



MEMORANDUM

Comfort Lake-Forest Lake Watershed District

Date: August 3, 2026
To: CLFLWD Board of Managers
From: Mike Kinney, District Administrator
Subject: Bone Lake South Nature Area Management and Restoration Plan



Background/Discussion:

District staff, with assistance from EOR, have prepared a draft management and restoration plan for the Bone Lake South Nature Area (BLSNA). The plan covers the day-to-day operations and management of the Nature area as well as a detailed five-year restoration plan for the entire property – including both wetland and upland habitats.

As part of this effort, staff reviewed five management plans shared by three conservation organizations that manage similar sized properties throughout the Metro Area. The BLSNA management and restoration plan borrows from the reviewed plans and includes similar management elements and regulations. Staff also contacted several organizations regarding their management of hunting on their properties and have incorporated many of their suggestions / regulations into the BLSNA hunting regulations.

Attached to this memo is the draft BLSNA Management and Restoration Plan for Board review and consideration. Staff have prepared a high-level presentation to introduce the plan to Board Managers. Managers will then have the following week to review the document and provide comments to staff. **We ask that all comments are emailed to staff by 8-21-26.** Staff will make edits and the plan will be brought back to the Board for further discussion and consideration at the 8-27-26 Board meeting.

Attached

Draft BLSNA Natural Resource Management and Restoration Plan

Natural Resource Management Plan

Bone Lake South Nature Area



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EXECUTIVE SUMMARY

Background

The Bone Lake South Nature Area is a 238-acre natural area located just South of Bone Lake along 228th St within the City of Scandia, Washington County, MN. The property contains various habitat types include remnant prairie / oak savanna, northern mixed hardwood forest, and several wetland habitat types. Upon completion of property restoration actions, it will be open to the public for non-motorized day use recreation, including seasonal hunting and fishing. The property was purchased in 2025 using Outdoor Heritage Fund (Lessard Sams Outdoor Heritage Council) and Conservation Partners Legacy (MN Department of Natural Resources) grants as a conservation, preservation, and restoration property.

Natural Resource Management Plan Recommendations

The Natural Resource Management Plan (NRMP) contains two distinct, but intertwined recommendations:

1. Protect and enhance/restore the Nature Area for ecological biodiversity and health.
2. Establish and enhance public access opportunities for light recreation.

The Bone Lake South Nature Area has a great deal of potential to restore and protect rare MN habitats. The property contains remnant prairie / oak savanna, northern mixed hardwood forest, and several wetland habitat types that could all be enhanced and protected to benefit wildlife, as well as provide natural areas for future generations to enjoy. Restoration would include native plantings, prairie establishment, wetland restoration / legacy nutrient load removal, invasive species removal, and management of the area for ecosystem resiliency.

Access to the property will be established off 238th St N, across from Mallard Ave N. This parking area will allow access to over 3 miles of trails throughout the property. The trail system will include several trail loops of varying lengths as well as interpretive signs located at unique ecological or historical sites. The remnant farm roads / cattle trails will form the basis of much of the trail system, but some relocation of trails may be needed to avoid sensitive areas and / or connect the entirety of the property.

A summary of the steps in realizing these recommendations can be found in the Five-Year Work Plan detailed in this document. Much of the funding for the efforts detailed in the Work Plan will come from the Outdoor Heritage Fund - Bone Lake South Wetland Phase 2 grant (available spring 2026).

Adaptive Management

Natural areas will decline in quality when not properly managed. Long-term preservation and enhancement of natural areas and their rare features and species depend on management of native and invasive vegetation, providing for appropriate public uses, and engaging stakeholders (general public, volunteers, neighboring landowners, etc.) in management activities and educational programs. Adaptive management is a systematic process for continually improving management policies, planning, and practices. By monitoring and evaluating the outcomes of management (and outreach) activities, the results of activities such as

prescribed fire, grazing, invasive species control, and public programming can inform future planning and selection of best practices. Providing for appropriate public use is necessary for long-term public support for all preservation, enhancement, and management activities. Planning is a prerequisite for effective management. This document is part of an effort to meet District goals and property objectives. It articulates a strategy for stewardship that addresses ecosystem restoration, management, and protection, as well as public outreach. Information presented in this plan is based on site visits, ecological evaluations, restoration concepts, historic aerial imagery, and various reports.

Plan Purpose

The purpose of this document is to establish a plan for natural resource management for the acquired property known as the Bone Lake South Nature Area in accordance with the guidelines provided in section 3012 of the Comfort Lake-Forest Lake Watershed District's (CLFLWD) 2022-2031 Watershed Management Plan (WMP). A relevant excerpt from the WMP can be found in Appendix B.

Terms of this natural resource management plan reflect the District's consideration of the factors listed in the WMP. In the course of management operations, District representatives may deviate from these guidelines on the basis of judgments concerning expected hydrologic loads, flora and fauna considerations, hydraulic response and other relevant factors. The District will manage the Site in the best interest of affected watershed residents. However, this manual is for internal use only and does not create any right in any third party with respect to the manner in which the Site is managed. By adopting this manual, the District is not assuming any duty not otherwise imposed by law and reserves all immunities and other rights and protections it is afforded under law.

This plan includes:

- Background data on site ecology, geology and soils, hydrology, historic ecological conditions, its context within the landscape, and any known rare features
- Detailed evaluation of the site conditions at the time of the survey (May 2026)
- An implementation plan which is a schedule of management actions with relationship to ecological objectives of the site.

CHAPTER 1 - BACKGROUND

Site Description & Land Use

The Bone Lake South Nature Area is a 237.8 acre natural area located on three parcels immediately to the south of Bone Lake, east of Lofton Avenue, and south of 228th St in Scandia Minnesota (Figure A, page 38). The property Identification (PID) numbers are: 0803220140016, 0803220410002, 1703220120001 (Figure B). The property is bordered by parcels with homesteads, mixed use of woodlands, and farmland. Properties on the north side of 228th St (along Bone Lake) are single family homes. There is a 3.3 acre utility property encompassing transmission lines running diagonally across the southern half of the property owned by Xcel Energy (Figure B). At the time of acquisition, there are two access gates on the west side along Lofton Ave, and one on the north side along 228th St. There are farm access roads throughout the property and there is an

old barn on the north end of the property. The property is largely open-space wetland and grassland areas with some portions previously used for grazing and hay production.

The District's engineers, Emmons and Olivier Resources (EOR), conducted a Phase I Environmental Site Assessment (PIESA) for the Bone Lake South – Larson Property site in August 2025. The PIESA included a historical and environmental records search by Environmental Data Resources, Inc. (EDR) on July 22, 2025. Two environmental records were found for the property, both of which referred to an active feedlot permit for the Roger Larson Farm. The most recently recorded feedlot permit from 2020 indicated 60 Animal Units, primarily beef cattle. This feed lot is located on the adjacent property that was not acquired as part of the Bone Lake South Nature Area, and as such, it not a concern of this management plan.

Historic aerial photographs were also obtained for the PIESA, dating back to 1938. Aerial imagery indicated several changes at the site. A road formerly ran through the northeastern side of the property and appeared to be decommissioned between 1964 and 1991. Water level fluctuations within smaller wetlands were noticeable among images. The photographs show that the subject property was primarily used for agricultural production from 1938 through the present. A farmstead with multiple buildings can be seen in aerial photographs from 1938 up until the 1964 photograph. In the photographs from 1978 on, only the barn can be seen. Also in the earliest photographs, the alignment of 228th Street runs north/south through the northeastern corner of the subject property. The transmission line running through the southeast corner of the subject property can be seen dating back to 1938. Historic aerial imagery of the subject property from 1938, 1953, 1957, 1964, 1991, 2004, 2012, 2020 are available in Appendix A.

Historic Land Use

Pre-settlement survey notes indicate much of the property was equal parts aspen-oak land, conifer bogs and swamps, and Big Woods hardwoods. Upon settlement, portions of the area were under cultivation for crops and hay, and much of the property was grazed. Aerial photography records begin in the 1930s. At this point, the agricultural use of the property shows primarily grazing on the eastern half, with portions of the western half under row crops and pasture or hay for much of the last century.

Roger Larson started purchasing and combining the parcels that now make up the property in the 1970's and steadily took ownership of the ~317 acre "Larson Farm" property from which the BLSNA was split. Mr. Larson continued to use the property for hay and pasture for cattle. The portions of the property acquired by the District were mainly grazed with some areas of hay production along the uplands on the west side of the property.

Historical imagery and landowner communication indicated there were three homesteads located on the greater Larson Farm property throughout the last 100 years. The existing homestead, located off Lofton Avenue was subdivided from the BLSNA just prior to purchase by the CLFLWD. This homestead/farm is still active as a horse rehabilitation center. The remnant of the northernmost homestead is evident in the barn that remains in the northern part of the BLSNA along 228th St N. There are two wells associated with the remaining barn. They consist of a semi-functional hand pump (pounded point) well and an abandoned cistern with a well at its bottom (non-functioning). All that remains of the third homestead is an abandoned well in the forested southern part of the BLSNA along Lofton Ave. Little is known about this long-forgotten

homestead, and the condition of the remnant well is unknown as it has yet to be located.

Historical imagery also indicates that Oakhill Road once connected through the BLSNA in its northeast corner (mentioned above). This was the old county road that provided access to the east side of Bone Lake. Oakhill road still exists further to the east beginning at a junction with Meadowbrook Ave North and heading southeast out of the District. A remnant roadbed/grade is evident on the BLSNA landscape along with several old powerline posts. This area is lined with decadent open-grown Bur oak trees and hints at the past oak savanna ecotype present on the property.

Topography, Geology, & Soils

Topography

The subject property is in a moderately flat area. Elevations on the site range from about 910 to 990 feet above mean sea level. The subject property drains to its center and then to the north to Bone Lake. There is microtopography on the site that includes steep slopes down to the wetland and pond areas.

Geology

This region is characterized by buried sand aquifers and relatively extensive surficial sand plains, part of a thick layer of sediment deposited by glaciers overlying the bedrock. It is underlain by sedimentary bedrock with good aquifer properties.

The southeastern third of Minnesota has good bedrock aquifers comprising thick, laterally extensive sequences of sandstone, siltstone, and limestone and dolostone of sedimentary origin. Groundwater occurs in granular pore spaces, partings, joints, fractures, and dissolution features. Conditions vary locally, but these aquifers are generally capable of yielding enough groundwater for most purposes. No seeps, springs, or karst areas are known on this property - though it is



Figure 1- Soil map for the BLSNA. List of abbreviations associated with Figure 1 can be found on page 45.

common for Tamarack swamp habitats to form due to ground water upwellings or a strong groundwater connection. Additional monitoring and modeling could be helpful in determining if a ground water connection is contributing to the southern wetland hydrology.

Soils

Over 20 different soil types can be found on the landscape (USDA 2025). The most abundance soil types include: **Seelyeville very poorly drained muck**, **Brill moderately well drained silt loam**, **Antigo well drained silt loam**, and **Barronett poorly drained silt loam**. A complete list of soils can be viewed in Figure 1, as well as in FIGURES section near the end of this document. In general, the property wetland/low lying areas (~60% of the property acreage) are considered poorly drained while uplands (silt/loam soils) are considered well drained. This conditions were likely formed by the glacial processes that shaped these landscapes.

Water Resources

The following section provides a hydrologic context for the Site and describes the existing water resources.

Watershed & Hydrology

The Bone Lake South Nature Area contains a ~120 acre contiguous wetland habitat, as well a several smaller lateral wetlands with variable connectivity to the larger wetland complex. The large wetland complex is connected to Bone Lake, which was recently delisted by the MPCA for nutrient impairment. This wetland complex has significant potential for flood water storage. Preliminary modeling suggests that the property has topography to contain an ~7-inch rain event if a control structure and berm were to be constructed at its northern end (Figure 2).

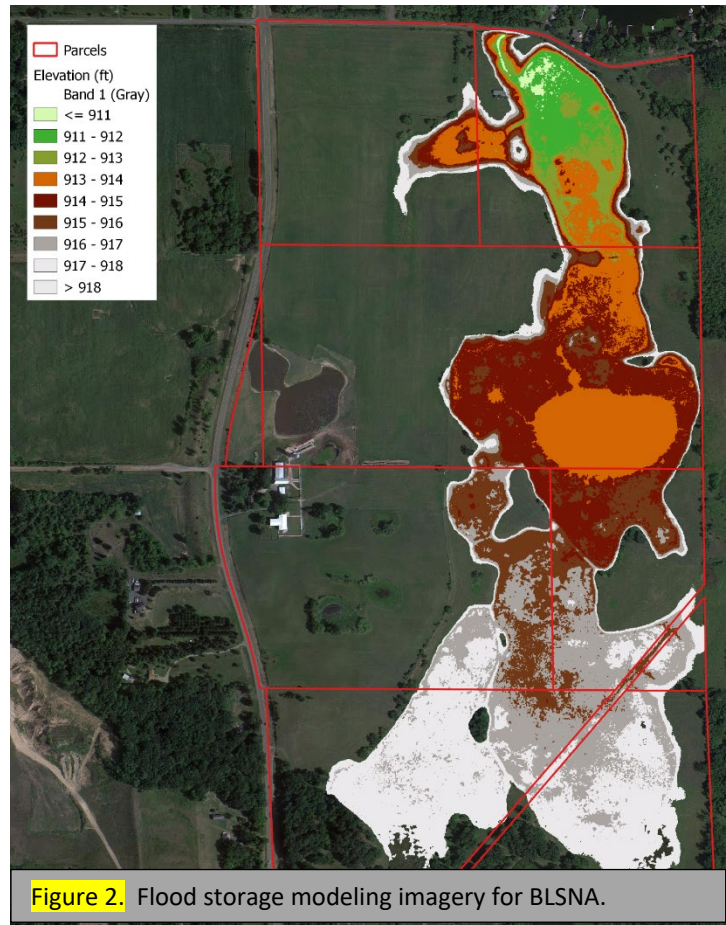


Figure 2. Flood storage modeling imagery for BLSNA.

The Hydrogeomorphic classification for the ~120-acre wetland complex contains 4 main basins classified as either a pond or peatland. Water flow within these basins is primarily vertical and is dependent upon changing amounts of precipitation, evapotranspiration, and groundwater seepage. Evidence of groundwater discharge was observed in the Tamarack Swamp wetlands at the south/upgradient end of the wetland complex. In general, water flows from the south end of the property north through the wetland complex; eventually discharging to Bone Lake. Flow between basins/lobes of the wetland complex is restricted by two-track farm roads intersecting the wetland complex. Small culverts currently control the flow of water between the basins. The drainage area for the property is approximately 1,000 acres.

The drainage to the property is approximately 1,275 acres, which comprises ~23% of the surface drainage to Bone Lake. The map of the drainage area is included in Figures Section (Figure F).

Wetlands and Ditches

The Bone Lake South Nature Area contains three DNR mapped native plant communities including Northern Rich Fen, Tamarack Swamp and Willow-Dogwood Shrub Swamp. No MN DNR Public Water lakes or wetlands are mapped within the site. The National Wetland Inventory (NWI) identified many wetland types on the property (Figure 3 and Table 1). The five dominant wetland types include: wet meadow, shallow open water, shrub wetland, and coniferous swamp. These wetlands are considered modified as several ditches have been identified on the landscape. One intermittently flowing ditch is mapped along the northern boundary of the Site. Aerial imagery and field work also identified a ditch along the east boundary of the Site and a third ditch which enters the southern boundary and exits on the eastern boundary of the Site, creating a right angle through the southeast corner of the Site.

Two open water habitats exist at the Bone Lake South Nature Area. A large pond of unknown depth is located in the center of the property and several smaller shallow open water wetlands are present along the southern boundary of the property. An additional open water habitat will be created with the “legacy load” wetland restoration planned to remove nutrient contaminated soil from the wetland adjacent to the old barn along 228th street.

Table 1. Wetland types within Site

Cowardin	Eggers & Reed	Circular 39
PEM1C	Freshwater Emergent Wetland / Wet Meadow	Type 1/2 - Seasonally Flooded Basin
PEM1A	Freshwater Emergent Wetland	Type 1 – Temporarily Flooded Basin
PUBH	Shallow open water	Type 5 – Shallow open water wetland
PSS2/EM1Dg	Freshwater Forested/Shrub wetland	Type 6/7 -Hardwood/Shrub Wetland
PFO2/EM1Dg	Freshwater Coniferous Forested Wetland	Type 7/8 -Coniferous swamp (Tamarack)

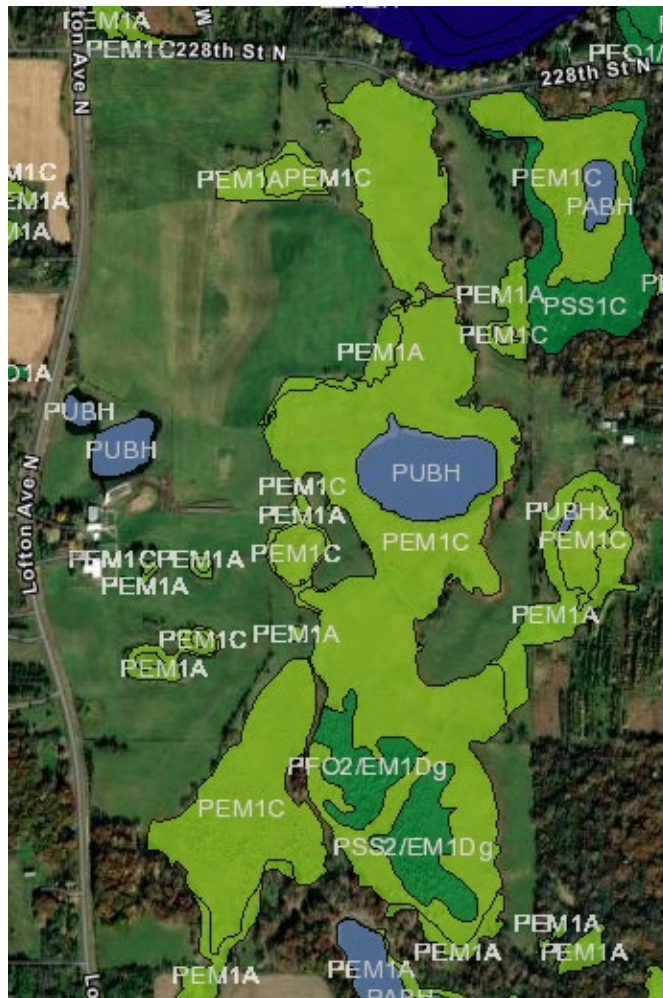


Figure 3. National Wetland Inventory map of the BLSNA.

Upland Resources

The upland portions of the property are characterized by their historic use in production agriculture, whether by haying or grazing. The western portion of the uplands were more intensively managed with a hay planting of alfalfa and cool-season grasses. This area was also routinely grazed and is characteristic of an actively managed hay/pasture field.

The upland resources further to the east include pastures that do not show signs of recent hay planting and were likely managed as a less intensively grazed pasture.

The southern upland areas include the wooded and savanna portions of the property. Periodic grazing or mowing has yielded an area with a savanna like structure with scattered oak trees and a low growing herbaceous layer with limited regeneration of woody plants.

Ecological Description & Inventory

Based on the MN DNR's ecological classification system, the Site is located within the Anoka Sand Plains Subsection of the Minnesota and NE Iowa Morainal Section, within the Eastern Broadleaf Forest Province

of Minnesota (Figure C,). The following section describes the plants observed, vegetation communities within the Site, and wildlife known or likely to utilize the Site.

Vegetation Communities

EOR Survey - Prior to acquisition of the site EOR provided a summary of existing vegetation from off-site mapping, aerial imagery reviews, and an on-site investigation of the parcels of interest. Community conditions were assessed based on DNR guidelines for native plant community classification, which categorizes condition as excellent, good, fair, or poor based on multiple factors such as dominance of native versus non-native vegetation.

The existing vegetation/community types have been mapped in Figure 4. Much of the open area on site has been used for agricultural and/or pastoral purposes (Unit 7, **Table 2**). The existing open and mesic forested areas in the southern portion of the property have been disturbed but have retained native canopy trees. Wetland vegetation is a significant component of the site. In total, there are approximately 112.7 acres of wetland, not including the areas classified as pond or open water. These wetlands range in type and condition. Further information about these wetlands can be found in the following sections.

Staff Meander Survey –District staff conducted a meander survey of the upland plant communities on May 26th, 2026. The results of this survey confirmed some of the findings of the initial EOR survey, mainly that upland plant communities are of poor habitat condition and are dominated by introduced species. The results of this survey are tabulated in Appendix B. The meander identified 65+ herbaceous and woody upland species, of which half were non-native (32) and ten of which are commonly considered invasive species. The survey did not evaluate wetland habitats. Separate visual inspections and assessments were used to evaluate the current conditions of the property wetlands.

Table 2: Existing Communities

Existing Community	Acreage	Ecological Threats/Issues	Community Condition
1. Cattail Marsh	90.3	Dominated by near-monotypic invasive cattail Low native plant diversity	Poor
2. Open Water	9.8	Not observed – frozen conditions	N/A
3. Northern Rich Fen	0.9	Good vegetation. Diversity representative of a native plant community. Likely a remnant of historically dominant wetland plant community in the wetland complex A few glossy buckthorn individuals present	Good
4. Tamarack Swamp	17.5	Hybrid cattail and reed canary grass dominate the understory. There are a few small scattered remnant understories throughout the Tamarack Swamp unit. Some Tamarack regeneration is occurring.	Fair/Poor
5. Sedge Meadow	1.1	Floating mat subtype Hybrid cattail surrounds the small community.	Fair

7. Agricultural/ Hayfield	141	Non-native/invasive cool season grasses and weedy species dominate the area.	Poor
9. Mesic Forest	6.3	Canopy of mature native hardwood trees. Lack of understory and shrubby vegetation.	Poor
10. Open Forest	12.9	Mature, scattered trees with non-native/invasive cool season grass understory. Little-no shrub layer. Two-track trail runs through the unit.	Poor
12. Roadside/Ditches	8.0	Non-native, invasive, and weedy species dominate the area.	Poor
13. Old Roadbed/Tree Line	16.3	Mature, scattered trees along western side of unit. Non-native/invasive cool season grasses and weedy species dominate the area.	Poor

**Communities 6, 8 & 11 were excluded from this table as they are no located on the BLSNA Area. This table and associated Figure originated in another document developed by EOR to evaluate the larger Lason Farm Property.*

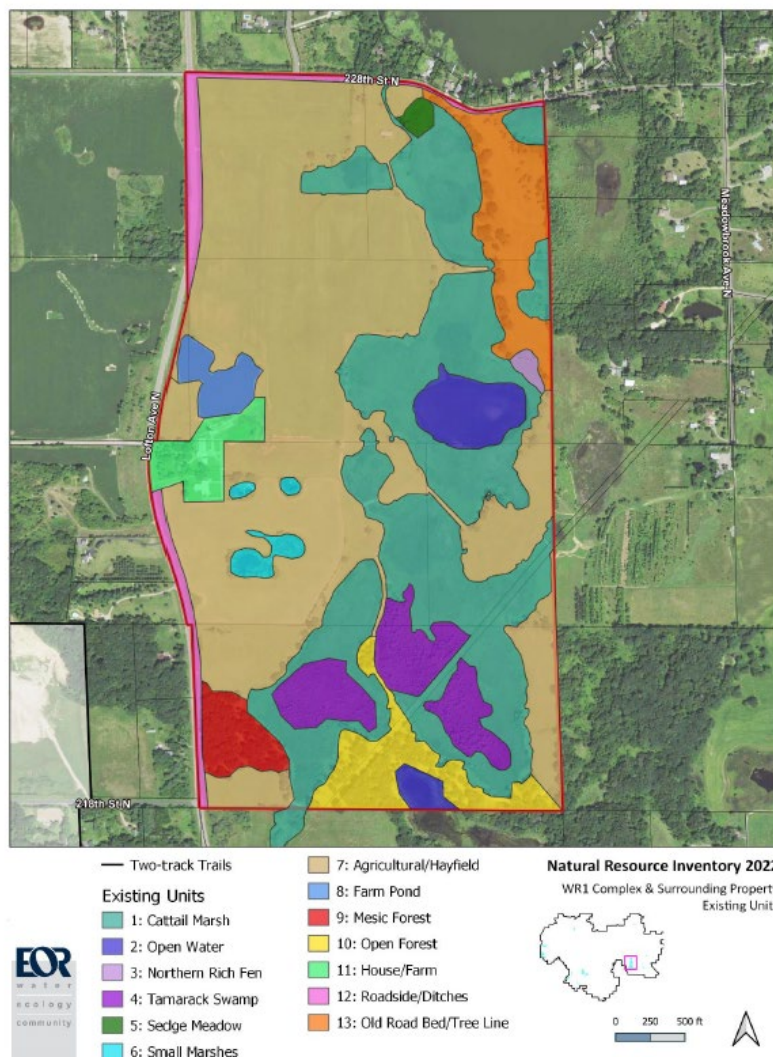


Figure 4. EOR map of the habitat types within the BLSNA.

Wildlife

According to the DNR wildlife database, the Bone Lake / Scandia area encompasses diverse habitats that support a rich inventory of wildlife. Its deciduous forests, wetlands, and prairies are home to white-tailed deer, black bears, wild turkeys, and migratory waterfowl. Rare, threatened, and endangered species like Blanding's turtles, the Rusty-patched bumble bee, Monarch butterfly, and Red-shouldered hawks are also present.

A generalized inventory of wildlife documented in Scandia and eastern Washington County includes the following:

Mammals

- **Large Predators:** Black bear, Bobcat, Coyote, Red fox
- **Ungulates:** White-tailed deer are highly abundant
- **Forage & Small Mammals:** Eastern cottontail rabbits, and various rodents like mice and voles, Raccoon, Striped skunk, Beaver, Thirteen-lined ground squirrel (Minnesota gopher), and Least weasel.
- **Semi-Aquatic:** Mink, Muskrats, and occasionally River otters.
- **Tree Dwellers:** Eastern gray squirrels, Red squirrels, and Northern flying squirrels.
- **Bats:** Big brown bats, Little brown bats, and Northern long-eared bats.

Birds

Over 100+ bird species breed in Washington County using similar habitats to those on the property, including:

- **Raptors:** Bald eagle, Red-tailed hawk, Broad-winged hawk, Turkey vultures, Great horned owl, and Barred owl.
- **Waterfowl & Waders:** Trumpeter swan, Tundra swan, Sandhill crane, Canada goose, Mallards, and Wood duck.
- **Woodland & Forest Birds:** Pileated woodpeckers, Black-capped chickadees, Ovenbirds.
- **Upland Game Birds:** Wild turkey and Ruffed grouse.
- **Songbirds:** Eastern bluebird, Northern cardinal, Blue jay, and various woodpeckers.

Reptiles & Amphibians

- **Turtles:** Blanding's turtle (state-threatened), Painted turtle, and Snapping turtle.
- **Frogs & Toads:** Blanchard's cricket frog, Spring peeper, Wood frog, Gray treefrogs, and American toads.
- **Snakes:** Gopher snake, Red-bellied snake, Eastern hognose snakes, Northern water snakes, and Eastern garter snake.

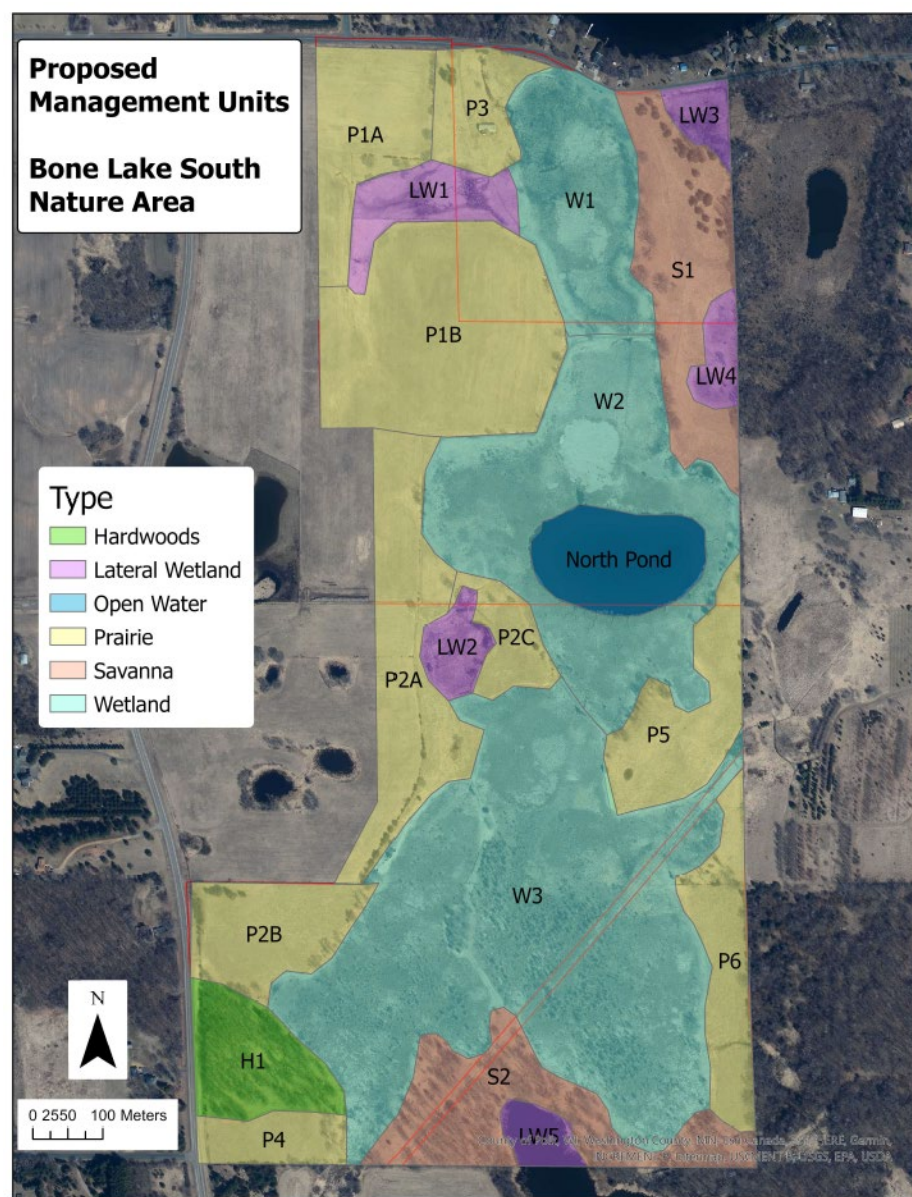
Insects & Invertebrates

- **Pollinators:** Monarch butterfly, Rusty-patched bumble bee (federally endangered), and diverse native bees.
- **Numerous other Insects:** various flies, beetles, moths, ticks, mosquitoes, ants, wasps, bees, Grasshoppers, crickets, dragonflies, and mayflies

CHAPTER 2 – PROPERTY RESTORATION

General Property Goals

- Conserve and preserve 238 acres of Wildlife habitat
- Restore 62 acres of native prairie and 25 acres of Oak Savanna
- Improve the hydrology and water quality of the ~120 acres of wetlands in the Nature Area
- Restore hydraulic connectivity of the wetlands on the property
- Enhance the distinct habitat types of the property; including wetlands, prairie, savanna, and mixed forest.
- Increase flood storage on the property by up to 300-acre feet
- Provide natural environment non-motorized recreation opportunities for the community



Desired Future Conditions

- This property will be an example of quality restored habitat that provides flood storage and water quality benefits to the Bone Lake subwatershed.
- This property will be ecologically and culturally important to the local community and will provide opportunities for public use.

Management Units Restoration Goals, Objectives, and Actions

The entire BLSNA has been broken into distinct management units based on current conditions and past land management (Figure 5). The following section outlines the restoration goals and objectives for each management unit and details the actions needed to reach those goals.

Figure 5. Management Units of the BLSNA.

Prairie & Savanna Units

Current Conditions: The prairie units are generally characteristic of old-field sites and are dominated by grasses and forbs planted for hay and grazing. Units P1 and P2 are a more productive grass hay mix that was more actively managed for harvestable forage. The remaining units were primarily pasture. The native species that are present were generally colonizing species or species that respond positively to grazing. The current plant community does not represent a native habitat type. **Habitat Score: F.**

The savanna units have characteristics similar to the old-field conditions present on the prairie units. While these sites generally contain more native vegetation and savanna habitat structure, the site does not constitute any native habitat type. The southern savanna area has an abundance of mature canopy trees, but with a heavily grazed understory and little understory species diversity. **Habitat Score: F.**

Desired Future Conditions: A restored mesic prairie and savanna ecosystem with a diverse plant community suitable for the current landscape.

	Objective	Management Unit	Timeline
Goal 1: Establish native prairie habitat in old-field sites.	Cool-season grass & invasive species control (87 acres)	P1- 6 S1, 2	Summer / Fall 2026
	Native seeding (87 acres)	P1- 6 S1, 2	Winter 2026/27
	Establishment Maintenance (87 acres)	P1- 6 S1, 2	Spring 2027 – 2031
	Tree Regeneration (25 acres)	S1, S2	Continuous

Goal 1: Establish native prairie habitat in old-field sites.

- **Objective 1:** Control or manage existing non-native vegetation, especially invasive species and cool season grasses across 62 acres of prairie units. This work will occur in summer and fall of 2026.

- Considerations - There are two different management regimes that have occurred on these sites. P1 and P2 have been more intensively managed for forage harvest, while the remaining units show evidence of more intensive grazing, and have less well established stands of forage.

Field activities should be planned in a way that mitigates impact on migratory birds using old field sites for nesting. Mitigations could include leaving unmowed refugia and adjusting the timing of vegetation treatment and removal.

- Recommended Activities -

- Herbicide treatment of existing vegetation. Existing non-native vegetation should be treated with herbicide to control and remove existing populations. A non-specific herbicide such as glyphosate can be used with up to three treatments occurring at least 30 days apart. Vegetation can be mowed no sooner than 7 days after herbicide treatment to remove canopy and allow unaffected plants a better chance at exposure to repeat treatments.
- Haying to remove biomass during site preparation. Removing biomass from the site will reduce nutrient levels and will create conditions that favor establishment of native vegetation. Haying may be used across the prairie section in stands that have not been treated with herbicide that will impact the suitability of the forage for harvest and distribution. This practice may be suitable in the years following establishment to reduce thatch buildup and enhance diversity.
- Mowing to control vegetation growth and spread of undesirable species. Mowing should occur prior to planting in coordination with haying and herbicide application. Following planting the area should be mowed to allow for the establishment of the native vegetation and the control of annual and perennial weeds that remain. The timing of mowings should be conducted with consideration of what weed species are flowering, as well as the impact of the other

recommended activities.

- **Objective 2:** Plant prairie species suitable for the site across the entire prairie section, 62 acres. This work will occur in winter of 2026/27
 - Considerations - The diverse terrain of the different management units may require different planting techniques, and different seed mixes. Care should be taken to select methods and species well suited for the management unit.

Unpredictable winter weather in a warming climate indicates that split seeding of the area may be prudent. Planting in both early and late winter can create more opportunity for successful seed establishment. Opportunity for split seeding needs to be balanced with the cost and availability of planting resources.
 - Recommended Activities
 - Haying or mowing to allow improved seed-soil contact. Prior to seeding, chances of good soil contact will be improved by mowing the existing vegetation low, or by haying and removing the cut material.
 - Prescribed fire to remove thatch. In addition or instead of haying and mowing, prescribed burning can be used to remove thatch and prepare the site for seeding.
 - Planting by seed drill. A no-till drill will provide optimal seed to soil contact. Problems with this method include the suitability of different seed types for use in a drill. Recommended seed mix should be determined based on observations of soils on the site. If budget allows, 2-3 seed mixes should be used, including dry, mesic, and wet mixed height prairie. Different seeding zones will need to be delineated based on field observations.
 - Planting by broadcaster. Planting with a pendulum broadcaster may be appropriate if a well-prepared seedbed is available. Broadcast seeding is also suitable in areas that are harder to access with a drill, and should only be used in cover conditions and in a season that will ensure good seed to soil contact. For best results, broadcast seed should be harrowed or packed after seeding.
 - Planting by hand seeding in sensitive areas. For areas that are inaccessible by equipment due to terrain or sensitive areas, hand seeding can be done. Care should be taken to ensure that optimal seed to soil contact occurs based on time of year and conditions.
- **Objective 3:** Tree Regeneration. Facilitate regeneration of savanna trees on the relevant units, 25 acres.
 - Considerations – The spread of pests and changes to the local climate should inform decisions when selecting tree species. Likewise, preference should be given to local genotype plants, including propagation from existing seedlings and saplings.
 - Recommended Activities
 - Tree planting to establish species across the savanna unit. Bare root trees should be planted in early spring, and should have some component of weed suppression around the tree. Trees should be planted with the intention of improving diversity of savanna appropriate species, and maintaining a savanna canopy density.
 - Seedling / sapling protection. Specimens of appropriate species that have volunteered on the site should be protected from herbivory and restoration equipment using fencing or other protection method.

Primary Wetland Units

Current Conditions: The large wetland complex is generally in poor condition with a history of alteration (access roads, ditching) and impacts from nearby agriculture. The northern lobe contains excess nutrients

from manure runoff from the nearby dairy /barn. Several farm roads and associated culverts dissect the complex, reducing connectivity and flow between the wetland basins. The majority of the wetland has been accessed by cattle, and there is an abundance of reed canary grass and hybrid cattail. Despite the history of agriculture, several patches unique habitat are intact – the tamarack swamp in the southern lobe of the wetland, a rich northern fen located on the northeast side of the middle lobe, and an ~7.5-acre pond also located in the middle lobe. No restoration actions are being proposed for this pond at this time. Habitat Score: C-.

Desired Future Conditions: A large wetland complex with restored hydrology and connectivity with improved water quality, expanded Tamarack swamp, increase flood storage capacity, and a well-established native wetland buffer.

Goal 1: Improve Wetland Water Quality	Objective	Management Unit	Timeline
	Remove nutrient rich “legacy load” wetland soils	W1	Winter 2027/28
Goal 2: Restore wetland Hydrology	Objective	Management Unit	Timeline
	Improve hydrologic connectivity of the wetland complex	W1, W2, W3	Summer / Fall 2027
Goal 3: Enhance Wetland Vegetation	Alter hydrology to expand the wetland boundary and provide floodwater storage potential	W1	Winter 2027/28
	Objective	Management Unit	Timeline
	Establish a min 50-foot wetland buffer surrounding all wetland habitats.	W1, W2, W3	2027/28
	Established willow gallery	W2, W3	Spring 2028
	Tamarack stand improvement and Expansion	W3	Spring/Fall 2029
	Northern rich fen protection	W2	2028 & Spring/Fall 2029

Goal 1 - Improve Wetland Water Quality

- Objective 1 - Remove nutrient rich “legacy load” wetland soils
 - Considerations – Only applicable to W1 near the old barn site. Project will require EOR assistance for wetland delineation, restoration project design of legacy load excavation, wetland permitting, project implementation oversight, revegetation, spoils disposal. Implement in conjunction with Goal 2/Objective 2 (Retention Berm) for W1.
 - Recommended Activities
 - Collect additional soil cores to define excavation area
 - EOR to lead wetland delineation and permitting work
 - Implementation / excavation should be done under frozen conditions
 - Consider the southern half Dahlin Filed for spoils spreading

Goal 2 - Restore Wetland Hydrology

- Objective 1 - Improve hydrologic connectivity of the wetland complex
 - Considerations – Use H&H modeling and surveys to evaluate the farm road/culverts that control the connectivity of the wetland complex (W1 – W3). Consider removing roads and / or repositioning

culverts as appropriate. Determine impacts of hydrology changes on existing and desired vegetation (W3 Tamarack Swamp) and prioritize actions accordingly.

- Recommended Activities
 - H&H Modeling and survey of culverts / farm roads
 - Eliminate unneeded farm roads/culverts
 - Adjust culvert size/position to establish desired condition
- Objective 2 - Alter hydrology to expand the wetland boundary and provide floodwater storage potential
 - Considerations – There is potential for additional flood storage in W1 with the construction of an earthen berm near the outflow of W1. This structure would impound additional water and alter the hydrology resulting in additional flood storage capacity in this wetland unit. Care should be taken to ensure this action would not negatively impact any upstream wetland habitats that may be sensitive to a hydrologic change (W3 tamarack swamp). Wetland permitting may be a challenge for this project. A similar effort is planned for LW1 – these project may be done in tandem.
 - Recommended Activities
 - Extensive modeling and topographic surveys needed
 - A prolonged permitting period may be needed with WCA, DNR, USACE
 - The wetland has been verified as Public Waters
 - Implement this project along with Goal 1 / Objective 1.
 - A rocked outflow and emergency overflow should be included in the project design.

Goal 3 - Enhance Wetland Vegetation

- Objective 1 - Established a min 50-foot wetland buffer surrounding all wetland habitats.
 - Considerations - Care should be taken to select methods and species well suited for the management unit and wetland type. Width of the wetland buffers should be field fit with a minimum width of 50 ft, but potential extending to +100 ft in areas that would allow it or benefit from an extended buffer (lower-lying seasonally inundated areas).
 - Recommended Activities
 - Mowing and/or herbicide should be used for site prep to allow improved seed-soil contact.
 - Planting by broadcaster or by hand in sensitive areas. Broadcast seeding is suitable in areas that are harder to access with a drill, and should only be used in cover conditions and in a season that will ensure good seed to soil contact. For best results, broadcast seed should be harrowed or packed after seeding. For areas that are inaccessible by equipment due to terrain or sensitive areas, hand seeding can be done. Care should be taken to ensure that optimal seed to soil contact occurs based on time of year and conditions
 - Select / develop specific seed mixes for these transitional environments.
- Objective 2 - Established Willow/Shrub Gallery
 - ⊖ Considerations – Three areas could benefit from the establishment of a dense willow gallery to establish another unique habitat type in the BLSNA. These areas include 1) east of the W3 along both sides of the Xcel powerline corridor, 2) the area between W3 and LW2, and 3) the west and southwest portions of LW1.
 - Recommended Activities
 - Cut willow and dogwood in the winter and store onsite until planting in spring.
 - Cutting could be sourced from W3, or from off site locations. Nurseries may be an option as well.
 - Harvest / plant a minimum of 4 shrubby willow species for diversity and resilience within the gallery
 - Use Conservation crew or volunteers for harvest / plantings.
 - Consider veg matting/fabric to control reed canary grass competition. This would require planting in clumps (a 4 by 6 ft patch of matting) or in linear strips (using the entire roll of fabric).

- **Objective 3 - Tamarack Stand Improvement and Expansion**
 - Considerations - The Tamarack swamp is one of the iconic habitats found at the BLSNA. Its distinctive fall color and natural beauty along with its rarity in the area will draw visitors to the property. Care should be taken to protect and enhance this habitat type for future generations to enjoy.
 - Recommended Activities
 - Remove invasive species from W3 by means of mechanical harvest (hand tools) and/or herbicide application. This will likely require a DNR public waters aquatic plant management (APM) permit.
 - Restore a continuously saturated hydrologic regime suitable for peatlands via Primary Wetland Goal 2/Objective 1, while ensuring Primary Wetland Goal 2/Objective 2 (flood storage) does not negatively impact the tamarack swamp
 - Supplemental planting of Tamarack to expand this habitat type; if needed, based on the Tamarack response to hydrology restoration (Goal 2/Objective 1). If needed, source bareroot plants from a local nursery or Conservation organization and plant in appropriate areas of W3. Nurseries generally require the purchase of boxes of 100 plants each. Consider planting +5 boxes over the restoration period.
- **Objective 4 - Northern Rich Fen Protection**
 - Considerations – A Northern Rich Fen is located on the eastern “shoulder” of W2 – to the northeast of the pond (Figure 4, Page 14). This is another unique habitat for the greater Scandia area, as well as the BLSNA. Care should be taken to protect this habitat from invasive species and hydrology changes that could impact the quality of this fen.
 - Recommended Activities
 - Invasive species control / management – remove any invasive species encroachment (glossy buckthorn).
 - Restore a continuously saturated hydrologic regime suitable for peatlands via Primary Wetland Goal 2/Objective 1, while ensuring Primary Wetland Goal 2/Objective 2 (flood storage) does not negatively impact the rich norther fen habitat.
 - Floristic enhancement. Add additional native plants as needed that are suitable for this unique habitat.

Lateral Wetland Units

Current Conditions: Several lateral wetland habitats exist on the property that have either been cut off from the large wetland complex by farm roads or isolated by geology. These wetlands are considered degraded with altered hydrology, an abundance of reed-cannary grass and hybrid cattail, and a history of agriculture related impacts (to a much greater extent than the primary wetland complex). Lateral Wetland 5 is unique from the other lateral wetlands in that it is considered a deep marsh with the majority of its area in open water. Habitat Score: D.

Desired Future Conditions: Lateral wetlands with a higher degree of connectivity to the larger wetland complex (where applicable), increased flood storage capacity, enhanced vegetation species diversity (including woody species) and a well-established native wetland buffer.

	Objective	Management Unit	Timeline
Goal 1: Restore wetland Hydrology	Improve hydrologic connectivity of the wetland complex	LW2	Summer / Fall 2027
	Alter hydrology to expand the wetland boundary and provide floodwater storage potential	LW1	Winter 2027/28

	Objective	Management Unit	Timeline
Goal 2: Enhance Wetland Vegetation	Established a min 50-foot wetland buffer surrounding all wetland habitats.	LW1, LW2, LW3, LW4, LW5	2027/28
	Established Willow Gallery	LW1, LW2	Spring 2028
	Aspen Stand Improvement	LW4	Spring 2028
	Invasive Species Control	LW3	2027 - ongoing

Goal 1 - Restore wetland Hydrology

- Objective 1 - Improve Hydrologic connectivity of the wetland complex (see Primary Wetland Goal 2, Objective 1)
 - Considerations –Evaluate the farm road/culverts that control the connectivity of the lateral wetland on the property (LW1 & LW2). Consider removing roads and / or repositioning culverts as appropriate. Determine impacts of hydrology changes on existing and desired vegetation and prioritize actions accordingly. Much of this evaluation /analysis would be accomplished in conjunction with Primary Wetland Goal 2, Objective 1.
 - Recommended Activities
 - H&H Modeling and survey of culverts / farm roads
 - Eliminate unneeded farm roads/culverts
 - Adjust culvert size/position to establish desired condition
 - Reroute Nature Area trails as needed (regarding culvert removal)
- Objective 2 - Alter hydrology to expand the wetland boundary and provide floodwater storage potential
 - Considerations – There is potential for additional flood storage in LW1 with manipulation of the outflow control as it connects to W1. There is currently a farm road/culvert at this location that controls the hydrology in LW1. Altering this culvert (raising the culvert elevation or adding a culvert riser) and adding fill along the farm road would effectively impound water in this wetland.
 - Recommended Activities
 - Extensive modeling and topographic surveys needed
 - A rocked outflow and emergency overflow should be included in the project design.
 - Fill would need to be added to the farm road /trail raise the road prism elevation and prevent flow from washing out the road /trail during storm events.

Goal 2 - Enhance Wetland Vegetation

- Objective 1 - Established a min 50-foot wetland buffer surrounding all wetland habitats.
 - Considerations - Care should be taken to select methods and species well suited for the management unit and wetland type. Width of the wetland buffers should be field fit with a minimum width of 50 ft, but potential extending to +100 ft in areas that would allow it or benefit from an extended buffer (lower-lying seasonally inundated areas) or that would help to reconnect lateral and primary wetland habitats.
 - Recommended Activities
 - See the *Primary Wetland Unit Buffer Recommendations* (Goal 3/ Objective 1)
 - Select / develop specific seed mixes for this transitional environment.
- Objective 2 - Established Willow Gallery
 - ⊖ Lateral wetlands LW1 and LW2 could be enhanced with the addition of Willows clusters or

clumps. As mentioned above in the Primary Wetland Unit section, the willow gallery areas include: 1) east of the W3 along the Xcel powerline corridor, 2) between W3 and LW2, including the east side of LW2, and 3) the west and southwest portions of LW1.

- Recommended Activities
 - See the *Primary Wetland Unit Willow Gallery Recommendations* (Goal 3/ Objective 2)
- **Objective 3 - Aspen Stand Improvement and Expansion**
 - Considerations – there is a small Aspen grove near the northern part of LW4 that has been historically suppressed by grazing. Protect this habitat type and expand the grove between the adjacent property line and the old County road prism – as appropriate. The southern part of LW4 would benefit from a row of Swamp White Oak in the area between the wetland and old County Road prism.
 - Recommended Activities
 - Marking (flagging) or tube placement on natural regeneration of the stand
 - Careful mowing or no mowing in the aspen stand to prevent regeneration setback
 - Supplementation of aspen trees; as needed. All planted trees should be tubbed and marked (flagging) as to aid in survival. Trees can be sources from local nurseries or Conservation organizations in orders of 100 bareroot trees.
 - Control invasive species in the lateral wetland and associated aspen stand.
- **Objective 4 – Invasive Species Control**
 - Considerations – Invasive species should be managed in all the lateral wetlands. As reed canary grass and hybrid cattails are well established and very difficult to manage, control efforts are better suited for encroachment by wood invasive species – particularly buckthorn. A patch of buckthorn has been identified on the south side of LW3, but additional individual plants are noted in many of the lateral wetland habitats and should be treated before gaining a stronghold in these wetlands.
 - Recommended Activities
 - Annual inspections of wetland habitats for buckthorn and other invasive species of interest
 - Mechanical and chemical removal /treatment of invasives. Mowing, hand pulling, girdling, cutting, stump herbicide application, or foliar spraying of herbicide are all appropriate treatment strategies and should be applied as needed and/or as applicable to each situation. Use best practices guidelines for herbicide applications as mentioned elsewhere in this document.
 - Use Conservation Corps or Volunteers for annual mechanical invasive species removal

Hardwood Forest Unit

Current Conditions: The Hardwood Forest unit is the only upland site with an identifiable native habitat condition. This unit is identified as a Southern Dry-Mesic Oak Forest (MHs37) It contains a modest assemblage of mature canopy trees, however there is a lack of recruitment/ understory regeneration due to a history of heavy grazing. The ground vegetation is also diminished due to past grazing. There is some encroachment by woody invasives on the east facing hillside. Despite these conditions, H1 has potential for habitat improvement without extensive restoration. Habitat Score: C-.

Desired Future Conditions: A mature Northern Hardwood Forest ecosystem with a robust understory of multi-stage replacement trees, native shrubs, forbs, and grasses that provide wildlife habitat and forest resiliency.

Goal 1: Manage the unit for improved hardwood habitat condition.	Objective	Management Unit	Timeline
	Invasive Species Control	H1	Summer 2026 -

			Ongoing
	Promote tree regeneration and native shrub and herb layers	H1	Summer 2026 - Ongoing
	Expand this area into adjacent units	P2, P4	Spring 2027 - Ongoing

Goal 1: Manage the unit for improved hardwood habitat condition.

- **Objective 1** – Invasive Species Control. Complete control of any identified invasive species should be conducted, specifically of common buckthorn and Tartarian honeysuckle.
 - Considerations – Care should be taken to pair removal activities of promotion or replacement with appropriate native species. Herbicide impacts on newly planted areas should be avoided.
 - Recommended Activities
 - Annual inspections of H1 for buckthorn and other invasive species of interest
 - Mechanical and chemical removal /treatment of invasives. Mowing, hand pulling, girdling, cutting, stump herbicide application, or foliar spraying of herbicide are all appropriate treatment strategies and should be applied as needed and/or as applicable to each situation. Use best practices guidelines for herbicide applications as mentioned elsewhere in this document.
 - Use Conservation Corps or volunteers for annual mechanical invasive species removal
- **Objective 2** – Promote tree regeneration and native shrub and herb layers. Implement activities that suppress existing non-native vegetation and allow native tree, shrub, and herb layer to propagate.
 - Considerations – Existing non-native vegetation is likely to be managed, not controlled. Disturbance regime and strategic introduction of new native plants should be sufficient to meet this objective.
 - Recommended Activities
 - Periodic mowing conducted annually or as conditions warrant to suppress the spread of annual non-native vegetation.
 - Winter sowing native seed will add to the existing seed bank and increase diversity on this site.
 - Tree and shrub planting, or protection, will allow the tree and shrub layer to regenerate more quickly.
- **Objective 3** – Expand this ecotype onto adjacent lands as conditions and climate warrant.
 - Considerations – The climate of this area is leading to the mesification of woodland and prairie habitats. Due to this, we are likely to see expansion of the woodland section into adjacent prairie sections. Rather than creating strict borders, the boundaries between management units should be feathered and fluid, creating diverse habitat mosaics to maximize biodiversity.
 - Recommended Activities
 - Mowing or prescribed burning to manage the spread of volunteer trees and shrubs. Disturbance is necessary to create breaks in the canopy and opportunities for changing habitat types at the boundary.

Restoration Funding / Budget

Much of the funding for the restoration of the Bone Lake South Nature Area will be from the Outdoor Heritage Fund - an allocation from the MN State Legislature, as recommended by the Lessard-Sams Outdoor Heritage Council. The matching funds for this grant will be sourced from the local ad-valorem tax levy. These funds will be used over the first five years of District ownership of the property to restore and establish the Site as an open natural space for both wildlife and public recreation. After these funds expire, the annual operation and long-term management of the property will be funded by the ad-valorem tax levy and/or any BLSNA Property Management Plan

grants that can be acquired to support these ongoing efforts (see the O&M Annual Budget section below). The Outdoor Heritage funds to be used for property restoration will become available in July of 2026 and will expire June 30, 2031.

Table 3. Outdoor Heritage Restoration Funding Breakdown

Activity	Grant (LSOHF)	Leverage (Local Funds)	Total
Personnel: CLFLWD Staff Time	\$30,000	\$122,700	\$152,700
Contracted Services: Driveway/Access, Wetland Restoration/Enhancement, Prairie Restoration, Forest Enhancement	\$923,000	\$0	\$923,000
Professional Services: Engineering and Legal Assistance	\$259,000	\$0	\$259,000
Capital Equipment: Tractor w/ Mower Attachment	\$60,000	\$0	\$60,000
Supplies/Materials: Education Materials, Prairie/Wetland/Forest Seeds, Tree Saplings, Drill Rental, Seed Broadcaster Rental	\$160,000	\$0	\$160,000
TOTAL	\$1,432,000	\$122,700	\$1,554,700

Five-Year Work Plan Summary

Table 4- Five-year work plan

Activity	Description	Timing	Estimated Cost
General Property Maintenance	Install/repair/clear property fence. Remove invasive wood species along fenceline. Barn Improvements. Well Sealing, Hazard assessment and mitigation. Purchase equipment.	Summer 2026	\$110,000
Restoration Planning and Site Prep	Begin feasibility and design work for the Legacy Load wetland project and Prairie Restoration. Begin Prairie site prep – herbicide applications	Summer & Fall 2026	\$35,000
Forestry Mowing	Mow forested areas to control woody invasive species. Annual Fall activity.	Fall 2026 - 31	\$24,000
Prairie Restoration	Continued Site prep and prairie seeding in Spring. Fall mowing.	Spring-Fall 2027	\$75,000
Legacy Load Wetland Design	Legacy Load Wetland Design and Permitting. Put project out to bid late summer.	Spring / summer 2027	\$94,848
Parking lot / Access	Construct Parking Lot for future access. Develop Access signage.	Summer 2027	\$35,000
Lateral Wetland Design	Feasibility and Design of lateral wetland enhancements	Summer/Fall 2027	\$15,000
Forest Enhancement Design	Feasibility and Design of Forestry enhancements	Summer / Fall 2027	\$10,000
Legacy Load Wetland Implementation	Implementation of the Legacy Load Wetland Restoration Project	Winter 2027/28	\$316,160
Lateral Wetland Enhancement	Install lateral wetland vegetation and implement enhancement.	Spring 2028	\$225,350
Trail Establishment	Develop and construct/enhance trail system. Develop and install educational signage. Grand opening of property.	Summer 2028	\$25,000
Prairie Establishment	Regular mowing and interseeding to help establish native vegetation. Spot herbicide treatment to control invasive species.	Summers 2028-31	\$218,640

Forestry Enhancement	Implement Forestry enhancement. Invasive species removal, fall planting and associated mowing/site prep.	Fall 2028	\$55,200
Tamarack Enhancement	Invasive species removal. Planting of Tamarack.	Spring 2029	\$68,310
Oak Savanna	Oak Planting throughout Oak Savanna Area – understory/ ground cover established during prairie restoration efforts.	Spring 2029	\$123,696
General Property Maintenance	Annual invasive species removal, fence repair, trail maintenance, etc	2017-31	\$65,000
Prescribed Burn	Prescribed burn on prairie habitats, as needed – to establish and maintain native vegetation	Spring 2029-31	\$65,000
Conservation Grazing	Prescriptive conservation grazing, as warranted - to establish and maintain native vegetation	Summer 2030/31	tbd
Estimated Grand total			1,561,204

Restoration Priorities

Restoration of the property will be prioritized to achieve the greatest change / restoration with the available funds. As such, certain activities would be implemented earlier in the grant period. The following table (Table 5) details the BLSNA restoration priority and rational.

Table 5. Restoration Action Prioritization.

Action Prioritization	Prioritization Rational
Primary	
1. Preserve Existing Quality Habitat	Protecting the habitat that already exists on the property is the underlying goal of the property acquisition. As such a “do no harm” mentalist will help to focus the restoration actions undertaken on the BLSNA.
2. Wetland Legacy Load	Will improve wetland water quality; benefiting BLSNA and Bone Lake. Will create additional open water habitat for wildlife
3. Prairie Establishment	Field conversion to native prairie will create native wildlife habitat over a large area of the property
4.Oak Savanna Establishment	Same rational and general restoration effort as prairie establishment with the additional planting an oak canopy – savings realized with implementation with priority #2 (similar understory species assemblage)
5.Hydrology Restoration	Will reconnect wetlands by removing culverts and other restriction – this will restore natural hydrology and promote ecological function and resiliency
Secondary	
6.Flood Storage	Will help to mitigate flooding in and around Bone Lake
7.Forest Enhancement	Will improve habitat for wildlife species and improve forest resiliency
8.Lateral wetland Vegetation Enhancement	Will create addtional wetland habitats to benefit wildlife and general ecology
9.Tamarack Expansion	Hydrological restoration may facilitate natural Tamarack regeneration. Interplanting of Tamarack may be needed to supplement natural regeneration.
10.Northern rich fen enhancement	Hydrological restoration may facilitate natural regeneration of native vegetation. Interplanting of adapted species may be needed to supplement natural regeneration.

CHAPTER 3 – OPERATIONAL POLICIES AND PROCEDURES

The following are the operational policies or procedures for the Bone Lake South Nature Area. As additional management alternatives are adopted, these policies and procedures will be updated.

Public Access

The Site was acquired in 2025 using DNR Conservation Partners Legacy and Lessard-Sams Outdoor Heritage funds. A condition of these funds is that the property must be open to the public as a recreation opportunity – including hunting and fishing (see below).

As such, the Nature Area will be open to the public for year-round non-motorized day use recreation from dawn till dusk. No camping or access/use is allowed between 10 pm and 5am. It shall be operated as a low-impact day-use recreational area with a 3+ mile primitive trail system (Figure H) and opportunities for hiking, wildlife viewing, hunting & fishing, and foraging.

Access will be exclusively from the sole parking area that will be located along 238th St N across from Mallard Ave N. No access via the two gated farm roads off Lofton Ave will be permitted and parking at these driveways will be prohibited and enforced by local law enforcement. The gates to these areas will be locked.

Public Access signage indicating the acceptable and prohibited uses of the property will be installed at the entrance to the property (detailed below). The property will be open to the public year-round, unless conditions warrant closure due to concerns of erosion of the trail system under saturated conditions (potentially during spring melt or periods of heavy rains).

Access will be limited to foot traffic only to limit disturbance of the landscape. No ATV's, dirtbikes, snowmobiles, bicycles, or pack animals / livestock are permitted on the property unless used by the District for property maintenance/restoration efforts or as a management tool (Conservation grazing). No trail riding, no Fires, no firewood gathering, and no trapping will be allowed on the property. Nature Area guests are expected to Pack Out all trash and pet waste.

Nature Area Rules

Table 6 – BLSNA general public use rules

Permitted Uses	Prohibited Uses	
Day use only - Open dawn to dusk	Pack out all trash and pet waste	No Target / Trap shooting
Pets welcome on leash	No motorized vehicles	No trapping of wildlife
Hunting and Fishing allowed as per local/state regulations	NO ATV/UTV/ Snowmobiles	No discharge of firearms within 500 ft of any building or residence
Foot traffic only	No Fires	No Bicycle riding
Cross Country Skiing /snowshoeing allowed	No Camping	No motorized watercraft
Non-motorized watercraft permitted (canoe/kayak)	No Firewood harvest	No Horseback riding

Winter Access/Use

The Nature Area will be open to the public during the winter for non-motorized recreation. The property will be open from dawn to dusk. No snowmobiles or similar motorized equipment/vehicles are permitted on the property at any time unless used for official District business or the event of a medical emergency. The District will not maintain the trail system throughout the winter and will have limited capability to keep the parking area snow free. As such, access to the Site may be limited during periods of deep winter snowpack.

Conservation Grazing

Conservation Grazing is a recognized management tool under the guidelines of the LSOHF grant. Conservation grazing includes high intensity, short duration grazing with long vegetation recovery periods that can be used to control invasive species and introduce a disturbance regime to maintain and encourage specific ecotypes. It is commonly used to maintain prairie habitats. Depending on the desired plant communities, livestock such as cattle, sheep, goats, and bison are commonly utilized. Horses are not recommended as they are more selective grazers and often “pull or uproot” vegetation instead of “chew” the tops of the plants – causing excessive ground disturbance and damage to the plant. Additionally, horses are more susceptible to toxic vegetation that can be commonly found in new prairie restorations. Conservation grazing is typically introduced following the establishment phase of the restoration and then used with mowing and prescribed burning as a management tool.

Any conservation grazing used on the Site will conform to Staff recommended grazing density, durations, rotation and be prescribed based on the needs of the resource, or in other words, adaptively managed. This will require the use of temporary fencing and/or GPS collar “virtual fencing” to control the grazing pressure and keep animals from sensitive environments (wetlands) or structures (barn). These control items would be provided by the grazer along with watering and feeding sites greater than 200 ft from any water resource. In addition, the grazer will need to manage cattle and public interactions - to ensure public safety and the welfare of their cattle.

Example Conservation Grazing Recommendations and Limits

- a maximum of 60 AUM (Animal Unit Months)
- Maximum grazing period for any area of 7 consecutive days (for cows, adjust for other animals)
- Minimum recovery period of 21 days
- Season extending from May 1st – November 1st

Examples:

- 2 year cattle are 0.8AU. With 60 AUM, 15 head can be grazed for 5 grazing periods from May - Sep (7 days on, 21 days off).
- 75 head of 2 year cattle can be grazed for one grazing period (7 days) in the entire grazing season.
- For context, a mature horse is 1.25 AU (compared to (.8) for young steer. Horses also have very different grazing impacts and are therefore not recommended for conservation grazing.

Hunting and Fishing

As mentioned above, the Nature Area was acquired with grant funds that stipulate hunting and fishing must be permitted on any lands purchased using these funds (<https://www.revisor.mn.gov/statutes/cite/97A.056>, Subd.19 sections A-C). The District acknowledged this requirement during the grant acquisition process and agreed to

these requirements by accepting these funds. As such, the property will be open to hunting and fishing in accordance with all applicable state and local regulations.

In addition to local hunting and fishing rules, the District will impose the following additional regulations.

- Day use hunting and fishing only. Hunting and fishing only during the daylight hours.
- No use of tree-stands or blinds that alter or impact woody vegetation – no screw in steps or cutting of tree limbs. No Cutting of Shooting lanes. All stands or blinds must have display at least 144 square inches of solid blaze orange material visible from all directions around the blind and must be labeled with the owner's name and contact information.
- All hunting stands or blinds must be removed daily – no leaving of stands or blinds in place throughout the hunting season. Any structure found unattended will be removed by the District.
- No discharge of firearms within 500 ft of any residence, building, or livestock. Fencelines within close proximity to structures or livestock will be posted to alert hunters of this 500-foot hunting exclusion buffer. Figure I, on page 50 indicates the hunting exclusion area.
- No stands or blinds may be placed within 150 ft of any BLSNA boundary.
- No feeding or baiting of any wildlife – including salt licks, corn piles, "bear bait," or other.
- All game must be removed without the use of motorized equipment – E.G. no use of ATV's to drag out deer.
- Access to the BLSNA would be restricted during the two-week rifle deer season to ensure safety. Non-hunting visitors would be required to wear blaze orange during this period and limit their use of the property to avoid key hunting hours (dawn and dusk periods) and conflicts. The property would remain open to general public access during all other hunting seasons including deer archery, upland bird, small game, waterfowl, turkey (E.G. non-rifle hunting seasons) though caution when accessing any public land is warranted /expected; regardless of season (hunting or otherwise).

Firewood Cutting

Harvest of either standing dead or downed trees for firewood is not an allowable use of the property. Both standing and downed timber offer habitat for wildlife and benefits the ecology of the area – including benefits soil health during the decomposition process. As such, standing dead timber that is not directly adjacent to any Nature Area trails should be left standing as it is key habitat for many species – including secondary cavity nesting birds. Similarly, downed timber that does not impede recreation and/or considered a hazard should be left to natural decomposition processes as this is an important habitat for microorganisms, fungi, insects, birds, and small mammals. Downed woody debris is a foundation of the ecology and food web of any natural system, but due to past land management, is a lacking habitat element of the BLNA property.

Trapping

Recreational trapping is not recommended as an allowable use of the Bone Lake South Nature Area. This is primarily due to concerns regarding conflicts with visitors and pets with trapping equipment and the potential for incidental trapping of non-target species. The District may reconsider the use of trapping on the property in the context of use as a management tool. If nuisance wildlife are identified as causing harm to the property or management thereof, trapping could be used to control these nuisance wildlife populations. Careful management of this tool would be needed to avoid the concerns mentioned above within this section.

Property Fence

To control access and define the Nature Area boundaries, a fence will be installed and maintained around the entire perimeter of the property. The fence serves to not only control access, but to ensure that visitors are not inadvertently trespassing on adjacent private lands. The fence will be constructed in accordance with wildlife friendly designs and will also be essential in the application of Conservation Grazing management techniques. The fence will be inspected and repaired annually to ensure form and function and signs will be installed every ~500 ft identifying the property boundaries and acknowledging the adjacent private lands.

Public Involvement in Land Management

The Bone Lake South Nature Area was established for public use and enjoyment. As such, we encourage public use and stewardship of the property. An aspect of this stewardship is the facilitation of volunteer efforts to help manage and maintain the property. The District encourages public input on property management and will work with interested parties to achieve property management goals and objectives. Groups or individuals interested in helping to maintain the property shall contact the District with their ideas for management/efforts to seek approval for these actions. District staff must approve and supervise all volunteer efforts. Volunteers must also sign a standard liability form prior to all work performed on the property that indemnifies the District from any injury sustained during performance of the work. Volunteer activities may include invasive species removal, trash pick-up, trail maintenance, barn repair, fence repair, fund raising, tree planting, etc.

Donations

The District can accept donations dedicated for a specific purpose. As such, fund raising and subsequent donations can be used to support management of the Nature Area. The District can also accept tools, running equipment (mowers, weed whips, ATV), native vegetation (trees, shrubs, seed), and materials (fence posts, wire, lumber, used culverts, silt fence) that would be useful for improvement /maintenance of the property or that would support volunteer efforts.

Parking Lot

The Bone Lake South Nature Area Parking lot, as a part of the greater property, will be open in accordance to the Nature Area regulations – open from dawn to dusk during all seasons of the year. As such, overnight parking is not permitted and any vehicles found in the parking lot during “off” hours are subject to fines and/or towing. As indicated in the section below, there will be no garbage services in the Nature Area. Anyone found dumping material or waste/trash in the Nature Area parking lot (or property in general) is subject to prosecution to the greatest extent of the law. The parking lot will be available during the winter, however, snow removal (and subsequent access) may be limited based on annual snowpack and District capacity.

Garbage Service

There will be no garbage service at the Nature Area. Visitors are expected to pack out any trash they generate during their use of the property. The District has encountered issues with dumping of household trash at other District locations that did have garbage service – mainly District boat launches. The District has discontinued garbage service at these locations and has no interest in starting such service at the Bone Lake South Nature Area. Pack-Out signs will be placed at the entrance to the property to indicate this rule.

Encumbrances of Property

As mentioned elsewhere in this document, the Bone Lake South Nature Area was purchased using state grant funds. With this funding came restrictions regarding use of the property; specifically, any action that encumbers BLSNA Property

the property to another entity. This Notice of Funding Restrictions states “The interest in real property, or any portion of the interest in real property, shall not be sold, transferred, pledged, or otherwise disposed of or further encumbered without obtaining the prior written approval of the Lessard- Sams Outdoor Heritage Council or its successor. The ownership of the interest in real property transfers to the state if: (1) the holder of the interest in real property fails to comply with the terms and conditions of the grant agreement or accomplishment plan; or (2) restrictions are placed on the land that preclude its use for the intended purpose as specified in the appropriation.” As such, the District cannot sublease or grant easements over the property without risk of forfeiting ownership of the property. The exception to this is a grazing lease - if used exclusively as a conservation grazing management tool to promote the restoration / management of the property. Any proceeds from such a grazing lease must be used to further restore / improve the property or be returned to the State Legislature (granting agency).

Property Signage and Outreach

As a goal for the Bone Lake South Nature Area is public outreach and education, educational signs will be installed at strategic locations throughout the Nature Area. Signs at the entrance will indicate property rules and regulations. Signs will also be placed along the trail system pointing out historic features, unique habitats and ecology, restoration efforts, unique plants or animals, or history of the property and past land management. All signs should include reference to the funding agencies in accordance with state statute (<https://www.revisor.mn.gov/statutes/cite/97A.056>, Subd.13(i) A recipient of money appropriated from the outdoor heritage fund must erect signage according to Laws 2009, chapter 172, article 5, section 10.)

Fenceline signs – As the Nature Area is surrounded by private lands, signs should be placed along the perimeter identifying the Nature Area boundary and indicating “No Trespassing” on the neighboring lands. Signs should be installed every 500ft along the property boundary except where the Nature Areas is bordered by Public Roadways.

Hunting Signs – Additional signage should be placed along the perimeter fenceline where it is within 500 ft of a building, roadway, or livestock operation. These signs should clearly state the City firearm regulations.

General Outreach – Staff will inform the public of BLSNA Management efforts including prescribed fire, conservation grazing, herbicide application, construction / excavation, and significant forestry management. Outreach should use multiple platforms including newspaper notices, social media, targeted mailers, and temporary signage at property entrances.

Operation, Monitoring, & Maintenance Policy

Operations, Monitoring, and Maintenance (OMM) will be important in facilitating successful restoration and management of the Site for public use. The following section details the nuances of the BLSNA Operations, Monitoring, and Maintenance program.

Operation

The Bone Lake South Nature Area was purchased through Lessard-Sams Outdoor Heritage Fund and DNR Legacy Partner grants for the intended purpose of restoration, protection, preservation, and as an outdoor recreation opportunity for the public. The property should be restored / enhanced with these goals in mind. The property shall be operated as “park reserve-like” space, and after restoration effort are completed, become an example of the many historic habitats of the central

Minnesota region.

Monitoring & Record Keeping

Monitoring and record keeping will be important to facilitate successful management of the Site, as well as identify and mitigate any potential risks to the public or natural resources. It is recommended that field visits / inspections occur once or twice a year depending on conditions, and after large storm events with damaging winds and/or intense precipitation. Monitoring should include, at minimum, a review of the items listed in Table 7.

Table 7. Monitoring & Inventory Guide

Item	Inspection Description	Inspection Frequency
Property Fence	Inspect entire permanent fence for repair needs and signs of illegal access of the property (not from the parking area)	Annually and after large storm events
Property Gates	Inspect all access points to be sure the property is secure	Bi-annually
Hunting Areas	Inspect and remove hunting related items (stands, blinds, etc.) that do not conform to Nature Area regulations	Weekly in the Fall during hunting season
Conservation Grazing Areas	Assess grazing needs. If actively grazing, inspect vegetation response, cattle enclosure/cattle access to unwanted areas. Record animal units, grazing areas and grazing timing.	Annually or as needed
Barn	Inspect structure for safety and maintenance needs	annually
Parking lot	inspect parking lot surface, fence, and signs for maintenance needs	monthly
Trails	Evaluate trail condition and maintenance needs. Assess erosion and ground disturbance to determine if trail closures/relocation is needed	Bi-annually, spring and fall
Restoration projects	General inspection of completed restoration effort for effectiveness and maintenance needs in accordance to the District's Comprehensive O&M Manual. To inform adaptive management, monitoring plans will be developed specific to final restoration implementation tasks concurrent with project-specific scoping. Prairie / oak savanna – evaluate plant establishment and survival Wetlands – evaluate hydrology connectivity, assess erosion and sedimentation, collect water quality samples, evaluate vegetation health Forest – evaluate forest stand health and encroachment by invasive species	Annually, except for specific monitoring plans related to ongoing restoration efforts

Annual Maintenance and Budget

Restoration funding and efforts will conclude in 2031, however, continued funding is needed to properly maintain and operate the Nature Area moving forward. The table (Table 8) below details the annual estimated budget needed to maintain the restoration gains made using the Outdoor Heritage Funds and keep the area safely open to the public. The source of these Operations and Maintenance (O&M) funds would likely be from the ad-valorem tax levy and/or yet to be identified external grant sources. It is estimated that an annual budget of \$10,000 to \$15,000 is needed for the Nature Area.

Table 8. Annual O&M Budget.

Item	Maintenance Description	Annual Expense
Property Fence	Repair breaks in fence as needed. Use staff, conservation corps, or volunteer labor.	\$1,000
Property Gates	Replace locks and gates as needed	\$50.00
Barn	Repair structure as needed	\$500
Parking lot	Annual snow removal, gravel additions, fence and sign repair/replacement	\$2,000
Trails	Repair trail system as needed. Add wood chips, relocate trails away from sensitive areas, keep trails moved, spot herbicide treatment.	\$2,500
Invasive Species Control	Annual mowing and spot herbicide treatments of all habitats. Use of periodic prescribed burns and Conservation grazing (contract out for these services).	\$5,000
Equipment	Annual maintenance of all equipment – oil change, winterization, repairs as needed	\$500
Vegetation	Annual interseeding, tree replacement, etc	\$1,500
Total Annual Allocation Requested		\$ 13,050

Public Safety & Risk Management

District staff will inspect the entire property on an annual basis and after major weather events to identify developing issues and/or potential for risk to both the public using the property and/or local natural resources. Inspections will conform to the specifications indicated in the Monitoring and Record keeping section above. Staff will prepare and maintain inspection reports for each inspection. The District Administrator will be alerted to any matters that may require attention.

On April 20, 2026, District staff inspected the property to identify potential safety or risk concerns. Their findings are detailed below.

Potential Safety Hazards

Staff identified several potential hazards on the property that need to be addressed / mitigated for or hazards that may be present due to historic land management and/or proposed Nature Area management and policies.

Barn - An old barn is present in the northern part of the property along 228th St N. The barn is useable, but will need some repairs including roof repair, loft floor replacement, restoring electrical service, and foundation reinforcement. The barn is built into the hillside and a concrete slab forms ~25ft of the loft floor offering a usable surface for equipment storage until the barn loft floor is improved. The ground floor (concrete slab) needs manure removal and clean up. The public should be excluded from this entire structure. Repurposed fencing gates could be used to secure this location. Signs and locks are also recommended.

Wells – There are several old wells on the property that may be potential hazards to the public. Two wells are located near the barn at the north end of the property. One is a shallow pounded point well with a hand pump that could be reconditioned to allow non-potable water for visitors and pets. The other is a cistern with a submerged well at its bottom. This well presents a potential hazard in that a person or animal could fit through the opening and become trapped in the well. It is recommended that this well be permanently sealed. There are several grant programs to assist with this ~\$6,000 project. One other well has been reported near the southernmost entrance to the property along Lofton Ave. It is believed that this is another shallow pounded point well that could be reconditioned. Staff have been unable to locate this well.

Wetlands and Open Water – Two open water ponds are located on the property along with abundant wetland habitats (~120 acres in total). These water resources are easily identifiable when approaching on foot and will vary in size based on the abundance of recent rainfalls. These features do not present any hazard other than those normally associated with surface water bodies. They are highly visible and posting signage for their presence is not necessary.

Conservation Grazing – This potential management tool presents a significant public hazard. Interactions between cattle and visitors to the property could lead to injury, damage of property, or injury to the animal. Careful management and access restrictions should be imposed during conservation grazing to avoid these risks. It is recommended that areas being actively grazed are not

open for public access. Signs and public notice of this management activity should be posted prior and during implementation. Temporary fencing or GPS collars should be used to limit grazing areas and reduce public / cattle interaction – see the conservation grazing section above.

Hazard Trees – Several dead or dying trees were identified on the property – primarily green ash in the forested wetland areas and hardwoods within the forested areas. Dead trees within falling distance of the trail system should be identified and removed to reduce risk to the public. Dead and dying trees located greater than 200 ft from the trail system should be left standing as they provide crucial wildlife habitat.

Hunting and Firearms – A potential for negative interactions between hunters / firearm discharge and the general public or adjacent properties / landowners is a possibility. Hopefully, all Nature Area users will be respectful of the property and other visitors. State regulations prohibit discharge of firearms with 500 ft of any building. As such, signs should be placed along the property perimeter fence in areas where a building or residence on an adjacent property is within 500 ft of the fence line (Figure I). Additional signs should be placed at the Nature Area entrance indicating the hunting season, no discharge of firearms with 500 ft of any structure, the recommendation for non-hunters to wear brightly colored clothing during the hunting seasons, and a request for all visitors to be respectful of other visitor's recreation choices.

Remnant Farm Debris- Inspection of the property identified several remnant agriculture debris items that could pose a minimal risk to Nature Area visitors. These items should be removed prior to opening the Nature Area to full public access. In addition, all internal fencing should be evaluated and removed if not useful in the management of the property (conservation grazing).

Dumping and Contamination

During the site inspection, no signs of dumping or contamination were observed. This is consistent with the findings of the Phase I Environmental Site Assessment conducted by Emmon and Olivier Resources Inc during August of 2025.

Historic Site Usage and “illegal” Access

The Bone Lake South Nature Area has been farmed for over 100 years. Recent agriculture uses included hay production and harvest in the uplands and rotational cattle grazing near the large wetland complex and southern forested area. Remnants of the agriculture history can still be seen upon the landscape in the form of the old barn along 228th St, old farm roads, cattle trails, some discarded farm debris, and several old wells associated with the former farmsteads.

With the blessing of the former landowner, the property was commonly accessed by local residence for hiking and hunting. Conversations with neighbors that attended the March 30, 2026 BLSNA informational meeting indicated a long history of this type of access/use as well as revealed a history of trespassing, fence cutting, and other access related issues. As such, the District should prioritize fence / illegal access inspections and related repair work to dissuade access at locations other than the official access point along 228th st. In addition, it will be crucial to establish and enforce property rules to be sure to usher in and reinforce the public's acceptance of the new land use / management of the Site.

SUMMARY OF RECOMMENDATIONS

The Bone Lake South Nature Area is a 238-acre farmstead located just South of Bone. It contains a unique mix of habitat types including: remnant prairie / oak savanna, northern mixed hardwood forest, and several wetland habitat types. The property holds high potential for successful restoration and protection of these native MN habitats. As such, it is recommended that the District restore this unique blend of habitats to benefit wildlife while providing non-motorized recreation opportunities for the community.

Outdoor Heritage Fund grant dollars have been secured for property restoration. As such, restoration planning and site preparation should begin as soon as 2026. This will allow much of the property restoration to occur during the summer 2027 (prairie/oak savanna) and winter 2027/28 (Wetland Legacy Load Restoration). This schedule will help to maximize the restoration achievements possible within the allotted grant window. As public access is also a priority for the property, establishing parking, perimeter fencing, and removal of hazards should also occur in year one or two of the restoration effort.

Secondary restoration actions, such as the lateral wetland and forest enhancement activities would follow in 2028 and 2029 along with access trail development. These actions are consistent with the values and goals of the funding agencies as well as the core values of the District – specifically encouraging wildlife habitat and public access. The five-year restoration work plan included in this document details the restoration efforts and timelines. Actual design work for the restorations will be developed by the District Engineer (Emmons and Olivier Resources, Inc), District Staff, and/or outside consultants during the 2026 planning and site preparation year.

Upon completion of the proposed 2027/28 restoration actions, it is recommended that the property be opened to the public for non-motorized access and day-use recreation. Management of the property should focus on protecting natural spaces, enhancing wildlife habitat, promoting ecosystem resiliency, providing public access, and encouraging seasonal hunting, fishing, and outdoor recreation activities. It is also recommended that the District operate the property as a wild Nature Area or reserve - as opposed to a park-like area with pavilions, play structures, and/or other amenities. As desirable as these amenities may be for the public, they do not conform to the intent of the property acquisition grants nor are they allowable under the terms of the grant agreements.

Upon completion of the restoration efforts, an annual operations and management budget of ~\$13,000 would be needed for upkeep of the Nature Area for the immediate future. These funds would be used to repair fences, trails, and access points, to maintain the restored habitats, to control invasive species, and to maintain equipment and infrastructure. Much of this maintenance work would be completed by staff, volunteers, and/or contractors (herbicide application, prescribed burns, etc.). The annual budget should be reviewed and refined every 3-5 years to account for inflation and /or pressing land management needs.

To control public access and associated litter/dumping, a single access point to the property should be established off 228th St N, across from Mallard Ave N -as recommended/approved by the City of Scandia. At this location, a fenced 15 -20 vehicle capacity gravel parking lot should be created to allow access to over 3

miles of trails throughout the property. Property rules and regulations should be clearly posted at this location to both inform and educate the public about the property, restoration efforts, property history, as well as indicate allowable recreation activities for the Nature Area. This single access point would also allow better regulation of the public use of the property and allow better enforcement of Nature Area regulation. The remnant farm roads on the property would form the basis of the trail system, with some trail relocation needed to avoid sensitive areas and/or connect the entirety of the property. Additional interpretive signs could be placed along the trail system pointing out unique ecological or historical sites.

As natural landscapes are inherently dynamic, so must be any plan that hopes to adequately manage those lands. As such, the District should utilize its proven adaptive management philosophy to manage and operate the Bone Lake South Nature Area. This would include management of native and invasive vegetation, providing for appropriate public uses, and engaging stakeholders (general public, volunteers, neighboring landowners, etc.) in management activities and educational programs. Adaptive management is a systematic process for continually improving management policies, planning, and practices. Monitoring and evaluating the outcomes of management (and outreach) activities, recreation pressure, the results of activities such as restoration implementation, prescribed fire, grazing, and invasive species control can inform future planning and selection of best practices. Providing for appropriate public use is necessary for long-term public support for all preservation, enhancement, and management activities.

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Natural Resources Index (includes: Animals, ECS, Forests, Invasive Species, Native Plant Communities, Plants, Rare Species Guide, Rocks & Minerals, Watershed Information, additional fact sheets and information) - <http://www.dnr.state.mn.us/nr/index.html> . Accessed multiple times, 2018.

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FIGURES

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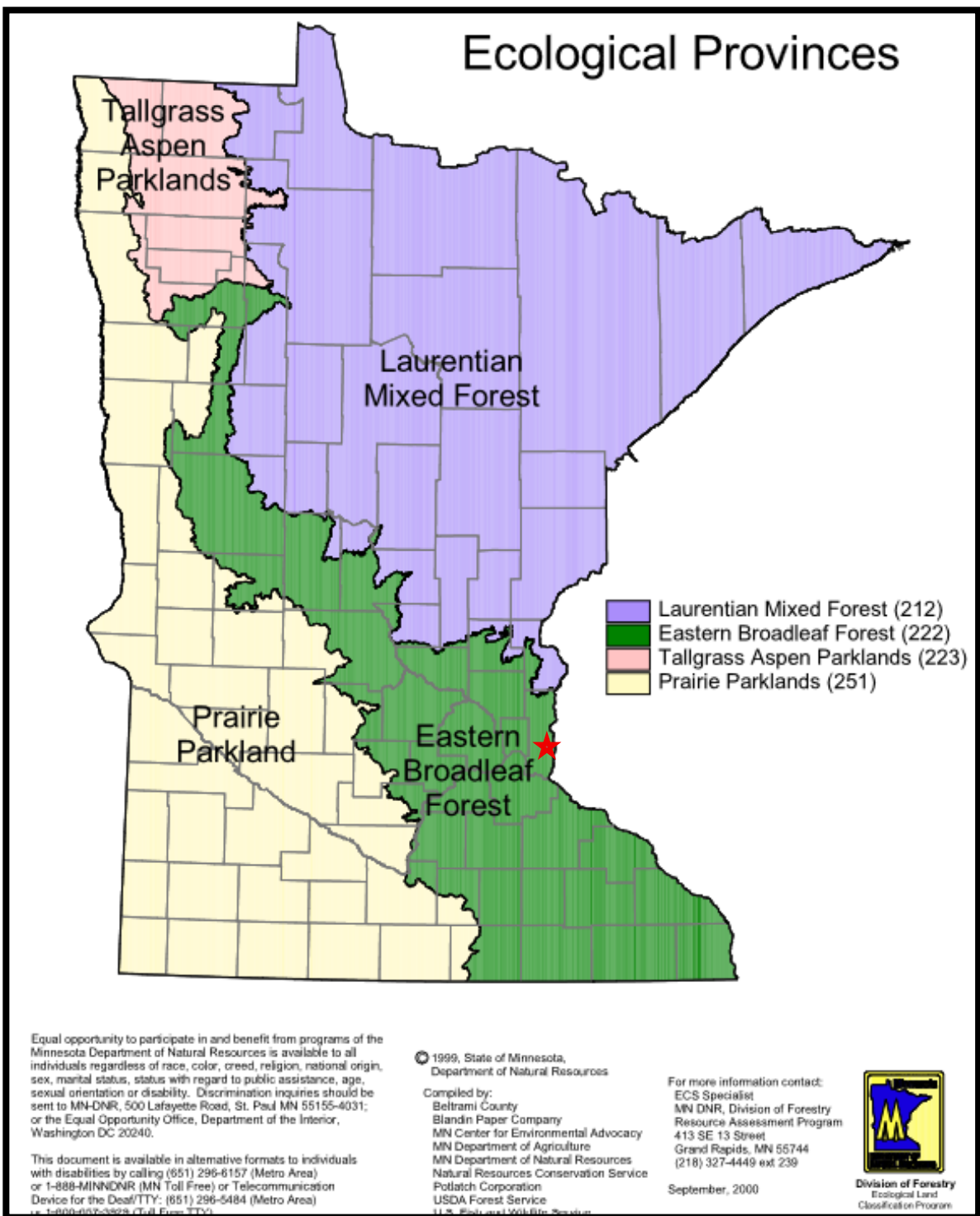
Figure A. Location



PROPOSED PARCEL DESCRIPTIONS



Figure C. Ecoregion



The red star indicates the approximate location of the Bone Lake South Nature Area – at the transition of the Eastern Broadleaf Forest and Laurentian Mixed Forest. https://files.dnr.state.mn.us/natural_resources/ecs/province.pdf

Figure D. Topography



Topography map of the Bone Lake South Nature Area. <https://mntopo.dnr.state.mn.us/>

[illegible]

Map Unit Symbol	Map Unit Name
12C	Emmert gravelly loamy coarse sand, 3 to 12 percent slopes
49C	Antigo silt loam, 6 to 15 percent slopes
49D	Antigo silt loam, 15 to 35 percent slopes
120	Brill silt loam
155C	Chetek sandy loam, 6 to 12 percent slopes
155D	Chetek sandy loam, 12 to 25 percent slopes
159B	Anoka loamy fine sand, 3 to 9 percent slopes
177D	Gotham loamy sand, 12 to 20 percent slopes
302B	Rosholt sandy loam, 2 to 6 percent slopes
302C	Rosholt sandy loam, 6 to 15 percent slopes
454C	Mahtomedi loamy sand, 6 to 12 percent slopes
454D	Mahtomedi loamy sand, 12 to 25 percent slopes
507	Poskin silt loam
540	Seelyeville muck
541	Rifle muck
543	Markey muck
544	Cathro muck
1847	Barronett silt loam, sandy substratum
C56C	Braham-Cutaway loamy sands, 2 to 12 percent slopes
C75A	Seelyeville, occasionally ponded-Cathro, frequently ponded, complex, 0 to 1 percent slopes
W	Water

Figure F. Drainage Area of Bone Lake South Nature Area

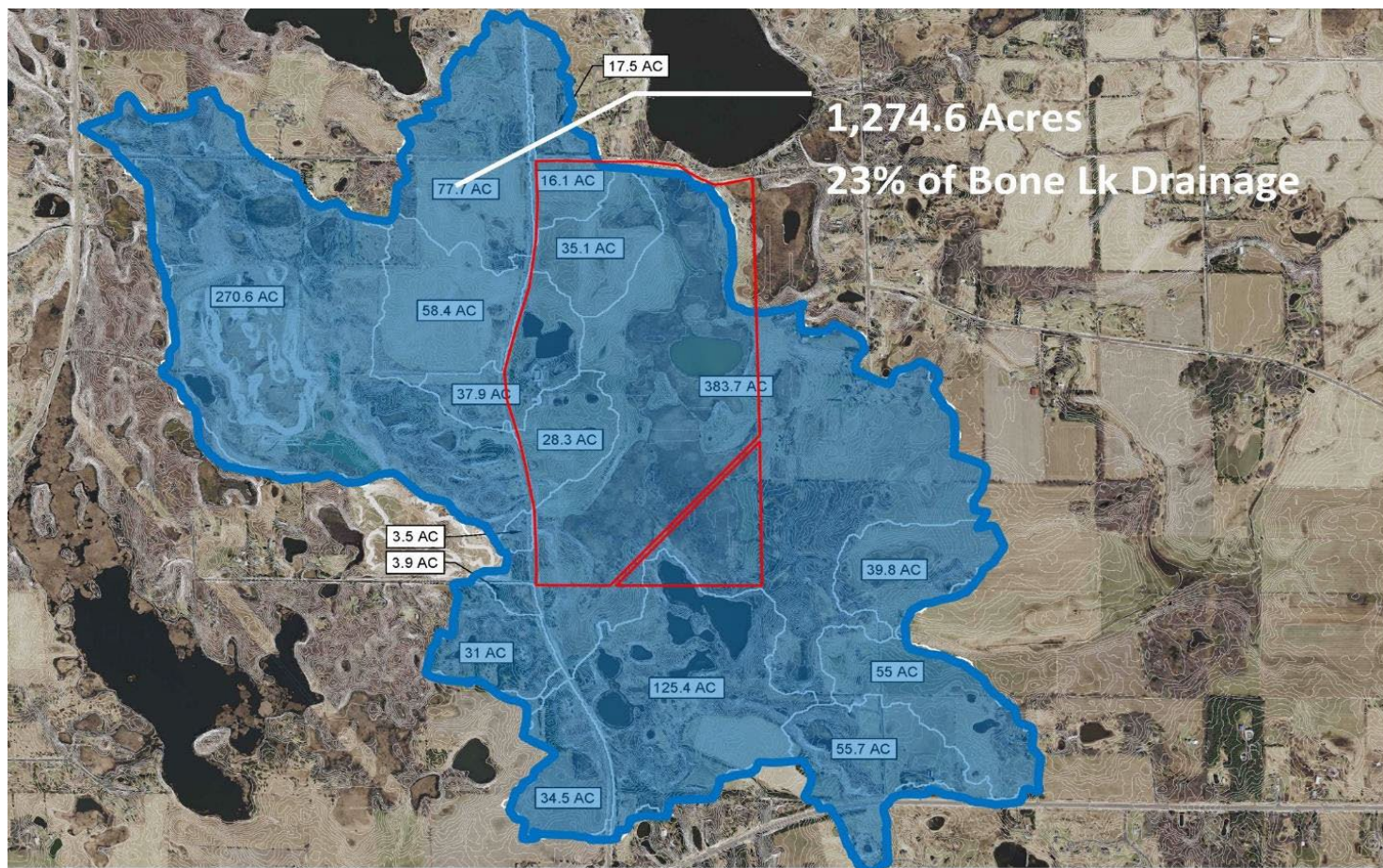
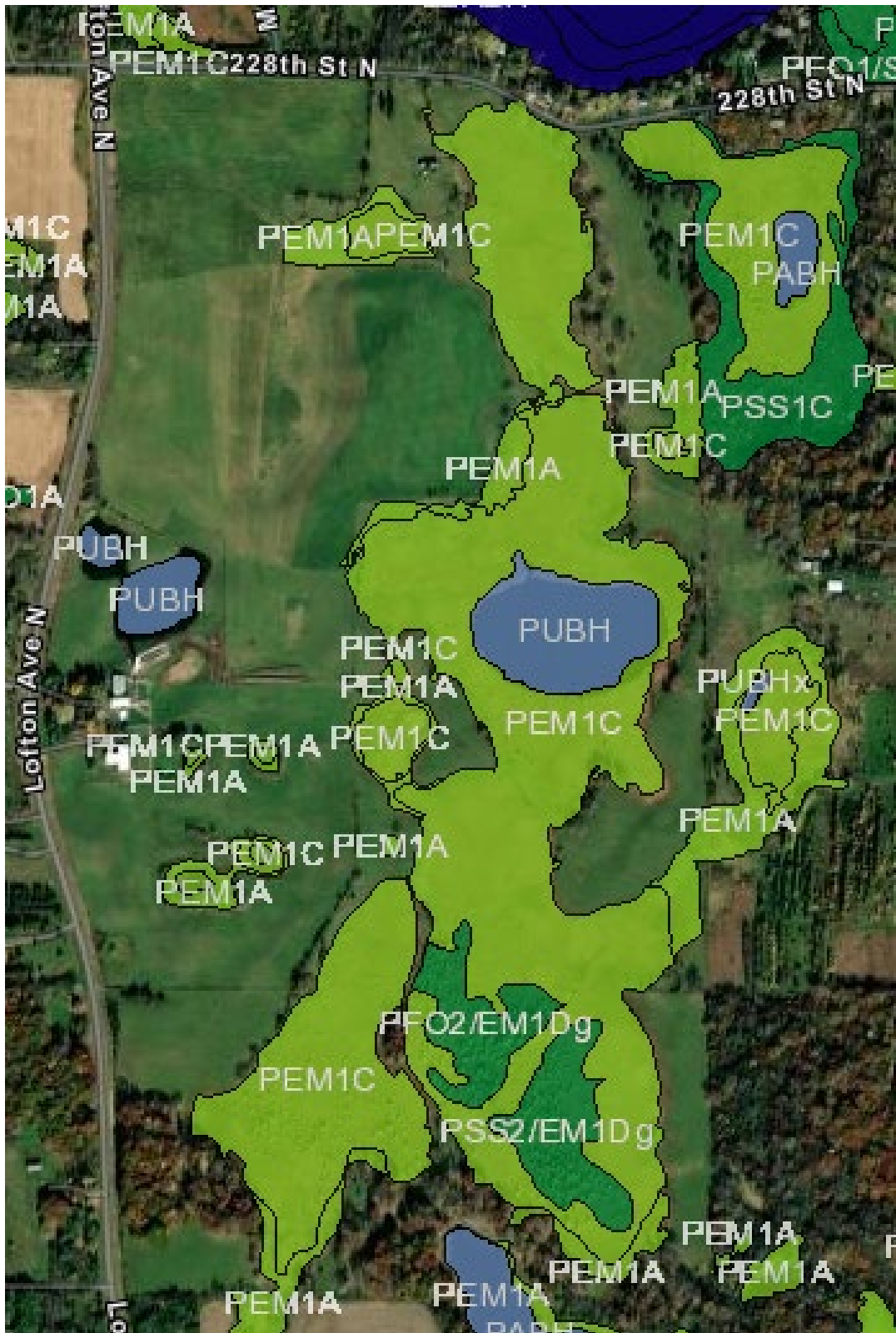


Figure G. Water Resources



National Wetland Inventory Map of the BLSNA.

HGM Class	Circular 39	Eggers & Reed	Cowardin Vegetation Class	Typical Water Regimes
Depression	1	Seasonally Flooded Basins	PEM- Emergent	Seasonally Flooded
Riverine	1	Floodplain Forests	PFO- Forested	Temporary Flooded
Depression Sloped Organic Flat	2	Sedge Meadows	PEM- Emergent	Saturated
Riverine Depression Mineral Flat	2	Fresh (wet) Meadows	PEM- Emergent	Saturated
Depression	2	Wet to Wet-Mesic Prairies	PEM- Emergent	Saturated
Sloped	2	Calcareous Fens	PEM- Emergent	Saturated
Depression Lacustrine Fringe	3	Shallow Marsh	PEM- Emergent	Semi permanently flooded (up to 6")
Depression Lacustrine Fringe	4	Deep Marsh	PEM- Emergent PAB-aquatic bed	Semi permanently to permanently flooded (6"-3')
Depression Lacustrine Fringe	5	Shallow, Open Water	PEM- Emergent PUB-Unconsolidated Bottom	Permanently flooded (up to 8.2')
Mineral Flat Sloped	6	Shrub-Carr	PSS- Scrub-shrub	All regimes except permanently flooded (Saturated most of growing season)
Mineral Flat Sloped	6	Alder Thicket	PSS- Scrub-shrub	All regimes except permanently flooded (Saturated most of growing season)
Mineral Flat Sloped	7	Hardwood Swamp	PFO- Forested	All regimes except permanently flooded (Saturated most of growing season)
Mineral Flat Organic Flat Sloped	7	Coniferous Swamp	PFO- Forested	All regimes except permanently flooded (Saturated most of growing season)
Organic Flat	8	Open Bog	PML- Moss-lichen	Saturated
Organic Flat	8	Coniferous Bog	PFO- Forested	Saturated

Wetland classification system comparison and descriptions.

Figure H. Tentative Trail System for the BLSNA

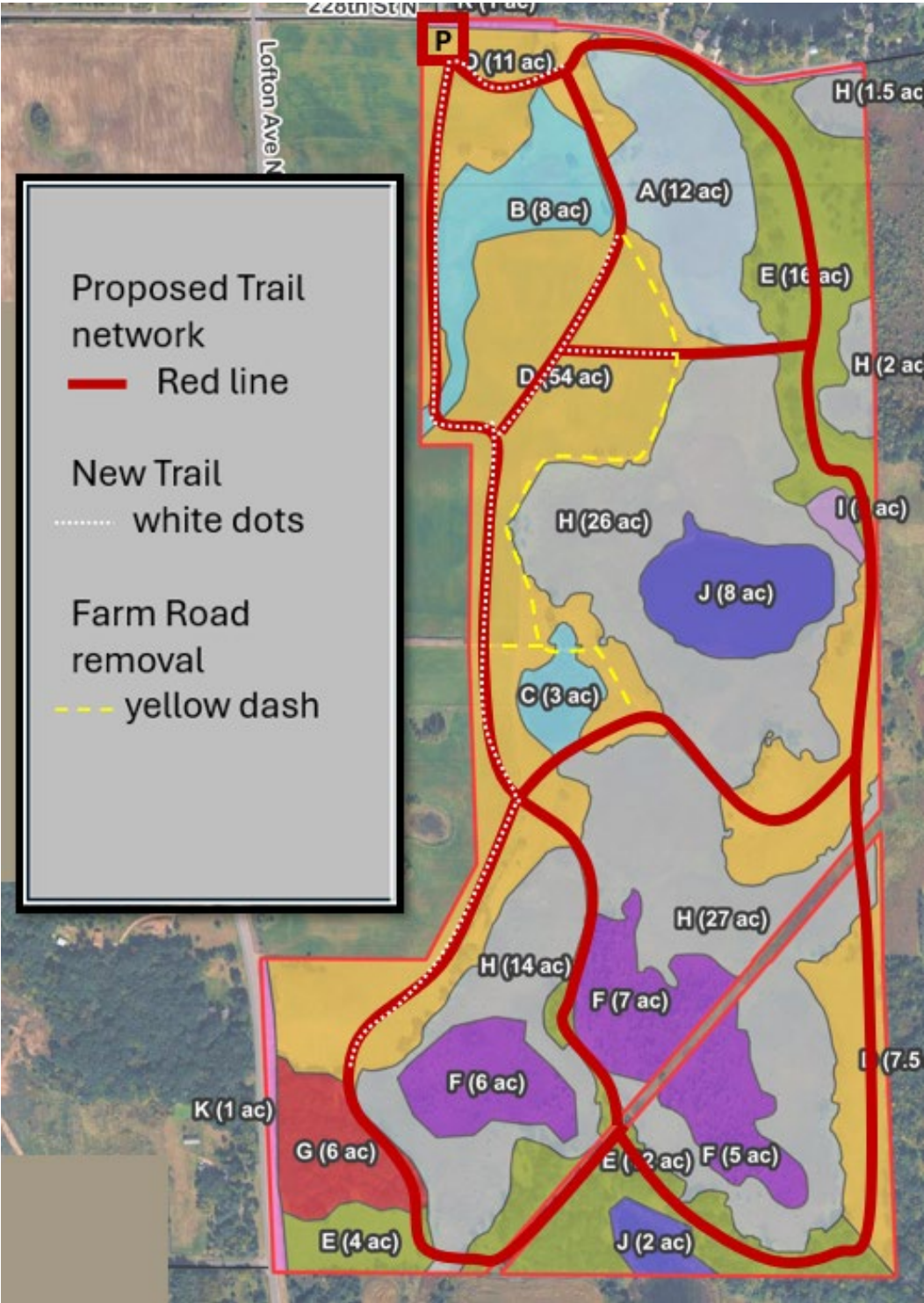
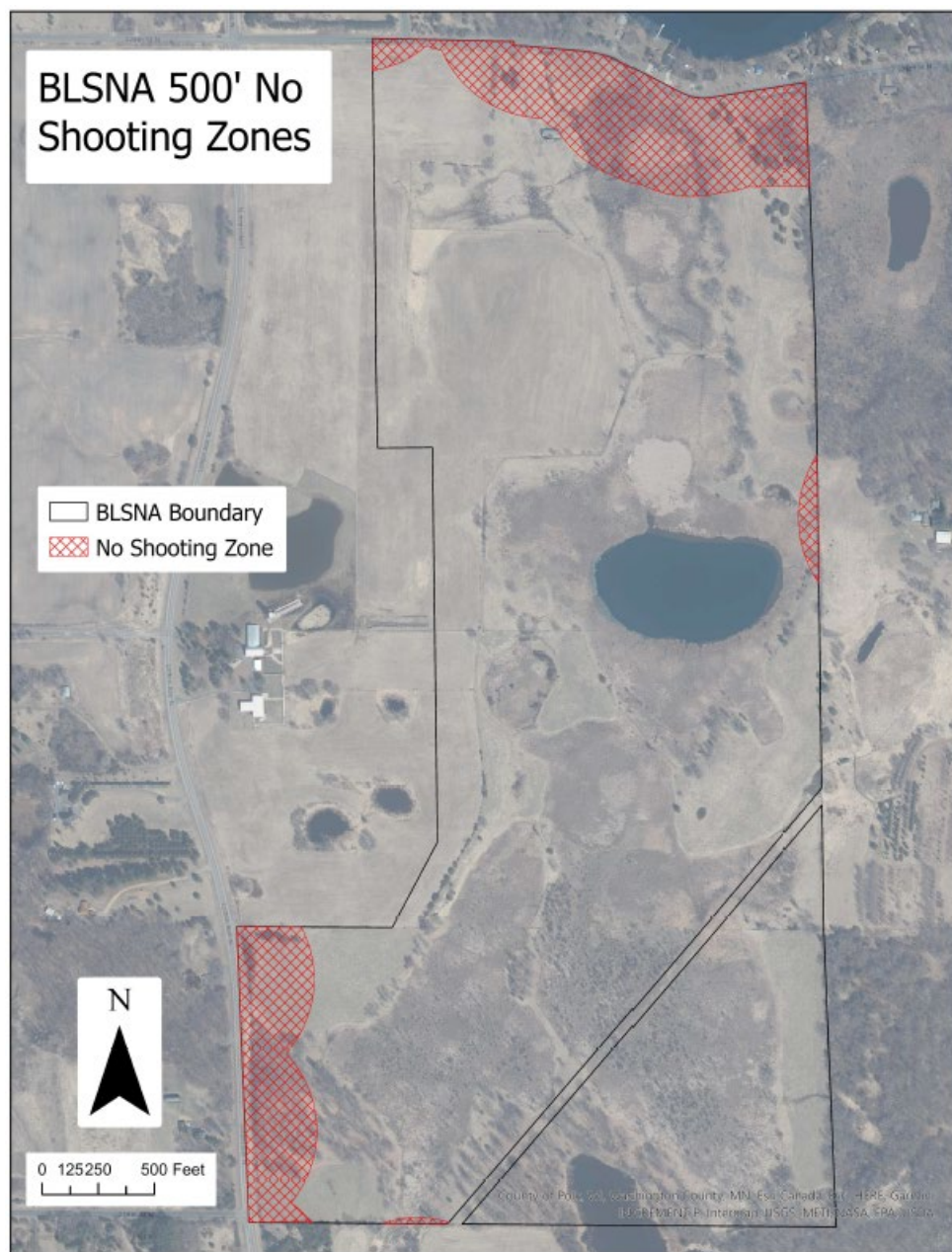


Figure I. Hunting Exclusion Areas.



Appendix A: Photos

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Historic Photos of the BLSNA

The Yellow Star is a point of reference between the images.



1938



1953



1957



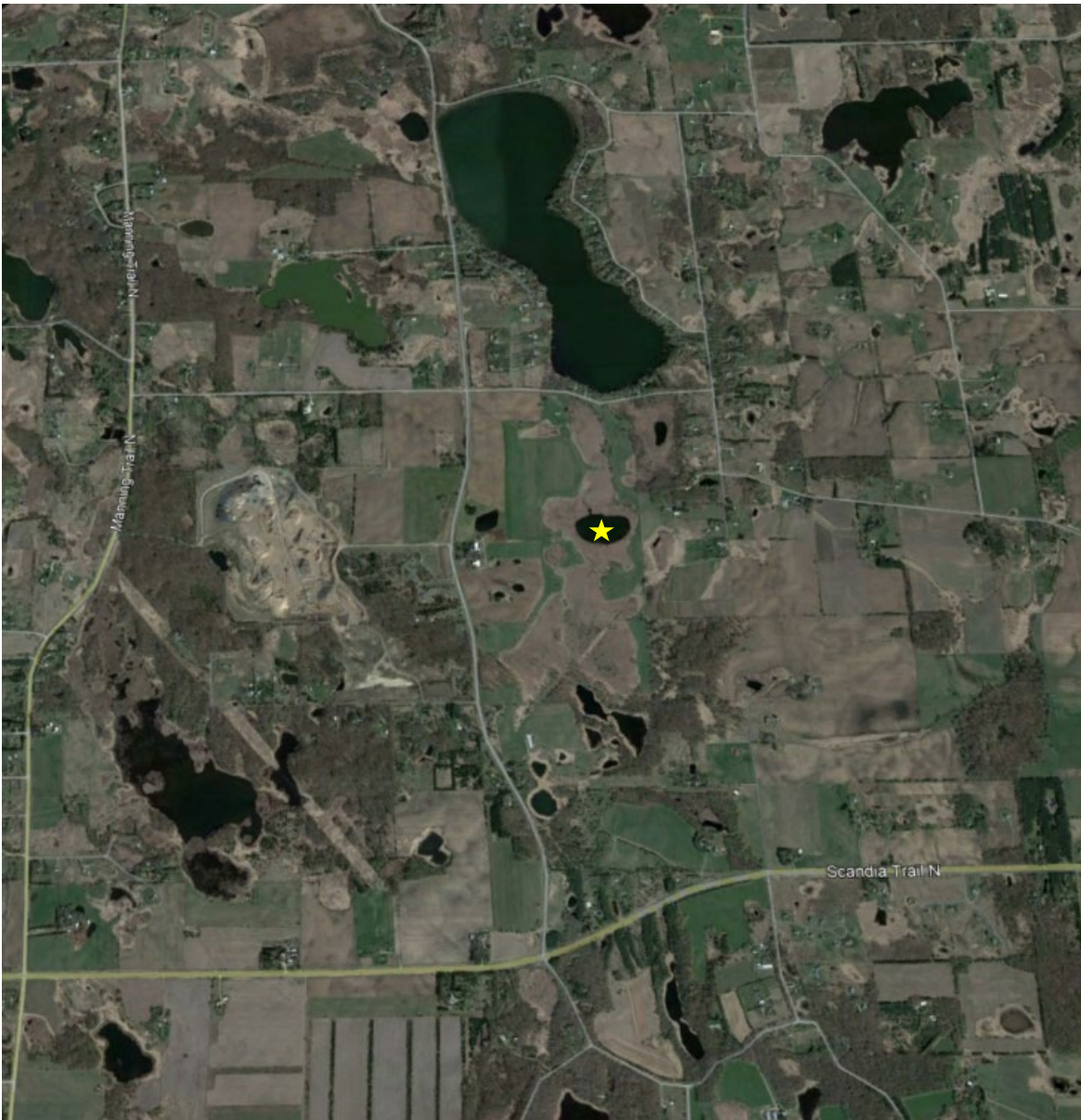
1964



1991



2004



2012



2020

Property Images



Sothern Ponds



Remnant Oak Savana



Tamarack Swamp in south of property



Large open water in center of property



Mixed Northern Hardwood Forest – SW area of property



Hay Fields / Remnant Prairie



Barn located off 228th St N



Wells adjacent to the Barn



Southern Access off Lofton



Northern Access off Lofton



Barn Access of 228th



Proposed Parking Area (across from Mallard Dr)



Powerline Corridor facing north from southern property line



Powerline Corridor facing north from southern edge of wetland complex



Powerline Corridor facing south from eastern edge of property – Xcel matting in place for pole replacement



Northern Rich Fen located on the eastern "shoulder" of W2

Appendix B – Additional Resources

Management Plan Purpose – WMP Context and District Goals

The purpose of this document is to establish a plan for natural resource management for the acquired property known as the Bone Lake South Nature Area in accordance with the guidelines provided in section 3012 of the Comfort Lake-Forest Lake Watershed District's (CLFLWD) 2022-2031 Watershed Management Plan (WMP).

Under this program, the Board of Managers will acquire land and land access to support capital projects and reinforce public education and recreation. The District may also utilize this program to acquire land for the purposes of a District office space. Under this program the District will develop a Land Acquisition & Management Comprehensive Plan to provide further detail on land acquisition procedures, contacts, etc.

Before committing funds to acquire a fee or easement interest, the Board of Managers will consider the following:

- *The potential suitability of the property for a capital project or other project identified in the Plan.*
- *The potential for the land rights to facilitate the District's pursuit of water quality, flood management or other water resource goals identified in the Plan, with respect to specific waterbodies or more generally.*
- *The market value of the rights to be acquired, by means of appraisal or other valuation as the Board of Managers determines appropriate for the transaction.*
- *The water resource value of the acquisition.*
- *Consistency of the District's acquisition with the city's or township's land use classification and plans and potential for collaboration on use of the property.*
- *The extent to which the water resource purposes of the acquisition may be achieved without the District's spending public funds, due to physical, regulatory or similar constraints on use of the property.*
- *Ongoing property management costs.*
- *The District's ability to dispose of its property interests if its potential use for a capital or other project fails to materialize.*

Terms of this natural resource management plan reflect the District's consideration of the factors listed above. In the course of management operations, District representatives may deviate from these guidelines on the basis of judgments concerning expected hydrologic loads, flora and fauna considerations, hydraulic response and other relevant factors. The District will manage the Site in the best interest of affected watershed residents and businesses. However, this manual is for internal use only and does not create any right in any third party with respect to the manner in which the Site is managed. By adopting this manual, the District is not assuming any duty not otherwise imposed by law and reserves all immunities and other rights and protections it is afforded under law.

DISTRICT GOALS & MANAGEMENT OPPORTUNITIES

The following section outlines management opportunities for the Site within the context of applicable District Goals identified in the 2022-2031 [Watershed Management Plan](#). Protection, restoration, and enhancement on this site will provide multiple benefits and serve multiple goals.

Applicable District Goals

5100 Floodplain

This site has the potential to provide up to 300 acre feet of additional flood storage.

Goal 1: Reduce or mitigate flooding in areas with known flooding and/or high water problems by achieving the interim measurable goal of increasing water storage by an additional 99 ac-ft (or 0.16 inches over 7,397 acres of upland) over

the next 10 years (2022-2031) based on the Lower St. Croix 1W1P.

5200 Lakes

This site will protect and improve water quality in Bone Lake, which is located immediately downstream of the site.

Goal 2: Adaptively manage District lakes to improve water quality by achieving the 10-year (2031) total phosphorus and Secchi goals.

5400 Wetlands

This site will restore and enhance wetlands to support water quality treatment, support flood attenuation and storage, enhance wildlife habitat and recreational opportunities, and establish wetland buffers.

Goal 1: Restore or enhance at least 400 acres of wetlands that support water quality treatment.

Goal 2: Restore or enhance at least 200 acres of wetlands to support flood attenuation and storage.

Goal 3: Preserve existing wetland buffers and encourage the establishment of buffers for water quality and habitat benefits through District Programs.

Goal 4: Restore or enhance at least 80 acres of wetlands to support wildlife habitat and recreational opportunities.

5500 Upland Resources

This site will provide one new natural park open space within a priority area identified in the Bone Lake Management District.

Goal 1: Partner with municipalities to establish at least 1 new natural park open space within a lake management district priority area.

Granting Resources

Below is a list of Grants that may be appropriate for the recommended management actions for this Site.

- MN DNR Conservation Partners legacy (L-SOHC)
- Environmental and Natural Resources Trust Fund (ENRTF)
- EPA Aquatic Ecosystem Restoration (CAP Section 206)
- North American Wetlands Conservation Act Grants Program
- Five-Star Restoration Program
- Native Plant Conservation Initiative
- Bring Back the Natives (BBN)
- Community-based Habitat Restoration Partnership

Additional Management Information

Invasive Species Management

Due to a history of grazing and hay production, the Bone Lake Soth Nature Area is relatively free of any large invasive species infestations. Several invasive species are present, but in low enough abundance that they can be effectively managed by hand pulling or spot herbicide application and periodic mowing.

In general, all invasive species management should use an integrated pest management plan that considers the following guidelines:

1. Populations of invasive species should be inventoried and delineated to help identify priority areas.
2. Prioritize areas in early stages of invasion, areas adjacent to higher quality communities, and novel invasive species.
3. Conduct regular inspections and removal efforts (hand pulling, mechanical, and herbicide treatment.)
4. Treated areas should be reseeded or replanted with native plants appropriate for each community. Seeds

and plants should be sourced from a certified native plant provider within the same ecoregion. The MN DNR recommends sourcing native seed from within 30 miles if possible.

Invasive species management within wetland and upland areas could improve water quality, would greatly improve the herbaceous and woody understory, would allow for long-term survival and recruitment of native tree and forb species, as well as have multiple benefits for wildlife. Staff, volunteers, and groups such as MN Conservation Corps or MN Green Cops could be used to help control invasive species on an annual basis. In addition, the mowing included in the restoration plan will be used to limit the spread of invasive species.

Invasive Species Prevention

A key element of invasive species management is the prevention of introduction or spread of new invasive plant species. This can be accomplished by education and outreach as well as through regulations limiting Nature Area use and access. Educational signs and a shoe cleaning station should be installed at the Nature Area entrance to both educate visitors and promote land stewardship / prevention of invasive seed dispersal. Access regulations that limit introduction of invasive seeds on muddy tires and in animal droppings (manure with undigested invasive seeds) will be enforced. The measure will reduce the spread of invasive plant seeds and limit the ground disturbance that promote these aggressive invasive species establishment. These regulations include the exclusion of all motorized vehicles, bicycles, and pack animals – see Public Access section below.

Forest Health and Resiliency

No major invasive species issues have been identified in the upland area. Woody invasives including common buckthorn (*Rhamnus cathartica*) and Tatarian honeysuckle (*Lonicera tatarica*) were identified in small numbers and will need to be monitored and/or removed regularly as indicated in the above section. The abundance of these invasive species is such that annual pulling or localized herbicide treatments should sufficiently control these species.

The current condition of the forested areas of the property allows for management that would result in two distinct habitat types – Oak Savana or Mesic/Mixed Northern Hardwood Forest. Both ecosystems would be considered suitable for the historical landcover of this area. If left alone, and in the absence of a regular disturbance regime (such as mowing or prescribed fire), the property would likely move to the hardwood forest ecotype. Restoration goals call for the establishment of Oak Savana on the property. As such, actions should be undertaken to establish and maintain that type of habitat, while also promoting forest health in the already established Mixed Northern Hardwood Area. Periodic mowing, prescribed burns, conservation grazing are all tools that could be used to achieve the goals for both forest types.

Part of the hardwood forest management strategy would be the promotion of biodiversity and forest resiliency. This could take the form of understory enhancement and canopy replacement and augmentation. As mentioned elsewhere in this document, the understory is mostly void of shrubs and trees in the stem or sapling stage. Bare root shrubs and trees can be purchased for less than \$2.00 per plant and could be planted by staff or volunteers as needed to add diversity to the understory of the upland and trees could also be added near the upland wetland fringe to increase diversity and build in resiliency to future climate change.

Understory planting species could include chokecherry, hazelnut, *vaccinium*, or other mast or fruit producing species that could provide wildlife forage (see the shrub guide in the appendix for additional recommendations). Tree species appropriate for the area may include basswood, northern red oak, sugar maple, paper birch, and red maple (see the information sources section of this document for additional tree guidance). Bare root plants can often be purchased

through spring plants sales by conservation districts, the DNR, or purchased directly from a grower/nursery (usually 100 plant/species minimum order).

Hydrology Restoration

Approximately 120 acres of the Bone Lake South Nature Area are wetland habitat. A series of farm roads with associated culverts separate these wetlands causing some hydrologic disconnection and/or limiting the flow of water between the wetlands. This farm road network should be evaluated during the trail planning/establishment effort for the property to determine which culverts need to be replaced, resized, or repositioned and if any of the farm roads should be eliminated from the proposed trail network. Modeling could be utilized to evaluate wetland hydraulic connections and determine if actions are needed to reconnect these habitats.

Methods for Controlling Exotic, Invasive Plant Species

A. Trees and Shrubs

Common Buckthorn, Tartarian Honeysuckle, Siberian Elm, and Black Locust are some of the most common woody species likely to invade native woodlands or prairies in Minnesota. Invasions result in a dense, impenetrable brush thicket that reduces native species diversity.

Siberian elm, native to eastern Asia, grows in disturbed and low-nutrient soils with low moisture. Seed germination is high and seedlings establish quickly in sparse vegetation. It can invade and dominate disturbed areas in just a few years. Black locust is native to the southeastern United States and the very southeastern corner of Minnesota. It has been planted outside its natural range, and readily invades disturbed areas. It reproduces vigorously by root suckering and can form a monotypic stand.

1. Chemical Control

All chemical applications should be part of a integrated pest management plan.

One efficient way to remove woody plants that are half inch or more in diameter is to cut stems close to the ground and treat the cut stumps with herbicide immediately after they are cut, when the stumps are fresh and the chemicals are most readily absorbed. Failure to treat the stumps will result in resprouting, creating greater removal difficulty.

In non-freezing temperatures, a glyphosate herbicide such as Roundup can be used for most woody species, although triclopyr is generally more effective. Apply using label indicated rates and concentrations. Adding a marker dye can help to make treated stumps more visible. In winter months, an herbicide with triclopyr must be used. Garlon 4 is a common brand name and it must be mixed with a penetrating oil manufactured for the purpose such as Bark Oil Blue.

Brush removal work can be done at any time of year except during spring sap flow, but late fall is often ideal because buckthorn retains its leaves longer than other species and is more readily identified. Cutting can be accomplished with loppers or handsaws in many cases. Larger shrubs may require brush cutters and chainsaws, used only by properly trained professionals.

For plants in the pea family, such as black locust, an herbicide with the active ingredient clopyralid can be more effective than glyphosate. Common brand names for clopyralid herbicides are Transline, Stinger, and Reclaim.

In the year following initial cutting and stump treatment, there will be a flush of new seedlings as well as resprouting from some of the cut plants. Herbicide can be applied to the foliage of these plants. Fall is the best time to do this, when desirable native plants are dormant and when the plant is pulling resources from

the leaves down into the roots. For fall foliar treatments, Triclopyr is recommended for most non-coniferous woody species. Glyphosate and Krenite (active ingredient – fosamine ammonium) are also commonly used herbicides for foliar application. Glyphosate is non-specific and will kill anything green, while triclopyr targets broadleaf plants and does not harm graminoids. All herbicides should be applied by licensed applicators using label indicated application standards and rates. Care should be taken to avoid application to other plants. “Weed Wands” or other devices that allow dabbing of the product can be used rather than spraying, especially for stump treatment.

Basal bark herbicide treatment is another effective control method. A triclopyr herbicide such as 10% Garlon 4, mixed with a penetrating oil, is applied all around the base of the tree or shrub, taking care so that it does not run off. If the herbicide runs off it can kill other plants nearby. More herbicide is needed for effective treatment of plants that are four inches or more in diameter.

2. Mechanical Control

Three mechanical methods for woody plant removal are hand pulling (only useful on seedlings and only if few), weed wrenching (using a weed wrench tool to pull stems of one to two inches diameter), and repeated cutting. Pulling and weed wrenching can be done any time when the soil is moist and not frozen. The disadvantage to both methods is that they are somewhat time-consuming, as the dirt from each stem should be shaken off. Weed wrenching also creates a great deal of soil disturbance and should not be used on steep slopes or anywhere that desirable native forbs are growing. The soil disturbance also creates opportunities for weed germination. This method is probably best used in areas that have very little desirable native plant cover.

Repeated cutting consists of cutting the plants (by hand or with a brush cutter) at critical stages in its growth cycle. Cutting in mid spring (late May) intercepts the flow of nutrients from the roots to the leaves. Cutting in fall (about mid-October) intercepts the flow of nutrients from the leaves to the roots. Depending on the size of the stem, the plants typically die within three years, with two cuttings per year.

Undesirable trees and shrubs can also be destroyed without cutting them down. Girdling is a method suitable for small numbers of large trees. Bark is removed in a band around the tree, just to the outside of the wood. If girdled too deeply, the tree will respond by re-sprouting from the roots. Girdled trees die slowly over the course of one to two years. Girdling should be done in late spring to mid-summer when sap is flowing and the bark easily peels away from the sapwood. Herbicide can also be used in combination with girdling for a more effective treatment.

3. Stems, Seedlings and Re-sprouts

Prescribed burning is one method that may be a cost effective way to control very small stems, seedlings, and re-sprouts of all woody plants. It also restores an important natural process to fire-dependent natural communities (oak forests, for example). Burning can only be accomplished if adequate fuel is present and can be done in late fall or early spring, depending on conditions. If burning is not feasible, critical cutting in the spring is also effective, though it can impact desirable herbaceous plants as well. Foliar (leaf) application of a bud-inhibitor herbicide (Krenite) during fall is also effective. This method can also affect non-target species, though most natives will be dormant by that time.

4. Disposal

The easiest and most cost-effective method to handle large amounts of brush is usually to stack it and burn it in winter. In areas where brush is not dense, it can be cut up into smaller pieces and left on the ground where it will decompose in one to three years. This method is especially useful on slopes to reduce erosion potential. Small brush piles can also be left in the woods as wildlife cover. Where there is an abundance of larger trees, cut trees may be hauled and chipped and used for mulch or as a biofuel. Alternatively, the wood can be cut and used for firewood, if a recipient can be found. For large amounts of material, chipping and disposing of the material onsite can rapidly restore organic matter to the impacted area.

B. Forbs

1. Canada Thistle

Native thistles are not generally problematic, invasive species such as Canada thistle are clone-forming perennials that can greatly reduce species diversity in old fields and restoration areas (Hoffman and Kearns 1997). A combination of chemical and mechanical control methods may be needed. Chemical control is most effective when the plants are in the rosette stage and may be less effective when the plants are flowering. A broadleaf herbicide such as 2,4-D is appropriate to minimize damage to native grasses. It is most effective when applied 10 to 14 days before the flowering stems bolt. Dicamba could also be used, with the advantages that it can be applied earlier in the spring. All herbicides should be applied at label rates and as part of an integrated pest management plan. Plants that do not respond to treatment or that are more widely dispersed could be controlled mechanically.

Mechanical control, involving several cuttings per year for three or four years, can reduce an infestation, if timed correctly. The best time to cut is when the plants are just beginning to bud because energy reserves are at their lowest. If plants are cut after flowers have opened, the cut plants should be removed because the seed may be viable. Plants should be cut at least three times throughout the season. Late spring burns can also discourage this species, but early spring burns can encourage it. Burning may be more effective in an established prairie, where competition from other species is good, than in an old field, where vegetation may not be as dense.

2. Wild Parsnip

Treat wild parsnip similar to Canada thistle. Recommendations include:

Mechanical

- Do nothing in healthy prairies, natives can sometimes outcompete the parsnip
- Hand pulling and removing of plants
- Cut the plant below the root crown before seeds set, and remove the cut plant
- Mow or cut the base of the flowering stem and remove

Chemical

- Use sparingly in quality habitats
- Spot application with glyphosate or selective metsulfuron after a prescribed burn; parsnip is one of the first plants to green up

This plant can be very irritating to the skin for some people. It contains a toxin that reacts with sunlight to produce welts on the skin, similar to poison ivy. The welts can itch and get infected. Use gloves and long sleeves when handling this plant.

3. Sweet Clover

White and yellow sweet clovers are very aggressive annual species that *increase* with fire. Sweet clover can be eliminated by using a treatment that eliminates smooth brome. However, it is a common plant in agricultural areas, so if restoration is implemented, the area should be surveyed for this species on an annual basis. Individual plants or small populations can be removed by hand-pulling. If seed production occurs, prodigious amounts of seed could be spread.

C. Reed Canary Grass

Recommendations are summarized below. More detail can be found in the original source Reinhardt, C. H. and Galatowitsch, S. M. 2004. Best Management Practices for the Invasive Reed Canary Grass (*Phalaris arundinacea* L.) in Wetland Restorations.

1. General recommendations for Reed Canary Grass (RCG) control

Dense populations that currently exist will need to be removed for native species to establish.. For the RCG seed bank to deplete to levels that will not prevent native species establishment, RCG control will likely need to take place over several growing seasons. Minimize disturbance of the soil to prevent turning up additional RCG seed in these areas.

Even after two years of effective herbicide application, RCG will recolonize, largely from the seed bank and from incoming propagules, and outcompete new native vegetation from a restoration seeding. Therefore, three years of herbicide application are recommended.

For areas with native species cover, selective removal of RCG will be critical to the maintenance of these native populations. We recommend hand weeding of RCG seedlings in the early spring as soon as they reach an identifiable stage (removal will be easiest before the seedlings establish a network of rhizomes) and herbicide wicking of established RCG individuals in the fall (damage to non-target species will be lowest at this time when many native species have already senesced). Herbicide wicking is also an option in the early spring, but hand weeding is preferable, as herbicide applications during the early spring may not achieve complete mortality. Selective control of RCG in these areas can begin immediately and continue for as long as needed.

2. Areas with woody species cover

Some management units with woody species cover (shrub units) have been invaded by RCG, although other species exist in the understory. Similar to the areas with native species cover, selective removal of RCG rather than homogeneous treatment over a large-scale area, will be necessary. We recommend hand weeding of RCG seedlings in the early spring and herbicide treatment of established RCG individuals in the fall. Herbicide wicking is also an option in the early spring, but hand weeding is preferable, as herbicide applications during the early spring may not achieve complete mortality. Selective control of RCG in these areas can begin immediately and continue for as long as needed.

3. Reestablishment of native vegetation

Following control of RCG seeding with a native species restoration mix will be needed to stimulate reestablishment of native vegetation. If there are no high quality wetlands nearby to serve as propagule sources, and years of drainage have made the seed bank depauperate, it is highly unlikely that native vegetation will establish through natural means of propagule dispersal.

Areas that have been treated with herbicide applications must be seeded uniformly. Prepare the soil for seeding, by first performing a prescribed burn on the area (either in the previous fall or the early spring of that year) if necessary, to remove dead vegetation. The appropriate seeding rate will depend on the target community.

For areas that have received selective removal of RCG (not broadcast herbicide application), inter-seeding is recommended for areas left open after RCG removal. As native species begin to establish, selective removal of new recruits of RCG is necessary as they emerge within the establishing native community, via hand-weeding or selective treatment with herbicide.

Suggested Native Shrubs for Replacing Common Buckthorn

Dry Upland Areas					
Common Name	Scientific Name	Height [feet]	Light	Wildlife Value	Comments
New Jersey tea	<i>Ceanothus americanus</i>	2 to 3	Full sun	High: butterflies and hummingbirds	Dry prairie –forms patches.
Gray dogwood	<i>Cornus racemosa</i>	9	Sun/shade	Very high	Used by over 40 species of wildlife. Spreads
American hazelnut	<i>Corylus americana</i>	6 to 12	Sun/part shade	highly valued by mammals and birds	Spreads, but slowly; forms very deep roots
Beaked hazelnut	<i>Corylus cornuta</i>	6 to 12	Sun/shade	high	Spreads, but slowly. More northern range than American hazelnut.
Eastern red cedar	<i>Juniperus virginiana</i>	20	Sun	high	Invades prairies in absence of fire. Important bird cover in winter and summer heat.
Pin cherry	<i>Prunus pensylvanica</i>	10 to 30	Sun	Excellent	Used by 81 species of wildlife
Smooth rose	<i>Rosa blanda</i>	4 to 6	Sun/part shade		
Silver buffaloberry	<i>Shepherdia argentea</i>	8 to 10	Full sun	High: birds	Thicket forming in prairies; silvery green foliage; red berries in late summer. Native to west edge Minnesota
Wolfberry	<i>Symphoricarpos occidentalis</i>	2 to 4	Full sun		Thicket forming in prairie; small pinkish flowers
Dry-Mesic Upland Areas					
Common Name	Scientific Name	Height [feet]	Light	Wildlife Value	Comments
Allegheny serviceberry	<i>Amelanchier laevis</i>	15 to 25	Sun/part shade	high	
Round-leaved dogwood	<i>Cornus rugosa</i>	8 to 12	Part sun/shade	Butterflies use flowers; birds eat berries	
Eastern wahoo	<i>Euonymus atropurpurea</i>	6 to 20	Sun/shade		Spreads
Common ninebark	<i>Physocarpus opulifolius</i>	8 to 10	Full sun	Bird food	Dense growth habit
American plum	<i>Prunus americana</i>	20 to 35	Sun	high	
Choke cherry	<i>Prunus virginiana</i>	20 to 30	Sun/part shade	Excellent	
Sambucus pubens	<i>Red-berried elder</i>	10 to 12	Sun/part shade	High value: bird food	Cluster of white flowers; red berries in early summer.
smooth rose	<i>Rosa blanda</i>	4 to 6	Sun/part shade		
Red-berried elder	<i>Sambucus pubens</i>	6 to 12	Shade	Very high	Excellent massing, fast growing.
Bladdernut	<i>Staphylea trifolia</i>	8 to 15	Shade		Tolerates many soil conditions, disease resistant
Arrowwood viburnum	<i>Viburnum rafinesquianum</i>	5 to 8	Part shade/shade	high	Pretty foliage

Highbush cranberry	<i>Viburnum trilobum</i>	6 to 12	Sun/shade	High -Birds eat fruits.	Foliage open form in shade, dense in sun.
Wafer ash	<i>Ptelea trifoliata</i>	10 to 15	Sun/shade	Larval host for swallowtail butterfly	Foliage open form in shade, dense in sun.
Flood Tolerant Areas					
Common Name	Scientific Name	Height	Light	Wildlife Value	Comments
American elder	<i>Sambucus canadensis</i>	8 to 10	Full sun	High value: bird food	Very tolerant of soil conditions; blue-black fruit in late summer
False Indigo	<i>Amorpha fruticosa</i>	8 to 10	Sun/part shade	Butterflies	Attractive flower
Black chokeberry	<i>Aronia melanocarpa</i>	5 to 8	Sun/shade	Bird food	
Buttonbush	<i>Cephalanthus occidentalis</i>	6 to 12	Full sun	Birds, butterflies	Round flower head; fragrant
Pagoda dogwood	<i>Cornus alternifolia</i>	15 to 20	Sun/shade		Beautiful growth form.
Silky dogwood	<i>Cornus amomum</i>	6 to 12	Full sun	Bird food	Blue fruit; reddish-purple bark
Red twig dogwood	<i>Cornus sericea</i>	6 to 12	Sun/part shade	Bird food	Red twigs, greenish-white fruit
Witch hazel	<i>Hamamelis virginiana</i>	20 to 30	Sun or shade	Late-season pollinators	Unique, spider-shaped yellow flowers that bloom late in the year.
St. John's Wort	<i>Hypericum kalmianum</i>	2 to 3	Sun/part shade	Pollinators	Masses of yellow flowers in summer
Winterberry	<i>Ilex verticillata</i>	6 to 8	Sun/light shade	Bird food	Showy red fruit in fall.
Black Currant	<i>Ribes americanum</i>	3 to 6	Sun/light shade	High value: birds and mammals	White flowers and black-purple fruit
Pussy willow	<i>Salix discolor</i>	20	Full sun	Soil stabilizer	Showy catkins and ornamental
Red willow	<i>Salix sericea</i>	6 to 8	Full sun	Bird food	Upright, rounded form; and reddish-brown twigs
Meadowsweet	<i>Spiraea alba</i>	3 to 6	Full sun	Bird food	Of wet meadows. Erect branching; white flower spikes in July
Nannyberry	<i>Viburnum lentago</i>	16 to 20	Sun/part shade	high	Dense foliage
Highbush cranberry	<i>Viburnum trilobum</i>	6 to 12	Sun/part shade	High value: bird food	White flat-topped flower clusters; red fruit persists until spring; red color to foliage in autumn

Observed Species from upland meander survey:

UNITS	COMMON NAME	SCIENTIFIC NAME	STATUS
P, S	Yellow Wood Sorell	<i>Oxalis stricta</i>	Native
P, S	Awl Fruited Sedge	<i>Carex stipata</i>	Native
P, S	Giant Ragweed	<i>Ambrosia trifida</i>	Native
P, S	White vervain	<i>Verbena urticifolia</i>	Native
P, S	Common Yarrow	<i>Achillea millefolium</i>	Native
P, S	Daisy Fleabane	<i>Erigeron annuus</i>	Native
P, S	Cinquefoil	<i>Potentilla simplex</i>	Native
P, S	Goldenrod	<i>Solidago canadensis</i>	Native
P, S	Black willow	<i>Salix nigra</i>	Native
P, S	Green Ash	<i>Fraxinus pennsylvanica</i>	Native
P, S	Eastern Red Cedar	<i>Juniperus virginiana</i>	Native
P, S	Yellow avens	<i>Geum aleppicum</i>	Native
P, S	American vetch	<i>Vicia americana</i>	Native
P, S	Common Milkweed	<i>Asclepias syriaca</i>	Native
P, S	Solomon's seal	<i>Polygonatum biflorum</i>	Native
S, H	Goosebury	<i>Ribes sps.</i>	Native
S, H	Violet	<i>Viola sororia</i>	Native
S, H	Wild Geranium	<i>Geranium maculatum</i>	Native
S, H	Wild Strawberry	<i>Fragaria virginiana</i>	Native
S, H	Upright carrionflower	<i>Smilax ecirrhata</i>	Native
S, H	Large-leaved aster	<i>Eurybia macrophylla</i>	Native
S, H	Columbine	<i>Aquilegia canadensis</i>	Native
P, S	Field pussytoes	<i>Antennaria neglecta</i>	Native
S	Stinging nettle	<i>Urtica dioica</i>	Native
H	Aunt Lucy (Fringed Loosestrife)	<i>Lysimachia ciliata</i>	Native
H	American Elm	<i>Ulmus americana</i>	Native
H	Red Maple	<i>Acer rubrum</i>	Native
H	Sugar Maple	<i>Acer saccharum</i>	Native
S, H	Bur Oak	<i>Quercus macrocarpa</i>	Native
H	White Oak	<i>Quercus alba</i>	Native
H	Red Oak (Northern Red Oak)	<i>Quercus rubra</i>	Native
S, H	Black Cherry	<i>Prunus serotina</i>	Native
S, H	Pennsylvania Sedge	<i>Carex pensylvanica</i>	Native
P, S	Alfalfa	<i>Medicago sativa</i>	Non-native
P, S	Chickweed	<i>Stellaria media</i>	Non-native
P, S	Dandelion	<i>Taraxacum officinale</i>	Non-native
P, S	Timothy Grass	<i>Phleum pratense</i>	Non-native
P, S	White Clover	<i>Trifolium repens</i>	Non-native
P, S	Orchard Grass	<i>Dactylis glomerata</i>	Non-native

P, S	Kentucky Bluegrass	<i>Poa pratensis</i>	Non-native
P, S	Hairy Vetch	<i>Vicia villosa</i>	Non-native
P, S	Common Burdock	<i>Arctium minus</i>	Non-native
P, S	Red Clover	<i>Trifolium pratense</i>	Non-native
P, S	Winter Cress	<i>Barbarea vulgaris</i>	Non-native
P, S	Broadleaf Plantain	<i>Plantago major</i>	Non-native
P, S	Mugwort	<i>Artemisia vulgaris</i>	Non-native
P, S	Curly Dock	<i>Rumex crispus</i>	Non-native
P, S	Buttercup	<i>Ranunculus acris</i>	Non-native
P, S	Speedwell	<i>Veronica officinalis</i>	Non-native
P, S	Bittersweet nightshade	<i>Solanum dulcamara</i>	Non-native
P, S	Lily of the valley	<i>Convallaria majalis</i>	Non-native
S	Catnip	<i>Nepeta cataria</i>	Non-native
S	Motherwort	<i>Leonurus cardiaca</i>	Non-native
S	White Campion	<i>Silene latifolia</i>	Non-native
P, S	Lamb's Quarters	<i>Chenopodium album</i>	Non-native
P, S	Canada Thistle	<i>Cirsium arvense</i>	Non-native (invasive)
P, S	Smooth Brome	<i>Bromus inermis</i>	Non-native (invasive)
P, S	Creeping Charlie	<i>Glechoma hederacea</i>	Non-native (invasive)
P, S	Birdsfoot trefoil	<i>Lotus corniculatus</i>	Non-native (invasive)
P, S	Common Mullein	<i>Verbascum thapsus</i>	Non-native (invasive)
P, S	Hoary alyssum	<i>Berteroa incana</i>	Non-native (invasive)
S, H	Common Buckthorn	<i>Rhamnus cathartica</i>	Non-native (invasive)
S	Field Bindweed		Non-native (invasive)
S	Tartarian Honeysuckle	<i>Lonicera tatarica</i>	Non-native (invasive)
S	Oxeye Daisy	<i>Leucanthemum vulgare</i>	Non-native (invasive)