



# Restoring the Cullen Nature Preserve to its Historic Oak Savanna Habitat



Saving the Majestic Oak Trees  
at the Cullen Nature Preserve

## Cullen Nature Preserve – A Family Gift and Legacy

The Cullen Nature Preserve is a City-owned property protected in perpetuity under a Minnesota Land Trust Conservation Easement. Ann Cullen Smith and her husband William Cullen purchased the 30-acre property in Minnetonka in 1935. After the couple built a house and moved to the property in 1937, Ann continued to live in the home for 77 years until 2014. Ann and William often discussed their desire to have the property remain in its natural state so it could be appreciated and enjoyed by the public. After working with the Minnesota Land Trust to develop a conservation easement for the property, Ann approached the City of Minnetonka and arranged to sell the property to the City for half its value. When Ann passed away in 2015 at the age of 105, the property was transferred to the City of Minnetonka.

Ann Cullen’s vision for the property, detailed in the conservation easement, includes the protection of the property with a goal of preserving its key conservation values. These values include protecting and restoring the open and natural features of the property to provide important woodland, savanna, and wetland habitat, and opportunities for public education and passive use such as nature observation, study, and reflection.

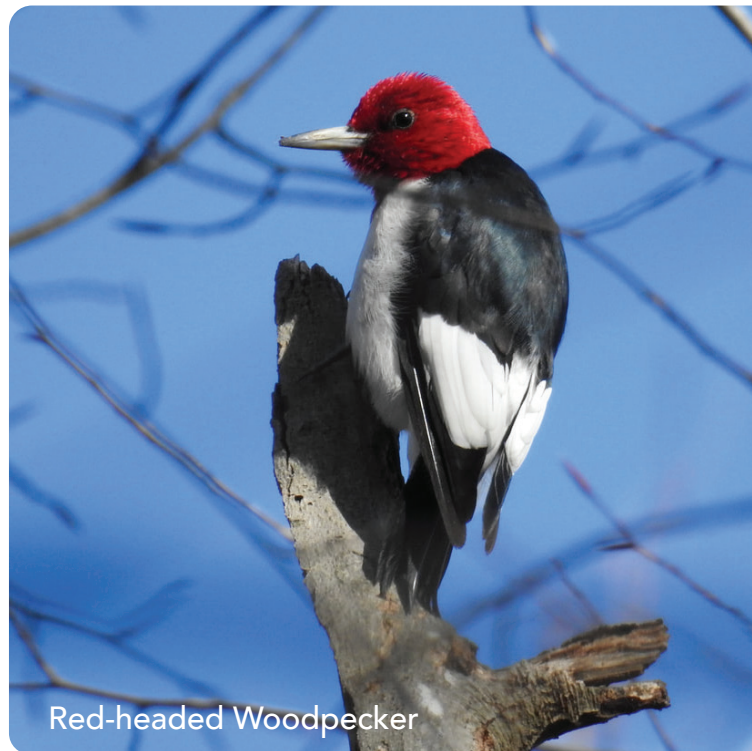
Return of the red-headed woodpecker, a species near threatened, is a special target for the restoration efforts; Bill Cullen, son of Ann Cullen, recalls that the red-headed woodpecker was once common on the property.

## Restoration Goals and Outcomes – A New Approach

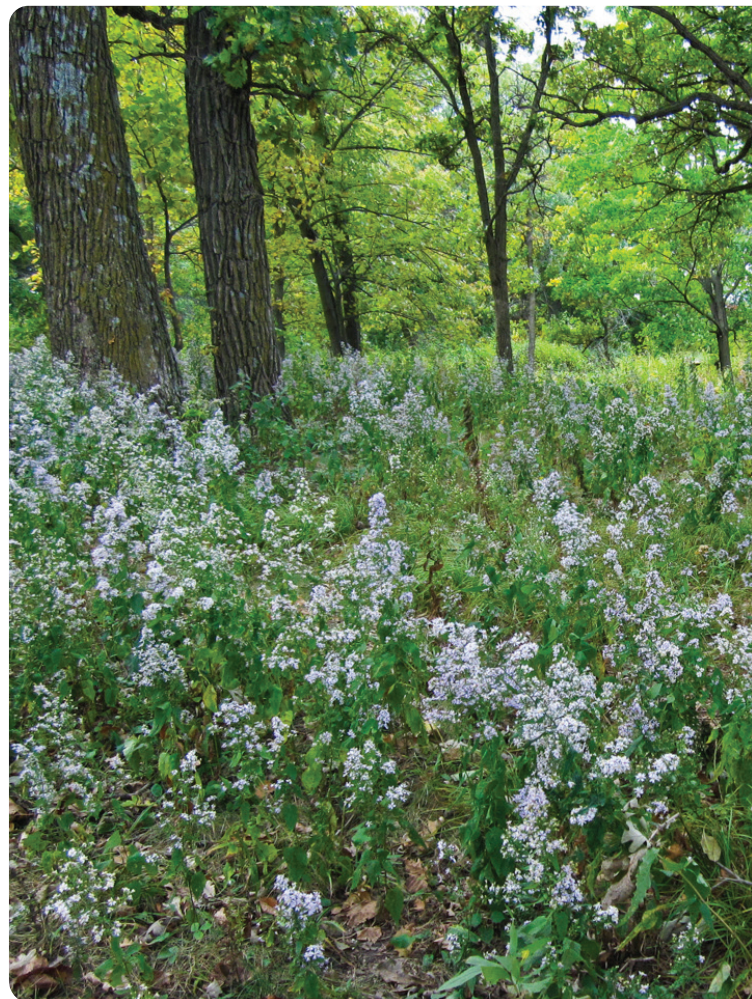
This 12-acre restoration will look very different from the forests that one might observe while visiting a Minnetonka park. The Cullen Nature Preserve restoration will include the implementation of new restoration approaches that are not currently or regularly employed in the management of our parks’ natural resources including:

- extensive harvesting of undesirable woody biomass,
- seeding to establish diverse native ground layer vegetation, and
- regular use of prescribed fire.

The overarching restoration goal for the Preserve is to save the majestic oak trees and shift the plant community back to its former stable and climate resilient state — an **oak savanna**.



Red-headed Woodpecker



## What is an Oak Savanna?

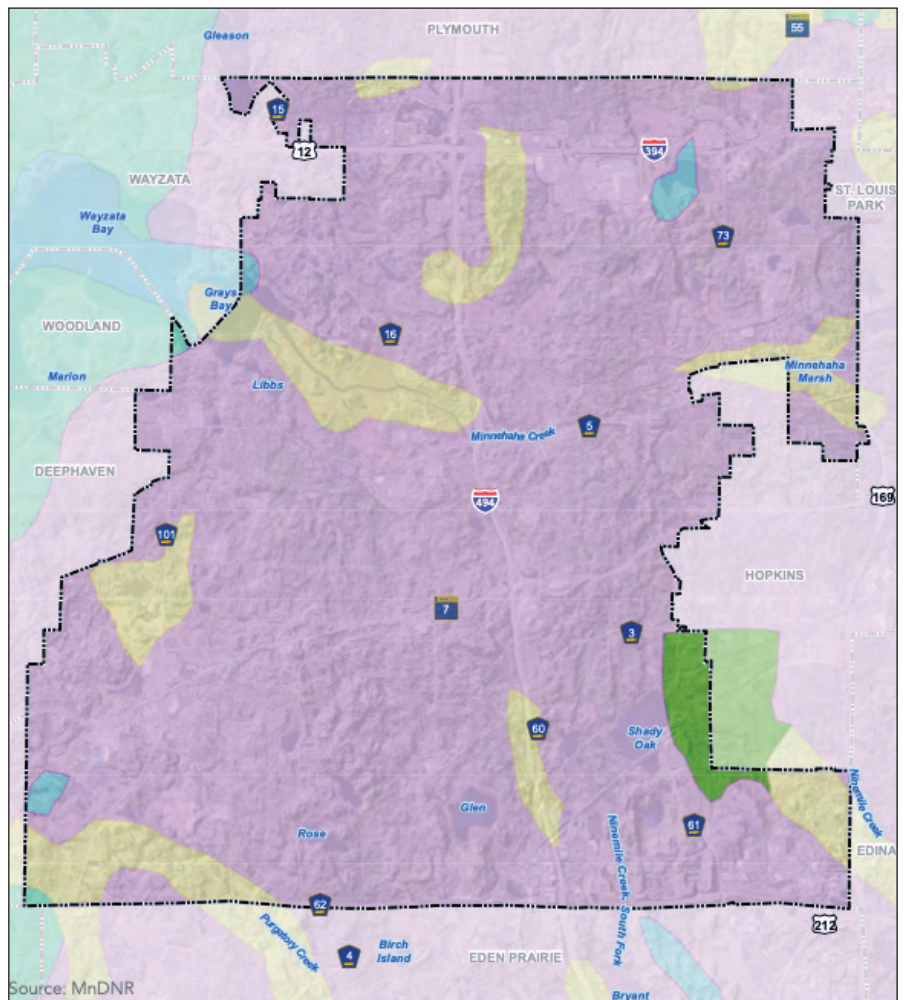
Oak savannas are landscapes characterized by widely spaced oak trees and a prairie-like ground layer vegetation. These landscapes were historically maintained as open grasslands through human-facilitated means including fire, and natural disturbances such as grazing by bison and elk. The primary tree species in oak savannas— bur and white oaks—are long lived and considered keystone species because they support an extraordinary amount of wildlife, more than any other tree species.

## A Disappearing and Rare Landscape

Currently in Minnesota and throughout the Midwest, oak savannas are an extremely rare plant community with less than 1% remaining. **Globally, oak savannas in northern latitudes (temperate zone) are one of the world's most endangered ecosystems.** Prior to European settlement, much of the land in Minnetonka was managed and maintained as oak savanna. Native Americans played an integral role, managing these open landscapes to provide grazing animals forage and ultimately nutritious food sources (game, fruit, and seed) that sustained the Native American community.

Oak savannas are extremely diverse plant communities hosting prairie and woodland flowering plants, grasses, and sedges, in addition to unique plants that grow only in savannas. Oak savannas provide unique habitat for rare and declining bird species such as the red-headed woodpecker. The Cullen Nature Preserve 12-acre oak savanna restoration will provide the community with the first present-day model, and foster an appreciation for Minnetonka's natural heritage.

*Map of Pre-European Settlement Plant Communities in Minnetonka. The area colored light purple was oak savanna. Source: MN DNR and City of Minnetonka 2021 Natural Resources Master Plan*





*“Regenerating oak savannas restores Minnetonka’s natural heritage because oak savanna was the predominant ecological community in Minnetonka prior to European settlement. Oak savannas are more resilient to over-browsing, invasive species, heat, drought, and wind, and can withstand extremes in wet and dry conditions.”*  
2021 Natural Resources Master Plan

## How Do Oak Savannas Differ From Forests?

Tree canopy cover in oak savannas can range from sparse (5% tree cover) to more tightly spaced pockets with intermittent canopy openings (50% tree cover). Even at 50% tree cover, the canopy openings still allow enough sunlight to reach the ground to foster the growth of prairie-like vegetation. This dense prairie-like vegetation is a critical component of an oak savanna because it:

- stabilizes soil to reduce erosion,
- facilitates the infiltration of rainwater,
- provides habitat for pollinators, birds, and wildlife,
- competes with invasive plants for light and nutrients, helping to reduce the invasibility of the site, and
- historically, provided forage for grazing animals such as bison and elk.

## Opening of the Tree Canopy

To achieve these oak savanna tree cover targets at the Cullen Nature Preserve, harvesting of all invasive plants and many non-oak trees will occur to create openings in the canopy. This will produce a park-like visitor experience with extensive and scenic views through the understory of the oaks, and outstanding bird and pollinator habitat.

## Saving the Legacy Oaks

No ecological restoration management has occurred at the Cullen Nature Preserve for over 150 years. With the absence of fire and grazing animals maintaining an open landscape and facilitating the growth of prairie-like vegetation, the Preserve (and all of Minnetonka's remaining savannas) have become severely degraded. Degradation of savannas can result from a combination of factors including:

- the removal of key natural inputs (fire and grazing),
- the establishment and growth of non-oak native trees creating a closed canopy forest,
- the loss of dense ground layer prairie-like vegetation from tree canopy shading, and
- the invasion by invasive plants.



All of these factors contribute to the decline in health of the Preserve's majestic oaks. The non-oak trees and invasive species ultimately compete with the oaks for light, nutrients, and water. The closed canopy conditions also increase the oaks' susceptibility to disease due to reduced air flow, increase in moisture, and lack of adequate amount of sunlight.

## A Shock to the System

The former oak savanna at the Cullen Nature Preserve is now an altered and unstable system. The legacy oaks are on life support. If no intervention were to occur, the community would lose this rare savanna ecosystem and the majestic oaks that provide the critical backbone of the plant community. To reverse the trend of degradation, bold restoration management actions are required, actions that will 'shock' the system back to its former stable and resilient state.

***The Preserve's oak trees are majestic giants and several are over 170 years old—some of the oldest oak trees in Minnetonka!***

For this reason, all restoration decisions will be driven by the oak savanna plant community target goals and best management practices to preserve the health of the legacy oak trees present on the property.

# What to Expect – Restoration Activities

## Invasive Plant Removal and Opening of the Tree Canopy

During the winter months and while the ground is frozen, large tree harvesting and invasive plant management equipment will be used to remove the undesirable plants and open the tree canopy.

## Prairie and Savanna Grass Seed

Next, native prairie and savanna grass seed mixes will be sown on the bare ground to start establishing the prairie-like vegetation.

## Invasive Plant Management

After establishing native grasses, and allowing existing plants to respond to the increase in sunlight, contractors will monitor and manage any undesirable plants. This may include mowing down the vegetation in summer and returning in autumn to herbicide any remaining invasive plants such as buckthorn regrowth.

## Prescribed Fire

Once dense vegetation and grasses become established that can provide enough fuel, the restoration area will be burned. Burning will help control invasive plant seedlings, cycle nutrients into the soil, and temporarily provide bare ground for sowing wildflower seed.

## Flowering Plant Seed

After the prescribed burn and while the ground is still bare, native flowering plants will be sown. This will complete the two-part process to establish diverse prairie-like ground layer vegetation.

## Restoration Sequence



Source: City of Minnetonka 2021 Natural Resources Master Plan