

# Newell G and Ann M Meyer Preserve Management Plan 2023 – 2030



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October 2023



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## **1. Purpose**

This plan is intended to serve as living document of the general goals and intent of management and restoration activities on the Newell G and Ann M Meyer Preserve. The plan applies to the 653 acres of contiguous land that comprise the main portion of the preserve. The plan is not exhaustive and should be revisited and updated as new knowledge and information warrants. An in-depth review of the document is suggested at least once every five years to refresh maps and integrate any additions or changes to TNC's ownership portfolio.

This plan does not cover the outlying tracts of the preserve including the Sommer, Girl Scouts of Northern Illinois Tract (GSNI), Hirschboeck, Saeian or Loth Tracts. Restoration and management of the unique site conditions on those lands are better guided by separate restoration plans.

This plan will inform and guide TNC's management and restoration of the Meyer Preserve and is purposed to reflect the obligations set out in Newell Meyer's will, as agreed to by representative of Newell's estate and TNC in 2007. Through the implementation of this plan, TNC will comply with all applicable laws, regulations, and agreements.

In approaching this planning, we respectfully acknowledge the many generations of stewards of these lands, past and present, who have thoughtfully tended and cared for the diversity of life harbored in the Mukwonago River Watershed, of which this preserve is a part. It is with esteem and recognition of the deep knowledge and the role many centuries of land care have played in shaping the biodiversity that exists in the watershed today, that we humbly and ambitiously chart a path forward to implementing stewardship to sustain diversity and resilience in on the Meyer Preserve far into the future.

## **2. Overview and Background**

In 2006, Newell and Ann Meyer donated 374 acres to The Nature Conservancy (TNC) through their estate. The following year, TNC established the Newell G. and Ann M. Meyer Preserve in accordance with their wishes. The Meyers' dream was to create a nature sanctuary, an oasis of quiet beauty amidst the hustle and bustle of southeast Wisconsin.

Lifelong Milwaukee residents, the Meyers bought the first 80 acres in Eagle, WI 1976 as a summer retreat. They were artists—Newell a sculptor and Ann a painter—and spent time at the property pursuing their art and enjoying wildlife. Along with the land, the Meyers donated the vast majority of their estate. Theirs is the largest gift of land and assets ever made in Wisconsin for conservation.

Ecological restoration began in 2009 with the clearing of buckthorn in the woodlands around the cabin and continues today.

### **Landscape context**

The Newell and Ann Meyer Nature Preserve is located within the Mukwonago River Watershed project area. The Meyer preserve is adjacent to the southern unit of the Kettle Moraine State Forest and is located about three miles northwest of the Conservancy's Lulu Lake and Crooked Creek preserves.

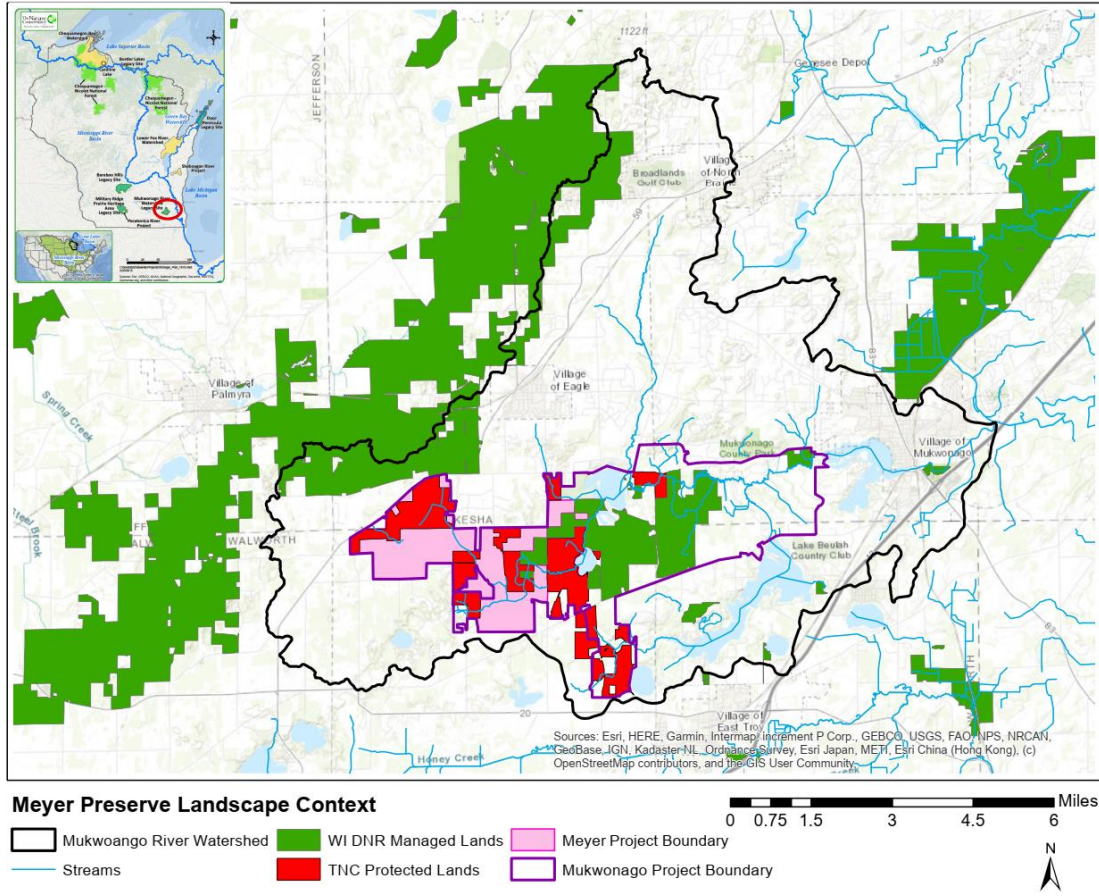


Figure 1. Meyer Preserve Landscape Context.

The main portion of the preserve is 653 acres of contiguous land located along the border of Waukesha and Walworth Counties. The main preserve includes the Meyer 1 and 2, Zimdar and Malek tracts (see figure 2) Outlying Meyer properties which have been acquired through Meyer funding include the Hirschboeck, GSNI, Sommer, Seaian and Loth tracts (see fig. 3). This plan focuses on the main Meyer Preserve and restoration plans for the outlying properties are attached in Appendix B.

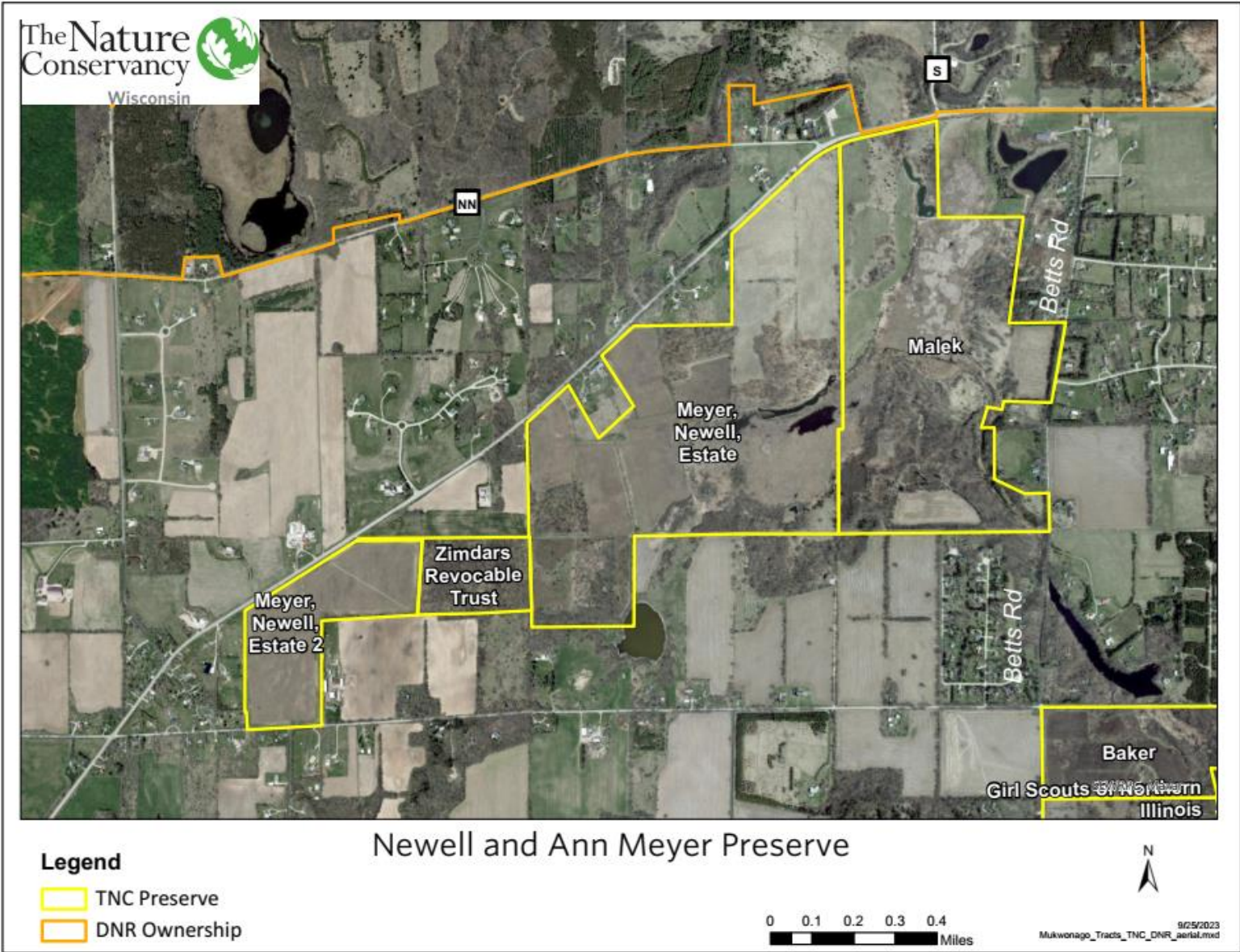


Figure 2. The main portion of the Meyer Preserve.

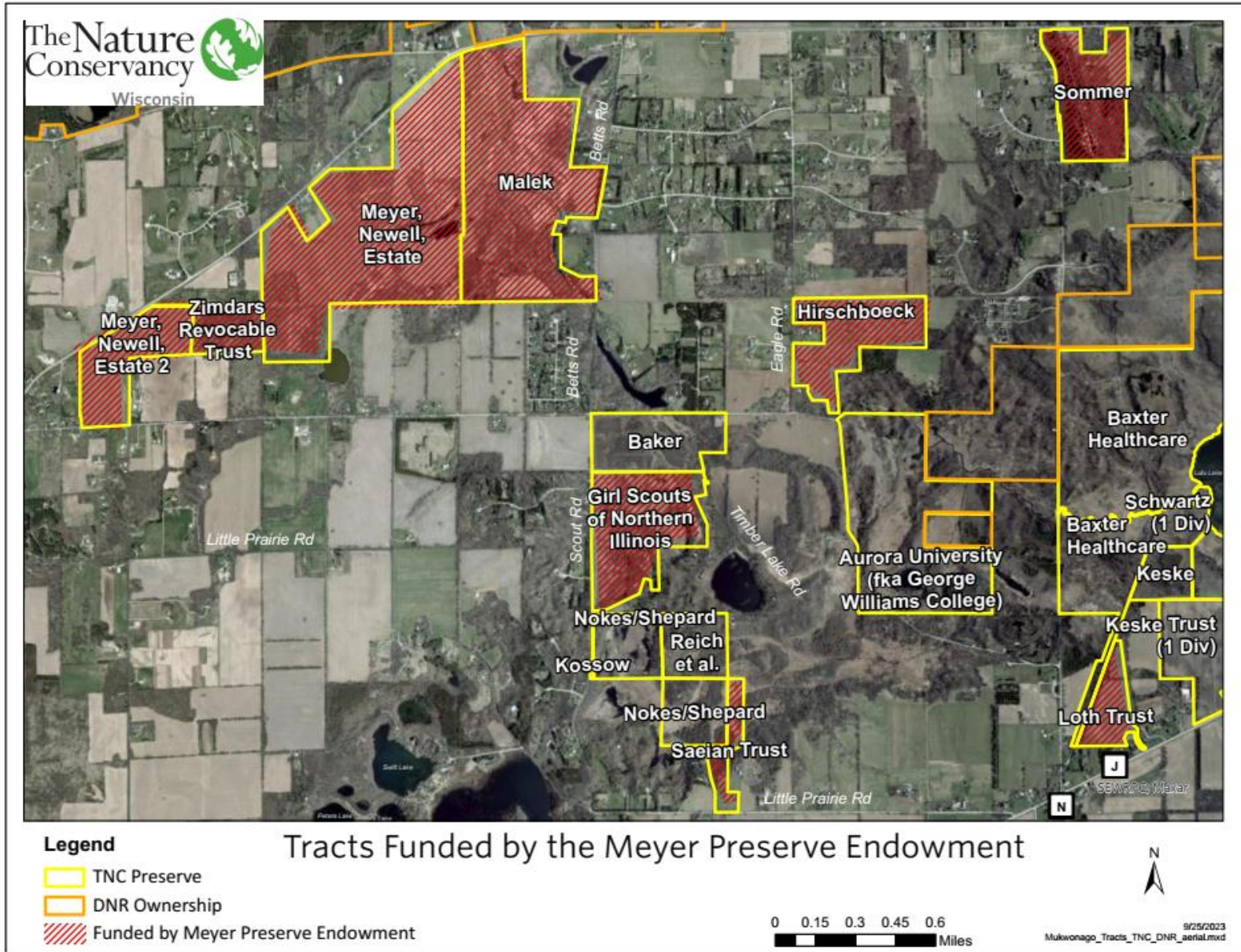


Figure 3. TNC Mukwonago River Watershed Tracts. Properties funded by the Meyer Preserve Endowment are shaded red

## Natural Communities

The Meyer Preserve is primary grassland, savanna, and non-forested wetland. Natural communities include: restored dry to mesic prairies, old-hay fields, oak openings, oak woodlands, southern sedge meadow, emergent marsh, and calcareous fen. Detailed community descriptions can be found on the WIDNR Natural Communities website at

<https://dnr.wisconsin.gov/topic/WildlifeHabitat/actionPlanNatCom.html>

The natural communities vary in quality throughout the preserve. The sedge meadows and fens have the highest quality remnant communities present on the preserve. However, those communities are threatened by invasive species, especially reed canary grass, purple loosestrife, and non-native cattail.

The restored prairies have a characteristic assemblage of species with limited or localized populations of non-native invasive species. Shrubs and trees are minimal within the prairies, with the exception of a large clone of aspen in the western most prairie.

The oak woodlands and savannas on the property are severely degraded. The highest quality woodland is located near the cabin, south of the entrance. This woodland has a characteristic oak woodland structure, but lacks most of the herbaceous indicator plants in the understory. Historic grazing, lack of fire, and encroachment of native and non-native invasive shrubs have contributed to a loss of diversity in herbaceous understory.

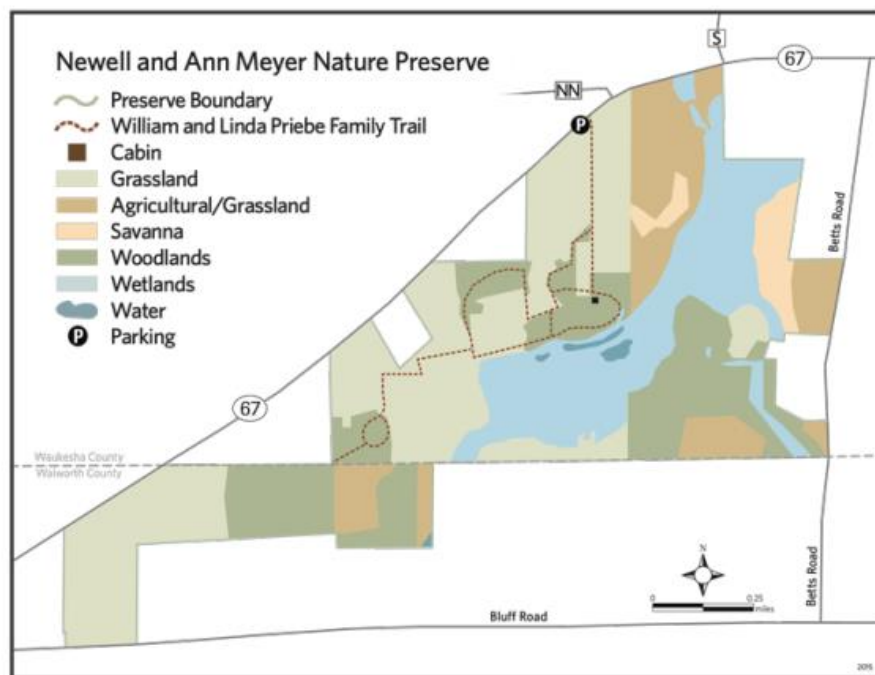


Figure 4. Natural Communities on the Meyer Preserve.

## Historical Use

Agriculture dominated much of the preserve prior to TNC ownership. All of the restored prairies in Fig. 4 were used for agricultural purposes until they were planted to prairie between 2010 and 2020. Roughly half of the fields were used for hay crops, while the remainder were in row crops. Prairie establishment on row crop fields tends to fair better in the shorter term (<5 years) than those restored on hayfields.

There is evidence of heavy grazing in most of the woodlands and hayfields on the property. Historically, grazing contributed to changes in fuel, resulting in lack of fire, and pressure from cattle likely extirpated many herbaceous understory plants across the preserve.

In 2009, TNC opened the preserve to public use. Approximately 2 miles of trail, the William and Linda Priebe Family trail, runs through the prairies and woodlands on the preserve. The preserve is open to outdoor recreation, including hiking, hunting, snowshoeing, and birdwatching.

## Infrastructure

*Cabin.* An historic cabin is located on the preserve, approximately ¼ mile south of the main entrance. This cabin was originally located in Michigan and was relocated by the Meyer's in 1982.

*Garage.* The garage from the Meyer's house remains on the property. It is showing signs of reaching the end of its usability, including damage to the siding and rodent damage.

*Signs.* Boundary signs are posted along the exterior of the preserve and preserve entry signs are located at the parking lot on Hwy 67. Trail signs and information signs are scattered throughout the preserve. An inventory was completed in 2022.

## Climate Change

Climate change presents a challenge to management. The changing climate is bringing warmer temperatures to the Meyer Preserve, including shorter, milder winters and more precipitation falling as rain rather than snow. Precipitation is also increasing, with a greater percentage of annual precipitation falling during increasingly frequent extreme events. Although warmer annual temperatures will increase extend the growing season, they will also interact with altered precipitation regimes to increase drought stress.

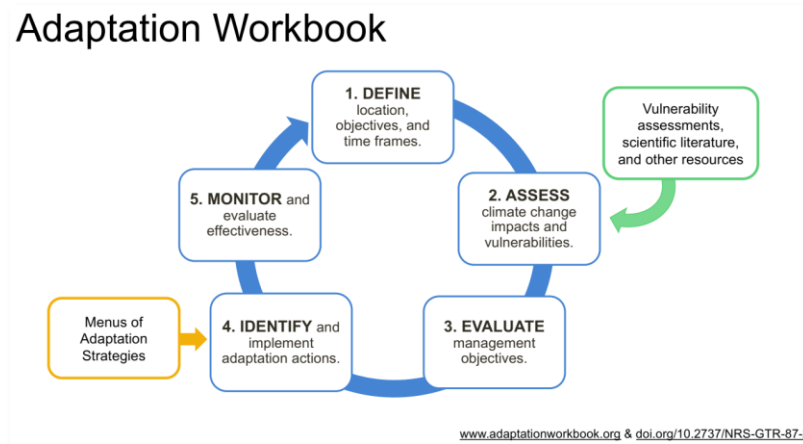
Site-level conditions can make the preserve more or less vulnerable to climate impacts than other sites in the region. Site level conditions affecting climate vulnerability identified at the Meyer Preserve planning include:

- Loam-rich soils without steep slopes decreases erosion risk compared to sites with steeper topography and sandier soils; however south of the wetland there is more dramatic topography that increases erosion risk in this area
- Topographic diversity in this glaciated landscape, along with a relatively large intact property, promote landscape resilience; however, the preserve is disconnected from other nearby protected lands (e.g., Crooked Lake, Lulu Lake State Natural Area & Pickerel Lake State Natural Area)

<b>Specific consideration for oak savannas and oak woodlands</b>	
<b>Factors that increase climate change risk</b>	<b>Factors that decrease climate change risk</b>
Degraded starting point (low species diversity, high % cover of invasive species, degraded structure)	Site is suitable for prescribed fire (e.g., appropriate edge ratio, contiguous area, low-density development in surrounding properties), with a history of successful prescribed fire in some woodland blocks
Deer browse pressure across property	Diversity of oak age classes on property
Low fuel levels in some woodland blocks make it challenging to carry fire	In some woodland blocks, oak litter and warm-season grasses is sufficient to carry fire
	Dominant native species have broad geographic ranges and are at low risk of range shifts

<b>Specific consideration for wetlands</b>	
<b>Factors that increase climate change risk</b>	<b>Factors that decrease climate change risk</b>
Neighboring agricultural properties, especially in northeast corner of the property	Less intensive agriculture in the surrounding landscape (i.e., hobby and horse farms)
Subdivision development nearby	Local ordinances that have protected wetlands
Calcareous fen plant communities have higher risk from climate change	Wetland is groundwater fed
Heavy infestation of non-native cattail	Pockets of high-quality wetlands with native vegetation and better conditions with respect to invasive species than 'average' wetlands in the area
Reed canary grass in the neighboring uplands	Dominant native species have broad geographic ranges and are at low risk of range shifts
Social/human/permitting constraints for fire management in the wetlands	Site is suitable for prescribed fire (e.g., trails and roads on edges help containment; ~80% of property has fuels that can carry fire)
	Site is at high elevation in the watershed, reducing climate vulnerability in multiple ways: <ul style="list-style-type: none"> <li>▪ Most neighboring properties drain away from Meyer</li> <li>▪ None/few CAFOs high in the watershed</li> <li>▪ Less affected by extreme precipitation events compared to downstream areas</li> </ul>

*Climate Adaptation Planning.* In 2022 and 2023, TNC staff partnered with staff from the Northern Institute of Applied Climate Science (NIACS) to understand the trade-offs between carbon and plant biodiversity in climate-informed land management of southern Wisconsin, with particular focus on the Meyer Preserve. To facilitate this process, we used NIACS’s Adaptation Workbook process (<https://adaptationworkbook.org/>) to consider how to manage for multiple goals, including climate adaptation and carbon management in oak savannas and non-forested wetlands. The Adaptation Workbook is a structured process to consider the potential effects of climate change and design land management and conservation actions that can help prepare for changing conditions (<https://adaptationworkbook.org/about>).



During the Adaptation Workbook process, TNC staff identified management goals and objectives (Step 1, see table 1) in consultation with NIACS staff. Broadly, management goals focused on maintaining and enhancing habitat-specific plant biodiversity with secondary goals of maintaining and enhancing carbon storage and sequestration on the landscape.

In January 2023, NIACS staff conducted a workshop with TNC staff, as well as ecologists from the WIDNR. During that workshop, participants reviewed climate change impacts for southern Wisconsin (Step 2), reviewed and assessed feasibility of each management objectives considering these climate change impacts (Step 3), identified adaptation actions considering both biodiversity and carbon outcomes (Step 4, Table 2) and discussed and recommended monitoring aligned with new management actions (Step 5).

*Carbon Stewardship.* A unique aspect of the adaptation planning process for the Meyer Preserve was the consideration of carbon outcomes of management actions. The Adaptation Workbook does not specifically address this aspect, so NIACS staff conducted a literature review of scientific publications investigating carbon outcomes of land management actions (Keller 2023). The results of the literature review helped inform Step 4 of the Adaptation Workbook process.

Table 2 in the Management Recommendations below notes the relative carbon and plant biodiversity outcomes of recommended management actions. It is important to note that these are general directions and relative magnitudes of outcomes and mostly focus on above-ground carbon storage. The process of ecosystem carbon movement is complex, particularly in wetlands, so quantifying carbon outcomes of management actions is extremely difficult.

### 3. Land Management Plan

#### Management Goals

*Maintain and Increase Biodiversity.* TNC’s overall goal for the Meyer Preserve is to maintain and restore high quality, biodiverse natural communities including oak savanna and woodlands, non-forested wetlands, and dry to mesic prairies. Promoting biodiversity is the primary goal and this is done by management actions that affect plant diversity. It is generally assumed that higher plant diversity promotes more animal and microbial diversity.

Specific ecosystem management goals and objectives are listed in Table 1. The management objectives apply broadly to each ecosystem type and described the desired future condition. Some areas on the preserve have a higher quality starting point and objectives will be more easily met in those areas. Other area which are severely degraded may not fully meet objectives by 2030, but working towards the ecosystem objectives in those areas will increase the overall ecosystem health on the preserve.

**Table 1. Ecosystem Management Goals**

Ecosystem Type	Management Goals	Management Objectives	
Non-forested Wetland	Increase or maintain plant species diversity	Maintain relative % cover of native wetland sedges and grasses to at least 40%.	
		Reduce total % cover of non-native grasses to under 3%.	
		Reduce total cover of Typha spp. (cattail) to under 15%.	
	Reduce shrub cover along wetland/upland border		Reduce total % of native shrub cover to under 20%.
			Reduce total % of non-native invasive shrubs to under 3%
	Protect and maintain hydrology		Limit water extraction from aquifers to maintain groundwater supply by promoting the use of groundwater/high capacity well model developed by USGS and TNC with municipalities and counties when considering site for high-capacity wells. NOTE: Implementation is somewhat out of TNC's control.
	Restore fire as an ecosystem process		Complete first entry burn in 70% of wetlands by March 2025.
Burn wetland complex at least 3 times per decade			
Grasslands	Maintain and/or increase plant diversity in restored grasslands	Reduce herbaceous or maintain non-native invasive species to under 1%. Many of the restored prairies have already met this objective. Some of the old-hay fields may not reach this objective.	
		Maintain native shrub cover to under 10%	
		Reduce total % cover of non-native invasive shrubs to under 3%	
	Increase species diversity in old hay Fields		Increase cover of native forbs and grasses by 10% each year

Oak Savannas (Woodlands and Openings)	Reduce or maintain canopy cover to under 50% in oak openings and between 40% and 80% in oak woodlands.	
	Reduce total % cover of low/medium woody plants (<6ft tall).	Reduce cover invasive shrubs to under 3% in the highest quality area with no more than 10% across the preserve landscape.
		Reduce cover native shrubs to under 15% in higher quality areas, with no more than 20% across the preserve landscape.
	Increase species diversity in the understory	Increase or maintain total % cover of native graminoids to 50-65%.
		Increase number of native indicator species
		Decrease native disturbance indicators to under 30% by increasing fire frequency.

*Connecting People with Nature.* The preserve is open to the public for enjoyment of outdoor recreation, including hiking and hunting. The parking lot on Hwy 67 and the William and Linda Priebe Family Trail will continue to be maintained for public access. As opportunities arise, staff and volunteers will engage with the local community and neighboring communities such as Milwaukee to connect people with nature on the Meyer Preserve.

*Carbon Stewardship.* Carbon stewardship is one of multiple management goals on the preserve. Therefore, we are focused on optimizing (not maximizing) carbon within the context of ecosystem integrity and climate adaptation. Some management actions which will have positive effects on plant biodiversity, and therefore increase climate adaptation, may decrease carbon storage or sequestration in the aboveground stores. In the long term, management actions that increase climate adaptation address risks to ecosystem health that sustain or improve the capacity of systems to sequester carbon.

Table 2. Recommended Land Management Actions.

Ecosystem Type	Adaptation Actions		Carbon/Biodiversity		Benefits	Drawbacks & Barriers	Practicability of Tactic	Recommended Tactic?
	Approach	Tactic	Carbon Storage Outcomes	Plant Diversity				
Non-forested Wetlands	Prevent invasive species establishment and limit their impacts where they already occur.	Treat cattail (cut culm treatment), RCG, Phragmites, prioritizing species rich areas	Small short-term decrease of above ground living C	Increase	Improves diversity of native plants		High	Yes
	Promote prescribed fire in fire-adapted wetlands	Promote Rx Fire at least 3x per decade. Time burns to follow invasive species treatment	Small decrease of above-ground C	Increase	reduces non-native shrubs, reduces herbaceous litter (esp typha), improves nutrient cycling	Barriers include Rx fire capacity and NR109 permit restrictions	Medium	Yes
	Prevent the introduction and establishment of invasive plant species and remove existing invasive species	Treat herbaceous invasive species with targeted foliar herbicide treatments; treat woody invasives with stump-cut, foliar and basal bark treatments; mowing	small initial decrease of live above-ground C. If piles and cuttings are left, most of the C converts to dead above-ground C until burned	increase	Improves diversity of native plants		Medium	Yes
	Maintain and restore a natural hydrologic regime	Allow beaver to colonize wetland	Limit C losses from wetland drying	Maintain/increase	Beaver dams, ponds can retain water during droughts	Not easily manipulated during flooding. May be pushed back from neighbors/	low	more research/outreach needed

Table 2. Recommended Land Management Actions.

						general public.		
	Maintain and restore a natural hydrologic regime	Modify culvert at road to maintain options for regulating water levels	Limit C losses from wetland drying	Maintain/increase	Would allow for water retention during droughts and	Needs permitting. May be concern from neighbors/general public.	Low	No
Grasslands	Prevent the introduction and establishment of invasive plant species and remove existing invasive species	Treat herbaceous invasive species with targeted foliar herbicide treatments; treat woody invasives with stump-cut, foliar and basal bark treatments; mowing	Varies, removing woody invasives can decrease above-ground live C, treating herbaceous may maintain or increase C	Increase	increase plant diversity	Barriers include: staff capacity to contract work	Medium	Yes
	Maintain and enhance species and structural diversity	Inter-seed with herbaceous species mix that have diverse functional groups (sedges, C3 and C4 grasses, legumes, forbs, perennials, some biennials, and annuals)	Increase	Increase	Increases both above ground live carbon and plant diversity. improves fuel beds for Rx fire. Use in old hayfields	Requires fall fire.		Yes
	Facilitate habitat biodiversity adjustments through species transitions	Interseed drought tolerant species. Introduce fire tolerant species from other (southern) regions,	Increase of aboveground live C, especially if planting trees	Increase	Diversifies oak stands to provide redundancy from forest pests, etc	Could be controversial if species are not within their	High	Yes

Table 2. Recommended Land Management Actions.

		e.g. chinquapin oak.			Increases/protects aboveground live carbon.	historical range.		
Grasslands /Savannas	Promote landscape connectivity	In agriculture field adjacent to Zimdar tract, restore to oak opening/oak woodland species that can tolerate full sun/part shade (especially along woodland edges); follow up with interplanting oak seedlings with eventual goal of converting to oak opening/oak woodland.	Increase of aboveground Live C	Increase	increases connectivity with other blocks of woodlands Large increases above ground live carbon		High	Yes
Oak Savanna	Prevent the introduction and establishment of invasive plant species and remove existing invasive species	Treat herbaceous invasive species with targeted foliar herbicide treatments; treat woody invasives with stump-cut, foliar and basal bark treatments; mowing	Small decrease of above-ground C	Maintain/increase		Barriers include: staff capacity to contract work, many areas of the preserves have significant cover of invasives.	low/medium	Yes

Table 2. Recommended Land Management Actions.

	Restore or maintain fire in fire-adapted ecosystems	Use prescribed fire more frequently, particularly fall burns which are ideal for site prep prior to seeding; use woodlands rather than prairies as indicators for timing of burns (i.e., it's ok if prairies burn hot or not at all some years); be open and prepared to burn in non-traditional windows. windows; Allocate budget and program resources to support engagement of contractors	Small decrease of above-ground C	Increase	Fire frequency will improve brush control, provide opportunity for interseeding. Increasing fire frequency will make burning easier over time	Requires contract burning or small TNC crew to be more flexible for non-traditional burn windows.	Medium	Yes
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Table 2. Recommended Land Management Actions.

	Restore or maintain fire in fire-adapted ecosystems	Use prescribed fire in late growing season to reduce shrubs (requires sufficient fine fuels) – consider doing “micro burns” in small patches; Prepare well in advance for burns (e.g., burn plans approved, prepare equipment, put breaks in) so immediate mobilization is possible within limited burn	Small decrease of above-ground C	Increase	Fire frequency will improve brush control, provide opportunity for interseeding. Increasing fire frequency will make burning easier over time	Requires contract burning or small TNC crew to be more flexible for non-traditional burn windows.	Medium	Yes
	Maintain and enhance species and structural diversity	Inter-seed with herbaceous species mix that have diverse functional groups (sedges, C3 and C4 grasses, legumes, forbs, perennials, some biennials, and annuals)	Increase of aboveground live C in areas where no herbaceous cover currently exists	Increase	Improves diversity of native plants; improves fuels for fire	requires fall RX fire in woodlands	High	Yes

### 3. Ecological Monitoring

Ecological monitoring is an essential part of management of the preserve. Early Detection and Rapid Response (EDRR) is an approach designed to detect and eradicate new invasions of non-native species. Course Level Metrics have been developed for oak woodlands, oak savannas and southern sedge meadows. These metrics “focuses on key ecological attributes, or metrics, that are biologically important for plant and animal species and that can be influenced by management” (Carter et al 2023) and can be used to track overall community health in each ecosystem type. EDRR and CLM form the backbone of monitoring efforts for the preserve.

Other monitoring should include:

- Land-use change around the preserve, monitored in terms of % developed/ % agriculture/ %natural cover.
- Land acquisition opportunities: stay abreast of farms, other lands for sale within the project boundary.
- Water level in wetlands, at culvert, and at cabin well: monitor seasonal changes and trends through time using continuous data monitor to understand effects from high-capacity wells and climate change (both punctuated extreme events and gradual changes)
- Water quality, including nutrient (e.g., phosphorus) loading downstream of the wetland.

Table 3 Summarizes the monitoring recommendation for the Meyer Preserve.

**Table 3. Monitoring**

<b>Ecosystem Type</b>	<b>Adaptation Monitoring Variable</b>	<b>Monitoring Implementation</b>
Site-Wide	Early Detection and Rapid Response of Invasive Species	Complete annually in grasslands, and in conjunction with CLM in woodlands and wetlands
Oak Savannas	Course Level Metrics for Oak Woodlands and Oak Openings (Carter et al 2023)	Complete every three years in all oak woodlands and Openings
Wetlands	Course Level Metrics for Southern Sedge Meadow and Wet Prairies (O'Connor 2019)	Complete every three years in sedge meadows
Wetlands	Floristic Quality Assessment (Bernthal 2003)	Complete before and after major invasive species treatments (i.e cattail treatments)
Wetlands	Water Quality	Add SWIMS stations at wetland and at culvert. Consider adding monitoring on well at cabin.