

Management Plan for Dayton Wet Prairie

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For the Stewardship Committee

Chikaming Open Lands

Nov 8th 2012

Adapted by the Board of Directors Nov. 16th, 2012

MISSION STATEMENT

Chikaming Open Lands is dedicated to preserving open spaces and the diverse character of southwest Berrien County by acquiring land and conservation easements through donation and purchase.

Introduction

The management plan proposed in this document has two main objectives. First, to provide background information about Dayton Wet Prairie (DWP) – its history and its current condition. Second, to present a set of goals to guide Chikaming Open Lands (COL) in restoring the natural value of this property, and doing so within a framework that will: encourage us to work co-cooperatively with those who live on the borders of the property; encourage us to enlist the co-operation of groups who share common interests with COL; and educate the wider community about the potential value of our interests in and efforts concerning DWP.

Until fairly recently, conservancy organizations throughout the U.S. spent much of their energies finding ways to preserve areas of land from the encroachment of people and housing, roads and industry. These efforts have only been partially successful, and so, at a national level, a shift has been made to help people re-think what conservation means. This shift has perhaps been best stated by Glenn Prickett, the chief external affairs officer for The Nature Conservancy (TNC): “We spent the 20th century protecting nature *from* people, and we will spend the 21st century protecting nature *for* people.”

Not only is this shift in perspective important, there is a second shift taking place which is equally important. The contemporary understanding of the science of ecosystems is moving away from protecting and encouraging biodiversity as something we should be doing as a precaution (preserving what we have so that it will not be lost) to protecting and encouraging biodiversity because of the *demonstrated benefits* of biodiversity, including the health and economic benefits. (Naeem, Duffy and Zaveleta. 2012)

We should articulate these shifts as we work with property owners around DWP, and as we encourage groups to work with us in restoring and preserving DWP. We will need to be able to describe what a

renewed healthy ecosystem at DWP would mean for the whole community, so that they will feel motivated to join us in our conservation efforts. Conservation takes on a whole new meaning for farmers when they know that a healthy DWP will mean better pollinators and pest control for their crops. Conservation takes on a whole new meaning when students have the opportunity to study the ecology of a set of plant communities, some of which are rare. Conservation takes on a whole new meaning when people learn that a diversity of bird life in an area decreases the mosquito population carrying West Nile virus. Conservation takes on a whole new meaning when it is known that DWP is delivering ecological services to Bertrand Township. In our work as a Committee, we should be identifying the ways a healthy ecosystem at DWP will benefit people.....

Some History

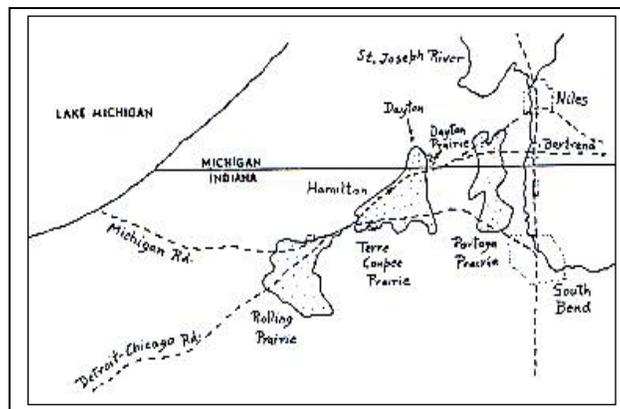


Figure 1: Map of Southeast Michigan, prior to European settlement

Dayton Wet Prairie sits at the north end of Terre Coupee Prairie, which with Rolling Prairie and Portage Prairie together comprised an area of 15,000 – 20,000 acres in northern Indiana, La Porte and St. Joseph Counties, and Berrien County in Michigan. The Native Americans called the prairie closest to Dayton Prairie “Terre Coupee” meaning 'shaking or quivering ground.' How the nature of this land was formed has been well described by Kost and Hyde in their book Exploring the Prairie Fen Wetlands of Michigan (Kost and Hyde 2009).

A prairie fen is a wetland community dominated by sedges, grasses and other flowering plants that prefer moderately alkaline soil. They occur where cold calciferous ground-water fed springs reach the surface, and where that water can very slowly move through the soil. The flow rate and volume of groundwater through a fen strongly influence vegetation patterning. A community will contain multiple, distinct zones of vegetation depending on the specific hydrology.

DWP has been described in the past as having some wet prairie areas of vegetation, as well as prairie fen. A wet prairie is dominated by grasses e.g. bluejoint grass and cordgrass. Sedges are less dominant in wet prairie. Currently it appears that areas of wet prairie are very limited in DWP. Shrub carr has

extended to many parts of the property.¹

Wetlands which included prairie fens were once widespread in southern Michigan. Unfortunately the priority of land use for agriculture since the arrival of European settlers has resulted in the loss of 75% of these wetlands in southern Michigan making the prairie fen nature of DWP now very rare in this area (Kost and Hyde.2009). Historically these ecosystems were known for their high plant and animal diversity. This has slowly been lost. Sine acre for acre, the biomass of living material produced on marshlands is four times that of grasslands and three times that of cropland and since the photosynthetic production in marshlands can equal or even exceed that which occurs in tropical forests, the restoration of DWP would make a significant contribution to increasing the diversity of the ecological services of the area, something which would be of potential value to neighboring farmers..

Location

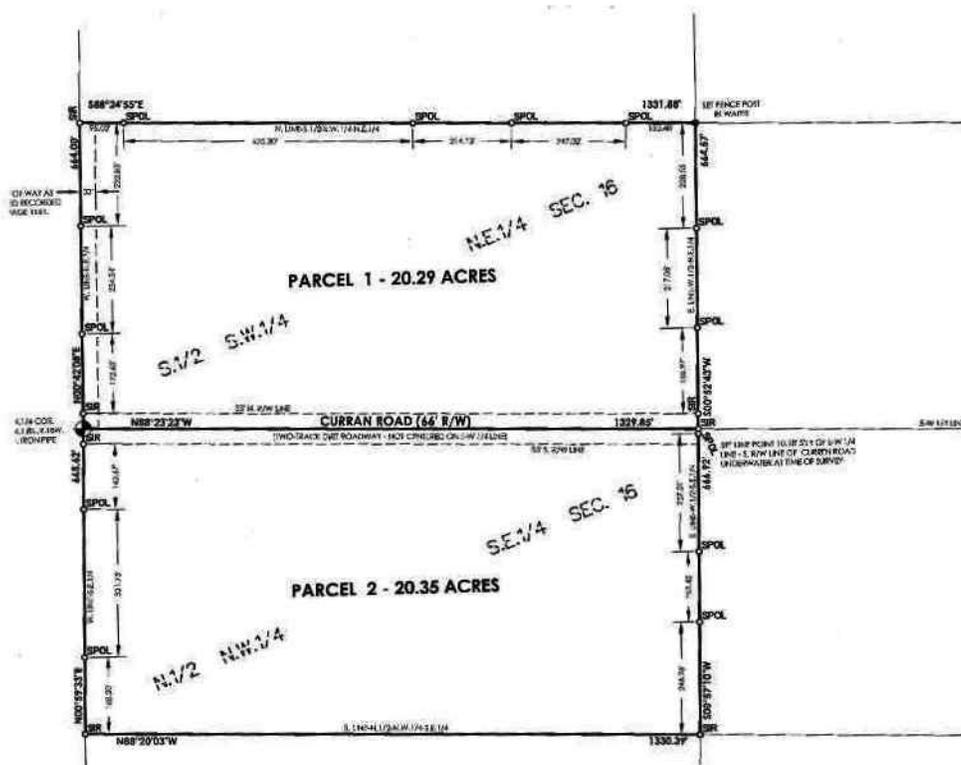


Figure 2. 2011 Survey of DWP 1

DWP is a 40 acre property divided into two 20-acre parcels on the north and south side of Curran Road in Bertrand Township. COL obtained the property from The Nature Conservancy in 2011.

¹ Shrub carr are deciduous shrubs which grow on saturated, seasonally flooded soils.

The property has the following legal description:

Berrien County, Bertrand township, Michigan; N1/2 of NW ¼ of SE ¼ and S1/2 of SW ¼ of NE ¼ of Section 16 T8S R18W. GPS coordinates are: -86.40677 41.77807 (NW), -86.40188 41.77806 (NE), -86.40183 41.77439 (SW), -86.40670 41.77443 (SE).

The survey of the property was conducted for COL by Abonmarche² in 2011 (See Figure 2).

The Nature Conservancy originally acquired the property in two parcels:

- In December 18th 1978 Ruth R. Gillette of Niles Michigan donated 20 acres south of Curran Rd as described below:

The North half of the Northwest Quarter of the Southeast Quarter of Section 16, Township 8 south, Range 18 West Bertrand Township, Berrien County Michigan.

- On December 16th 1985 The Nature Conservancy purchased for \$6000 the property south of Curran Rd from the Federal Land Bank as described below:

The South half of the Southwest corner of the Northeast quarter of Section 16, T8SR18W; EXCEPTING and reserving a right of way across the West 33 ft thereof, providing that this right of way shall not be further developed without express consent guarantee or its successors of assignees.

The exception described above was transferred to the COL when the property was transferred from The Nature Conservancy. Currently the implications of this exception for COL are being investigated.

Figure 3 on the following page is an aerial map of the property courtesy of Google Maps (2012). The property boundaries are shown with white lines. The red markers are GPS locations supplied by CardnoJFNew.

² Abonmarche, 45 W. Main Street, Benton Harbor MI 49073.



Access

DWP preserve is accessed by taking U.S.12 east to Dayton Rd, proceeding south to Curran Rd and then turning left (east) onto Curran Rd. DWP is located on Curran Rd



Figure 4. Location & Access to DWP

between Sage and Oak Forest Roads. Curran Rd is unsealed, narrow and lightly used. In wet weather the road is very damp in the vicinity of DWP. Access to DWP is available from Curran Rd along the length of the property but in many places requires knee high boots to traverse the property. (Figure 4)

The water levels across the property vary throughout the year, with some locations being difficult to access at times, while at others times there is no difficulty.

Geology of DWP

The landscape of Michigan was largely shaped by the Wisconsin glacier which reached its maximum extent in southern Illinois, Indiana and Ohio about 18,000 years ago. As the glaciers retreated they left behind a complex landscape of hills, valleys and plains. Prairie fens were formed in the interlobate regions of the glacier retreat pattern.

Figure 5 downloaded from National Resources Conservation Services (NRCS) soil survey website shows that the major soil type in DWP is Houghton Muck.³ Houghton muck is typically up to 51 inches in depth, containing up to 50% woody material. The Edwards muck adjacent to the east boundary of DWP has a lesser thickness of organic matter (16-51 inches) and is more likely to have formed over marl (a calcium carbonate mudstone which contains variable amounts of clays and silt.) The marl is the source of the calcium and magnesium salts which are required for maintaining a prairie fen.

Figure 5. NRCS Soil Survey

³ **Muck** is a soil made up primarily of humus from drained swampland.



Berrien County, Michigan (MI021)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
5	Houghton muck	78.4	87.9%
19A	Brady sandy loam, 0 to 2 percent slopes	3.9	4.4%
55	Edwards muck	6.9	7.7%
Totals for Area of Interest		89.2	100.0%

Topographical maps of the area show that the land to the east and the west of DWP is higher by 10-15 feet. (Figure 6)

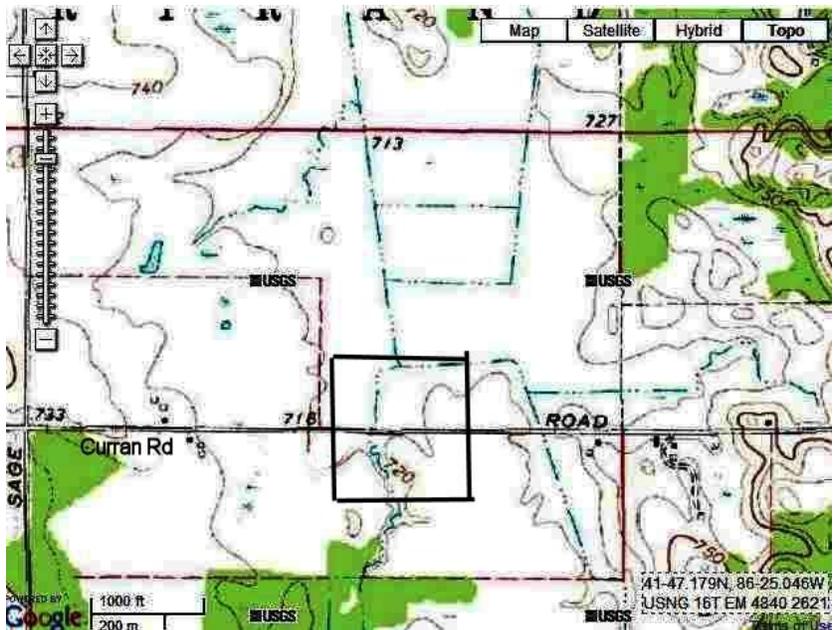


Figure 6. Topographical map of DWP

Land Use History

Vegetation Before European Settlement

DWP is a remnant of larger prairie areas present in southern Michigan and northern Indiana prior to European settlement. Native Americans had established trails through the prairies because the areas offered easier travel routes. The Great Sauk Trail was established across these prairies and later became the route for the first Detroit-Chicago Rd. (Figure 1) The prairies were favorite camping grounds for Native Americans.

Oak barrens, dry prairie, mesic prairie, and prairie fen were part of a continuous landscape that covered southern Michigan in pre-settlement times. The close proximity of both prairie and oak barrens to the west of the preserve suggests that fire may have been relatively frequent at Dayton Prairie in pre-settlement times compared to most other fens in Michigan. Fires probably originated most often in the adjacent Terre Coupe prairie to the west.

At the time of European settlement it appears that a continuous fen may have extended from DWP to the Bakertown Fen along the McCoy Creek. Original land survey notes describe wetland around McCoy Creek as being open and surrounded by oak, savanna and barrens with Terre Coupee prairie to the south and west. "Cranberry marshes" and "spring marshes with little standing water" were described from the site. (Thompson, 1981) The surrounding upland area was originally covered with forests of valuable growing timber.

Changes Related to European Settlement

The prairie areas in south west Michigan and northern Indiana were the sites of early European settlement as they offered attractive areas for agriculture. They were flat, mainly free of trees and had rich soils. The first European settlement was established in the DWP area on the Terre Coupee prairie immediately west of DWP by Charles Vial who arrived in 1830. (See location on Figure 1.) Soon after this, the land in the area was surveyed and other settlers arrived to cultivate the rich productive soil (Coolidge, 1906). A sawmill was established in 1831 in Dayton and when the Michigan Central Railroad was completed there was a stop at Dayton, then known as Terre Coupee. (Figure 1)

According to a TNC Management Plan (McGowan-Stinski and Crackel, 1993) the north side was plowed and farmed in 1962. Thompson's land to the south was last farmed in 1968 and surrounding buffer land has been either plowed or grazed throughout the 1950's and 60's (Chapman 1985). Portions have been mowed as recently as 1980. A wild fire apparently burned most of the fen in the 1960s.

DWP is a small area that probably escaped cultivation because it is lower and wetter than much of the surrounding area. Fortunately, this has left DWP and its associated prairie fen as the least disturbed area where a number of rare isolated species of plants and animals have taken refuge.

In the 1930s, efforts were made to extend agriculture into the DWP area. To do so, extensive ditching was installed on the north side of DWP. A topographical hand drawn map from 1930 downloaded from the USGS site shows no ditching but shows a relatively large area of wetland. (Figure 7)

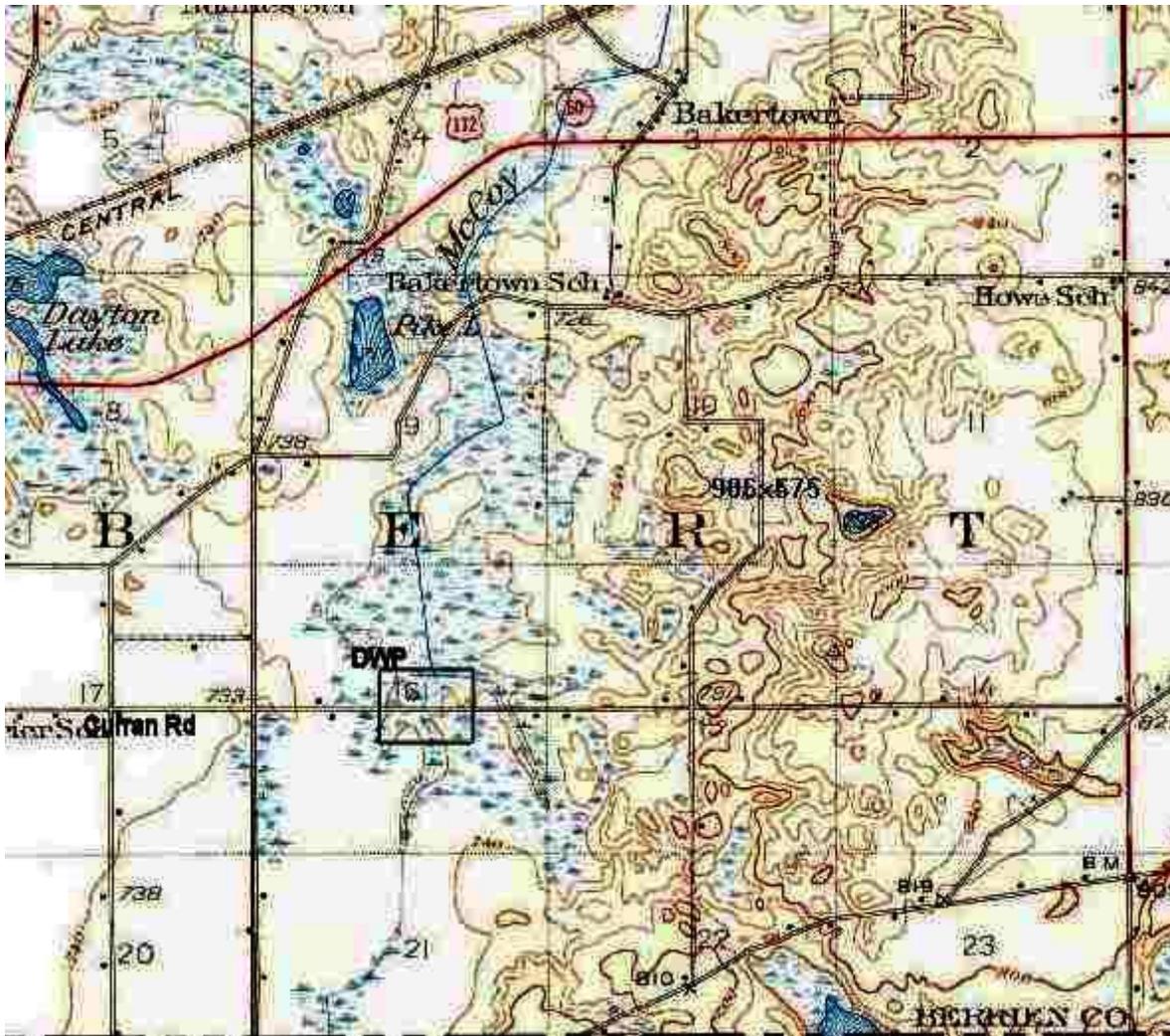


Figure 7. 1930 Hand drawn topographical map of the area around DWP

By 1938 some ditching had been done in DWP as can be seen in Figure 8A on the next page. It is a 1938 aerial photo obtained from NRCS with hand drawn topographical features.

Figure 8B is a 1954 aerial photograph, also from NRCS. It shows the ditching pattern which can be seen today. These ditches resulted in the McCoy Creek tributary on the north side of Curran Road

being channelized probably to a depth of 1-1.3 m (Norling 2000).

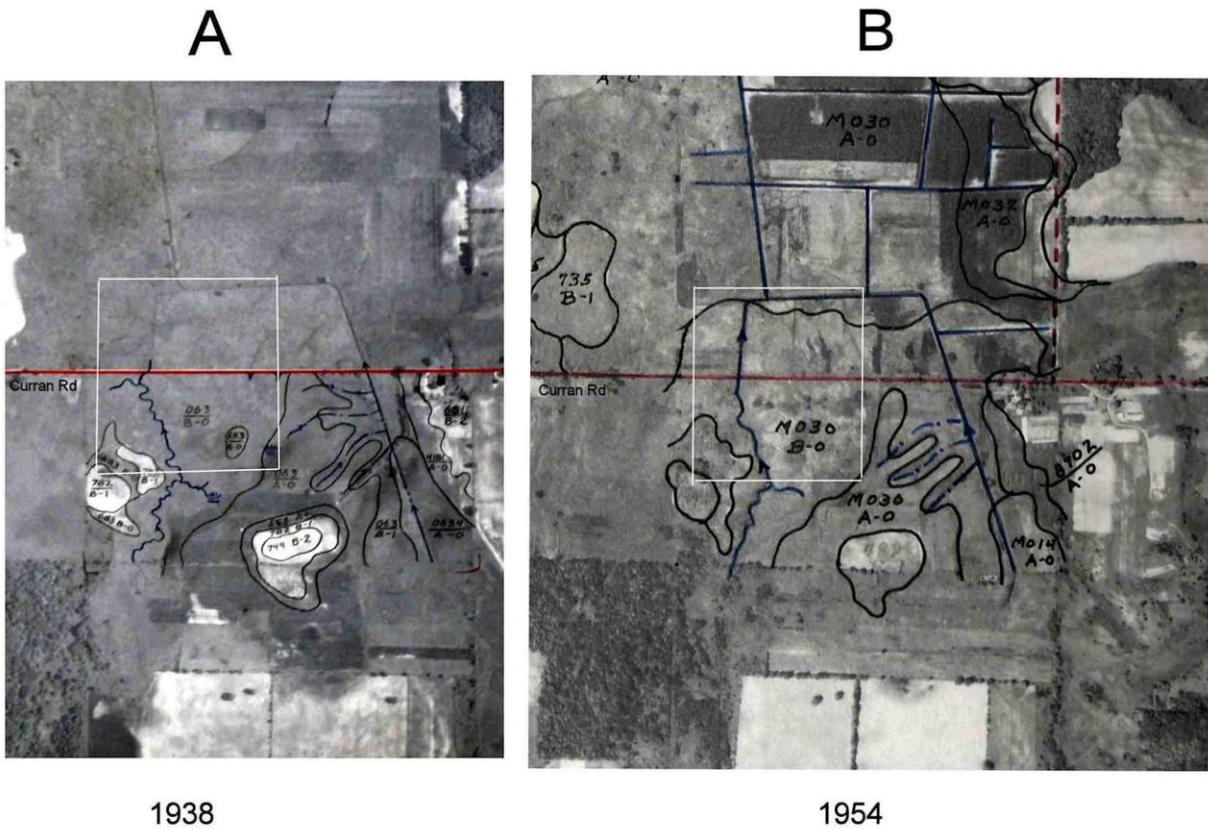


Figure 8. Aerial photos of DWP

McCoy Creek in nearby Buchanan, about 5 miles away is valued as a trout fishing area. At Buchanan, the McCoy Creek flows into the St Joseph River.

The Site Today

DWP is a mixed complex of fen, wet prairie and shrub carr that is surrounded by fragmented natural areas and agricultural fields. The north side of DWP has been severely disrupted by ditching (Norling 2000). It is bisected by Curran Road. A tributary of McCoy Creek runs through the south side of the property and is channelized into ditches on the north side where they join the main channelized branch of McCoy Creek. (Figure 9)

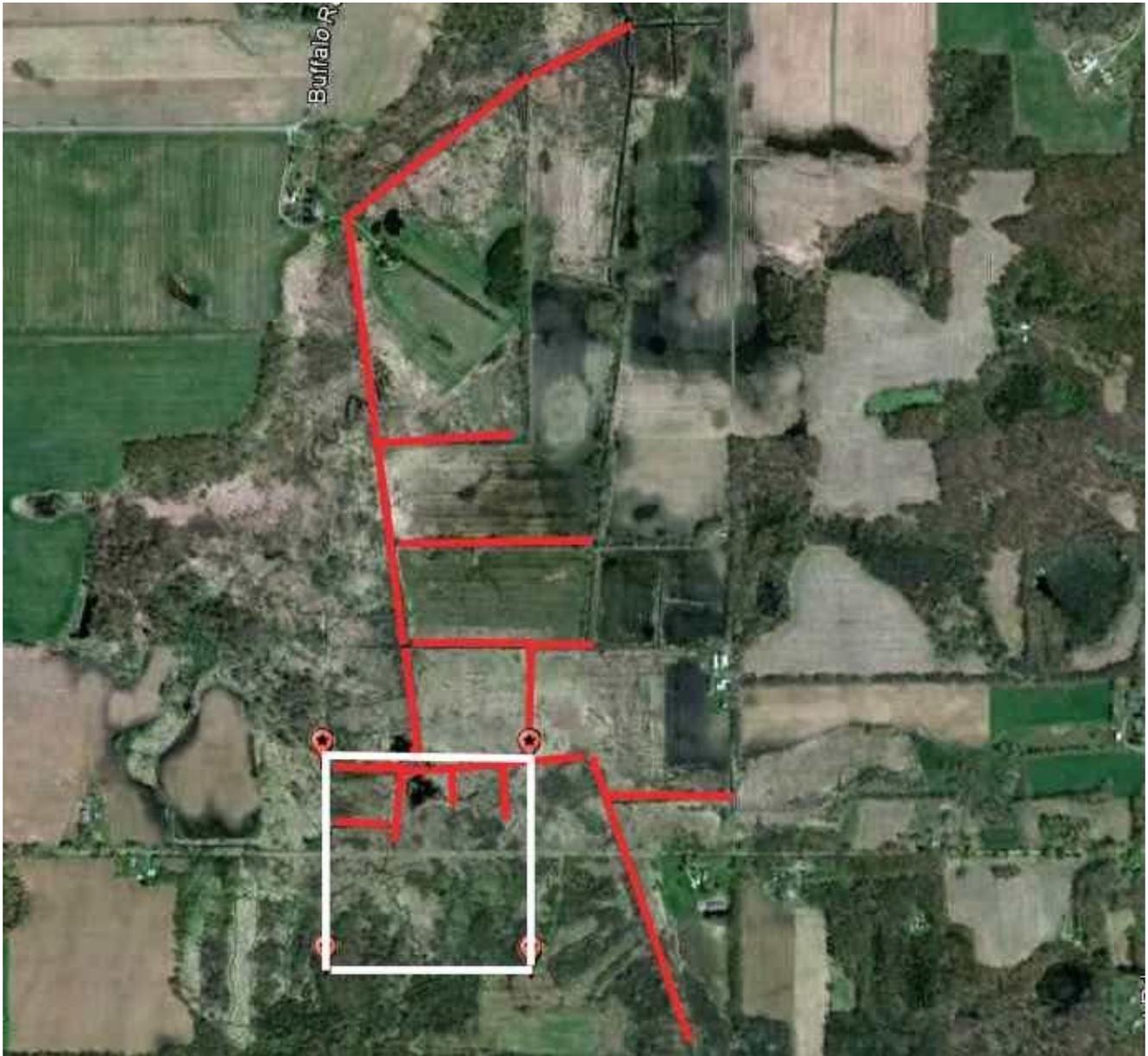


Figure 9. Ditching in the vicinity of DWP

The most extensive remaining area of prairie fen is on the south side of the property. This area is dominated by sedge tussock. Grasses, other flowering plants and low shrubs are also part of the landscape. This is the area at DWP where the majority of rare plants have been found as reported in TNC documents published in 1983, 1993 and in Norling's thesis in 2000.

Threatened and rare plant species that have been identified on the property during the last 25 years include: Prairie Indian-plantain (*Cacalia plantaginea*), White Lady's Slipper orchid (*Cyperipedium*

candidum), Shooting Star (*Dodecatheon meadia*), Wild Sweet William also known as Spotted Phlox (*Phlox maculata*), Jacob's Ladder (*Polemonium reptans*), Rosin weed (*Silphium integrifolium*), Edible Valerian (*Valeriana ciliata*).

The threatened species that have already been identified by COL include White Lady's Slipper Orchid, Rosin weed along the south side of the west end of Curran Road and Jacob's Ladder on the south in the area burned by CardnoJFNew. Spotted phlox was identified in June 2012 in open locations on both sides of Curran Road.

Widespread invasive species on the property include common reed (*Phragmites australis*), reed canary grass (*Phalaris arundinacea*), hybrid cattail (*Typha x glauca*) and multi-flora rose (*Rosa multiflora*). These have significantly impacted the extent of the native plant community. Remaining dominant native plant species include blue joint grass (*Calamagrostis canadensis*) and various sedge species (*Carex spp.*) Additionally, various woody species including glossy buckthorn (*Rhamnus frangula*) and common buckthorn (*Rhamnus cathartica*) as well as several native dogwood species have become established because there has been no regular fire in the area. This has resulted in a decrease of the herbaceous understory.

The TNC Management Plan of 1993 reports the presence of Eastern Massasuaga rattlesnakes (*Sistrurus catenatus*), Eastern Box turtles (*Terrapene carolina*) and Spotted Turtles (*Clemmys guttata*). Evidence of past beaver activity has been seen in chewed tree stumps and some fallen trees during recent COL inspection of the property. It was reported in TNC documents that in the 1999, the Road Commission destroyed a beaver dam to relieve flooding on Curran Road.

During COL inspection of the property in the Fall of 2011, deer hoof prints, sightings of deer crossing the road and the presence of a deer hunter's hide indicate that there must be a significant population of white tailed deer in the area.

A spring visitation to the property by members of the COL Stewardship Committee was able to identify sandhill cranes and ducks by vocalizations, and black winged blackbirds, nesting tree swallows, and a common yellow-throated warbler by visual sightings. Little is known about the invertebrates in the area. It has been suggested that since the property is a prairie remnant there may well be some rare and threatened species remaining in the area but this is presently conjecture.

The Current Threats to the Property

(A) Invasive species – Herbaceous plants

Cattails, phragmites, and reed canary grass cover significant portions of the preserve and prevent the growth of the endogenous wet prairie and fen species. Multiflora rose is well established on higher ground in the southeast corner. The invasives have increased in extent since periodic burning in the area

has been discontinued. Initial steps have been taken by COL to reduce the extent of these species. In the late summer of 2011, a contract was let to CardnoJFNew to apply herbicide treatment and later burn the areas of DWP most heavily infested areas. The spraying was completed but only Section D was burnt in early November 2011. (Figure 10). Attempts have been made in the fall 2012 to burn Unit A but weather conditions have not allowed this to be completed.

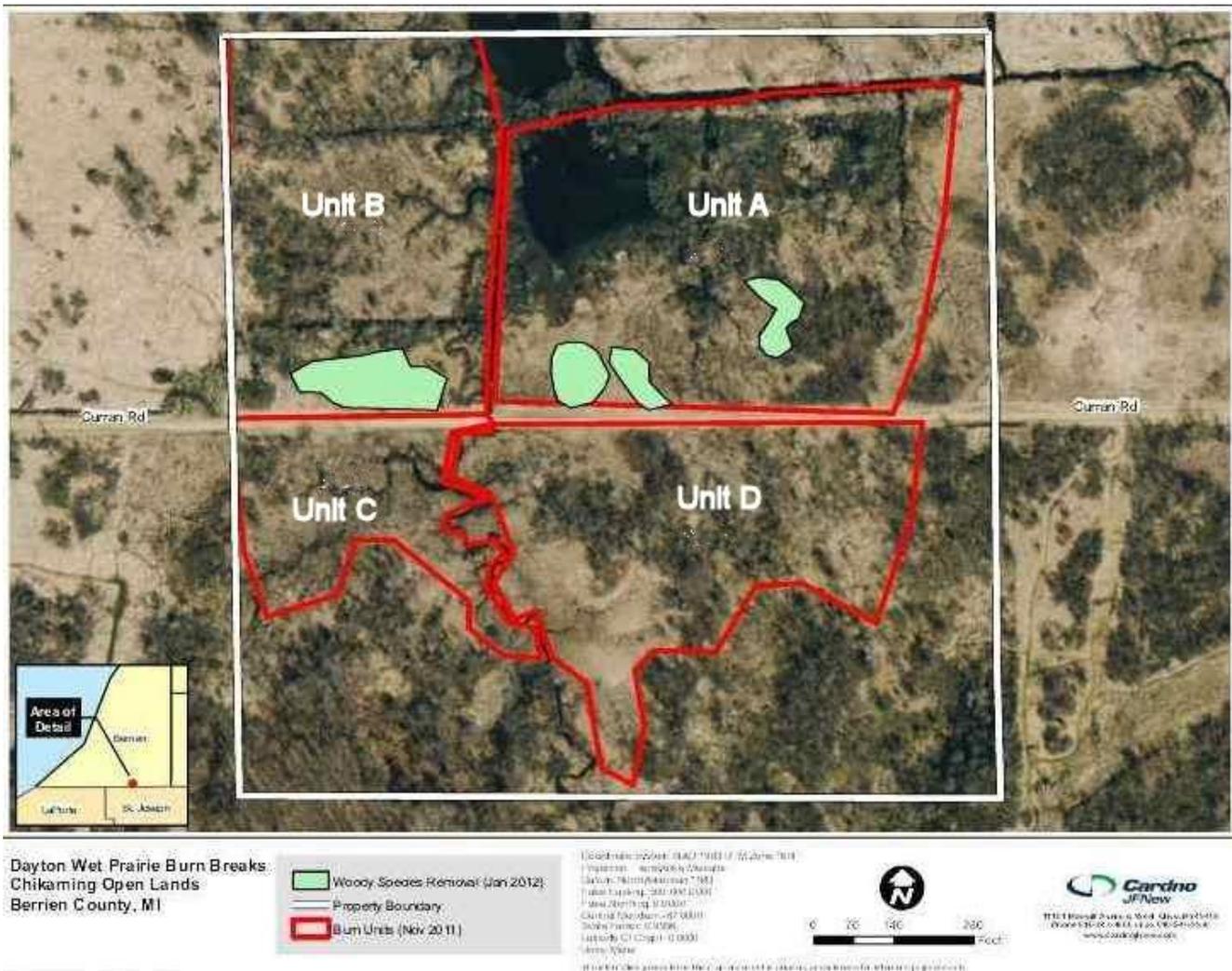


Figure 10. From CardnoJFNew

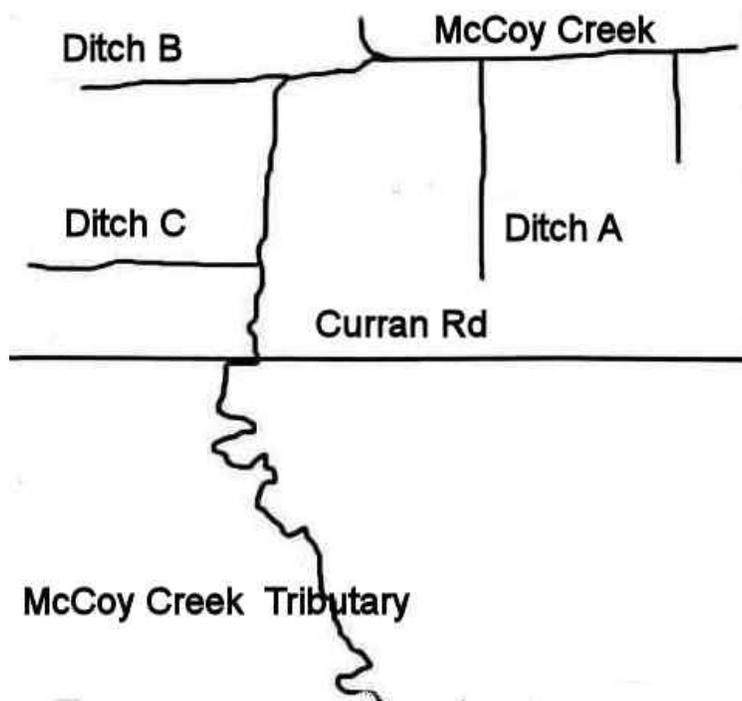
COL members visiting the site in the spring of 2012 have noted that there were a greater number of herbaceous species in the areas where cattails have been successfully burned compared to those areas where substantial amounts of un-burnt dead cattail stems are still present. Significant re-growth of cattails has also been seen. The sedge meadow land in Unit D on the south side in the area which had been burned in November 2011 showed strong growth of the sedge and some blooming irises in May 2012.

(B) Invasive species - Woody trees and shrubs

The north side of the property is the most disturbed because of the extensive ditching in the 1930s. This has encouraged the growth of both exotic glossy buckthorn (*Rhamnus frangula*) and native shrub species including, several dogwood species (*Cornus spp.*), willow (*Salix spp.*), trembling aspen (*Populus tremuloides*), and wild black cherry (*Prunus serotina*). Shrubs and trees have a variety of negative effects on prairie species. This can be because of accumulation of leaves and other debris, reduced sunlight, altered wildlife use, reduced peat accumulation, loss of species diversity etc. All of these factors make it impossible for prairie fen conditions to be maintained.

The CardnoJFNew contract included mechanical removal of woody species on the north side of Curran Road. In the winter of 2012 several areas (Figure 10) were cut at ground level and treated with triclopyr-based herbicide. The slash was stacked and burned. Inspection this spring indicated that the treatment was effective in killing the treated shrubs.

(C) Altered hydrological patterns



For a sustainable fen community to be maintained, it is essential that there be a continuous supply of cold groundwater which is rich in calcium and magnesium carbonates, and that wet conditions prevail throughout the year. These hydrological requirements were interfered with on the north side of Curran Road when extensive ditching of DWP and surrounding areas was undertaken the 1930s. The goal of those changes was to extend agriculture in the area. Although it appears that the drains did not make DWP suitable for farming, they greatly changed the structure and function of the ecosystems. They lowered the water table, disturbed the soil and encouraged the growth of shrub carr. (Norling, 2000)

Figure 11. Diagram of DWP ditches (Norling 2000)

In recent efforts to restore the hydrology on the north side, COL has enlisted the help of the Michigan Department of Natural

Resources (DNR) through their MDNR Landowner Incentives Program. The primary goal of the Landowner Incentive Program is to help private landowners create and manage habitat for species that are rare and/or declining. This is accomplished by providing advice, management plans, and funding to individuals and organizations throughout the state that qualify. Ken Kesson from DNR inspected the property in spring 2012 and suggested that adding a ditch plug Ditch A in order let the water from the ditch flow onto the property would be a first step to improving the hydrology of the north side of the property. (Figure 11) He reasoned that this would not cause flooding of or alteration to any neighboring properties. It was decided that the most cost effective and least intrusive method to fill the ditch would be to use tongue and groove cedar boards pounded into the substrate of the ditch to block the water flow. The plan is to install 4 of these cedar structures into ditch A. The first one would be 10 feet south of where Ditch A meets the McCoy Creek. The following three structures would be 60 feet from each other going south. The ditch between the first two structures will be filled for the whole 60 feet. The remainder of the ditch plugs will be back-filled 10 feet on each side. The cedar structures will be half an inch thick, ten feet long and ten feet tall. Blue Heron Ministries (BHM) out of Angola, Indiana has been offered the contract by the DNR for the restoration.

Recently following an onsite visit by a representative from Michigan Department of Environmental Quality (MDEQ) positive verbal agreement was given to our plan. There is still some administrative steps to be completed before we can proceed to have the plugs inserted. Nate Simons of BHM has suggested that this restoration should occur after the burn that CardnoJFNew is set to complete in the near future. The current plan is to start this restoration work in the late fall 2012.

Curran Road is another factor that affects the hydrology of DWP. It is a 5 m wide gravel road supported by buried railroad ties. A McCoy Creek tributary meanders through the south side of DWP, passes under Curran Road and then enters the series of ditches on the north side. (See Figure 11) The road interferes with the flow of water between the two halves of the property. Presumably the railroad ties allow for some movement of water between the two halves apart from the large culvert where the McCoy Creek passes under the road and the one smaller culvert further east on the property. Movement of the road can be seen when heavy vehicles pass through the area.

(D) Lack of regular fire

References quoted by Chapman (1880) indicate that fires may have been set annually by Native Americans in the DWP area. These fires were responsible for the open aspect of the oak savanna landscape in southern Michigan. Fire is a major factor for maintaining prairie and fen vegetation (Curtis 1959). Local residents have reported that some areas of DWP were burned about every 3 years in the 1940s and 1950s to prevent uncontrolled fires. They also report that the brush grew rapidly when this was no longer done. The last local wild fire was in the 1960s. Since TNC has taken ownership of DWP prescribed burns were undertaken in 1988 and 1997. We need to consider how frequently burns should be made, and budget accordingly.

Ultimate Goals

The ultimate goal should be to restore hydrological conditions at DWP that will support the fullest range of plant and animal diversity possible for a prairie-fen in south-west Michigan. While not restoring the ecological quality of the land to the level prior to European settlement, it would still provide a significant refuge for many plant and animal species.

Further, making the area suitable for public access and educational purposes should also be part of our ultimate goals.

Five Year Goals – Proposals for Consideration and Adoption

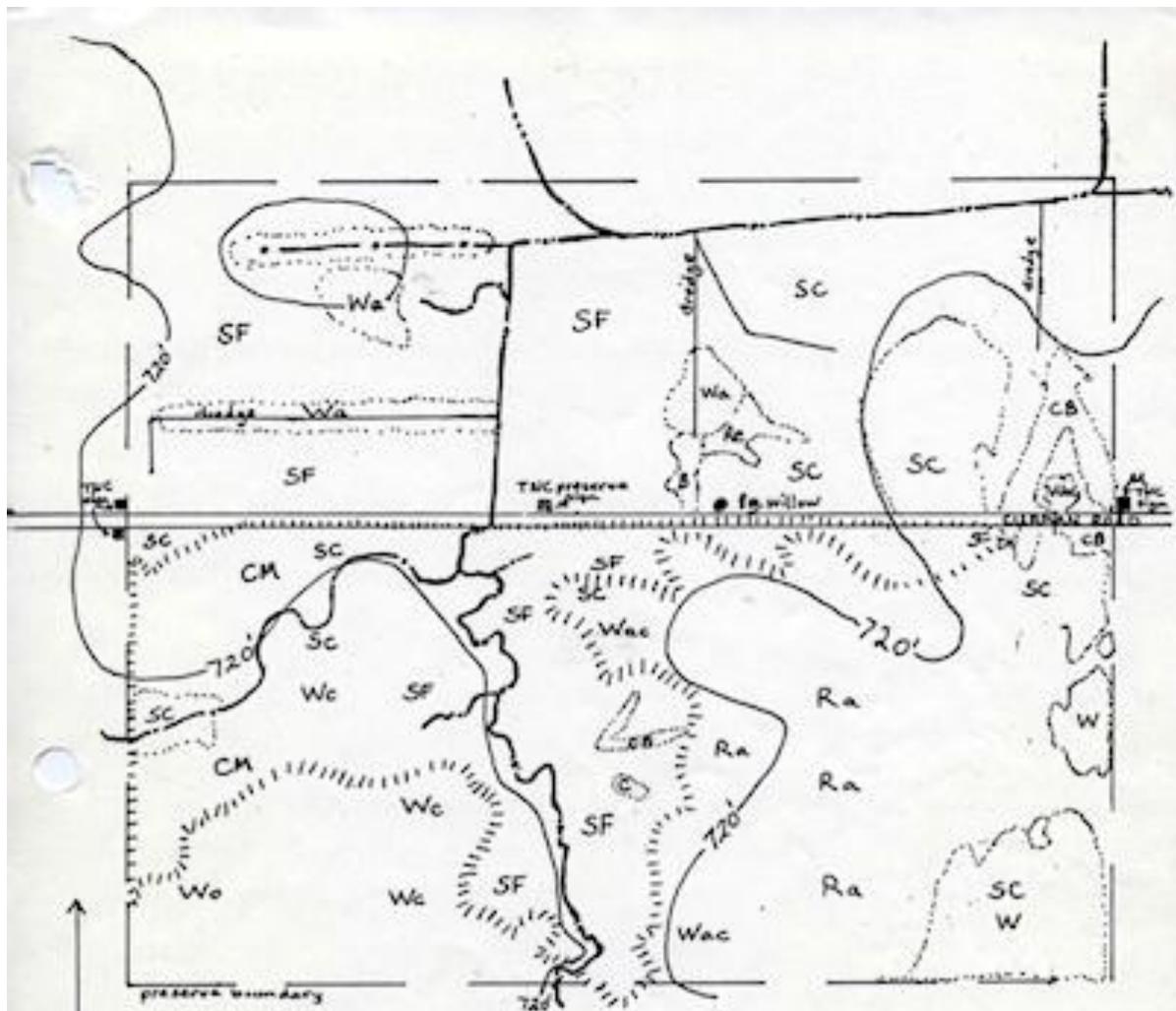
(1) Inventory and map DWP

Mapping the vegetation patterns and land formations is an important first step in planning restoration of an area. Some initial efforts have been made during several monitoring visits to DWP by members of the Stewardship Committee. Figure 12 is a phenology chart which will be used to guide our search for more of the rare and threatened species we might expect to find at DWP.

Species		Best Survey Period											
Scientific name	Common name	Months											
Plants													
<i>Cacalia plantaginea</i>	Prairie Indian-plantain	Jan	Feb	March	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
<i>Carex cumulata</i>	Clustered Sedge (Bailey Fern)	Jan	Feb	March	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
<i>Cypripedium candidum</i>	White Lady's-slipper	Jan	Feb	March	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
<i>Dodecatheon meadia</i>	Shooting-star	Jan	Feb	March	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
<i>Eryngium yuccifolium</i>	Rattlesnake-master	Jan	Feb	March	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
<i>Phlox maculata</i>	Wild Sweet William/Spotted Phlox	Jan	Feb	March	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
<i>Polemonium reptans</i>	Jacob's Ladder/Greek Valerian	Jan	Feb	March	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
<i>Rudbeckia sullivantii</i>	Showy Coneflower	Jan	Feb	March	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
<i>Salix myricoides</i>	Blueleaf Willow	Jan	Feb	March	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
<i>Silphium integrifolium</i>	Rosinweed	Jan	Feb	March	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
<i>Valeriana ciliata</i>	Edible Valerian	Jan	Feb	March	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Turtles													
<i>Terrapene carolina carolina</i>	Eastern box turtle	Jan	Feb	March	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
<i>Clemmys guttata</i>	Spotted turtle	Jan	Feb	March	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Snakes													
<i>Sistrurus catenatus catenatus</i>	Eastern massasauga	Jan	Feb	March	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Birds													
<i>Accipiter cooperii</i>	Cooper's Hawk	Jan	Feb	March	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
<i>Circus cyaneus</i>	Northern Harrier	Jan	Feb	March	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Insects													
<i>Papaipema maritima</i>	Maritime Sunflower Borer	Jan	Feb	March	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Invasive Species													
<i>Rhamnus frangula</i>	Glossy Buckthorn	Jan	Feb	March	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
<i>Rosa multiflora</i>	Multiflora rose	Jan	Feb	March	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
<i>Lythrum salicaria</i>	Purple loosestrife	Jan	Feb	March	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec

Figure 12. DWP Species Phenology Chart

GPS equipment purchased by COL is being used as part of developing vegetation maps. A map from TNC drawn up in 1993 will provide some guidance (Figure 13) but we are aware that there has been considerable increase in shrub carr, large trees and invasives since that time. The water levels are low at DWP this summer so plans are being developed to complete the mapping this season. GPS coordinates will be used to accurately define areas.



Dayton Wet Prairie Preserve

1" = a. 200'

- = prairie boundary
- = other plant comm. boundaries
- = Coy Ck, redirected
- = drainage

Approximate locations of plant communities:

- B = Bulrush marsh with bog birch
- CM = Cattail marsh
- CB = Cattail-bulrush marsh
- Ra = Old field dominated by greater bluegrass
- Re = Reed marsh
- SC = Shrub carr
- SF = Sedge-Forb ("wet prairie"/sedge fen)
- Wa = Aspen woods
- Wac = Aspen/cherry woods
- Wc = Cherry woods
- Wo = Oak woods

S.L., 1991

- Warning: plant community designations north of Curran Road are very general, esp. SF = SC, until verified in field.

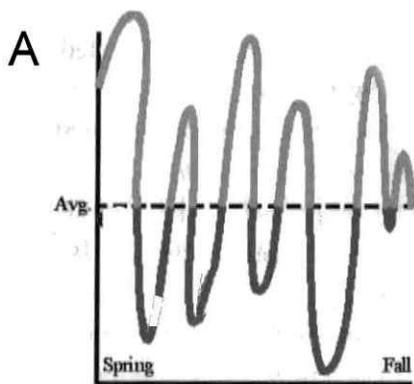
Figure 13. Plant concentrations on DWP

(2) Assess the water quality and flow in the property

For a sustainable fen community it is essential that there be a continuous supply of cold groundwater rich in calcium and magnesium carbonates with a slightly alkaline pH. It is also important that wet conditions should prevail throughout the year. The cleanliness of the water in a wetland is related to the diversity of the natural flora and fauna (Apfelbaum and Haney 2010).

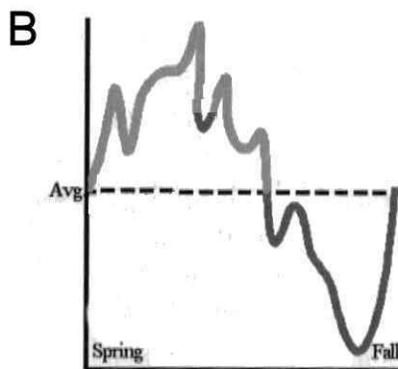
There are questions about how the adjacent agriculture may have affected the nutrient content of water flowing through DWP. Results from a study in the late 1990s (Norling 2000) were encouraging as no excess agriculture runoff was detected at that time. We need to determine that this is still true. COL currently knows little about the mineral content and the distribution of minerals in the soil in DWP. Further, we have not had stewardship of the land long enough to observe the water patterns over a period of intermediate time.

To understand these issues COL should plan to use a variety of monitoring activities:



Engineered System

- *Creates unpredictable swings in water levels
- *Creates biological instability
- *Promotes habitats for invasive species
- *Promotes poor water quality



Natural System

- *Creates annual seasonal high and low
- *Creates predictable hydraulics and seasonal trajectory
- *Promotes habitats for a stable yet diverse range of native plant and animal communities

◆ **Water quality:** Taking measurements starting in the southern part of the property since this is the major source of water flowing thru DWP. Relatively inexpensive kits have been obtained and initial measurements will be made this summer. These readings will provide baseline data for following the effects of redirecting the water in Ditch A. Testing will start with the McCoy Creek on the south side of the property and extend to the creek and ditches on the north side.

◆ **Creek flow rates:** The flow rate of water flow in McCoy Creek and ditches will be determined using methods described by Apfelbaum and Haney. (2010 p.104-6). We will then compare changes in flow rates within the property in the McCoy Creek and associated ditches after changing the water flow of Ditch A on the north side

◆ **Water Levels:** The natural water-level dynamics is predictable in most wetlands. These water levels are easily disrupted by agriculture and human activity in the vicinity and have large effects on vegetation. Figure 14 shows a comparison of water levels in (A) engineered and (B) natural systems (Apfelbaum and Haney, 2010). In natural systems there is a higher diversity of plants and animals. Altered wetlands encourage the entry of invasive plants and

Figure 14. Water level changes in natural v. engineered systems

animals on the property. Measurements of water levels in DWP could provide important information about the hydrology of the area, and therefore the degree to which DWP can be considered a natural system. The PVC wells installed by Jessica Norling in the late 1970's will be useful for this purpose if they are found to be functionally intact. They are on both sides of the property. The method described in Apfelbaum and Haney (2012 p.104) will be used for this purpose.

Depending on the outcome of the above activities more modification of the ditches may be needed to restore hydrology which will encourage the establishment of natural vegetation. Monitoring of the area before and after the institution of these changes will be important to determine the next steps.

(3) Reduce competition from invasive species.

The extensive cover of cattails, phragmites, and reed canary grass is preventing the growth of the endogenous prairie species. Shrub carr on the northern side of the property is a major factor in reducing the growth of prairie species there.

CardnoJFNew as part of a contract has started this work in summer and fall of 2011. Extensive herbicide treatment of reed canary grass, phragmites and cattail was undertaken. Unit D (see Figure 10) which contained extensive areas of cattails, a sedge meadow and shrub carr was burned in November 2011. Further burning was not completed. Woody species removal was completed in the winter of 2012. Springtime inspection of the areas shown in the Figure 10, showed some smaller prairie and fen species growing in the areas but no regrowth of woody species. Our activities will need to build on these initial undertakings as resources permit.

A native species of *Rubus sp.* Containing wild blackberries and raspberries, appears to be well established on the property. It is very evident in the areas of shrubs that were cut and herbicide-treated in the winter of 2012. Presumably the increased isolation have favored the growth of these aggressive plants. In savannah restoration it has been necessary to use herbicide to control these plants. We plan to identify the *Rubus spp* on the property and to monitor their growth and spread. Based on this information we will undertake chemical and mechanical control of the plants as needed.

To reduce competition from invasive species COL should plan to

- ◆ Continue periodic burns and herbicide treatment as a matter of priority and as time and funding allows. Reduction in invasive species should encourage the return of some species from the endogenous seed bank. Some wetland seeds are known to survive for up to 70 years. (Valk 1992). Careful consideration will be given to identifying the appropriate time to apply the herbicide and follow up activities that would discourage regrowth. If we get only a limited return of species we should also consider obtaining seeds from other prairie fens in southern Michigan.
- ◆ Purple loosestrife (*Lythrum salicaria*) was reported on the property in earlier TNC reports. It was not reported by Norling in her 1977-1979 studies. COL observations have not reported any plants. If a significant area is found, release of the biological control beetle *Galerucella* should be undertaken.

◆ Monitor vegetation so that the effectiveness of interventions can be measured. This will be done by means of

1. Regular observation recorded in monitoring reports.
2. Photography at set photo points using standardized protocols
3. Quantitative sampling of vegetation using quadrants and transects

Standardized protocols for these monitoring activities will be developed for best information capture and recording.

(4) Identify the animals on the property and monitor changes in population associated with changes in hydrology and restoration:

The presence of several rare or threatened animals have been reported on DWP over the years. We plan to find which of these species are still resident and hopefully document their return or increase in numbers and spread as our restoration proceeds.

A measure of wetland health can be obtained from knowledge of the resident water dwelling invertebrates (benthic macro-invertebrates). The EPA designates these organisms as good indicators of watershed health and has funding available for groups that are restoring wetland areas. We plan to begin collection of data from DWP in preparation for applying for funding in January 2013.

To identify animals and monitor changes in their numbers COL should plan to:

- ◆ Place “snake boards” (Apfelbaum and Haney 2010, p.117 and Apfelbaum and Haney 2012, p. 96-97) at designated locations in each season; a relatively simple method for obtaining information about snakes and other organisms that like to hide.
- ◆ Make contact with Berrien County Birding Club to determine their interest in doing bird counts on the property and enlist their co-operation in our work.
- ◆ Conduct spring surveys for amphibians during breeding periods. (Apfelbaum and Haney 2012. p 96)
- ◆ Compare the benthic invertebrates at different locations at DWP before and after changes in hydrology, after the filling of Ditch A. (Apfelbaum and Haney 2012. p. 97)

(5) Develop a working relationship with owners of adjacent properties

Both TNC in their management plan and JFNew in their preliminary restoration plan drew attention to the developed nature of the landscape surrounding DWP and rightly suggested that restoration efforts

must include coordination with surrounding landowners to minimize vegetative and hydrological impacts to DWP from their properties.

We plan to develop strategies for involving current owners in the restoration of DWP. This will include educating them on our plans and helping them understand how a healthier ecosystem in DWP can enhance the value of their properties and help their agricultural endeavors.

To involve current owners we should:

- ◆ Contact them. This has already been done with one of the immediate neighbors (Darryl Thompson) who has expressed an interest in providing an oral history of the area. He also expressed his pleasure that COL was now taking an interest in the property. Earlier contact with other neighbors by the TNC were positive.
- ◆ In 1989 TNC assessed the land requirements for stabilizing the DWP environment (See Figure 15A). Comparison with Figure 15B shows the 2011 landowners in this area. The suggestion that additional land be obtained would be expensive and currently well beyond the resources of COL but should be kept in mind when applying for funding sources.

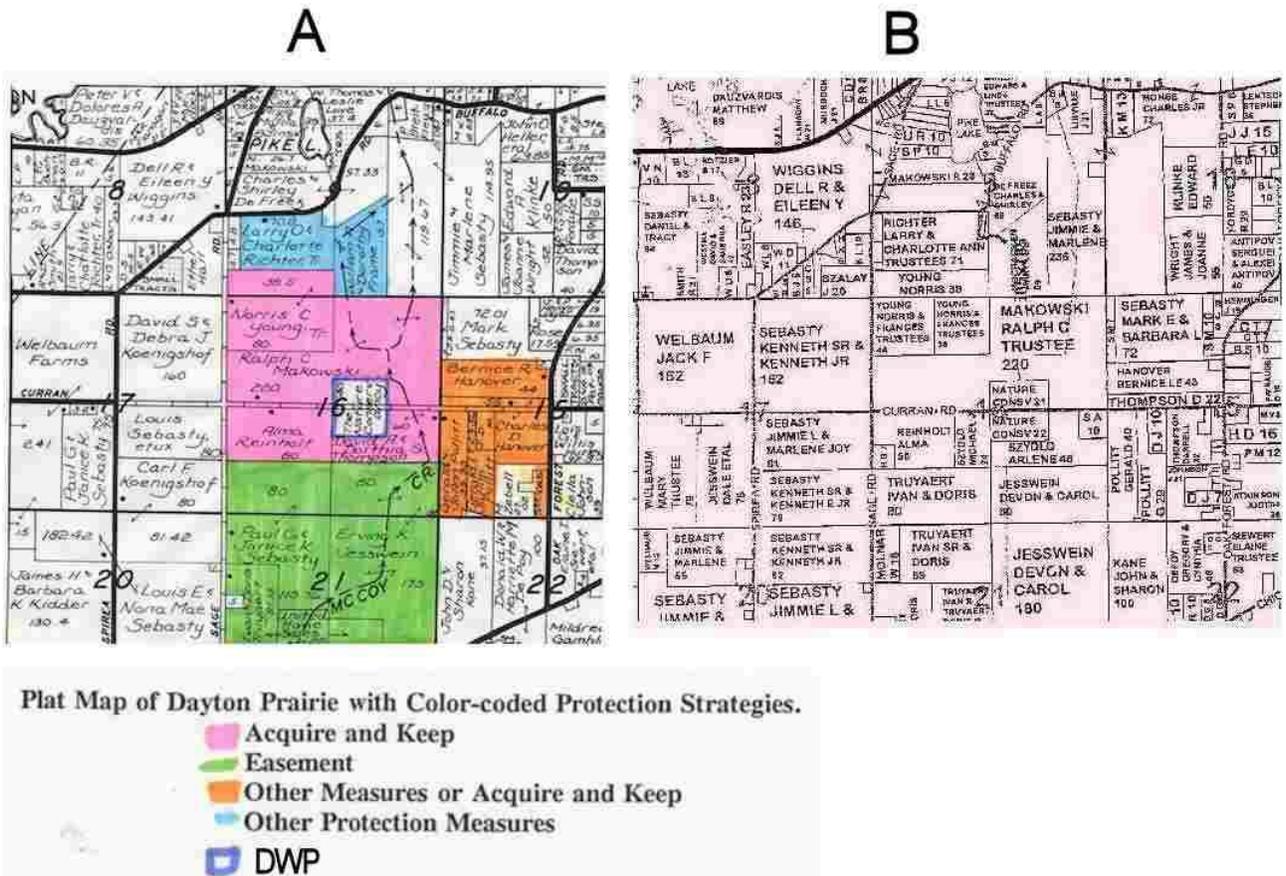


Figure 15. DWP's neighbors

- ◆ Educate current neighboring owners about technical, financial, and educational resources available to them through the resources the U.S. Department of Agriculture contributes to the conservation in general, and DWP in particular.

(6) Seek outside funding and expertise for DWP restoration by

- ◆ Continuing the relationship with the Michigan DNR Landowner Incentives Program which is a known funding source
- ◆ Identifying funding sources relating to improvement of the water quality of McCoy Creek
- ◆ Identifying funding sources relating to our direct connection to the Great Lakes

- ◆ Identifying funding relating to the invertebrate population of DWP (See http://water.epa.gov/grants_funding/)
- ◆ Developing cooperative relationship with those who have undertaken similar restoration efforts e.g. Nate Fuller of the Southwest Michigan Land Conservancy, Ed Collins of McHenry county. This may involve visiting their projects and/or having them speak to us about their work.
- ◆ Recruiting more volunteers e.g. follow up on names from Dennis Woodland; inviting Lisa Brush - Executive Director of the Michigan Stewardship Network to a combined meeting of the Development and Stewardship Committees to discuss her successful efforts in recruiting volunteers.
- ◆ Encouraging volunteers and staff to attend the annual Stewardship Network conference
- ◆ Ensuring that CardnoJFNew submits a final report which will include recommendations for further restoration work, as required in their contract with COP. This may provide information that would help us to modify or enhance our plan.

(7) Develop Public Access to DWP

In order to confer a public benefit to DWP, COL needs to plan ways to grant public access to the property. This will require COL to address issues raised by the sensitivity of the environment, public safety issues related to the changing water levels, the presence of rare and threatened species and the condition of the access road – Curran Road.

A relatively small area of DWP is covered by visibly standing water but throughout the year there are sections that are not passable on foot. The depth of the ditches and McCoy Creek even in the past dry summer made crossing difficult without high waders. The introduction of the cedar plugs into Ditch A will create even more extensive areas of wetland.

During the summer of 2012 we have identified several rare and threatened species in the area. The numbers of these plants are small so we have concern that they not be trampled or become known so that collectors remove them.

The road is narrow, parking along the side of the road is limited because the wet areas which come close to the road. It is unstable as it has been built on railroad ties which allow for improved hydrology but passage of a heavy vehicle is accompanied by noticeable movement in the road. Within the DWP predominant high peat water saturated soils cannot support off-road vehicles. The fen depends on seepage of calcium rich water from the ground and compaction of the upper soil layers will interfere with the natural processes of the fen. Thus it is appropriate to ban all off-road vehicles except those required for maintenance and restoration activities.

To improve public access the following activities will be considered:

- Lobby the Bertrand Township to impose a 15mph speed limit on Curran Rd within DWP preserve. Currently COL staff and stewards have observed local traffic is often too fast for the safety of those who need to park in the area.
- Find grant opportunities to identify and develop a suitable parking area. Construction of a parking lot within DWP would present many hydrological problems. We would explore the possibility of seeking land close to the property that would be more suitable for a parking lot as well as evaluating land within the property.
- Develop a board walk thru a limited section of the property so that evaluation of the impact on the environment could be undertaken by comparing changes in vegetation in areas close to the board walk and those left undisturbed. Our plans would include a board walk and observation deck with signage to provide educational information about the property. Further board walks will be developed as the impact and usage of the area is evaluated.
- Recreational uses which could be considered for DWP include but are not limited to low impact non-destructive activities such as birding, snow shoeing and hiking. Parking issues would need to be addressed before these activities could be encouraged.
- Allow access to DWP for educational groups and research individuals beyond public boardwalks by requiring that such groups and individuals to arrange for a COL representative to accompany them on their first visit. A guide book will be developed to include plans of the area and information related to safety and care to be taken to preserve rare and threatened species.
- It is anticipated that an important part of restoring and maintaining the unique features of DWP will to conduct periodic burns. The construction of permanent fire breaks around the boundaries of the property could allow for safer public access to the property.

(8) Recruit and supervise persons interested in using DWP as a research site.

COL does not have the staff, volunteers or funding needed to accomplish the work to be done in order to restore DWP. However identifying organizations or groups (government, educational, voluntary etc) who have interests coincidental with those of COL could lead to beneficial outcomes for both COL and these groups. A local school group has expressed interest in making a DWP project their focus for a 2012-2013 senior project in the Michigan Conservation District's Envirothon Competition.

(<http://macd.org/ME/about-envirothon.html>)

In the past, a major source of information about DWP has been the paper of a graduate student at Andrews University. It would be in our strong interest to contact biology departments in local

Colleges/Universities to ascertain whether COL and they might have mutual beneficial interests.

(9) Establish policy for issuing deer hunting permits for the property

Deer sightings by COL Stewardship Committee members, footprints and a deer hunter's hide all suggest that there is a significant deer population in the DWP area. The new COL deer hunting policy will be adhered to. The plan is to allow one hunter to have one bow hunter to continue to have access to the property. He will be required to post designated markers when he is on the property.

(10) Identify ways of discourage dumping of rubbish and waste on DWP

Curran Road is a lightly used road and some individuals have taken advantage of this to dump household rubbish and other waste near the road. Most of this has recently been removed by members of the Stewardship Committee. Three "No Dumping" signs will be erected in the near future to discourage this activity. Two large signs identifying COL ownership of the property will be erected as soon as the required permits are obtained from the Bertrand Township Board. Boundary posts will be placed at intervals along Curran Rd as well as at the corners and on other parts of the boundary as budgets allow.

See **Appendix A** below for a chart outline of proposed activities at DWP in the next 12 months. Progress achieved on these activities will be evaluated in 2013 and an amended plan developed for 2013-2014.

Respectfully submitted

Judith M. Brown

November 8th, 2012

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Appendix – Suggestions for priorities for 2012-2013

Goal	Summer	Fall	Winter	Spring
Inventory & mapping	Regular walk thru property to observe and record plant life. Purple loosestrife??	Regular walk thru property to observe and record plant life.		Regular walk thru property to observe and record plant life.
	Decide on appropriate photo points with GPS coordinates & markers. Develop written protocol.	Setup photo points by GPS & place markers. Take photos from photo points.	Take photos from photo points	Take photos from photo points
	Map rare plants with GPS and report to MFNI	Map rare plants with GPS and report to MFNI		Map rare plants with GPS and report to MFNI
	Add data to Google map of area. Post in monitoring reports on Web site	Add data to Google map of area. Post in monitoring reports on Web site		Add data to Google map of area. Post in monitoring reports on Web site
		Set up 4 transect lines &/or quadrats (effects of flooding ditch A, effects of buckthorn cutting, effects of burnt versus unburnt cattail areas)		Redo transect and/or quadrats lines
Water quality & flow		Installation of cedar dams		
	Investigate integrity of JN wells	Water level measurements before and after installation of dams	Look for springs & seepage from underling layers after freezing and snow	Water level measurements at JN wells
		Creek flow rates		Creek flow rates
	Test water from other JN wells			

Goal	Summer	Fall	Winter	Spring
		Can we borrow equipment for taking soil samples for Ca and Mg levels? Investigate costs in having soil samples analyzed.		
Reduce competition from invasive species	Negotiate with CardnoJFNew about where and when to burn	Choose areas to treat with herbicide to maximize burn effort. Apply herbicide.		Release <i>Galerucella</i> if purple loosestrife identified.
		Hand wicking of cattails in sedge meadow area and selected north side areas.	Develop plan for further herbicide treatment of invasives. Identify appropriate herbicides. Workdays and/or pay for service	
Identify animals	Contact Berrien County birding Club,	Collect and identify benthic organisms from creek, ditches before & after damming		Place snake boards and monitor weekly for a month
Develop relationship with neighbors		Introduce ourselves and contact personally about building of dam: Ralph Makowski, Scyold Arlene and Darryl Thompson – indicated willingness to tell history of land.	Develop presentation for a larger number of neighbors.	Make presentation to neighbors about our plans for DWP and provide educational material about restoration funding for farmers.
Seek outside funding & expertise	Trip to McHenry County 24 th August to meet Ed Collins, tour prairie fens and see equipment.	Arrange a combined meeting with Development Committee and invite Lisa Brush to make presentation.		Invite Nate Fuller from Southwest Michigan LC to visit the DWP and speak about his experience restoring a prairie fen.
	Gather info about “Friends of St Joseph River” and consider	Identify 1-2 grants for application in next 6 months	Contribute to grant writing	

Goal	Summer	Fall	Winter	Spring
	membership.			
Establish deer hunting policy		Display COL policy with signs		
Discourage dumping on property	Erect new COL signs, boundary signs and no dumping signs.			
Evaluate progress on plan				Evaluate progress on 2012-2013 plan and develop one for 2013-2014