wicking could be substituted.
  - b) Broadcast spray solution containing 2/3 to 1 1/3 pint/acre of Transline on the target plants. The chemical is more selective and targets broadleaf plants so grasses won't be impacted; however, caution must be used around native forbs. The choice of application will depend on the population size of the targeted species.

Ideally these species will be identified and sprayed either very early or late in the growing season prior to or after native plant growth. If species are located during the growing season they would either be sprayed or cut to prevent seeding. Mature seed heads will be removed and properly disposed of to prevent further spread. Follow-up treatments will likely be required.

## Perennial Grasses

Reed canary grass, fescues (*Festuca spp.*), smooth brome and cheat grass (*Bromus inermis* and *B. tectorum*), Kentucky bluegrass (*Poa pratensis*), and quack grass (*Elytrigia repens*) along with other aggressive perennial grasses can be controlled to some degree, like the perennial broadleaf weeds, through mowing and prescribed burning activities prior to seed set, but full control may require herbicide applications. Although these grasses can be located and identified early in the growing season, they may be more easily identified during the flowering stage; therefore, additional steps may be necessary to prevent their spread. The steps we recommend following include:

### Single Plants or Small Clusters

- 1) Seed heads, if present, will be cut and placed in thick, plastic bags and removed to a licensed landfill facility for proper disposal.
- 2) A herbicide solution, including the chemical (AquaNeat® or Rodeo®, Habitat®, Intensity® One, etc.), a surfactant or MSO, ammonium sulfate, and marking dye, will be applied through one of the below methods:
  - a) Apply solution containing 5% glyphosate or imazapyr or 2% clethodim to the plant using the “Glove of Death” technique. The technique involves spraying the solution onto a cotton glove that is worn by the applicator over chemically resistant gloves; the applicator then takes hold of the plant near the base and runs the cotton glove up the plant stem.
  - b) Broadcast spray solution containing 2% glyphosate or imazapyr or 1% clethodim on the target plants. Rates may need to be adjusted if the plants are mature. Backpack sprayers are typically used. If plant densities are relatively low, this method is not generally used because there is an increased chance of impacting the surrounding, native vegetation through drift since glyphosate and imazapyr are non-selective herbicides. The exception would be with the use of clethodim as this chemical is grass selective; however, caution would still need to be taken when spraying around native grass species.

### Large Clusters or Populations

- 1) Grass will be cut prior to seed development and allowed to re-grow.
- 2) Conduct a broadcast spray as discussed above.

All the recommended activities in the Buffer Plan and for the Protection Grant have been completed. Overall, the planting is doing very well; and as management continues, the warm season grasses are becoming denser and ELPRD hopes to conduct a prescribed burn in 2016 or 2017. Fire will assist with controlling many undesirable species and the invasion of woody vegetation, which is evident along the existing woods. Fire along with continued spot herbicide treatments and mowing will continue to improve the planting. Photos of the site can be found in Appendix A below.

# A

## APPENDIX A

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### Site Photographs





Native Seeding – June 2009



Native Tree & Shrub Planting – May 2012



Educational Tour – August 2014



Existing Prairie – 2014



Posted Educational Sign – 2014