

# **County Line Preserve: A Treasure Worth Restoring**

A Restoration Plan by Taj Lalwani

For a site of the Ozaukee Washington Land Trust

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## A. Introduction

County Line Preserve is a parcel of 72 acres in Ozaukee County, Wisconsin, owned and managed by the Ozaukee Washington Land Trust (OWLT). It is bordered on the West by Washington County; hence it is on the county line. The preserve is on the ancestral lands of the Potawatomi people, and was also stewarded by the Peoria, Myaamia, Očhéthi Šakówiŋ, Menominee, and Ho-Chunk people. Currently, the village of Newburg exists close to the preserve, as well as the town of Saukville and the City of West Bend, which are less close but more populous. County Line preserve contains a 50-year-old restored prairie, cedar woods, hardwood swamps, alder thicket, sedge meadows, and an esker topped by mixed woodlands.

The North Branch of Cedar Creek passes through the site, originating from an ephemeral stream at the northwest and exiting to the southwest, eventually joining the Milwaukee River near Cedarburg. There is an excavated spring-fed pond at the site as well, dug between 1963 and 1970. The site is two miles west of another OWLT preserve, Center Lane Preserve.



Aerial photo of County Line Preserve and the surrounding area, including the nearby Center Lane Preserve.

The lighter colored section of County Line Preserve near the parking lot is the prairie. The darker, round section to the right of the prairie is the pond. The blue line represents Cedar Creek, with the northern branch being the ephemeral stream.

This is a gorgeous site with some very diverse and healthy ecosystems. It also offers a rare example of alder thicket and northern hardwood swamp in southern Wisconsin. Both of these ecosystems are more typical of northern Wisconsin. The site offers something for animal and human communities that is otherwise hard to come across in this region of Wisconsin.

The invasion of non-local beings, including reed canary grass and narrowleaf cattail, is threatening parts of County Line preserve. My vision is to control the effects of these invasive species so the healthy ecosystems can remain intact, and so we can prevent ecosystem collapse in the reed canary grass (RCG)-dominated area.

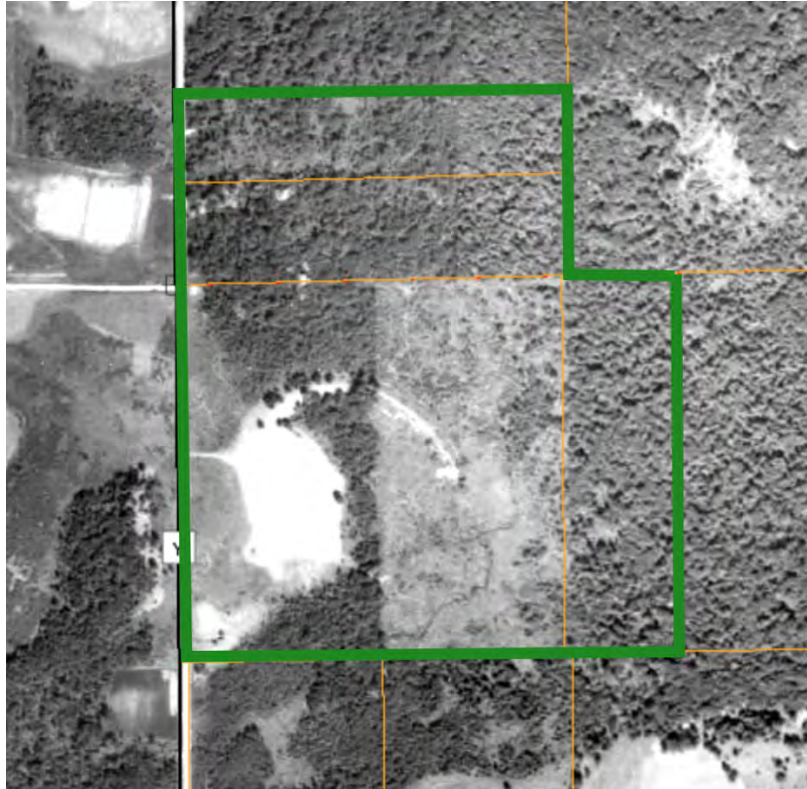
## B. The Past to the Present

The land where County Line Preserve lies was stewarded by the Potawatomi and other Indigenous peoples for time immemorial, until Euro-Americans colonized Wisconsin in the 1800s. From the 1830s-50s, the Potawatomi were forced to cede their ancestral homelands and migrate to reservations or other lands. A couple hundred Potawatomi people returned to Wisconsin, despite US government attempts to force them out. The settler culture did not have the same respect for plants, animals, and nature, so widespread deforestation, draining of wetlands, and other activities that caused ecological problems began.



A map of the First Nations of Wisconsin circa 1800, showing the main inhabitants of each area, with present-day Native nations in white.

The so-called Original Vegetation Survey of Wisconsin, taken between 1832 and 1866, described the parcel that is now County Line Preserve as mostly populated by swamp conifers, with forest on the Northern, Eastern, and Southern margins. The forest contained beech, sugar maple, basswood, red oak, white oak, and black oak. The first aerial photo of the site, from 1941, shows a field where the prairie currently is located, with forest fully denuded to the east of the field and about three quarters of the remaining forest intact.



Aerial photo of the site and surrounding area from 1941, with the parcel outlined in green. The curving white line that starts north of the field is the esker.

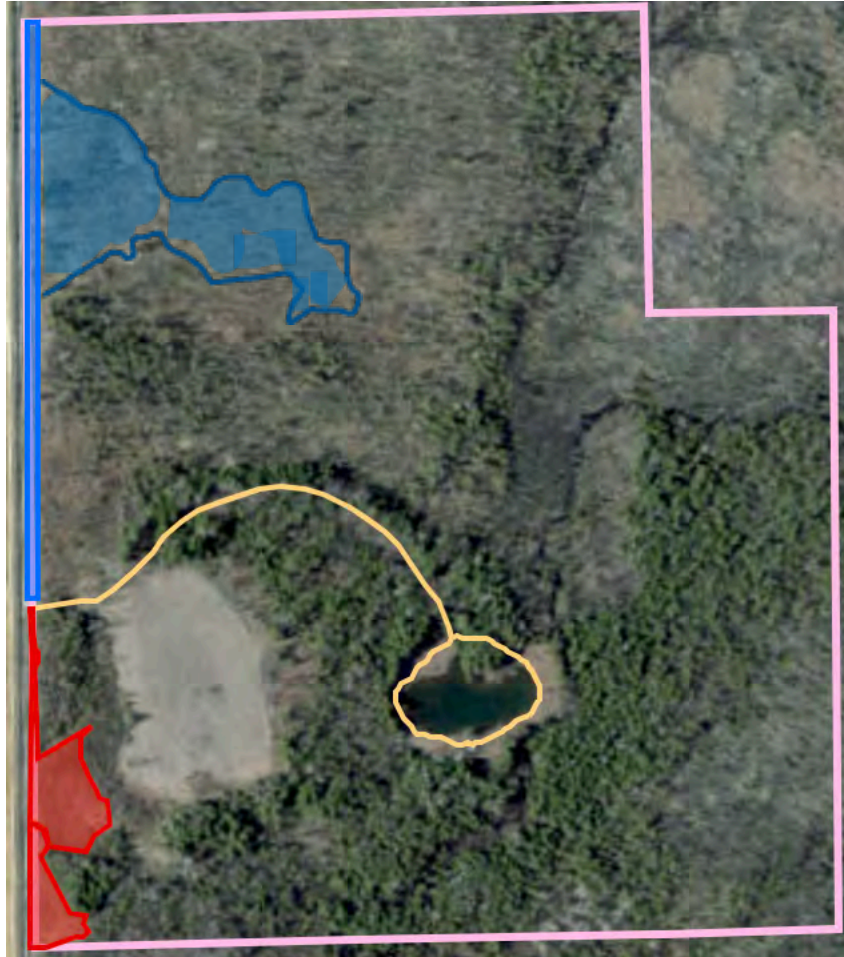
Historical aerial photos reveal that between 1950 and 1963, a large proportion of the forest north of Gravel Drive was cleared, possibly for agricultural use or for logging. Between 1970 and the present, a portion of the trees were gradually lost throughout the site in an interspersed manner. I hypothesize that initially Dutch elm disease, and later emerald ash bore, are the cause of this partial forest loss.

From 1971 until its purchase by OWLT in 2017, the land was owned by the Kinnamon family. David Kinnamon was a nature enthusiast who logged the presence of 25 mammals, 12 herps, and 150 birds at the site over multiple years. Mammal and herp Species of Local Conservation Interest (SLCI) logged by Kinnamon include green frog, leopard frog, wood frog, spring peeper, eastern gray treefrog, milk snake, eastern garter snake, Blandings' turtle, badger, mink, eastern fox squirrel, muskrat, grey fox, otter, and starnose mole. For brevity's sake, I will not list all of the SLCI birds. As I do not have data on the years each species was observed by Kinnamon, I



cannot be sure which are currently present. Restoring wetland health will improve the ability of wildlife to make this site their home.

The quality of the esker and pondside sedge meadow communities are high. Restorationists Nancy Aten and Dan Collins describe the quality of the prairie as “unusually high.” However, there are pockets of the site experiencing degradation. I will focus on two such pockets: a roadside section of about 5 acres of sedge meadow and alder thicket which is dominated by reed canary grass, and about 1 acre where nonnative cattails are dominating. Both pockets are primarily on the western side of the parcel, and both go along County Road Y. The RCG section starts just north of Gravel Drive. The invasion is worse as you go further North along this strip. The cattail invasion starts just South of gravel drive. The largest parts of the cattail invasion are far from the trails, so they may be missed by visitors. There are also areas containing the invasive species buckthorn and autumn olive, but these species are at levels where standard maintenance should keep them in check.



Aerial photo of the preserve. The reed canary grass-invaded section is highlighted in blue, and the narrowleaf cattail section in red. The pink line represents the borders of the preserve, and the yellow line represents the trail.

The prairie is burned every 1-3 years by OWLT and was burned every 3-4 years by the Kinnamons; this burning prevents the prairie from succession into forest. While the prairie was formerly a forest according to the original vegetation survey, the prairie is of very high quality and should be maintained as prairie.



Photo of the 50-year-old restored prairie.

My priority for restoration at County Line is the removal of invasive narrowleaf cattails and reed canary grass. The invasive species removal could be done by OWLT. In the case of the cattail invasion, I encourage engagement of volunteers, which I describe in section D. After these interventions are made, continued maintenance by OWLT should prevent reinvasion, and OWLT will continue to monitor the site.

For this restoration plan, I consulted the expertise of professional restorationists Nancy Aten and Dan Collins, who are the founding directors of the Land Restoration School (LRS). I also got information and advice from Ryan Wallin, stewardship director of OWLT. I got further advice from Chris Young, who is director of the conservation and environmental science program at University of Wisconsin-Milwaukee and a core LRS instructor.



### C. The Possible Future

The hope of this project is to maintain a diverse wetland at County Line. Wetlands cover just 5.5% of the contiguous US, and 15% of Wisconsin, but  $\frac{3}{4}$  of wildlife species require wetlands to survive. Wisconsin has lost and continues to lose wetlands; half of the wetlands that were present in Wisconsin in the 1800s have been drained for agriculture and other human uses. As mentioned in the previous section, numerous wildlife species, including Species of Local Conservation Interest, call County Line Preserve their home. Loss of the wetland to RCG or cattail monocultures would lead to the loss of both plant and animal communities.

RCG could be particularly devastating to the wetland due to its draining effects. According to OWLT, hardwood swamps are among the most vulnerable woodlands to climate change. While the site is closer to a sedge meadow and alder thicket complex now, it still contains numerous swamp species. The area would possibly revert to swamp if ash bore-resistant black ash trees were developed and introduced to the site. OWLT notes that protecting groundwater recharge will mitigate climate stress in hardwood swamps. As RCG drains groundwater aggressively, it is especially capable of compromising the ecosystem when combined with climate change.



A sedge meadow community exists under the dead ash trees, in what was once a northern hardwood swamp.

Without intervention, the RCG also threatens to take over the entire roadside sedge meadow area. At about 70% cover in the area with the most RCG, the RCG could cause ecosystem collapse if left unchecked, threatening the numerous species found in the alder-sedge meadow

complex (see appendix). Over a period of years, it could even reach the pond and take over the pondside sedge meadow, which is currently a very healthy habitat. The narrowleaf cattails, which cover about 60% or more of the ground in some areas, could form monocultures, as has been observed in other places. Like the RCG, this would lead to the loss of native species and diversity, which local wildlife rely on.



The high-quality pondside sedge meadow, pictured here, could eventually be taken over by reed canary grass if it is allowed to spread.

My plan uses multiple reference communities to understand the vegetation that is present. The site of the RCG invasion appears to have once been a northern hardwood swamp. While southern hardwood swamps are more common in the region, the site lacks many characteristics typical of southern hardwood swamps. Most notably, the usually dominant trees silver maple and red maple are uncommon at the site. Additionally, among the young ash trees, the southern hardwood swamp's dominant, green ash, is far outnumbered by northern hardwood swamp's dominant, black ash. I would guess that this means most of the mature ash trees at this site (all of which are dead) are black ash, but further investigation is required to confirm this. In addition to the main dominant tree of northern hardwood swamp, black ash, the site features yellow birch, another characteristic tree. There are numerous speckled alders, which are common in northern hardwood swamp as well as alder thicket. Many northern hardwood swamp forbs were seen, including swamp raspberry, common skullcap, orange jewelweed, and many sedges. Northern hardwood swamps have relatively constant water levels and often occur near smaller bodies of water such as Cedar Creek.





Photo of the alder thicket. Glossy buckthorn, an invasive species that can be addressed at this site through standard maintenance, is present.

Due to the ash die-off, the former swamp has lost its one dominant tree species and therefore it has lost the vast majority of its tree cover. Because of this, the roadside former-swamp area shows more characteristics of sedge meadow (especially in the North) and alder thicket (especially in the South). The following characteristics of southern sedge meadow were observed: the dominance of Canada bluejoint grass and *Carex* species (in places that are not dominated by RCG), associates Joe-Pye weed, marsh fern, swamp milkweed, and water horehound. The following characteristics of alder thicket were observed: dominance of speckled alder, associates are other shrubs including red osier dogwood, nannyberry, and willows, common herbaceous species Canada bluejoint grass, orange jewelweed, boneset, marsh fern, and sensitive fern. Alder thickets are often, but not always, a seral stage between meadow and swamp. Sedge meadows often intergrade with other communities, and alder thickets often intergrade with sedge meadows, so it is not surprising that the site shows mixed features of sedge meadow, alder thicket, and northern hardwood swamp.

The direction of succession for this mixed community ultimately depends on the fire regime and whether disease resistance develops in the black ash. If the site is burned every 1-3 years, it will go in the direction of a sedge meadow. If burned every 9 years or so, it will go in the direction of an alder thicket. Theoretically, with minimal fire, the community will revert to a hardwood swamp; however, as black ash is the only frequent tree species in many parts of the site, this may not happen unless black ash develops resistance to the emerald ash bore. I advocate for attempting to return this area to a hardwood swamp, as trees would shade out the RCG,

preventing reinvasion, and the site was originally a swamp. However, if mature trees cannot repopulate the site, I advocate for maintaining it as an alder thicket, which is a rare community in Southern Wisconsin. The burning of the thicket would facilitate RCG removal, and the shrubs would also partially shade out RCG.

#### **D. The How**

Both reed canary grass and narrowleaf cattail will be removed following the Bradley method. We will begin by preventing encroachment of these invasive species onto new sites by removing them at the margins. We will continue moving to slightly more disturbed areas, slowly approaching the most degraded area. We will remain cautious and make surveys at least once a year.

Because other vegetation is present in the RCG-dominated areas (they are at most about 70% RCG), we will not use herbicide. Instead, we will pull RCG by hand. According to Craig Annen (2016), the first step in managing RCG invasion is addressing problems in hydrology and nutrient load. Based on the topography and location of nearby farms, all runoff must cross the esker and forest before reaching the sedge meadow and alder thicket, and we did not observe any drain tiles. So runoff is likely not a major problem.



Reed canary grass dominates sections of the sedge meadow, including the one pictured. Photo by Dan Collins.





A variety of forbs and sedges grow under the RCG. If left unchecked, the RCG could replace them.

A more plausible contributor to RCG invasion is the ash die-off. All the mature black ash trees died at the site, causing gaps in the canopy, which RCG fills more quickly than other plants. Reforesting the site would prevent reinvasion of RCG. After clearing the RCG, more of the preexisting shrub vegetation could be planted to make shade for young trees, and then northern hardwood swamp trees could be planted. If a black ash variety that is reliably resistant to emerald ash bore is found, it should be planted widely, but at the moment, we do not know of such a variety. We should consider planting other species that are typical in northern hardwood swamp communities, including yellow birch, red maple, and Dutch-elm disease-resistant elms. Since black ash is normally the only dominant tree in northern hardwood swamp, more research must be done on potential negative effects of planting the other northern hardwood swamp trees without the ashes. This research may lead to the conclusion that the area cannot be restored to a healthy swamp without mature black ash trees. In that case, we will burn the area approximately every 9 years to maintain an alder thicket.

In terms of the RCG removal itself, plants can be pulled from mid-April to late June and mid-August through late September. Seeds will be topped in July or August to prevent RCG's reproduction. Field estimates show that similar patches require 5 person-days to seed top the estimated 40,000 stems in the main patch and 20 person-days to remove the same stems in the main patch by pulling or mechanical means.

As I will go on to explain, the removal of nonlocal cattails provides an opportunity to engage the community, feed people, and incorporate traditional ecological knowledge.





Dense stands of narrowleaf cattail dominate the southern roadside.



A variety of other plant species grow under the cattails. If left unchecked, the cattails could replace them.



In her book *Braiding Sweetgrass* (2015), Potawatomi scientist and professor Robin Wall Kimmerer elaborates on the numerous traditional uses of cattails. The inner stem of cattails can be eaten as a vegetable with a taste resembling cucumber or heart of palm. The pollen can be harvested and ground into a high-protein flour for baking.<sup>1</sup> The female flowers, when still green, can be cooked, and taste similar to artichoke. The roots are starchy and taste like a potato when cooked. Finally, Native peoples used the cattail leaves as insulation for their homes, and as sleeping mats. These uses apply to both the native broadleaf cattails and the nonnative narrowleaf cattails, which are native to other parts of North America. According to Elizabeth Campbell and Elise Krohn (N.D.), the best time to harvest shoots is in early spring. Female flowers are harvested in late spring through summer. Pollen is harvested in the summer, leaves in the late summer, and rhizomes in the fall.

Hosting public workshops in sustainably harvesting and cooking narrowleaf cattails could serve to engage a wider public in this ecological restoration. The most important time to host these workshops is in the fall, because removing rhizomes kills the plant, and the summer, because removing pollen will reduce reproduction. The workshops will also educate the public on narrowleaf and broadleaf cattails' role in native and invasive species, wildlife habitat, and biodiversity.

The knowledge of cattail's many uses comes from Native cultures, so we will reach out to Native communities in the region to invite them to these events and ensure we are conducting them in a respectful way. If interested, Native community members can work alongside us to plan the workshops. The workshops will have a recommended, but not required donation for participants to fund regional Indigenous organizations.

The workshops have the potential to start a movement of people sustainably using invasive cattails for food and fiber across the region, while addressing the problem of invasive narrowleaf cattail. However, we cannot predict turnout, and harvesting of the cattail root is not the fastest or most effective way to remove them. Therefore, we will remove the remaining narrowleaf cattails by cutting them below the water level when the site has standing water.

According to the Restoration company Natural Shore (2022), invasive cattails, like native cattails, play an important role in the ecosystem. They filter water, prevent soil erosion, and provide food and habitat to wildlife. Removing nonnative cattails too aggressively can do more harm than good. We will not remove more than 90% of the cattail cover, that way, some cattail can remain in the ecosystem. And all cattails that display characteristics of the native broadleaf cattail will be kept in place.

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<sup>1</sup> This is tangential to my plan, but I think it is worth mentioning that cattail pollen can also fetch a price of 20-30 dollars per half pound, or more online! It is priced so highly due to its use in traditional Chinese medicine and as a health food. Conservation agencies could collect and sell cattail pollen as a way to reduce cattail reproduction and produce revenue.

## E. Monitoring and management

To monitor the efficacy of our RCG and cattail removal, we can conduct yearly line transects in fixed areas and determine the percent cover of native and nonnative species before and after.

Both invasions will require treatment over multiple years. With effective removal, RCG diminishes at a rate of about 50% yearly, so in areas with 70% RCG cover, the RCG cover should be about 9% after 3 years of removal. Even when RCG and narrowleaf cattail have been reduced to levels where they are no longer dominating the landscape, yearly management is required to prevent their reinvasion.

Uprooting cattails by hand typically does not kill every plant due to the resiliency of the bits of rhizome that remain in the ground. By monitoring the percentage of narrowleaf cattail cover before pulling and around the same time next year, OWLT can determine how effective the cattail harvesting workshop is for narrowleaf cattail control. Based on the turnout, efficacy, and public appreciation of the workshops, OWLT can decide whether these workshops should be expanded.

Standard management is critical for maintaining the health of the preserve. Removing buckthorn and autumn olive, which are less threatening to the site than narrowleaf cattail or reed canary grass, will also be part of management. The cattail harvesting workshops will be used as an opportunity to connect with community members who are interested in volunteering to help with management.



Standard management, such as the removal of the glossy buckthorn in the midground of this photo, is essential to ensure the continued health of County Line Preserve's plant communities.



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## Appendix:

Vegetation spotted on a meander of the alder thicket and sedge meadow complex, north and lasting about 30 minutes. This list is far from exhaustive, and many species are not included due to not being noticed or recognized. Common names used except when only scientific names are known. Species are listed in the order they were spotted (starting with the left column).

Glossy buckthorn	Slippery elm
Black ash	Black ash
Reed canary grass	Tamarack
Joe pye weed	Bellflower
Carex aquatilis	Swamp milkweed
Chokecherry	Swamp birch
Marsh fern	Goldenrod sp.
Marsh raspberry	New England aster
Red raspberry	Poison sumac
Black cherry	Silky dogwood
Tag alder	Carex utriculata
Snakeroot?	Horsetail
Willow sp.	False nettle
Virginia creeper	Big bluestem
Botrychium	Skunk cabbage
Trillium sp.	Sensitive fern
Violet sp.	Narrowleaf cattail
Goldenrod gigantea	Broadleaf cattail
Water horehound	Yellow birch
Wetland rose sp.	Rice cutgrass
Winterberry holly	Carex sp.
Cinnamon fern	Jewelweed
Nightshade	Native bedstraw
Silver maple	Green ash
Carex lacustris	Giant sunflower
White meadowsweet	Carex cristatella
Bluejoint grass	Wild geranium
Swamp milkweed	Turk's-cap lily
Red cedar	
Carex stricta	
Carex lacustris	
Blue vervain	
Boneset	
Red ojier dogwood	
Mash bellflower	
Gooseberry sp.	





