MANAGEMENT PLAN FOR THE

Lester-Amity-Hawk Ridge Natural Area

OF THE DULUTH NATURAL AREAS PROGRAM

APRIL 2026

Nominated by:

Hawk Ridge Bird Observatory

Minnesota Land Trust

South St. Louis Soil and Water Conservation District

Minnesota Trout Unlimited

This report was produced by the nominating partners. Our thanks to the organizations and individuals who participated as collaborators to the plan and to the City of Duluth staff who supported this project.

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Introduction

This management plan for the Lester-Amity-Hawk Ridge Natural Area was developed following the requirements of the Duluth Natural Area Program (DNAP) ordinance. The purpose of this plan is to provide guidance for maintaining and improving the ecological function of the natural features for which the Lester-Amity-Hawk Ridge Natural Area was nominated to the program (see nomination report in Appendix A), including significant native plant communities, natural water feature area, and geological landform area.

The nominating partners will implement this plan with the assistance of the City of Duluth and other partners with interests within the natural area. Other partners involved in stewardship, management, and maintenance of features within the natural area include but are not limited to Cyclists of Gitchee Gumee Shores (COGGS), Duluth Cross Country Ski Club (DXC), Duluth Back Country Horsemen of Minnesota (Duluth BCH-MN), Duluth Foot Trails Alliance, and Duluth Drift-Toppers Snowmobile Club.

This plan presents an inventory of natural resources and human uses within the natural area, describes threats to the ecological function of these features, describes strategies for preserving the natural features, and presents an implementation plan with prioritized actions, timelines, and costs.

Natural Area Conditions

This section provides an inventory of natural resources in each of the scientific categories for which the Lester-Amity-Hawk Ridge Natural Area was nominated to the DNAP, describes human use of the natural area, and describes land ownership.

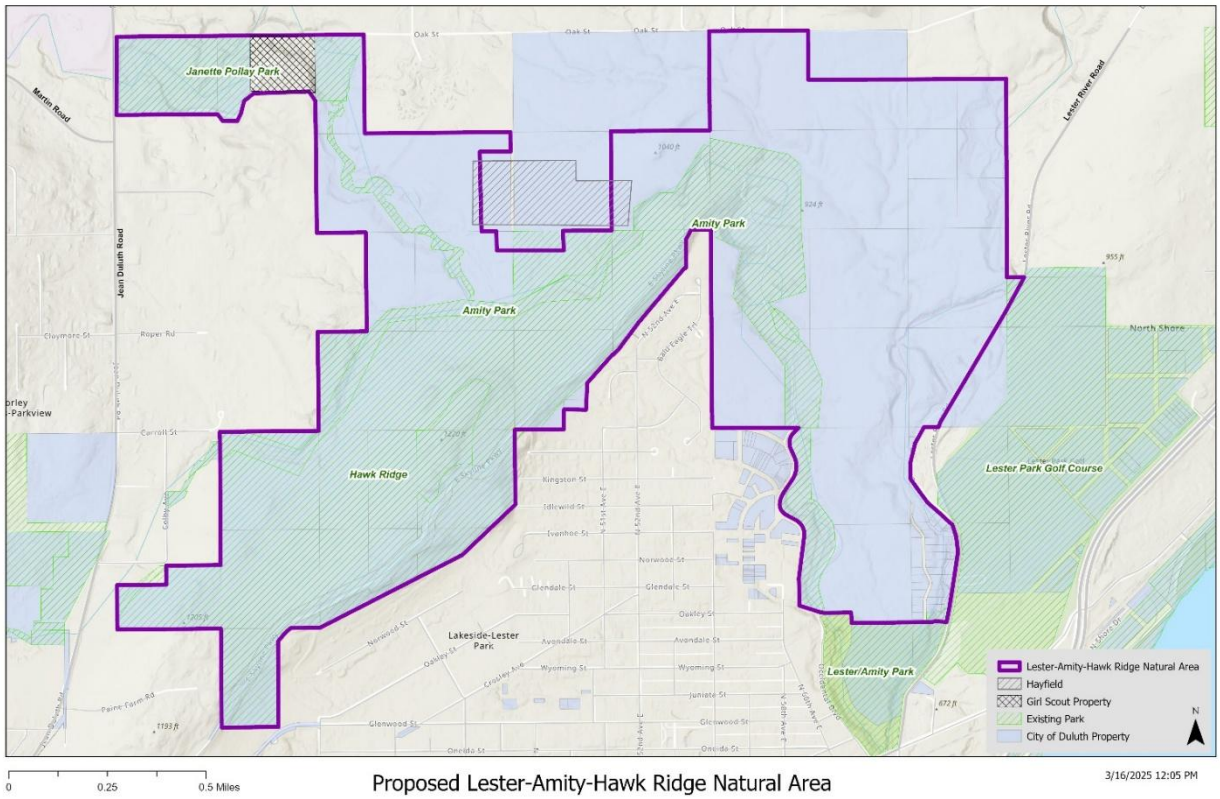

Figure 1: Lester-Amity-Hawk Ridge Natural Area Boundary

NATURAL RESOURCES INVENTORY

The significant natural resources for which the Lester-Amity-Hawk Ridge Natural Area was nominated include important bird congregation area, special species area, significant native plant community areas, natural water feature area, and geologic landform area. This section describes information provided in the Lester-Amity-Hawk Ridge Natural Area nomination report (Appendix A), as well as additional information from a 2025 field survey and other sources.

- Important bird congregation area – Over 200 bird species are documented annually in the natural area for nesting, foraging, and migratory habitat including raptors and passerines. Hawk Ridge Nature Reserve was the first Important Bird Area designated in the state of Minnesota.
- Special species area – Three special plant species (soapberry, barren strawberry, and pale sedge) were identified in the natural area in surveys conducted for the city of Duluth. Furthermore, 60% of the MN Bird Species in Greatest Conservation Need have been recorded at Hawk Ridge during count and banding research efforts.
- Significant native plant community areas – Eighteen noted native plant communities recognized by the Minnesota Department of Natural Resources accepted into the natural areas program criteria are documented within the proposed natural area.

- Natural water feature area – Amity Creek, East Amity Creek, and Lester River are designated trout streams with significant coldwater groundwater contributions.
- Geologic landform area – The geologic formation of Duluth is represented by landforms in the nominated natural area from two dramatic events in geologic history entailing the Mid-Continent Rift and the Great Ice Age Glaciation.

Important Bird Congregation Area

Lester-Amity-Hawk Ridge Natural Area is a significantly Important Bird Congregation Area in Mississippi Flyway for nesting, foraging, and migratory bird habitat for over 200 bird species, including raptors and passerines. Hawk Ridge Nature Reserve was the first Important Bird Area (IBA) designated in the state of Minnesota and recognized internationally as a global IBA.

Before 1950, local hunters shot passing raptors (hawks, falcons, eagles) for target practice. Through the efforts of the Duluth Bird Club (now the Northeastern MN Bird Alliance, fka Duluth Audubon Society), new laws to prohibit shooting were enforced. Dr. Pershing Hofslund, first ornithology professor at the University of MN Duluth, initiated early migration counts from the 1950s until 1971. As the magnitude of the migration became apparent at the site, members of the Duluth Audubon Society worked to raise funds to donate to the City to purchase the property for the protection and purpose of bird conservation efforts. The Hawk Ridge Nature Reserve was created in 1972, which is also the same year an amendment to the federal Migratory Bird Treaty Act was added to protect raptors. The standardized raptor migration count and banding research started that same fall and monitoring efforts increased to daily observation from August 15 through November 30.

In 2003, Hawk Ridge Bird Observatory was established as a 501(c)3 nonprofit with a primary purpose and mission to promote conservation of raptors and other birds in the Western Lake Superior Region through research, education, and stewardship. The Duluth Audubon Society helped create this new nonprofit as the management successor of the Hawk Ridge Nature Reserve through the trust agreement with the City of Duluth. Today, one of nature's remarkable spectacles continues to be witnessed each fall at Hawk Ridge Nature Reserve. Migrating raptors and other birds concentrate in impressive numbers at the western tip of Lake Superior originating from summer breeding areas as far north as the Arctic and have winter destinations as far south as South America. Reluctant to cross a large body of water, birds funnel down the North Shore of Lake Superior. Raptors ride updrafts formed above the rocky outcrops parallel to the lakeshore and efficiently soar for miles, as they migrate past Hawk Ridge.

More than 60,000 raptors and over 200,000 other birds are counted at Hawk Ridge annually (one of the longest running and highest counts in the continent - 50+ years!). The highest single species count for a single day at HRNR was tallied on September 1, 2003, with 101,698 Broad-winged Hawks recorded. According to the DNAP criteria for Important Bird Congregation Areas, the concentrations of raptors more than exceeds the recommended 5,000 to 10,000 seasonal totals. Figure 2 shows the annual total raptor counts since 1972.

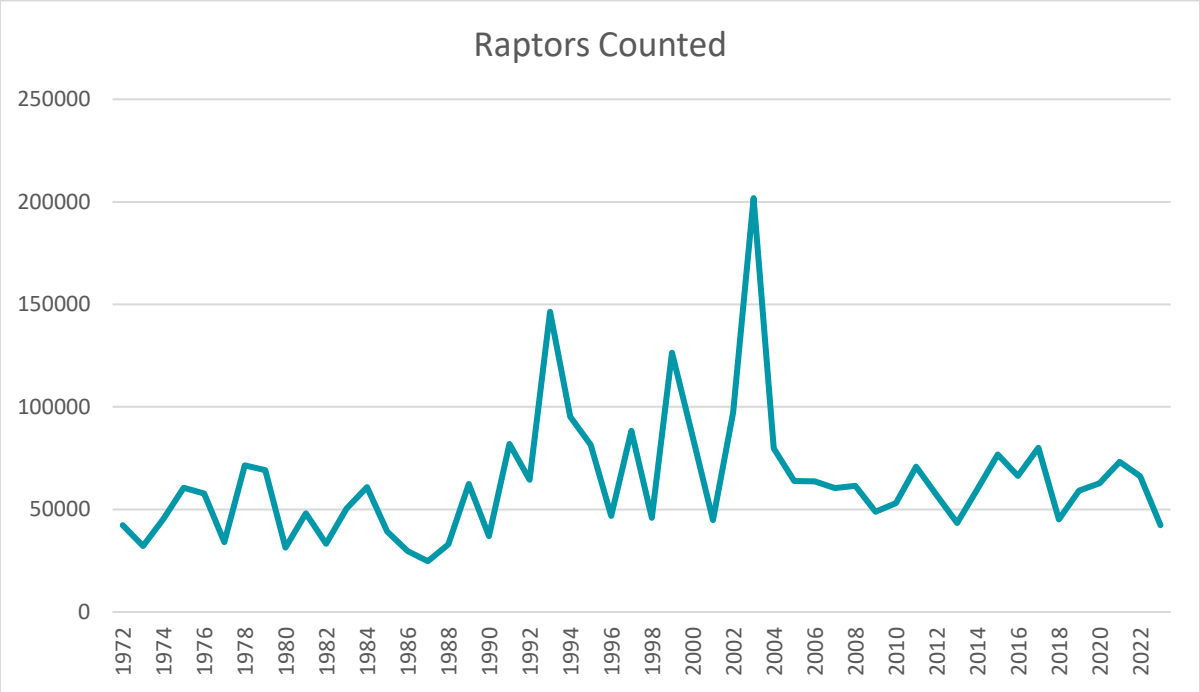

Figure 2: Raptor migration counts at Hawk Ridge Nature Reserve, 1972-2023.

Raptor species regularly recorded during the fall bird migration include: Bald Eagle, Northern Harrier, Sharp-shinned Hawk, Cooper's Hawk, American Goshawk, Short-eared Owl, Red-Shouldered Hawk, Broad-winged Hawk, Swainson's Hawk, Red-tailed Hawk, Turkey Vulture, Rough-legged Hawk, Osprey, Golden Eagle, American Kestrel, Merlin, Peregrine Falcon, and Mississippi Kite. The record season total stands at 201,826 raptors counted in 2003! Hawk Ridge bird counts are contributed to collective published research datasets, such as the Raptor Population Index, Hawk Migration Association HawkCount, Trektellen, and Cornell Lab of Ornithology's eBird. These long-term datasets are an important research tool in bird conservation efforts and environmental management decisions, such as health of bird populations and habitat.

Bird banding research is also conducted at Hawk Ridge during the fall bird migration for diurnal raptors and passerines (e.g., songbirds, perching birds) and nocturnal owls. The fall raptor banding research station has been in operation since 1972 and the passerine banding program since 1996. The research station is one of the few on top in terms of the total numbers of banded raptors and largest station for numbers of owls on the continent. An average of 3,000 raptors (including owls) and 1,200 passerines are banded each season. Regular owl species banded are Northern Saw-whet Owls, Long-eared Owls, Barred Owls, and Great-Horned Owls. Other owls that have been banded at HRNR include Boreal Owl, Snowy Owl, Great Gray Owl, and Eastern Screech Owl. Hawk Ridge and the banding research station has also been important as a training ground for field assistants whose careers have taken them into various educational and wildlife management fields. Focusing on conserving diverse bird communities when

developing habitat management plans helps ensure resilient and stable ecosystems. A list of the birds of greatest conservation need that have been counted and/or banded at HRNR is provided in Appendix B.

Monitoring bird populations is important because changes in bird populations can signal ecosystem health and degradation. To document breeding bird communities, habitat-use, and trends at HRNR, a standardized breeding bird monitoring program was established by Dr. Jerry Niemi (University of Minnesota, Duluth) and Dr. Matt Etterson (Environmental Protection Agency) in 2010. This monitoring effort consists of 13-point count locations that were systematically located across the reserve. Ten-minute point counts are conducted annually during the peak of the breeding season (June) by trained observers. In addition to the point count surveys, Hawk Ridge became an established Monitoring Avian Productivity and Survivorship Program (MAPS) banding station in 2015. The MAPS Program utilizes standardized, constant-effort mist netting and banding during the breeding season to collect data that can be used to estimate key demographic parameters such as productivity, recruitment, and survival of individual bird species. More than 25 species have been documented as breeding birds through the MAPS project, including the 12 species listed below that have been confirmed as regular resident breeding birds each year of MAPS 2015-2025. Together, these breeding bird monitoring programs provide important information that allows us to track changes in population and determine potential underlying causes of observed trends. The information can be used in various impactful ways including documenting changes in diversity and informing habitat management plans. Overall, these data can help inform the creation of a coordinated, holistic, and landscape-scale approach to long-term conservation and management of the proposed Lester-Amity-Hawk Ridge Natural Area.

Long-term MAPS monitoring from 2015 to 2024 confirms that Hawk Ridge supports a structurally complex and ecologically diverse breeding bird community that reflects high-quality forest conditions across multiple habitat types. The assemblage includes mature forest interior specialists such as Ovenbird, Red-eyed Vireo, Veery, and Blackburnian Warbler, indicating intact canopy cover and well-developed leaf litter layers; shrub and early successional associates such as Chestnut-sided Warbler, Mourning Warbler, American Redstart, Alder Flycatcher, and Golden-winged Warbler, reflecting regenerating patches embedded within mature forest; and cavity-nesting species including Pileated Woodpecker, Yellow-bellied Sapsucker, Downy Woodpecker, and Hairy Woodpecker, demonstrating the presence of large-diameter trees, snags, and downed woody material. Riparian and moist forest indicators such as Canada Warbler, Swainson’s Thrush, Yellow-bellied Flycatcher, and Common Yellowthroat further suggest intact hydrologic features and dense understory structure. The coexistence of these guilds, including multiple Minnesota focal species of conservation concern, signals a mosaic of age classes, vertical layering, and legacy structural elements across the landscape, supporting a resilient and functionally rich breeding bird community.

Special Species Area

Species of special concern in the Lester-Amity-Hawk Ridge Natural area include four species of birds and four plant species.

Special Bird Species

Four avian species of conservation concern, including Canada Warbler, Golden-winged Warbler, Veery, and Least Flycatcher, have been documented at HRNR.

Canada Warbler have been documented during the breeding season and fall migration. Regionally, it is a focal species for the Upper Mississippi River and Great Lakes Region Joint Venture due to long-term, though variable, population declines across its breeding range. Canada Warbler is closely associated with structurally complex forests with dense shrub or subcanopy layers.

Golden-winged Warbler have been documented during the breeding season and fall migration. Although not state-listed in Minnesota due to its relative abundance, Golden-winged Warbler is designated a Species in Greatest Conservation Need, placed on the Partners in Flight Red Watch List, and identified as a focal species for the Upper Mississippi River and Great Lakes Region Joint Venture due to ongoing population declines.

Veery have been documented during the breeding season and fall migration. As a species strongly associated with mesic deciduous forests, riparian areas, and dense understory vegetation, the relatively high breeding-season density of Veery indicates suitable breeding habitat characterized by moist soils, closed canopy conditions, and well-developed shrub layers. In Minnesota, Veery is designated a Species in Greatest Conservation Need due to long-term population declines and the state's importance in supporting a substantial portion of the species' breeding population, and it is also recognized by Audubon Minnesota as a Minnesota Stewardship Species.

Least Flycatcher have been documented during the breeding season and fall migration. Least Flycatcher serves as a strong indicator of breeding-season forest structure and provides an important baseline for interpreting relative abundance of less common species. Despite this local abundance, Least Flycatcher is classified as a Common Bird in Steep Decline, with a Continental Concern Score of 11/20, reflecting population declines of more than 50% across its range, and it has been identified as a regional stewardship species due to declines in boreal hardwood transition forests of northern Minnesota, Michigan, and Wisconsin. Over 250 have been banded over the past 10 years during the breeding season and fall migration at Hawk Ridge.

Special Plant Species

The state listed special concern species, Canada buffaloberry (S*hepherdia canadensis*) has been documented in approximately 120 scattered populations, generally grouped within three broader regions throughout the proposed natural area. The state listed special concern species, barren strawberry (*Waldsteinia fragarioides*) has been documented in four colonies in one geographic region. The state listed endangered pale sedge (*Carex pallescens*) has been documented as three isolated individuals in the same region. The state listed endangered eastern hemlock (*Tsuga canadensis*) has been documented just south of the DNAP boundary as three individual saplings.

Lester-Amity-Hawk Ridge was known to support several occurrences of the special concern species soapberry (*Shepherdia canadensis*), dating back to early observations by Olga Lakela (MN DNR). This study detected over 120 new populations of soapberry in rocky outcrops, fire dependent forest, bedrock riverbanks, and eroding clay bluffs.

Four different state listed species were found throughout the Lester-Amity-Hawk Ridge natural area and just beyond the natural area boundary, including soapberry (*Shepherdia canadensis*), eastern hemlock (*Tsuga canadensis*), pale sedge (*Carex pallescens*), and barren strawberry (*Waldsteinia fragarioides*). Soapberry was known within Hawk Ridge from previous surveys and community observations, which were re-observed in 2025 along with new, previously unknown locations. Soapberry prefers full sun to part sun along forest openings or in shrubby bedrock communities and occasionally in clay soil sloughing banks or hillsides. In the western United States where it is more common, soapberry rebounds quickly after wildfire, suggesting that it is a fire dependent or fire tolerant species and might be an indicator of suitable habitats to incorporate wildfire as a management tool. Each location marked as a point most likely represented one individual, but occasionally small groups of soapberry were observed and marked with a point, ranging from 2-10 individuals. Soapberry species observations totaled approximately 200 individuals growing as a single isolated shrub or a small, isolated population. Soapberry is a dioicous shrub with male and female flowers occurring on separate individuals, and one isolated shrub cannot self-pollinate. Deer still browse this species, but it is not a preferred food with occasional browse observed but was not common.

Eastern hemlock (*Tsuga canadensis*) was found in one location just south of the DNAP boundary that contained three 3-foot-tall individuals growing along an intermittent stream in dense conifer canopy. These individuals had been heavily browsed, and since hemlock is known to live as a seedling for up to 100 years in dense canopy, these individuals could be quite old natural origin, or they could have been planted within the last 20 years or more, coming from Wisconsin origin or elsewhere. Recent genetic testing in a Department of Natural Resources study has revealed some distinct natural origin populations that have evolved separately from one another due to their isolation from other hemlock populations. An attempt was made to locate a seed tree within the dense conifer canopy, but no seed tree was found. Hemlock in the eastern United States are often found in well-drained sandy soils, and in the Upper Peninsula of Michigan and northern Wisconsin, they are more commonly found in well drained mesic soils along with mesic hardwood species. In Minnesota, the known natural origin populations have been observed along river and stream ravines in shady habitats with surrounding mesic hardwood forests, but also in mesic mixed coniferous forests, sometimes far away from a stream and growing more similarly to a super canopy white pine.

Pale sedge (*Carex pallescens*) was observed along a dry path along a forest edge in partial sun. Four individuals were found scattered along the path with the first observation in summer exhibiting characteristic features and the other three individuals observed in October that were missing some of their perigynia that would distinguish them from potential look-alikes. This sedge is not well documented in Minnesota and was thought to be found along Lake Superior shorelines along the North Shore in full sun and occasionally along trails that maintain a forest edge that supply more sunlight to

the pale sedge. Pale sedge within Lester were found in similar habitats to the other observations of pale sedge within Duluth, primarily in well-drained soils or hardwood forests with access to more sunlight, often due to an artificial canopy gap like a trail.

Barren strawberry (*Waldsteinia fragarioides*) was observed on either side of a snowmobile trail within FDn43b Northern Mesic Mixed Forest with the larger populations occurring further from the snowmobile trail into the full shade of often dense conifer canopy. Barren strawberry is an infrequent herbaceous groundcover species in Minnesota. Since barren strawberry was only found in four populations within one region of Lester, plant community trends of this species could not be determined.

Significant Native Plant Communities

The DNAP uses NPCs, defined according to the MNDNR's *2005 Field Guide to Native Plant Communities of Minnesota,* to assess and manage all natural areas within the city. The classification of NPCs is a scientifically based method to assist understanding and managing an area's natural resources. An NPC is composed of plant species that were commonly associated prior to European development. Identifying a NPC today indicates a relatively high degree of naturalness or lack of human disturbance. NPC species lists can also be used as a template for restorations or reintroductions.

Forest and wetland ecosystems rely on certain types of natural disturbance processes to recruit and maintain their array of native plants and animals, recycle nutrients, and stimulate growth and reproduction. The techniques used to manage any vegetation should be based on mimicking, or using, the natural ecosystem processes that shape a particular NPC, such as fire, windthrow, or flooding.

Plant Communities within the Lester-Amity-Hawk Ridge Natural Area will be managed to maintain or improve the condition rank of each NPC, while recognizing natural development through growth stages. Management actions should be aligned with an understanding of the timing, extent, severity, and frequency of natural dynamics of each NPC to the extent practicable.

In the summer of 2025, GEI Consultants, Inc. completed plant surveys for the entire natural area, using GIS desktop analysis and field surveys. A total of 18 plant community polygons covering the 1,183-acres of the Lester-Amity-Hawk Ridge natural area were mapped and categorized into 14 NPC types and 5 NPC subtypes according to Minnesota Department of Natural Resources' MN DNR's *2005 Field Guide to Native Plant Communities of Minnesota: The Laurentian Mixed Forest Province* (MN DNR, 2003) (Figure 2; Table 1). Condition ranks were assigned to each polygon according to the ranking specific to each community.

The NPCs were given a natural quality ranking based on the DNR's Natural Heritage Element Occurrence Ranking Guidelines. Condition ranks for NPCs reflect the degree of ecological integrity of a specific occurrence of an NPC. Condition ranks are assigned by considering species composition, vegetation structure, ecological processes and functions, level of human disturbance, presence of non-native

species, and other factors. Condition ranks are assigned on a scale of A to D with an NA and NN ranking for altered and disturbed communities.

A = occurrences have excellent ecological integrity. They have species composition, structure, and ecological processes typical of the natural or historic range of the community and have been little disturbed by recent human activity or invasive species.

B = occurrences have good ecological integrity. They include lightly disturbed plant communities and communities that were disturbed in the past but have recovered and now have relatively natural composition and structure. B-rank occurrences normally will return to A-rank condition with protection or appropriate management.

C = occurrences have fair ecological integrity. They show strong evidence of human disturbance but retain some characteristic species and have some potential for recovery with protection and management.

D = occurrences have poor ecological integrity. The original composition and structure of the community have been severely altered by human disturbances or invasion by exotic species. They have little chance of recovery to their natural or historic condition.

NA = Native species present in an altered / non-native plant community. This NA ranking can only be used if the site is field checked from the edge or to a greater degree, thus confirming the presence of native species within a non-native community.

NN = Altered / non-native plant community. These semi-natural communities do not qualify for natural quality ranking. Using NN signifies the site has been field checked and confirms it is a semi-natural community.

Condition ranks for the NPCs are shown in Figure 3, with the range of conditions seen across the natural area for each NPC provided in Table 1.

NPC types and subtypes have been assigned conservation status ranks (S-ranks) that reflect the risk of elimination of the community from Minnesota (MNDNR, 2009). The five ranks are:

S1 = critically imperiled
S2 = imperiled
S3 = vulnerable to extirpation
S4 = apparently secure; uncommon but not rare
S5 = secure, common, widespread, and abundant

The S-ranks for the 23 NPCs found in Lester – Amity – Hawk Ridge Natural Area are given in Table 1. The majority of NPCs in the natural area rank as vulnerable to extirpation (S3) or apparently secure (S4). One community, Clay/Mud River Shore – Slumping Clay/Mud Slope (River) (RVx54a), ranks as imperiled.

Table 1: Native Plant Communities in the Lester-Amity-Hawk Ridge Natural Area

System	Subtype Description	Subtype Code	S-Rank	Condition Rank (range)	Area (Acres)
Fire-Dependent Forest/Woodland	Red Pine – White Pine Woodland - Balsam Fir Subtype	FDn33a1	S3	A-B	5.5
	Aspen – Birch Woodland	FDn33b	S5	B-D	55.5
	White Pine – Red Pine Forest	FDn43a		A	0.1
	Aspen – Birch Forest	FDn43b	S5	B-D	398
	Aspen – Birch Forest – Balsam Fir Subtype	FDn43b1	S5	B-C	42.8
	Upland White Cedar Forest	FDn43c	S3	C	5.0
Floodplain Forest	Black Ash – Silver Maple Terrace Forest	FFn57a	S3	B-C	78.6
Mesic Hardwood Forest	Red Oak – Sugar Maple – Basswood - (Bluebead Lily) Forest	MHn35b	S4	A-C	55.7
	Aspen – Birch – Red Maple Forest	MHn44a	S4	B-D	41.8
	Black Ash – Basswood Forest	MHn46b	S3	B-C	123.9
	Sugar Maple – Basswood - (Bluebead Lily) Forest	MHn47a	S3	A	5.8
Rock Outcrop System	Bedrock Shrubland (Inland)	ROn23a	S3	B-D	43.0
River Shore System	Sand Beach/Sandbar (River) Permanent Stream Subtype	RVx32b2	S3	C	7.8
	Gravel/Cobble Beach (River) Permanent Stream Subtype	RVx32c2	S3	C	1.4
	Bedrock/Boulder Shore (River) - Permanent Stream Subtype	RVx43a2	S3	C	17.6
	Clay/Mud River Shore – Slumping Clay/Mud Slope (River)	RVx54a	S2	B	32.3
Wet Forest System	Black Ash – Aspen – Balsam Poplar (Northeastern)	WFn55a	S4	B-D	55.7
	Northern Wet Alder Swamp	WFn74	S3	B-D	27.4

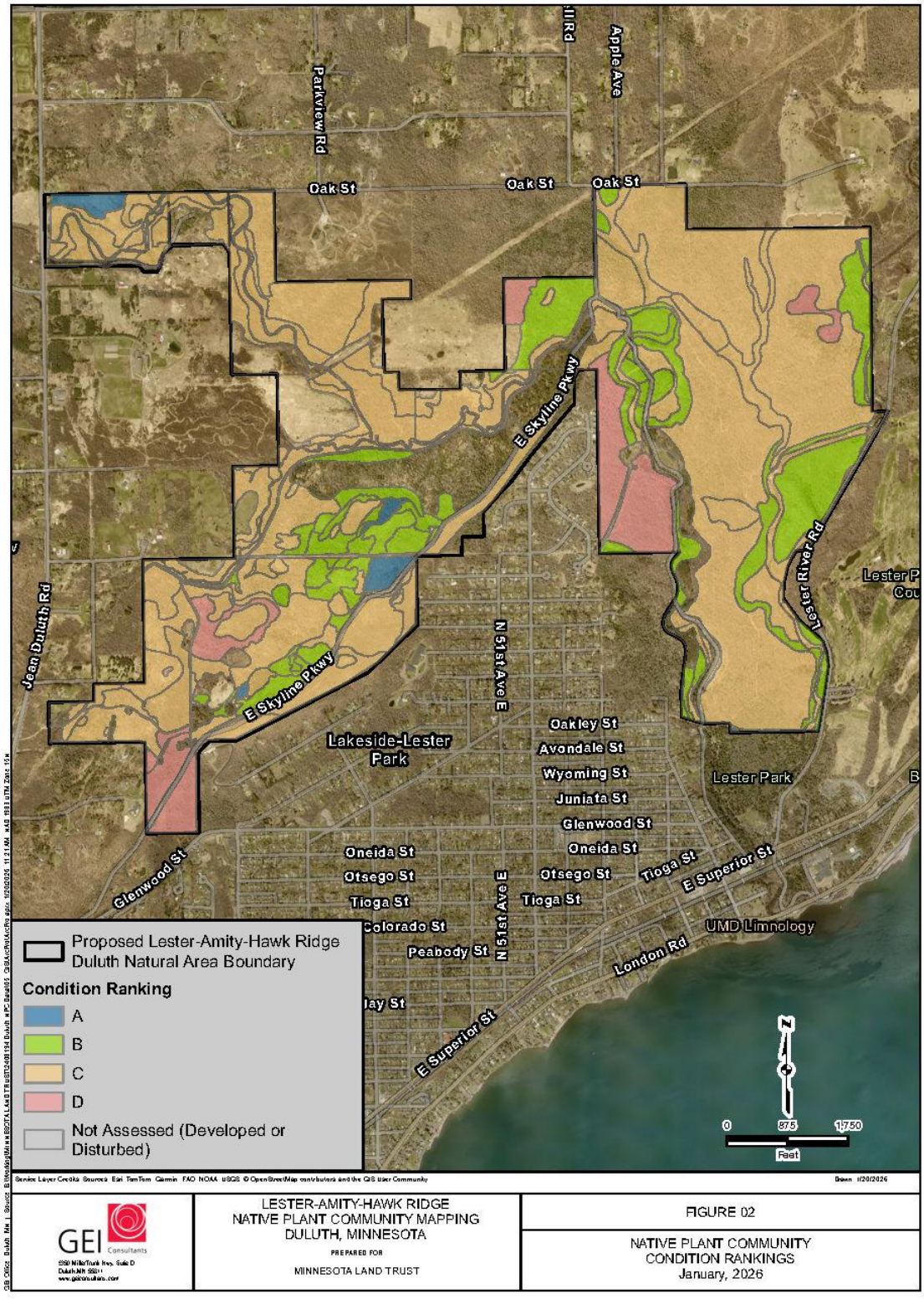

Figure 3: Native plant communities in the Lester-Amity-Hawk Ridge Natural Area.

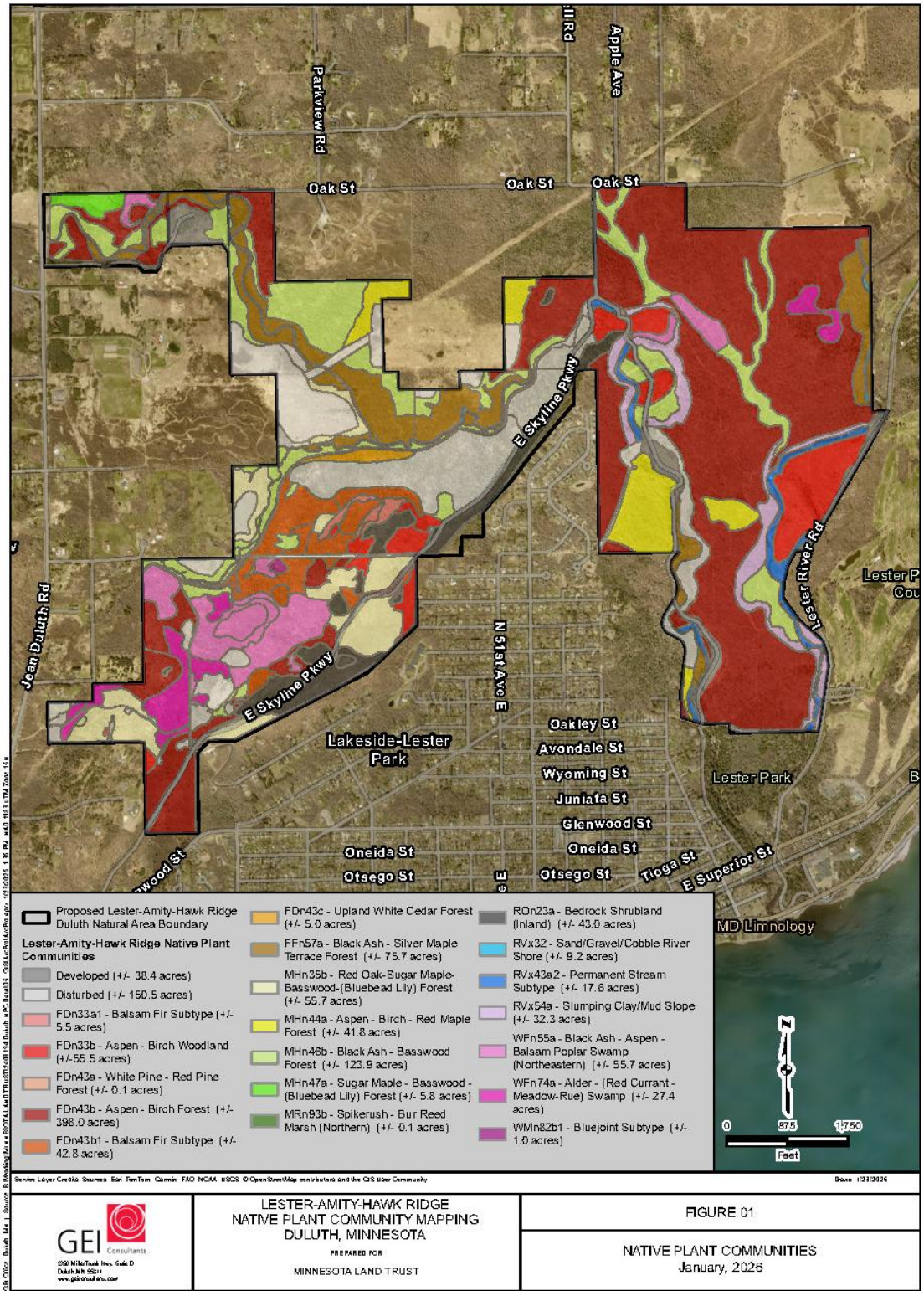

Figure 4: Condition ranks of native plant communities in the Lester-Amity-Hawk Ridge Natural Area.

Natural Water Features

Natural water features within the Lester–Amity–Hawk Ridge Natural Area include Amity Creek, East Amity Creek, and the Lester River. These streams are Lake Superior tributaries that provide high-value coldwater aquatic habitat, contribute to regional water quality, and support important recreational and ecological functions.

This management plan describes the general conditions of all three streams. However, due to the availability of recent assessment data and watershed planning efforts, the Threats, Strategies, and Implementation sections focus primarily on Amity Creek and East Amity Creek. The Lester River may be included in future updates to this plan as new assessment data become available.

Amity/East Amity Creek

Amity Creek is one of the least urbanized streams within the City of Duluth, owing largely to the extensive tracts of undeveloped land within its watershed. Only approximately three percent of the Amity Creek watershed is classified as developed, rural, or urban. The lower reaches of this designated coldwater trout stream are included within the proposed natural area, encompassing approximately 1.23 square miles (7.4 percent) of the combined East Branch and main stem watershed. Portions of Amity Creek within the Natural Area flow through a distinctive rhyolite canyon, further contributing to its ecological and geomorphic significance.

The Amity Creek watershed is widely recognized as supporting one of the highest-quality trout fisheries in the City of Duluth. Despite this, both the main stem and the East Branch of Amity Creek are listed by the State of Minnesota as impaired for turbidity. The *Amity Creek Stressor Identification Report* (Jennings and Geenen, 2016) documented key sources of sediment loading and identified priority stream restoration opportunities within these reaches. Several segments of both the East Branch and the main stem located within the proposed natural area were identified as major contributors of sediment, with degraded physical habitat resulting from channel incision, bank erosion, and bluff instability. Building on this work, the U.S. Environmental Protection Agency, Minnesota Pollution Control Agency, and South St. Louis Soil and Water Conservation District completed the *Amity Creek Watershed Nine Key Elements Plan*, which provides a comprehensive framework for addressing sediment impairments. With the completion of this plan, the watershed is now eligible for federal funding over the next fifteen years to implement sediment reduction and stream restoration projects.

The East Branch of Amity Creek provides the coldest water temperatures in the system and contributes a substantial portion of baseflow due to significant groundwater upwelling and wetland storage (Jasperson et al., 2017). The *Lake Superior South Stressor Identification Report* (Jasperson et al., 2017) highlights the exceptional quality of the East Branch's Brook Trout fishery, noting that it supports a robust, naturally reproducing population of native Brook Trout. Water temperatures and trout abundance in the East Branch are comparable to, or exceed, those found in many high-quality streams along the North Shore in less developed landscapes (Table 2).

Table 2: Adapted from Lake Superior South Stressor Identification Report (Jasperson et al, 2017). East Branch Amity Creek ranks fifth among non-stocked North Shore streams based on Brook Trout density and first in average Brook Trout size.

Rank (n=95)	Stream Name	Station	Visit Date	Distance Sampled (m)	# Brook Trout Sampled	BKT/meter	Batch weight (g)	Average Weight (g)
1	Kadunce River	13LS050	8/27/2013	221	214	0.968	4006	19
2	McCarthy Creek	11LS007	9/8/2011	150	112	0.747	3222	29
3	Cascade River	13LS013	9/4/2013	350	175	0.500	6279	36
4	Devil Track River	13LS046	9/4/2013	280	116	0.414	5247	45
5	**Amity Creek, East Branch**	**97LS038**	**6/20/2011**	**158**	**55**	0.348	**3124**	**57**
6	Little Devil Track River	97LS073	9/17/2013	150	50	0.333	1765	35
7	Big Sucker Creek	97LS089	8/31/2011	262	86	0.328	3038	35
8	Junco Creek	13LS006	8/22/2013	175	47	0.269	2059	44
9	Kimball Creek	13LS011	9/13/2013	134	33	0.246	471	14
10	Heartbreak Creek	97LS075	8/15/2013	220	52	0.236	1551	30
11	Elbow Creek	05LS005	8/7/2013	175	41	0.234	1824	44
12	Captain Jacobson Creek	11LS017	7/28/2011	150	31	0.207	902	29
13	Brophy Creek	10EM141	6/22/2010	157	30	0.191	763	25
14	Manitou River	98LS030	9/19/2013	420	79	0.188	2797	35
15	Cascade River	95LS013	9/5/2013	420	76	0.181	3200	42

A Brook Trout spawning assessment conducted in the fall of 2014 further illustrates the ecological importance of the East Branch (Figure 5). Along approximately three miles of stream, 186 areas of spawning activity (redds) were observed, equating to an average density of 62 redds per mile. In contrast, the main stem of Amity Creek supported an average of only nine redds per mile. Notably, several spawning areas on the main stem were concentrated near its confluence with the East Branch, underscoring the influence of coldwater inputs from the tributary. These findings clearly demonstrate the critical role of the East Branch as a spawning and rearing area for wild Brook Trout.

The *Lake Superior South Stressor Identification Report* emphasizes the importance of protecting the Amity Creek watershed within the context of the Duluth Natural Areas Program. While many of Duluth's trout streams are affected by urban runoff, road crossings, fragmented habitat, and elevated temperatures, East Branch Amity Creek stands out due to its extensive corridors of undeveloped public land, priority protection areas already in public ownership, and abundant groundwater and wetland resources that sustain coldwater temperatures and stable flows. Based on available data, East Branch Amity Creek represents one of the best remaining habitats for wild Brook Trout within the City and warrants long-term protection under the Duluth Natural Areas Program.

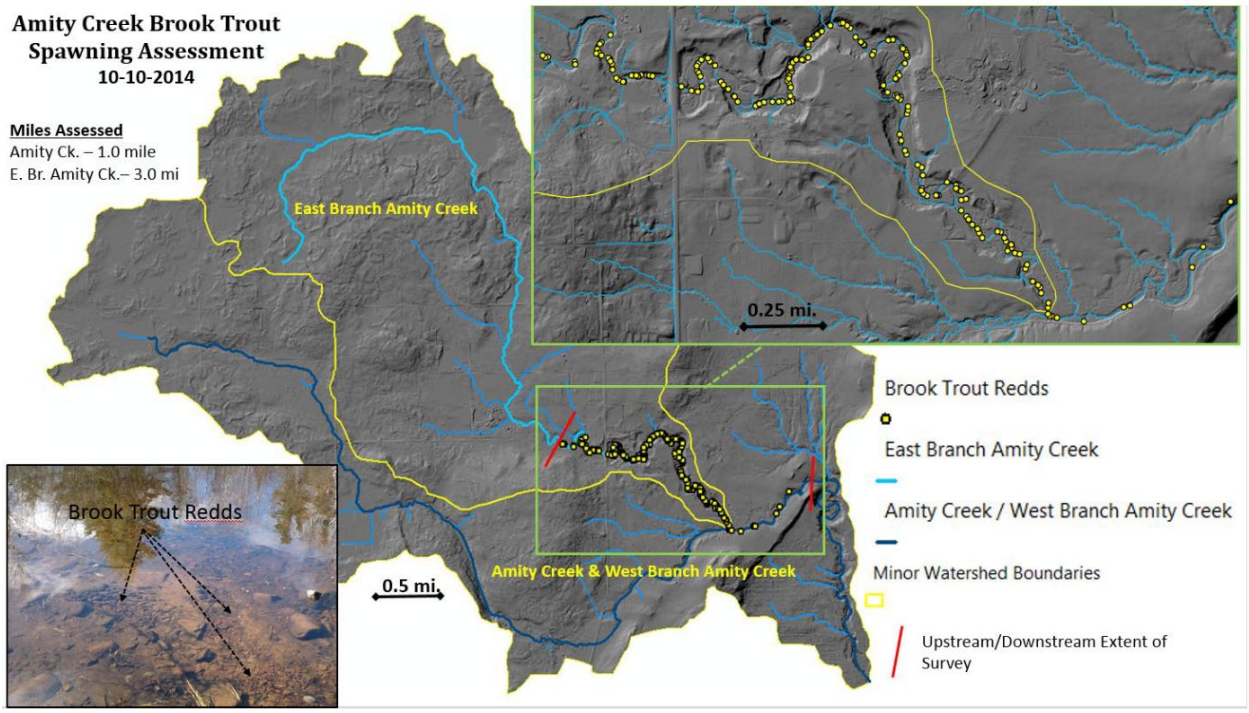

Figure 5: Results of Amity Creek/East Amity Creek Brook Trout spawning assessment completed in fall of 2014. Source: Lake Superior South Stressor Identification Report (Jasperson et al, 2017).

Consistent with these findings, the Minnesota Department of Natural Resources *Amity Creek Fisheries Management Plan* identifies Amity Creek as a high value coldwater stream that supports naturally reproducing Brook Trout populations and, in its lower reaches, provides nursery habitat for anadromous steelhead. The plan establishes population objectives for Brook Trout in upstream reaches and emphasizes the protection and improvement of habitat conditions necessary to sustain these populations over the long term.

Lester River

The Lester River is a major Lake Superior tributary that flows through the eastern portion of the Natural Area. The Minnesota DNR Fisheries *Lester River Fisheries Management Plan* identifies the Lester River as an important Lake Superior tributary supporting coldwater fisheries and recreational angling opportunities. While this Natural Area Management Plan does not currently identify specific restoration actions for the Lester River due to limited recent assessment data within the Natural Area boundary, the broader management goals of protecting water quality, maintaining riparian integrity, and minimizing activities that could degrade habitat are consistent with DNR Fisheries objectives.

As updated assessment data become available, future revisions to this Natural Area Management Plan may incorporate more targeted strategies for the Lester River that align with DNR Fisheries management direction.

Geological Landforms

The prominent, northeast-trending ridge on which the HRNR sits is higher than the surrounding landscape because it is made of a rock called diabase that is more resistant to weathering and erosion than the rocks to the northwest or southeast (Figure 6). This feature traces its origin to two dramatic events in its geologic history entailing the Mid-Continent Rift (about 1.1 billion years ago; Figure 7) and the Great Ice Age Glaciation (over the last 2.5 million years ago). Both of these events produced evidence of geologic formations included in the DNAP Geological Landform Area criteria.

Figure 6: Photo of ridge. Source: Dr. John Green.

All of the rocks in the Duluth area were formed approximately 1.1 billion years ago (late Precambrian times, or more specifically the mid-Proterozoic). At this time, the earlier crust of the Earth started to stretch apart and split up along a great, arcuate trend centered beneath present Lake Superior and reaching to about Detroit to the southeast and to northeastern Kansas to the southwest. This rifting (Midcontinent Rift System, or MRS) was apparently caused by a huge upwelling of hot rock from deep in the Earth's mantle (thick layer beneath the crust). As this "plume" of buoyant, hot rock approached the surface, it began to melt and produce immense volumes of magma (molten rock material) of basaltic composition. This basaltic magma passed upward toward the surface along fissures caused by the stretching and rifting. Most of this magma erupted as hundreds of great lava flows, which now make up most of the North Shore. Some of the magma never reached the surface, however, but instead squeezed into and between the already-erupted lavas. These "intrusions" then cooled more slowly than the volcanic rocks and formed coarser-grained rock of similar composition called diabase or gabbro. These diabase layers or sills developed fewer fractures as they cooled and proved to be more resistant to weathering and erosion, once they were exposed at the surface, than the nearby volcanic rocks. This is why Duluth's main high areas are made of diabase and gabbro, in contrast to the lava flows that underlie the lower areas downtown and in Lakeside.

As the rifting, stretching, and lava eruption continued, the central part of the MRS subsided, leaving the rock layers on its flanks tilted toward the rift axis. The lower reaches of Amity Creek and Lester River cut into rhyolite (light) and basalt (dark) lava flows to form gorges as they cascade down the Duluth hillside and join just before entering Lake Superior at the bridge. This exposed volcanic rock are further evidence of the Mid-Continent Rift.

Thus, in Duluth, the layers trend north to northeast and are tilted from about 10 to 20 degrees to the east. Slow uplift and erosion over the billion years or so since the rifting and volcanism ceased have "etched out" these harder layers. This has resulted in our landscape's prominent high areas: Duluth Heights to Spirit Mountain and Bardon's Peak, "held up" by the Duluth (gabbro) Complex; Mount Royal, held up by the Endion sill; Hawk Ridge, held up by the Northland sill; and Moose Mountain, held up by the Lester River sill. All these sills are made of diabase.

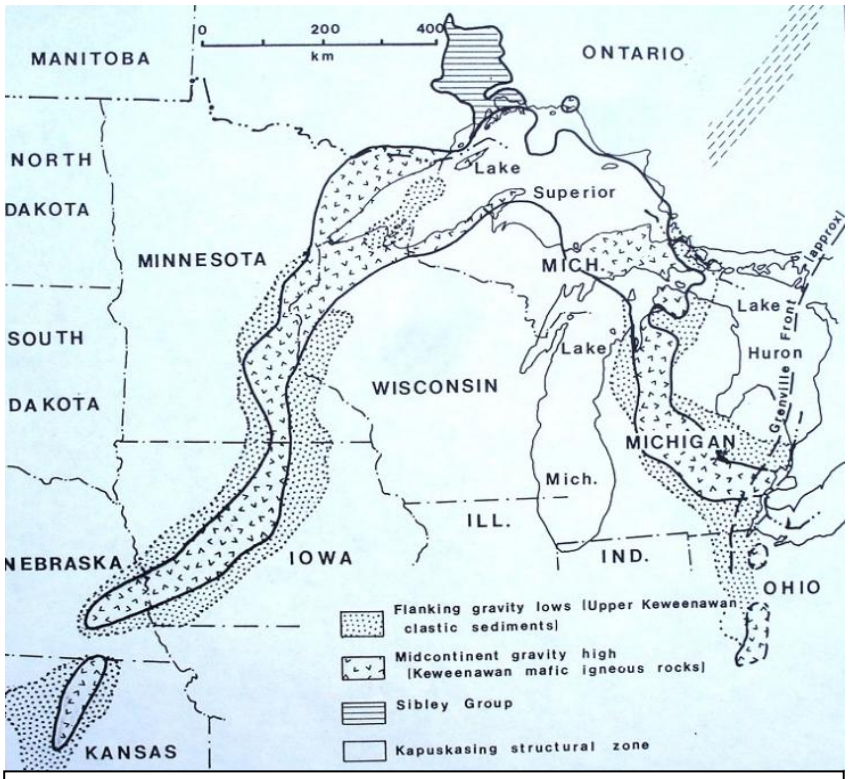

Figure 7: Map of mid-continental rift.

The last major geologic event that helped give Hawk Ridge its present character was the great Pleistocene Ice Age. Starting about 2.5 million years ago, several huge, mile-thick ice sheets spread out from east-central Canada and covered this area, again eroding the softer rocks more readily than the harder ones. The easiest to erode were the thick sandstones that had been deposited on top of the lava flows after volcanism waned at the close of the Midcontinent rifting. The glaciers preferentially gouged out these sandstones and formed the basin that Lake Superior has since occupied. The ice sheet eroded off most of the deeply-weathered igneous rocks too, leaving scratches or striations on the surface of the remaining fresh bedrock. These can be seen at several places along the Hawk Ridge trails. The last glacier also deposited till, a mix of very fine, medium, and coarse particles of varying thickness, on top of the bedrock. On the high points, including Hawk Ridge, there was little if any glacial sediment deposited. The minimal soil on this resistant, rocky ridge has inhibited human development over the years, allowing it to remain in public ownership, and the rocky character provides habitat for special rock-adapted plants. In a nutshell, the special topography here in Duluth, with prominent ridges next to the Lake Superior basin, is what concentrates the huge bird migration through this area. This topographic relief is the product of dramatic geologic processes and events over the last 1.1 billion years.

HUMAN USES

Hawk Ridge Nature Reserve is a well-loved outdoor recreation area with over 80,000 visitors annually for walking, biking, hiking, trail running, birding, nature observation, wildlife viewing. Over 4 miles of

multi-use trails are within the nature reserve, including a popular mountain biking section of the Duluth Traverse. It is internationally recognized as one of the best places to view the fall bird migration. Hawk Ridge Bird Observatory (HRBO) manages the nature reserve and conducts the fall bird migration count and banding research, as well as delivering environmental education programs and interpretation for the public.

Over 10,000 people of all ages (schools pre-K to college, private groups, general public) annually participate in a variety of programs offered by HRBO. Programs include live bird demonstrations, formal school/private group programs, public weekend programs/hikes, migration interpretation, kid's cart activities, free binocular rentals, and events like the annual Hawk Weekend Festival with visitors coming from around the world. 85% of the visitors during the fall are tourists, which also provides a significant economic impact to Duluth. Nearly 70 volunteers from throughout the community and region contribute close to 3,000 hours with HRBO in assistance with bird research, environmental education, visitor services, and site stewardship of the nature reserve.

The Hawk Ridge Facilities Mini-Master Plan for improvements to the site for accessibility, safety, and education was approved by the City Council in June 2022. As our educational programming and visitation has continued to grow, HRBO has faced a number of challenges. 3 of those major challenges are lack of accessible facilities (trails, restroom, education program areas, signage), lack of safe roadway space for visitors on E. Skyline Parkway near main overlook (viewing space, walkways, parking), and lack of education facilities (only one small outdoor group space). The opportunities this plan will address will be the ability to provide facilities that support accessible needs, safety of visitors, and increased capacity needed for environmental education programs and nature recreation inclusive of all ages and abilities at Hawk Ridge Nature Reserve.

In addition to the Hawk Ridge Nature Reserve, city residents use the Lester-Amity-Hawk Ridge natural area for many recreational uses, including hiking, biking, trail running, dog-walking, cross-county skiing, horseback riding, snowshoeing, climbing, and fishing. The myriad trails within the LAHR natural area (Figure 8), including the following:

- Duluth Cross-City East Snowmobile Trail
- City Hiking Trails – Snively/Amity Creek Trail and The Deeps Loop Trail
- Cross Country and Nordic Ski Trails – Some of these trails are lighted trails
- Duluth Traverse Mountain Bike Trails – Hawk Ridge Trail and Lester River Trail
- Equestrian Trails – Amity Creek Multi-Use Trail and Skyline Parkway
- Other multiuse trails

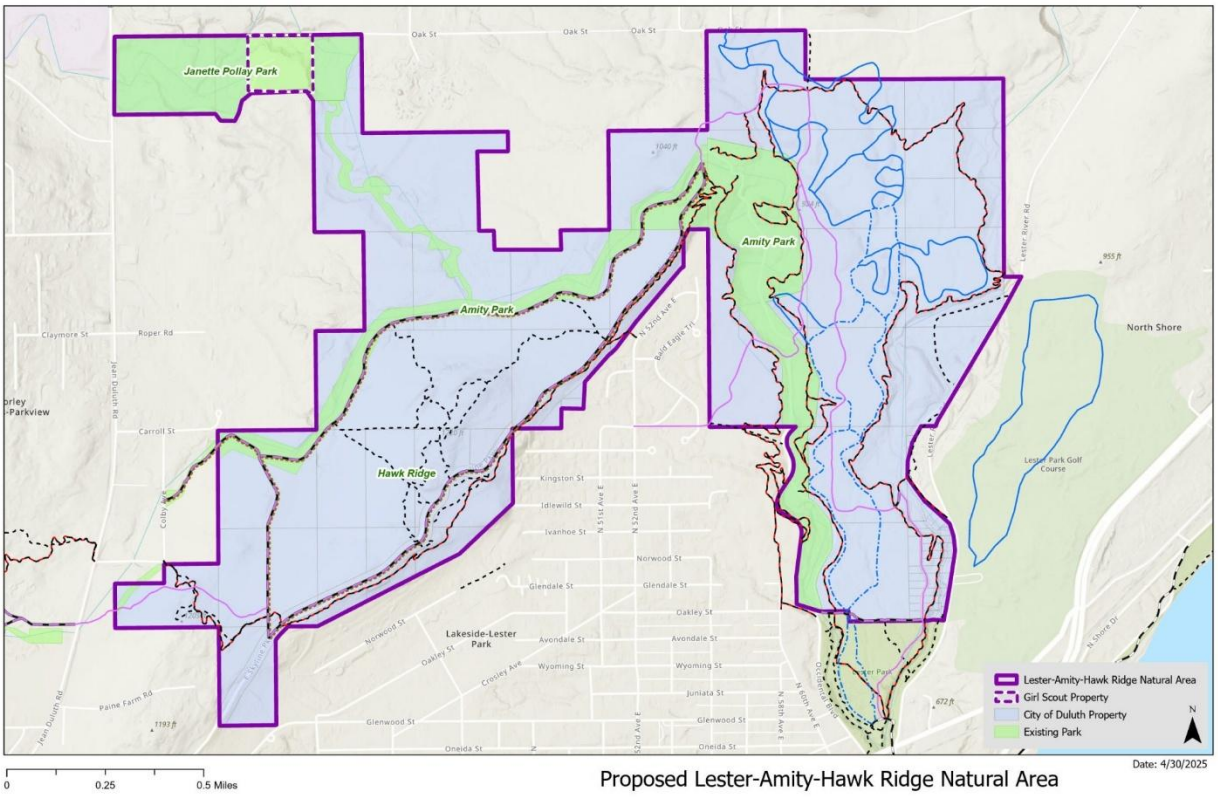

Figure 8: Trails within the Lester-Amity-Hawk Ridge Natural Area.

During the planning processes for the City of Duluth Cross Country Ski Trail Master Plan (2015) and the Duluth Traverse Master Plan (2017), analysis of existing and planned trails was completed. Recommendations for improvements to the trail systems based on this analysis have been completed, and no additional trails are planned for development within the natural area.

LAND OWNERSHIP

The Lester-Amity-Hawk Ridge Natural Area consists of 82 land parcels owned by the City of Duluth covering 1,183.6 acres. The Hawk Ridge Bird Observatory manages 364 acres within the natural area under a trust agreement with the City of Duluth.

Threats

The primary threats to the ecological integrity of the special features for which Lester-Amity-Natural Area was nominated to the DNAP are described in this section. While additional threats may exist, the focus of management actions for the natural area is on the following:

- Channel instability, floodplain abandonment, and excess sediment loading

- Barriers to aquatic organism passage and sediment continuity
- Degraded riparian vegetation, emerald ash borer, and invasive species
- Climate change and increasing storm intensity
- Human uses
- Habitat degradation and loss
- Bird collisions with structures

Channel Instability, Floodplain Abandonment, and Excess Sediment Loading

Channel instability, floodplain abandonment, and excess sediment loading represent a single, interconnected threat to the ecological function of Amity Creek and East Amity Creek. Historic logging, wildfire, road construction, and watershed development altered runoff patterns and sediment dynamics, initiating a channel evolution process characterized by stream incision and disconnection from historic floodplains.

As streams incised, shear stress during storm events increased, accelerating bank erosion and channel widening while preventing frequent access to the floodplain. These processes now contribute large volumes of fine sediment during runoff events, degrading water quality and impairing aquatic habitat. Excess sediment embeds spawning gravels, reduces habitat complexity for macroinvertebrates, and negatively affects Brook Trout reproduction and survival.

Floodplain abandonment further compounds these impacts by eliminating natural flood storage, reducing groundwater recharge, and increasing peak flows downstream. Together, these conditions create a self-reinforcing cycle in which unstable channels generate sediment, elevated sediment loads degrade habitat, and degraded habitat reduces the system's ability to recover naturally. Without targeted intervention to restore channel stability and reconnect floodplains, sediment loading and habitat degradation are expected to persist or worsen, particularly under increasing precipitation intensity associated with climate change.

Barriers to Aquatic Organism Passage and Sediment Continuity

Road crossings and culverts can disrupt natural stream processes by impeding aquatic organism passage and interrupting sediment transport continuity. Several crossings identified in the Nine Key Elements Plan function as partial or complete barriers during low- and moderate-flow conditions due to excessive velocities, perched outlets, or lack of natural substrate. These barriers fragment habitat, restrict access to spawning and refuge areas, and exacerbate sediment imbalances that contribute to upstream deposition and downstream channel instability.

Degraded Riparian Vegetation, Emerald Ash Borer, and Invasive Species

Riparian vegetation within portions of the Lester–Amity–Hawk Ridge Natural Area has been degraded by a combination of historic land disturbance, wildfire, windthrow, altered hydrology, and ongoing channel instability. These stressors have reduced the extent and quality of native riparian plant communities, particularly along incised stream corridors where floodplain disconnection lowers the water table. The loss or simplification of riparian vegetation decreases bank stability, increases solar exposure and summer water temperatures, and reduces inputs of organic matter and large wood that are essential for maintaining aquatic habitat complexity and food-web productivity.

An emerging and significant threat to riparian forest integrity is the spread of emerald ash borer. Black ash is a dominant component of riparian and floodplain forests along portions of Amity Creek and East Amity Creek, particularly in wetland settings. Anticipated ash mortality is expected to result in rapid canopy loss, increased stream temperatures, reduced bank stability, altered hydrology, and accelerated invasion by non-native species, which represent an additional and interacting stressor within the Natural Area.

Invasive species have a variety of negative effects in an ecosystem. They can displace, weaken or kill desirable plants resulting in loss of diversity; pose human health risks; degrade wildlife habitat; interfere with recreational activities; disrupt urban and community ecosystems, and divert millions of dollars for their control (MN Invasive Species Advisory Council, 2015).

Invasive plants can be more problematic in urban forests, such those in the Lester – Amity – Hawk Ridge Natural Area, because they are able to quickly colonize areas with high levels of disturbance. Compaction and erosion in high use areas such as trails provides more opportunities for invasive species to establish. Invasive species are better able to take advantage of these conditions than native species and can quickly populate disturbed sites. Invasives are introduced via hitchhiking of seeds on boots, tires, domestic animals, and equipment. They can also be spread by wildlife and domestic animals, and infestations can encroach from surrounding areas.

Without proactive management, these combined stressors pose a significant risk to water quality, aquatic habitat, and long-term ecosystem resilience.

Table 3: Invasive, nonnative plant species found in Lester-Amity-Hawk Ridge Natural Area in 2025.

Scientific name	Common name
Berberis thunbergii	Japanese barberry
Cirsium arvense	Canada thistle
Cotoneaster lucida	Cotoneaster
Frangula alnifolia	Glossy buckthorn
Hieracium aurianticum	Orange hawkweed
Lonicera morowii	Morrow's honeysuckle
Lonicera tatarica	Tartarian honeysuckle

Scientific name	Common name
Lonicera x bella	Showy honeysuckle
Lotus corniculatus	Bird's foot trefoil
Pinus sylvestris	Scot's pine
Poa pratensis	Kentucky blue grass
Phalaris arundinacea	Reed canary grass
Rhamnus cathartica	Common buckthorn
Taraxicum officinale	Dandelion
Valeriana officinalis	Common valerian

Climate Change and Increasing Storm Intensity

Climate change and increasing storm intensity pose a growing threat to the Natural Area. Regional trends indicate more frequent and intense precipitation events, longer dry periods between storms, and increased hydrologic variability. These changes exacerbate channel erosion, increase sediment delivery, reduce baseflow during drought periods, and elevate water temperatures, placing additional stress on coldwater aquatic systems. Addressing this threat requires restoration approaches that emphasize natural processes, floodplain connectivity, and long-term system resilience rather than short-term structural fixes.

Human uses

Trails provide opportunities for people to connect with nature and improve health and well-being, which is why the City and its partners support the continued existence of the many existing trails within the LAHR natural area. The LAHR natural area is well-loved and heavily used by both locals and visitors alike. With education, careful management considerations and strong relationships with partners, the City can ensure that the delicate ecosystems of this designated natural area are protected, while still allowing for low-impact recreation in designated areas.

The existence of large natural areas within an urban area such as Duluth is uncommon and therefore must account for human uses and the impacts that such uses can cause. Trails and trail use have been found to have negative impacts on soils, vegetation, water quality, plants, and wildlife (Hennings, 2017), including the following, specific impacts:

- Riparian habitat and water quality – disturbed riparian vegetation; altered drainage patterns and increased runoff
- Habitat loss, fragmentation, and edge effects – altered vegetation structure and invasive species introductions along corridors; creation of zones of avoidance for wildlife
- Introduction of invasive species – trail users transport species along trail systems, with multi-use trails tending to have more invasive species than single-use trails

The City and its partners are well-aware of the impacts that human uses can have on our sensitive ecosystems and have systems in place to ensure that impacts are mitigated as much as possible without blocking all access to our beloved forests and streams. Careful consideration of any new trail or trail re-route must go through a thorough review process by several City departments. Some of these proposals also require the approval of certain City Commissions or City Council. Several existing "Master Plans" also guide decisions on future trail locations and general recreation uses such as the Duluth Traverse Trail Plan, the City's Essential Spaces Park and Recreation Plan and the City's Comprehensive Plan.

HABITAT DEGRADATION AND LOSS

Habitat degradation and loss is one of the most significant threats to bird populations worldwide. While complete habitat destruction, such as the clearing of forests or draining of wetlands, has immediate and obvious consequences, more subtle forms of habitat degradation can be equally harmful over time.

Fragmentation

One major form of degradation is habitat fragmentation, which occurs when large, continuous habitats are broken into smaller, isolated patches due to land conversion for agriculture, urban development, roads, or infrastructure. Fragmentation increases the proportion of edge habitat, the transitional zones between natural areas and developed landscapes. Many bird species are highly sensitive to edge effects because these areas often expose them to higher rates of predation, nest parasitism, increased competition, and human disturbance.

Homogenization

Another critical issue is the homogenization of forest structure caused by intensive forest management practices. Even when overall forest cover remains stable, management strategies that prioritize uniform tree age and species composition reduce structural complexity. Many bird species depend on features associated with old-growth or late-successional forests, including large trees, snags (standing dead trees), downed woody debris, layered canopies, and diverse understory vegetation. The loss of these structural components diminishes nesting sites, food resources, and protective cover. As a result, forests may appear intact from a distance but no longer provide suitable habitat for specialized bird species.

Habitat degradation also reduces ecosystem resilience. Diverse habitats support diverse bird communities, which in turn contribute to ecosystem functions such as insect control, seed dispersal, and pollination. When habitat quality declines, these ecological services can be disrupted.

Bird Collisions with Structures

Collisions with human-built structures represent one of the leading direct, human-caused sources of bird mortality. These structures include buildings (particularly glass windows), communication towers, wind turbines, and vehicles.

Building and Glass Collisions

Glass poses a unique threat because it is effectively invisible to birds. Birds often perceive reflections of sky, vegetation, or open space in windows as extensions of natural habitat. Transparent glass can also create the illusion of a clear flight path, especially in buildings with windows on opposite sides. As a result, birds attempt to fly through what they perceive as open space and collide with the glass at high speeds. In the United States alone, it is estimated that up to one billion birds die annually due to building collisions.

Even when collisions are not immediately fatal, they frequently result in internal injuries, concussions, or compromised flight ability, reducing survival after release.

Light Attraction and Disorientation

Artificial light at night further exacerbates collision risk. Many migratory birds travel at night and rely on natural light cues, including the moon and stars, for navigation. Bright artificial lighting from buildings, communication towers, and wind turbines can attract and disorient birds. Disoriented individuals may circle illuminated structures repeatedly, leading to exhaustion, increased vulnerability to predators, and eventual collision. This phenomenon is especially dangerous during peak migration periods when large numbers of birds are moving through urbanized areas.

Wind Turbines and Communication Towers

Communication towers, especially those with steady-burning lights and supporting guy wires, can cause mass mortality events during poor weather conditions. Wind turbines can also pose risks, particularly to large soaring birds and species that fly at rotor height. While renewable energy is critical for addressing climate change, careful mitigation measures are necessary to reduce impacts on bird populations.

Vehicle Collisions

Vehicle collisions are another significant source of bird mortality. Birds that forage or hunt near roads are especially vulnerable. Species such as raptors and owls may be attracted to roadside carrion or open hunting areas created by roads. Low-flying species and ground-foraging birds are also at high risk. In the United States, it is estimated that up to 340 million birds die annually due to vehicle collisions.

Strategies

Strategies for bird friendly forest management and management of native plant communities, special plant species, non-native or cultural plant communities, invasive species, special water features, and trails within the Lester-Amity-Hawk Ridge Natural Area are described in this section.

Bird-Friendly Forest Management

Long-term MAPS data from Hawk Ridge (2015–2024) confirm the presence of a diverse community of resident breeding songbirds representing upland conifer, mixed hardwood-conifer, and riparian forest systems. Regular breeders include species such as American Redstart, Ovenbird, Black-and-white Warbler, Chestnut-sided Warbler, Mourning Warbler, Veery, Yellow-bellied Flycatcher, Pileated Woodpecker, and Yellow-bellied Sapsucker. Several focal Minnesota species of conservation concern documented breeding at Hawk Ridge include Blackburnian Warbler, Canada Warbler, Golden-winged Warbler, Least Flycatcher, Swainson's Thrush, Ruffed Grouse, Pileated Woodpecker, and Yellow-bellied Sapsucker. Many of these species are identified in Forestry for Minnesota Birds as indicators of high-quality habitat within specific forest types. Each forest habitat type requires a specific set of management strategies; however, there are some overarching key habitat structures and strategies that are important for maintaining bird habitats:

- Maintain differing levels of canopy cover (gaps to allow sunlight for regeneration of tree species) and the diversity of vertical structure to support a diversity of breeding bird species.
- Eliminate invasive plant species and create a diversity of native plants to ensure that birds have adequate food sources.
- Retain large-diameter trees to provide structures for roosting, nesting, and perching as well as provide the potential for future snags (standing dead trees).
- Retain downed, woody material and leaf litter to provide habitat for invertebrate populations, an essential food source for birds during the breeding season.
- Maintain wetlands and other water features to support both breeding and migratory birds.

Maintaining this diversity requires managing forests for structural complexity across stand and landscape scales.

Native Plant Communities

Native plant community polygons were delineated and classified through a desktop review. Meander surveys were then conducted within these polygons to verify the desktop determinations and to assess the ecological condition of each NPC. The following section provides an overview of the landscape context, dominant species, threats, and other notable features of the NPCs in the Natural Area. NPCs are organized by system (e.g., Fire Dependent Forest/Woodland), type (e.g., Northern Dry-Mesic Mixed Woodland), and subtype (e.g., Red Pine – White Pine Balsam Fir Subtype) when applicable.

Fire Dependent Forest/Woodland

Red Pine – White Pine Balsam Fir Subtype (FDn33a1), Aspen – Birch Woodland (FDn33b), Aspen – Birch Forest (FDn43b), Aspen – Birch Forest Balsam Fir Subtype (FDn43b1), Upland White Cedar Forest (FDn43c)

FDn33 Northern Dry-Mesic Mixed Woodland

FDn33a1 Red Pine – White Pine Balsam Fir Subtype

Total Acreage: 5.5

Red Pine – White Pine Balsam Fir Subtype was occasionally found in northern dry-mesic forests in pockets. In previous surveys, these plant communities were mapped due to their balsam fir dominant canopy and lacked other characteristic canopy species such as white pine and red pine (*Pinus strobus/resinosa*) and occasional jack pine (*Pinus banksiana*).

FDn33b Aspen – Birch Woodland

Total Acreage: 55.5

Northern Dry-Mesic Mixed Woodland was occasionally found along higher elevations near Lester River and Amity Creek and was common between rocky outcrops (ROn23a) throughout Hawk Ridge. These dry-mesic forests contained some of the soapberry (*Shepherdia canadensis*) species observations and some of the more aggressive native species in the herbaceous and shrub layers, primarily bush honeysuckle (*Diervilla lonicera*), bluejoint (*Calamagrostis canadensis*), thimbleberry (*Rubus parviflorus*), and large leaved aster (*Eurybia macrophylla*). The canopy was mainly comprised of mature paper birch (*Betula papyrifera*) and quaking aspen (*Populus tremuloides*). Hawk Ridge contained occasional red oak (*Quercus rubrum*) that was not naturally regenerating due to deer pressure. These dry-mesic forests would typically have more diversity, including white, red, and jack pine (*Pinus strobus/resinosa/banksiana*) and occasional red maple (*Acer rubrum*), which were lacking and, in some cases, replaced by the non-native scot's pine (*Pinus sylvestris*).

FDn43 Northern Mesic Mixed Forest

FDn43b Aspen – Birch Forest

Total Acreage: 398.0

Aspen – Birch Forest had the most acreage of all NPCs and occurred on well-drained mesic soils. Dominant canopy species were primarily quaking aspen (*Populus tremuloides*) and paper birch (*Betula papyrifera*), both young and mature. Buckthorn (*Rhamnus cathartica*) is a main stressor in the understory of this community and is inhibiting the natural regeneration of more desirable species along with white tail deer that browse any seedlings of those desirable species. More aggressive native species were often observed in the herbaceous and shrub layers, primarily bush honeysuckle (*Diervilla lonicera*), bluejoint (*Calamagrostis canadensis*), beaked hazelnut (*Corylus* cornuta), and large leaved aster (*Eurybia macrophylla*). These species outcompete more diminutive or less aggressive species such as fly

honeysuckle (*Lonicera canadensis*), bluebead lily (*Clintonia borealis*), sarsaparilla (*Aralia nudicaulis*), and canada mayflower (*Maianthemum canadense*).

FDn43b1 Aspen – Birch Forest Balsam Fir Subtype

Total Acreage: 42.8

Aspen – Birch Forest Balsam Fir Subtype was typically found within the greater FDn43b and FDn33 forest growing out of exposed bedrock or very shallow soils. They were characterized by the presence of a balsam fir (*Abies balsamea*) dominant canopy. The herbaceous understory was very low in diversity compared to the surrounding woodland due to the deep shade beneath the balsam fir. This plant community was mapped and designated as balsam fir dominant in prior surveys within Hawk Ridge.

FDn43c Upland White Cedar Forest

Total Acreage: 5.0

Upland White Cedar Forest was found in a larger polygon near Amity Creek. Small inclusions or narrow bands of upland cedar forest were observed immediately adjacent to Amity Creek, but those were too small to map individually and were part of the larger, surrounding plant community.

Floodplain Forest

FFn57 Northern Terrace Forest

FFn57a Black Ash – Silver Maple Terrace Forest

Total Acreage: 78.6

FFn57a Black Ash – Silver Maple Terrace Forest was typically found along Lester River and Amity Creek. Black ash terrace forest systems are distinguished from wet ash forest systems using the herbaceous ground cover species observed. Within Lester and Amity, the terrace forests include more floodplain species that tolerate fluctuating hydrology, including ostrich fern (*Matteuccia struthiopteris*), wood nettle (*Laportea canadensis*), tall meadow-rue (*Thalictrum dasycarpum*), and sensitive fern (*Onoclea sensibilis*). Unique to the Lester-Amity-Hawk Ridge area were the dominating black ash (*Fraxinus nigra*) in the canopy rather than silver maple (*Acer saccharinum*) and the very high perched nature of these systems. Generally, these floodplain terrace forests sit above a large river that experiences high spring floods or just at bankfull of a smaller stream that accesses that floodplain at large rain events. In Lester-Amity-Hawk Ridge, several of these perched river terrace communities are well above bankfull and the river is no longer accessing these wetlands.

Mesic Hardwood Forest

Red Oak – Sugar Maple – Basswood - (Bluebead Lily) Forest (MHn35b), Aspen – Birch – Red Maple Forest (MHn44a), Black Ash – Basswood Forest (MHn46b), Sugar Maple – Basswood - (Bluebead Lily) Forest (MHn47a)

MHn35 Mesic Hardwood Forest

MHn35b Red Oak – Sugar Maple – Basswood - (Bluebead Lily) Forest

Total Acreage: 55.7

MHn35b Red Oak – Sugar Maple – Basswood - (Bluebead Lily) Forest generally occurred in higher elevations with deeper, well-drained mesic soils. In Hawk Ridge, several larger polygons contained higher quality stands that had a diverse, mature canopy consisting of red oak (*Quercus rubrum*), sugar maple (*Acer saccharum*), and basswood (*Tilia americana*). Occasional super canopy white pine (*Pinus* strobus) would be expected in this community, but none were observed. Characteristic shrubs such as pagoda dogwood (*Cornus alternifolia*), beaked hazelnut (*Corylus cornuta*), and fly honeysuckle (*Lonicera canadensis*) were present. Some characteristic forest species were observed but were in low densities including bluebead lily (*Clintonia borealis*), rose twistedstalk (*Streptopus roseus*), wild sarsaparilla (*Aralia nudicaulis*), and sweet-scented bedstraw (*Galium triflorum*). More tolerant characteristic species included Pennsylvania sedge (*Carex pensylvanica*) and mountain rice grass (*Oryzopsis asperfolia*). Within Lester, several mapped forests contained a few indicator canopy tree species like sugar maple, basswood *(Tilia americana*), and yellow birch (*Betula alleghaniensis*), but those were single trees within an otherwise quaking aspen (*Populus* tremuloides) dominated forest. This was believed to be a younger northern mesic hardwood forest that is being kept from transitioning into a later successional stage due to the high population of deer within city limits.

MHn44 Northern Wet-Mesic Boreal-Conifer Forest

MHn44a Aspen – Birch – Red Maple Forest

Total Acreage: 41.8

Aspen – Birch – Red Maple Forest was scattered within the larger northern mesic mixed forest and slowly transitioned into other communities without obvious shifts in vegetation. Quaking aspen (*Populus tremuloides*), paper birch (*Betula papyrifera*), and red maple (*Acer rubrum*) with dominant in the canopy and black ash (*Fraxinus nigra*) occurred in the subcanopy. These plant communities had greater diversity among the herbaceous and shrub layers with a mix of wet species like bladder sedge (*Carex intumescens),* spotted touch me not (*Impatiens capensis*), and white avens (*Geum canadense*) and dry species including large leaved aster *(Eurybia macrophylla*), bush honeysuckle *(Diervilla lonicera*), and beaked hazel *(Corylus cornuta*).

MHn46 Northern Wet-Mesic Hardwood Forest

MHn46b Black Ash – Basswood Forest

Total acreage: 123.9

Black Ash – Basswood Forest occurred on moderate to soft slopes adjacent to Lester River and Amity Creek or intermittent streams. Characteristic canopy species included basswood (*Tilia americana*), black ash (*Fraxinus nigra*), and quaking aspen (*Populus tremuloides*). Herbaceous indicator species were limited due to the disturbance history within these communities but included woodbine (*Parthenocissus inserta*), jack in the pulpit (*Arisaema triphylla*), and graceful sedge (*Carex gracillima*) along with some of the more tolerant upland species like pensylvania sedge (*Carex pensylvanica*), large leaved aster (*Eurybia macrophylla*), and lady fern (*Athyrium felix-femina).* The absence of floodplain species such as ostrich fern (*Matteuccia struthiopteris*) and wood nettle (*Laportea canadensis*) indicated these areas were not FFn57a Black Ash Silver Maple Terrace Forest.

MHn47 Northern Rich Mesic Hardwood Forest

MHn47a Sugar Maple – Basswood – (Bluebead Lily) Forest

Total Acreage: 5.8

Sugar Maple – Basswood - (Bluebead Lily) Forest was mapped within the far northern polygon north of East Amity Creek. The canopy was dominated by old sugar maple (*Acer saccharum*) with a sparse shrub layer and characteristic herbaceous species such as rose twistedstalk (*Streptopus roseus*), mountain rice grass (*Oryzopsis asperfolia*), and Pennsylvania sedge (*Carex pensylvanica*). Leatherwood (*Dirca palustris*), a common indicator of rich mesic soil, was searched for but not found. This plant community did not suffer blowdown that occurred in 2016 to the south, which consisted mostly of quaking aspen (*Populus tremuloides*) in the canopy.

Rock Outcrop

ROn23 Northern Bedrock Shrubland

ROn23a Bedrock Shrubland (Inland)

Total Acreage: 43.1

Bedrock Shrubland (Inland) was mapped in Hawk Ridge at higher elevations with shallow to no soil. These rocky outcrops varied in size and were surrounded by forest that occurred at lower elevations where there was more soil. Vegetation structure consisted of scattered islands of shrubs such as juneberry (*Amelanchier sp.*), bush honeysuckle (*Diervilla lonicera),* and prairie willow (*Salix humilis*). Lower shrub and herbaceous species surrounded the islands of shrubs and grew within the bedrock cracks, such as pale corydalis (*Corydalis sempervirens*), rock spikemoss (*Selaginella rupestris*), poverty oat grass (*Danthonia spicata*), and pussy toes (*Antennaria spp.*). Other common species included caribou moss (*Cladina sp.)* and cliff ferns such as rusty wood fern (*Woodsia ilvensis*). Occasionally, bedrock outcrops supported small populations of soapberry (*Shepherdia canadensis*).

River Shore

Sand Beach/Sandbar (River) (RVx32b2), Gravel/Cobble Beach (River) (RVx32c2), Bedrock/Boulder Shore (Permanent Stream Subtype) (RVx43a2), Slumping Clay/Mud River Slope (RVx54a)

RVx32 Sand/Gravel/Cobble River Shore

Total Acreage: 17.0

RVx32b2 Sand Beach/Sandbar (River) and RVx32c2 Gravel/Cobble Beach (River) occurred within Lester-Amity-Hawk Ridge along Amity Creek. These two communities were often narrow bands along the stream or pointbars of cobble or sand deposited by flooding events from storm or snowmelt. Due to the small and sporadic nature of these and their general disturbance patterns causing frequent changes in shape and sometimes sediment type, they were classified to the higher level of RVx32 and lumped together.

RVx43 Rocky River Shore

RVx43a2 Bedrock/Boulder Shore (Permanent Stream Subtype)

Total acreage: 17.6

Bedrock/Boulder Shore (Permanent Stream Subtype) was within and immediately adjacent to Lester River and Amity Creek. Stunted tree species such eastern white cedar *(Thuja occidentalis),* white spruce *(Picea glauca),* and balsam fir (*Abies balsamea*) grew just beyond the ordinary high-water mark. Characteristic herbaceous species of Bedrock/Boulder Shore along a permanent stream included harebell (*Campanula rotundifolia*), giant goldenrod (*Solidago gigantea*), hairy goldenrod (*Solidago hispida*), water hemlock (*Cicuta maculata*), fowl mannagrass (*Glyceria striata*), and common bladder fern (Cysopteris bulbiferus). Within the understory and edges of the Bedrock/Boulder Shore community were several observations of soapberry (*Shepherdia canadensis*).

RVx54 Clay/Mud River Shore

RVx54a Slumping Clay/Mud River Slope

Total acreage: 32.3

Slumping Clay/Mud River Slope was typically found adjacent to Lester River and Amity Creek where the water had eroded away at the steep clay slopes. The dominant canopy species was speckled alder (*Alnus incana*) with shrubby willow species like sandbar, slender willow, and bebb's willow (*Salix interior/petiolaris/bebbiana*) and occasionally eastern white cedar (*Thuja occidentalis*). Exposed clay was common with characteristic herbaceous species such as hairy goldenrod (*Solidago hispida*), philadelphia fleabane (*Erigeron philadelphicus*), horsetails *(Equisetum sp*), tall meadow-rue *(Thalictrum dasycarpum*) and yellow rocket *(Barbarea vulgaris*). Occasional soapberry (*Shepherdia canadensis*) occurrences were found within the clay bluffs, usually at the top of an eroded bank near the edge of the vegetation. Some invasive species were taking advantage of the exposed clay such as orange hawkweed (*Hieracium aurienticum*) and tansy (*Tanacetum vulgaris*).

Wet Forest

Black Ash – Aspen – Balsam Poplar (Northereaster) (WFn55a) and Northern Wet Alder Swamp (WFn74a)

WFn55 Northern Wet Ash Swamp

WFn55a Black Ash – Aspen – Balsam Poplar (Northeastern)

Total Acreage: 55.7

Black Ash – Aspen – Balsam Poplar Swamp (Northeastern) occurred along the riparian corridors of upper Amity Creek before it enters the gorge along Seven Bridges Road and along unnamed and intermittent streams that flow into Lester River. The WFn55a communities along the unnamed, intermittent streams were narrow forested wetlands with black ash (*Fraxinus nigra*) dominating the canopy. Along Amity Creek, black ash used to be the dominant canopy species, but early infestations of the emerald ash borer have caused near full ash mortality causing the canopy to transition. There was occasional, scattered mature yellow birch (*Betula alleghaniensis*) and offspring would do well to revegetate this community if protected from deer. Several of these large black ash swamps experiencing significant mortality were in transition to either WMn82b1 Wet Meadow with Bluejoint Subtype with lower diversity due to the aggressive native Canada bluejoint (*Calamagrostis canadensis*) or WFn74 Northern Wet Alder Swamp with a canopy of either speckled alder (*Alnus incana*) or non-native buckthorn (*Rhamnus cathartica* and *Frangula alnifolia*).

WFn74 Northern Wet Alder Swamp

Total acreage: 27.4

Northern Alder Swamp was typically found in low lying depressions between rocky outcrops within Hawk Ridge and surrounded by upland mesic forest within Lester. Higher quality swamps were dominated by speckled alder (*Alnus incana*), but more often they were overtaken with buckthorn (*Rhamnus cathartica* and *Frangula alnifolia*) with very low diversity of herbaceous species. Areas of particularly low-quality include the western side of Hawk Ridge near the bird research lanes and the northwest end of the forest in Lester, both of which were disturbed by historic trails.

Management of Native Plant Communities

On a broad scale, the plant communities within Lester-Amity-Hawk Ridge were of mixed quality, and there are actions that could improve the natural area and protect the unique plant communities within the natural area. The following management recommendations are based on observations and findings from the 2025 field survey of the Lester-Amity-Hawk Ridge nominated natural area and include:

- Preservation of the highest quality plant communities
- Removal of seed producing invasives
- Restoration and underplanting of desired tree species in FDn33b, FDn43b, ROn23a, WFn55a, WFn74, MHn44, and MHn46

- Introduction of fire as a management tool in fire adapted plant communities (FDn33a1, FDn43a ROn23a)
- Further study of perched FFn57a and its history with Lester River and Amity Creek

Preservation of Ranked Highest Quality Plant Communities

Though the Lester-Amity-Hawk Ridge plant communities have been impacted by historical logging, wildfire, and more recent residential and recreational use, some higher quality habitats still remain. High quality NPCs include areas of Aspen – Birch Forest (FDn43b) dominated by conifers and supporting nesting great horned owls, terraced forests (FFn57a) that retain highly diverse floodplain understories, and open shrubby bedrock (ROn23a) and Slumping Clay/Mud River Slope (RVx54a) communities that support soapberry (*Shepherdia canadensis*). Although these areas are of higher quality, they would benefit from management that supports future canopy species. Black ash has been affected by emerald ash borer in floodplain terraced forests, and the white-tailed deer population in Duluth continues to prevent seedlings from reaching the sapling stage across all native plant communities.

Removal of seed producing invasives

To slow the spread of buckthorn and honeysuckle, a targeted approach to invasive species removal is recommended, beginning with the mature, seed producing individuals marked during this study and other past invasive species surveys. High quality plant communities with easy access, within view of the public, and areas that have a history of invasive species control effort should be the highest priority areas for maintenance control. Mechanical or chemical control is recommended to remove mature adult woody shrubs. Goats are sometimes used as a mechanical treatment for invasive woody shrubs, but this treatment method is only recommended in areas where communities have received a condition ranking D due to extremely low diversity within the herbaceous groundcover. While goats may be effective at controlling woody shrub seedlings, their use in forests with diverse understories would negatively impact desirable species, as goats do not differentiate between native and non-native plants.

Restoration and underplanting of desired tree species in FDn33b, FDn43b, ROn23a, WFn55a, WFn74, MHn44, and MHn46

Forested NPCs have been impacted by a long history of heavy recreational use, farming, wildfire, and fragmentation. To support the restoration of these ecosystems, underplanting is recommended in Northern Dry-Mesic Mixed Woodland (FDn33) and Northern Mesic Mixed Forest (FDn43b) with appropriate species such as white pine (Pinus strobus) and red pine (*Pinus resinosa*). Other species such as Eastern white cedar *(Thuja occidentalis)* along with hardwoods such as sugar maple *(Acer saccharum*), basswood *(Tilia americana*), yellow birch *(Betula alleghaniensis*), are suitable in FDn43, especially in areas near mapped mesic hardwood forests. Red oak (*Quercus rubra*) is a good option in FDn33 where this species is commonly found in the subcanopy. All species need to be protected from deer and hare browse, which has prevented many of these species from naturally regenerating.

Northern wet mesic hardwood forests (MHn44 and MHn46) were observed in pockets within the northern mesic mixed forest (FDn43), and both plant communities within Lester-Amity-Hawk Ridge were heavily impacted by logging, wildfire, and farming. Buckthorn (*Rhamnus cathartica*) was common in the understory of Lester and on the western side of Hawk Ridge and should be controlled. Underplanting of mix of yellow birch (*Betula alleghaniensis*), basswood (*Tilia americana*), red maple (*Acer rubrum*), eastern white cedar (*Thuja occidentalis*), sugar maple (*Acer saccharum*), and red oak (*Quercus macrocarpon*) is recommended to progress these plant communities toward a longer-lived, more diverse canopy that supports a diverse herbaceous groundcover. Where MHn44 is mapped along steep slopes, include more conifer species, such as eastern white cedar, white pine (*Pinus strobus*), and potentially eastern hemlock (*Tsuga canadensis*), since it has been found in Lester.

Rocky outcrops (ROn23a) have been impacted by invasive species, primarily buckthorn (*Rhamnus cathartica*) and honeysuckle (*Lonicera sp.*). An emerging invader in this system is cotoneaster (*Cotoneaster lucida*), which has also been observed in rocky outcrops elsewhere in town as well as HRNR. Continuing to remove these invasive, sun-loving shrubs is important and can be done with cutting and chemically treating the stumps or through a reintroduction of prescribed fire. It is also important to promote native vegetation that can outcompete invasive species such as occasional trees or isolated groups of naturally regenerating red oak, white pine, red pine, or jack pine that sometimes occur in rocky outcrops.

The wet forest (WFn55a) and floodplain forest communities (FFn57a) have been transitioning to non-forested communities due to the impact of invasive species. In both communities, black ash (*Fraxinus nigra*) canopy cover due has declined significantly due to the invasion of the Emerald Ash Borer, leaving canopy gaps and altering the hydrology of the system. As a result, the wetland can become too wet for trees to establish, and the community becomes graminoid or shrub dominated. This is especially problematic when invasive shrubs such as buckthorn (*Rhamnus cathartica*/*Frangula alnifolia*) take over. Underplanting the ash forests with suitable species such as yellow birch (*Betula alleghaniensis*), eastern white cedar (*Thuja occidentalis*), basswood (*Tilia americana*), American elm (*Ulmus americana*), red maple (*Acer rubrum*), bur oak (*Quercus macrocarpon*), and swamp white oak (*Quercus bicolor*) prior to significant loss of black ash will maintain the tree canopy and understory species. These same canopy tree species are recommended to plant and protect after the black ash has died to restore the canopy. If herbaceous diversity declined in response to canopy loss, seeding or planting understory species is also recommended to support recovery.

Introduction of fire as a management tool in fire adapted plant communities

Fired adapted communities within the Lester-Amity-Hawk Ridge natural area include rocky outcrops (ROn23a), Northern Dry-Mesic Mixed Woodland (FDn33a/FDn33b), and White Pine – Red Pine Forest (FDn43a). These communities typically experienced fire every 20-100 years, encouraging germination of the seedbank by breaking seed dormancy, exposing mineral soil, and increasing sun availability. Fire is a useful management tool in early spring on young buckthorn (*Rhamnus cathartica*) seedlings and saplings, but it recommended that fire is used after mechanical or chemical removal of mature adults. Burning every 1-3 years after buckthorn removal will support many of the plants in these fire-dependent

systems that benefit from frequent ground fires, providing them a competitive advantage over invasive species.

Further study of perched FFn57a and its history with Lester River and Amity Creek

Lester River and Amity Creek both have steep, eroding banks with floodplains perched higher than it appears the rivers can access. Floodplain species still survive within these plant communities, even though they do not have regular inundation of water, sediment, and nutrients. Quantifying the lifespan of these species could uncover how long ago these rivers downcut. Alternatively, it could indicate longer lifespans of these species which had been thought to be fairly short-lived due to the disturbance regime in which they thrive.

SPECIAL PLANT SPECIES

Four state-listed species were observed within or just beyond the DNAP boundary. While one of these species was known to occur within Hawk Ridge, many new populations were documented in the natural area, and the additional three species were unexpected. This suggests that there could still be more occurrences of these species or others not observed during the survey period. The presence of state-listed species indicates that a plant community is either of high quality or unique within the state, warranting protection of both the species and the community. When these species occur in communities threatened by invasive species, those NPCs should be prioritized for restoration.

Management of Special Plant Species

Soapberry (Shepherdia canadensis) occurs in Slumping Clay/Mud River Slope and Bedrock/Boulder Shore communities, both of which would benefit from removal of invasive species including common buckthorn, honeysuckle, and cotoneaster. Prescribed fire may be effective for invasive species control in bedrock shrubland communities but is not recommended for slumping clay/mud river slopes or boulder shore communities, where ongoing mechanical or chemical control is advised.

Barren strawberry (Waldsteinia fragarioides) occured in areas with little to no buckthorn. Additional populations may be present, and future surveys should focus on areas with minimal buckthorn. Buckthorn that occurs in suitable habitat should be prioritized for chemical or manual control, which would improve habitat conditions and could allow for expansion of barren strawberry.

More information about habitat requirements of (Carex pallescens) is required to make adequate recommendations for the management of this species. Historically, pale sedge was believed to grow along Lake Superior shorelines and occasionally on trails. It has recently been discovered in unexpected habitats in Duluth, and further surveys might reveal more populations.

Eastern hemlock (Tsuga canadensis) is a slow growing, fire intolerant species that was found in a mixed conifer forest. This forest supported a pair of nesting great horned owls and was distinct from the NPC directly north that was dominated by aspen. Expanding the mixed conifer forest to the north by planting conifer species and longer-lived hardwoods like sugar maple, yellow birch, basswood and red oak would

increase diversity and support both the eastern hemlock and great horned owls. If eastern hemlock in Lester are of natural origin, this would indicate that the forest is intolerant of fire, and that the area was likely unburned in the 1918 fire. Creating a publicly available GIS map of the 1918 fire could assist in better understanding the historic impacts of the fire on Duluth's native plant communities.

To support all these listed species, all new trail or recreational uses will be carefully considered by the City and its partners through existing evaluation processes.

Cultural or Non-Native Plant Communities

Non-native plant communities were classified as Disturbed and given a further qualifying classification, describing the cultural use of the plant community. Two different non-native plant communities were identified within the Lester-Amity-Hawk Ridge Natural Area and classified as disturbed. They were further qualified as non-native upland and conifer plantations. Within the Hawk Ridge Bird Observatory, several upland fields were mapped, consisting of a mix of native and non-native herbaceous species. These fields had historical agricultural or other uses and have not yet rebounded into a native plant community. Two types of conifer plantations were planted frequently in both Hawk Ridge Bird Observatory and the Lester forest: smaller, isolated plantations were planted with the native red pine (*Pinus resinosa*), and other, larger plantations were planted with the non-native scot's pine (*Pinus sylvestris*). In most of these disturbed plantations, native pine species would have been a component of the greater plant community, however, they were planted at the same time, creating a monotypic, even aged stand and shading out the understory with a dense canopy.

Management of Cultural of Non-Native Plant Communities

The tightly packed red pine (*Pinus resinosa*) that were used to plant smaller, isolated pine plantations within Lester-Amity-Hawk Ridge Natural Area provide dense shade to the understory and form single species, monotypic stands. Similarly, scot's pine (*Pinus sylvestris*) were planted in pine plantations taht now form monotypic stands. Further impacting the native plant community, they are a non-native species that is not preferred by deer, resulting in increased successful reproduction than the native pine species and associated deciduous species. To improve forest diversity and increase access to sunlight, thinning or girdling both pine species within these disturbed pine plantations coupled with underplanting of desired species such as, white pine (*Pinus strobus*), red oak (*Quercus rubrum*), and occasional white cedar (*Thuja occidentalis*) would improve species diversity and increase sunlight to the forest floor.

Invasive Species

The NPC survey conducted in 2025 identified a total of 15 concerning invasive species present in Lester - Amity - Hawk Ridge Natural Area (Table 2; GEI, 2026 TBD). Populations of invasive species were documented throughout the nominated natural area, but the greatest infestations occurred adjacent to roads or trails, adjacent to private property, and within forested communities with evidence of past land

alteration like homesteads or clearing (Figure 9). The primary invaders were established species including common buckthorn (*Rhamnus cathartica*), glossy buckthorn (*Frangula alnifolia*), and honeysuckle species (*Lonciera tatarica, Lonicera marrowii,* and *Lonicera X bella*). The most prevalent invasive species was common buckthorn (Figure 10), which had >50% cover in the most heavily impacted areas with scattered individuals between dense populations. It was often a mature shrub or small tree with fruit in rock outcrop areas and generally a non-fruit bearing seedling in shadier habitats. Glossy buckthorn was more common in the forested wetlands (WFn55a) and alder thicket (WFn74), while common buckthorn is most prevalent in the rock outcrop (ROn23a) and upland forested communities (FDn43b and MHn35b).

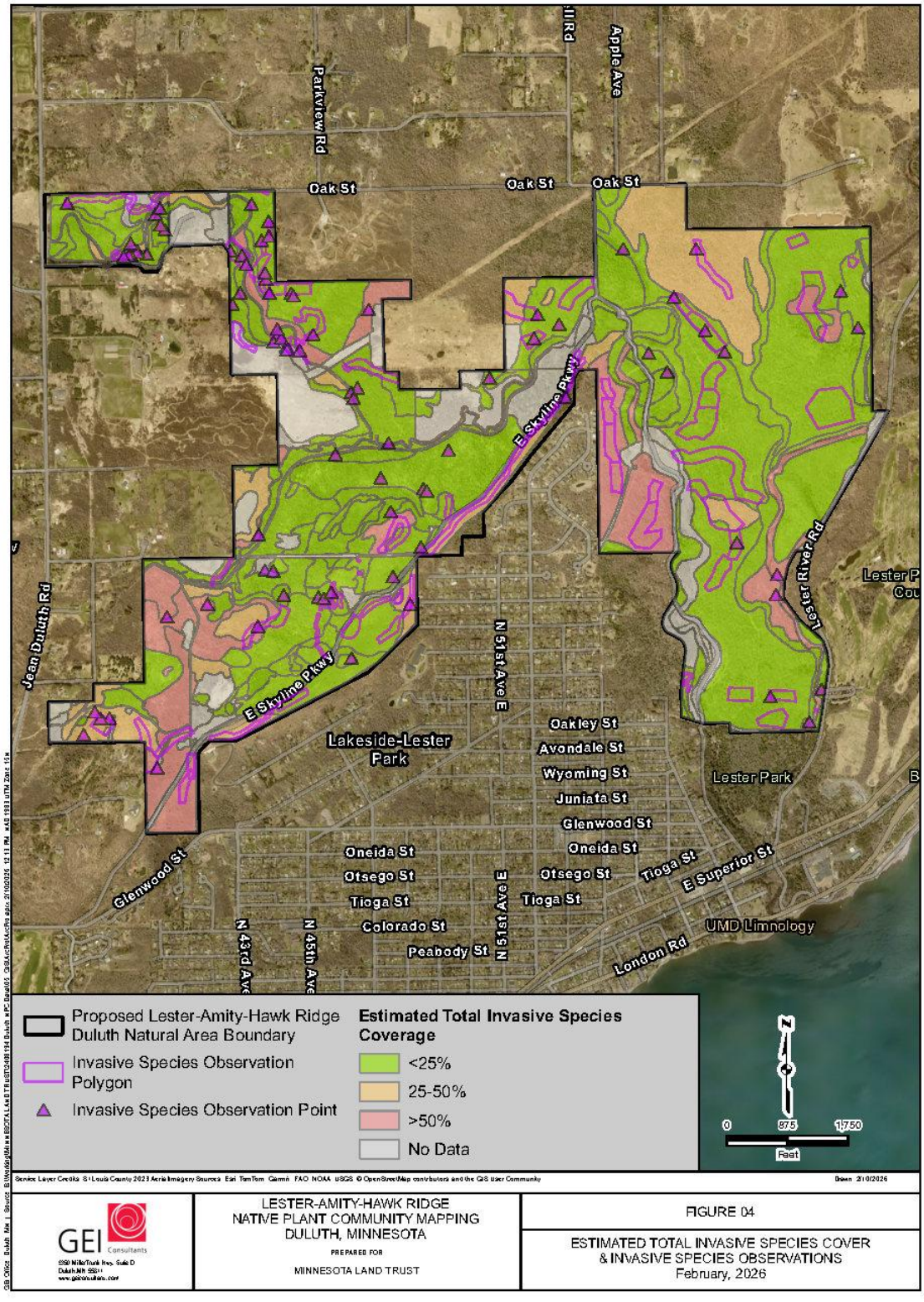

Figure 9: Estimated total invasive species cover and invasive species observations.

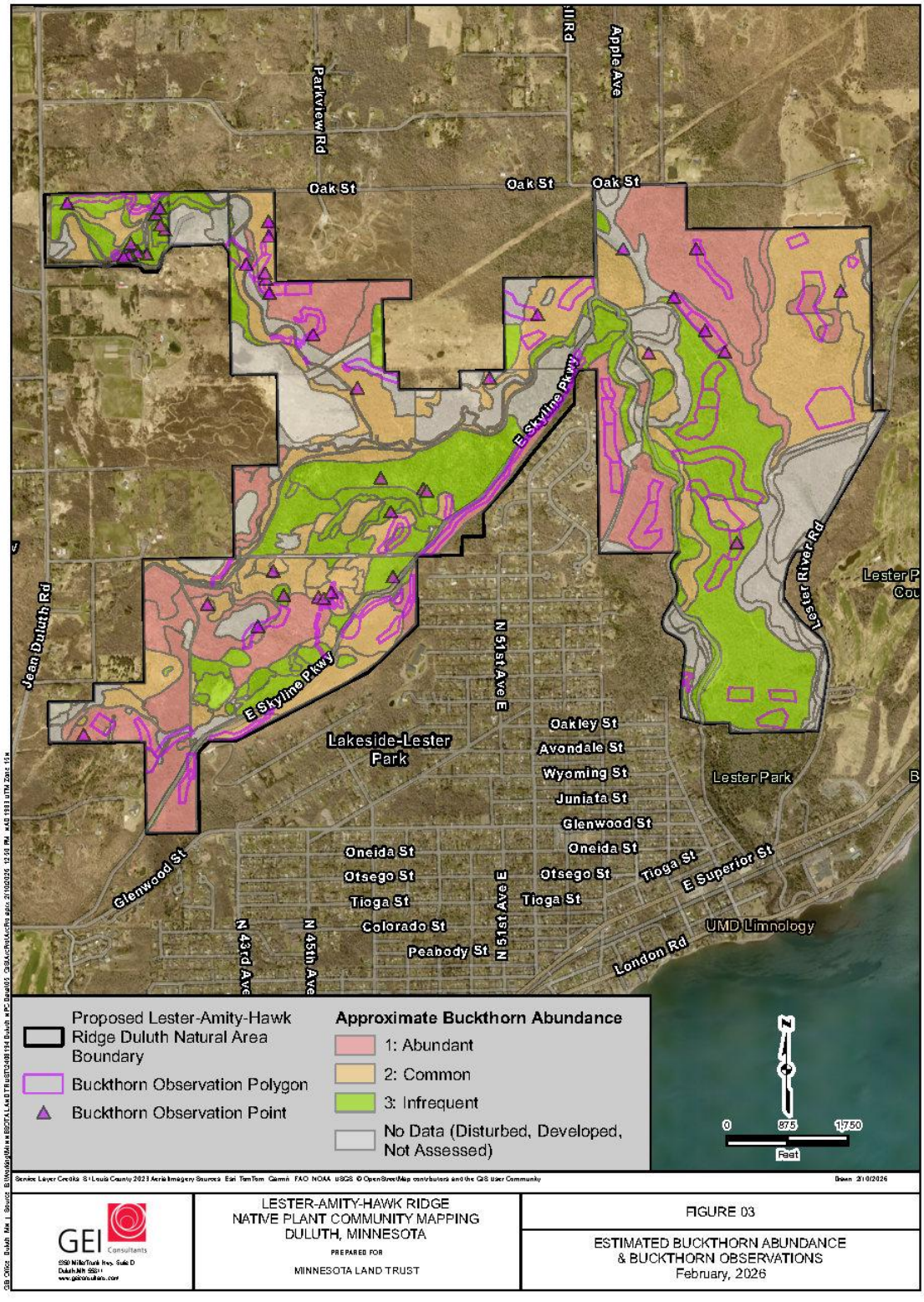

Figure 10: Estimated buckthorn abundance and buckthorn observations.

Management of Invasive Species

Shrubby invasive species should be removed through either persistent mechanical control or less frequent chemical control. Larger woody stems need to be cut close to the ground and immediately treated with herbicide to prevent resprouting. Younger growth can be hand pulled or treated with foliar spray. Invasive species treatments should be followed up with native tree and/or shrub species plantings to inhibit resprouting and germination of shrubby invasive species. In fire dependent native plant communities (FDn33a, FDn33b, and ROn23a), incorporating prescribed fire could be used after shrubby invasives have been mechanically cut to kill any resprouts. Reintroducing fire to these fire-dependent systems will likely improve species diversity, supporting the species that tolerate fire and were endemic to these communities. Fire will likely lessen some of the herbaceous invasive species, such as hawkweeds (*Hieracium sp*), tansy (*Tanacetum vulgare*), and daisy (*Leucanthemum vulgare*).

Natural Water Features

Management of the natural water features of Amity Creek and East Amity Creek will focus primarily on addressing stream incision, floodplain abandonment, and associated channel instability, which are the root causes of many water quality and stream habitat impairments within the Natural Area. Strategies emphasize restoring natural stream and floodplain processes that support water quality, aquatic habitat, flood resilience, and long-term ecosystem stability. Management actions are guided by watershed-scale planning efforts, including the *Amity Creek Nine Key Elements Watershed Plan*, and prioritize holistic restoration approaches over short-term or isolated fixes.

The core management strategy is to restore stream–floodplain connectivity by raising incised channels, reconnecting floodplains, and establishing stable channel forms that emulate reference conditions. Reconnecting streams to their floodplains reduces shear stress during storm events, decreases bank erosion, and allows floodwaters to spread and slow across the floodplain, increasing flood storage and groundwater recharge. These processes improve aquatic habitat by restoring natural pool–riffle sequences, maintaining clean spawning substrates, and supporting coldwater refugia for Brook Trout and other native aquatic organisms. Restoration designs will emphasize self-sustaining channel forms capable of adjusting to variable flows without ongoing maintenance, thereby increasing resilience to climate-driven increases in storm intensity and hydrologic variability.

To implement this strategy effectively, the South St. Louis Soil and Water Conservation District further refined restoration priorities following completion of the *Amity Creek Nine Key Elements Watershed Plan*. While the watershed plan prioritizes stream reaches based on sediment loading alone, reliance on this single metric can result in higher-risk projects that are vulnerable to continued sediment inputs from upstream sources. To reduce implementation risk and maximize ecological benefit, the prioritization framework was expanded to include 1) biological uplift potential, such as the presence of coldwater resources, and 2) risk reduction considerations, including an upstream-to-downstream sequencing of restoration activities. Using this enhanced approach, two stream reaches within the

Lester–Amity–Hawk Ridge Natural Area were identified as the highest priorities for restoration (Figure 11): (1) East Branch Amity Creek, from Jean Duluth Road to its confluence with Amity Creek (Reach EB-01; approximately 12,500 feet), and (2) Amity Creek, from the East Branch confluence downstream to Hawk Ridge Road (Reach AM-09; approximately 5,800 feet).

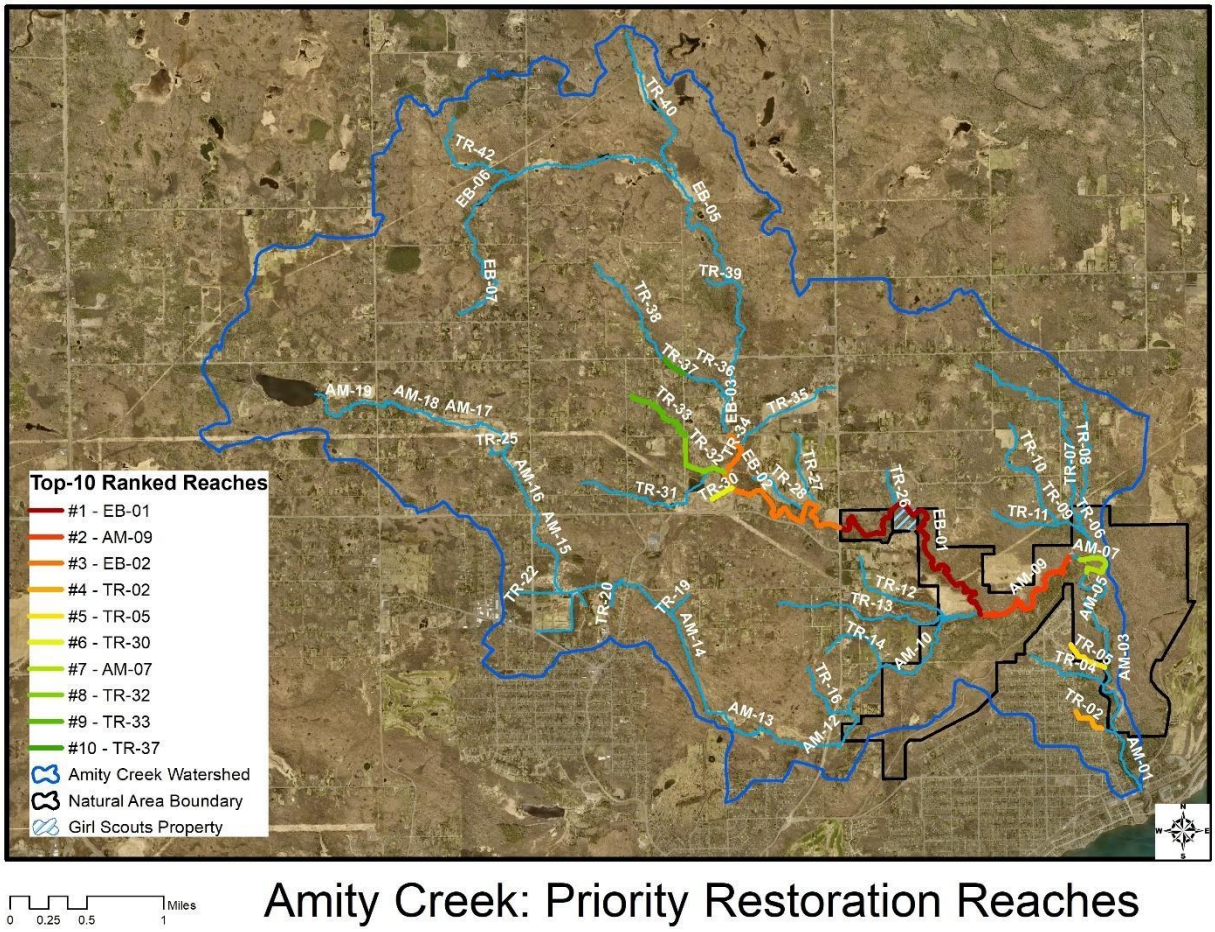

Figure 11: Map of highest-priority reaches for restoration in the Amity Creek watershed.

In addition to addressing in-channel processes, management will also consider sediment sources associated with overland flow, including gravel roads, parking areas, trails, and drainage features within and adjacent to the Natural Area. While secondary to in-channel sources, these features can contribute fine sediment during high-intensity rainfall events and exacerbate downstream impacts. Where feasible, sediment from overland flow will be managed through targeted erosion control and low-impact stormwater practices that slow runoff, promote infiltration, and reduce direct sediment delivery to streams. These efforts will be coordinated with routine maintenance of park infrastructure to improve effectiveness and cost efficiency.

Improving longitudinal connectivity is a key management strategy for restoring ecological function in Amity Creek and East Amity Creek. Priority actions focus on addressing barriers to aquatic organism passage and sediment transport continuity created by undersized or perched road crossings and other in-stream obstructions. Where feasible, these barriers will be addressed by installing structures that allow water, sediment, and aquatic organisms to move freely through the system, or restoring appropriate channel elevations to improve hydraulic conditions at crossings. Improving longitudinal connectivity enhances access to critical habitat for all life stages of native coldwater species and supports channel stability.

Degraded riparian vegetation further limits the effectiveness of restored stream and floodplain processes and will be addressed as a core component of natural water feature management. Many stream reaches within the Natural Area lack diverse native riparian cover due to historic disturbance, altered hydrology, ongoing erosion, windthrow, and the emerging impacts of emerald ash borer. Black ash is a dominant species in portions of the riparian corridor, particularly in wetland and floodplain settings, and anticipated ash mortality threatens to accelerate canopy loss and invasive species introduction, increase stream temperatures, reduce bank stability, and alter hydrologic function. Management strategies for degraded riparian vegetation will incorporate proactive planning for ash decline and invasive species by diversifying riparian plantings and restoring native, resilient plant communities.

TRAILS

Since most of the trail system is complete within the natural area, the focus of impact reduction must be on proper trail maintenance, prevention of unauthorized trail segments, and education of users regarding appropriate trail use and best management practices (BMPs) for invasive species control.

The City depends on many dedicated partners to help maintain all of trails within the LAHR including the Cyclists of Gitchee Gumme Shores Mountain Biking Organization; the Duluth Backcountry Horsemen of Minnesota; the Duluth XC Ski Club (ski trails); the Duluth Drift-Toppers Snowmobile Club; and the Superior Hiking Trail Association. The City also maintains and grooms all City-owned trails.

All trail restoration and realignments must follow best practices in sustainable trail design, management, and maintenance principles and must consider impacts to NPCs and natural water features. The City will work with partners to maintain the trail system and to educate users on proper BMPs related to trail use (for example, invasive species and erosion control). Within the Hawk Ridge Nature Reserve, trail maintenance and improvements will be done in accordance with the Hawk Ridge Mini-Master Plan (City of Duluth, 2022).

Unauthorized “social” trails are not allowed within the natural area. Social trails are generally created by members of the general public versus members of organized groups. The City will work with partners to eliminate unauthorized trails and educate users about the negative impacts of unauthorized trail creation.

Implementation

Management of natural resources in the Lester-Amity-Hawk Ridge Natural Area will rely on the approaches described in the previous section. A set of prioritized actions has been selected based on the identified threats to ecological function in the natural area. Selection of priorities also considered the Hawk Ridge Facilities Mini-Master Plan and ongoing stewardship priorities of City partners. The prioritized actions with associated timelines and costs, as well as partner responsibilities for implementing this management plan are described in this section.

Prioritized Management Actions

A set of prioritized actions were identified for the Lester-Amity-Hawk Ridge Natural Area based on the strategies and management approaches presented in this plan. Prioritized strategies were also selected by partners based on existing funding and future funding opportunities. These are summarized in Table 4 and described below. Note that the prioritized management actions will be updated as necessary due to implementation of currently listed actions, new partners getting involved, new funding opportunities, and/or as new information from assessments, research, and inventories becomes available. Therefore, updates may include implementation of the management actions currently in this plan or addition of new management actions based on new information. Successful implementation of this plan will depend on continued coordination among project partners, user groups, and the City of Duluth to ensure that ecological protection and public use remain mutually supportive.

Table 4: Prioritized actions for the Lester-Amity-Hawk Ridge Natural Area.

Action	Cost	Responsible Parties	Target Completion Date	Funding Options
1. Complete Forest Management Plan for Lester-Amity Forest	High ($60,000)	MLT (lead), City of Duluth	2026	LSOHF (secured)
2. Implement stream and floodplain restoration on East Amity Creek Reach EB-01	High - $2.5-$3.75 million ($200-300 per lineal foot, depending on scope) $900,000 secured $500,000 pending	South St. Louis SWCD (lead), MNTU, City of Duluth, MNDNR, MPCA	2030	Section 319, Lessard-Sams Outdoor Heritage Fund (LSOHF), Great Lakes Restoration Initiative (GLRI), Clean Water Fund (CWF), Sustain Our Great Lakes (SOGL), Great Lakes Sediment and Nutrient Reduction Program (GLSNRP)
3. Implement stream and floodplain restoration on Amity Creek Reach AM-09	High - $1.2-$1.8 million ($200-300 per lineal foot, depending on scope)	South St. Louis SWCD (lead), MNTU, City of Duluth, MNDNR, MPCA	2035	Section 319, LSOHF, GLRI, CWF, SOGL, GLSNRP
4. Control invasive plant species and re-establish native plant communities along Amity Creek and East Amity Creek	High - $700,000 ($15,000 per acre)	City of Duluth (lead), MNTU, MLT	Ongoing; coordinated with restoration projects	LSOHF, Great Lakes Restoration Initiative (GLRI), SOGL, Conservation Partners Legacy (CPL)

Action	Cost	Responsible Parties	Target Completion Date	Funding Options
5. Reduce sediment inputs from overland flow sources using erosion control and low-impact stormwater practices	Low–Medium ($10,000–$150,000 per site)	City of Duluth (lead), South St. Louis SWCD	2030	Section 319, CWF, GLSNRP
6. Conduct post-project and long-term monitoring to evaluate response to stream restoration actions	Medium ($50,000–$250,000 over multiple years)	MNDNR (lead), MPCA, South St. Louis SWCD, MNTU	Ongoing; coordinated with restoration projects	Section 319, partners
7. Implement the Hawk Ridge Nature Reserve Facilities Improvements Mini-Master Plan	High ($2.5-$3.5 million)	City of Duluth, Hawk Ridge Bird Observatory	Phase 1 - 2026, Phases 2 & 3 2035	Phase 1 - ENRTF/LCCMR ($155K secured), Lloyd K Johnson Foundation ($25K secured), LSOHF, MN Legacy Parks & Trails Funds, Private Foundations, Corporate Sponsors, Individual Donors, etc.
8. Continue long-term bird monitoring efforts through bird migration count, banding research, and post-restoration monitoring	Low-Medium ($125,000 annually)	Hawk Ridge Bird Observatory	Ongoing; coordinated with restoration projects	Hawk Ridge Bird Observatory
9. Develop and Implement Forest Stewardship Plan for Hawk Ridge Nature Reserve	Low-Medium ($50,000 annually)	Hawk Ridge Bird Observatory	TBD based on FMP Recommendations	LSOHC, CPL, EPA GLRI, SOGL

Action	Cost	Responsible Parties	Target Completion Date	Funding Options
10. Complete an assessment of the Natural Area trails' condition and erosion potential	Low ($15,000)	Partners and user groups	2030	TBD
11. Install interpretive signage on Hawk Ridge Nature Reserve Trails	Low ($2,000 per sign)	City of Duluth	2026	Natural Resources/Parks Capital budget
12. Update the Natural Area Management Plan as new assessment data become available	Low ($5,000–$25,000)	City of Duluth, South St. Louis SWCD, MNTU, HRBO, MLT	2030	Partners
13. Establish a stewardship team of natural resource partners and interest groups	Low (NA)	South St. Louis SWCD, HRBO, MNTU, MLT	2026	NA

1. Forest Management Plan for Lester-Amity Forest

The Minnesota Land Trust (MLT), in partnership with the City of Duluth, is developing a Forest Management Plan for the Lester-Amity-Hawk Ridge natural area. The plan will provide MLT, the City, and other partners with forest treatment prescriptions and recommendations for long-term forest management goals for the natural area. This plan will inform and guide future forest management projects within the natural area. The plan will be completed in Summer 2026.

2. Stream and Floodplain Restoration on East Amity Creek Reach EB-01

Stream and floodplain restoration on East Amity Creek Reach EB-01 addresses long-standing channel incision and floodplain abandonment that have degraded water quality, aquatic habitat, and flood resilience within the Natural Area. Historic watershed disturbances altered hydrology and sediment regimes, causing the stream to incise and disconnect from its floodplain. As a result, high flows are confined within an over-large channel, increasing shear stress, accelerating bank erosion, and delivering excessive sediment downstream. The EB-01 project seeks to reverse these processes by restoring natural stream–floodplain interactions that reduce erosion, improve aquatic habitat, and support long-term channel stability.

The restoration design raises the streambed where feasible, reconnects the channel to an appropriately-sized floodplain, and establishes a stable channel form that reflects reference conditions for coldwater trout streams in the region. In-stream habitat features such as riffles, pools, large wood, and habitat boulders will be installed to restore channel complexity, maintain clean spawning substrates, and provide habitat for all life stages of Brook Trout and other native aquatic organisms. Floodplain grading will allow flows to access the floodplain at bankfull and higher discharges, reducing stream power during storm events, increasing flood storage, and enhancing groundwater recharge that sustains coldwater baseflows.

Implementation of restoration within Reach EB-01 is being phased to align with funding availability and construction constraints. The first phase targets the upper approximately 3,700 feet of the reach and is currently underway in terms of design, permitting, and pre-construction planning, with construction scheduled for the 2027 field season. Riparian restoration will be integrated throughout the project to stabilize banks, provide shade, and support long-term resilience, including diversifying plantings in anticipation of emerald ash borer impacts. This phased, process-based approach will reduce sediment loading, improve aquatic habitat, and strengthen the long-term ecological function of East Amity Creek within the Lester–Amity–Hawk Ridge Natural Area.

Stream and floodplain restoration on East Amity Creek Reach EB-01 is anticipated to cost between $2.5-$3.75 million and occur from 2025-2030. The first phase is currently funded through Section 319 and LSOHF grants totaling $900,000.

3. Stream and Floodplain Restoration on Amity Creek Reach AM-09

Following restoration of East Amity Creek Reach EB-01, work will continue downstream on Amity Creek Reach AM-09. Restoration of this reach will focus on stabilizing channel form and reconnecting the stream to its floodplain downstream of the East Branch confluence, where cumulative sediment inputs and channel instability have degraded habitat and water quality. This work, which is anticipated to cost between $1.2 and $1.8 million, will be funded through both State and Federal grant programs and will occur in 2030-2035.

4. Invasive Species Control and Native Plant Community Restoration

Controlling invasive plant species and re-establishing native plant communities along Amity Creek and East Amity Creek is essential to supporting long-term stream and floodplain function. Management actions will include targeted invasive species control in riparian and floodplain areas, followed by active restoration of native plant communities suited to site-specific hydrology and soils. Riparian plantings will emphasize species diversity and resilience, including proactive diversification in response to emerald ash borer impacts, to stabilize streambanks, provide shade, and support aquatic and terrestrial food webs. This work is anticipated to cost $700,000 ($15,000 per acre) and will be funded through a combination of Local, State and Federal grant programs. The timeline for completion is ongoing and will be coordinated with the stream and floodplain restoration projects described above.

5. Reducing Sediment Inputs from Overland Flow

Reducing sediment inputs from overland flow sources will complement in-channel restoration by addressing secondary contributors of fine sediment within the watershed, including gravel roads, parking areas, trails, and drainage features within and adjacent to the Natural Area. Where feasible, management actions will include targeted erosion control measures and low-impact stormwater practices. These efforts will be coordinated with routine maintenance of park and transportation infrastructure to improve effectiveness and cost efficiency. This work is anticipated to cost between $10,000–$150,000 per site and will be funded through future water quality-related grant programs, such as Section 319, CWF, and GLSNRP.

6. Post-Project and Long-Term Monitoring for Stream Restoration

Post-project and long-term monitoring will be conducted to evaluate the effectiveness of restoration actions and inform adaptive management. Monitoring efforts will assess water quality, channel stability, floodplain connectivity, habitat condition, and biological response, including Brook Trout populations and spawning activity. Quantitative metrics such as channel cross-sections, longitudinal profiles, substrate composition, erosion indicators, water temperature, and biological surveys will be collected during an intensive post-construction period and at longer intervals over time. This monitoring framework will ensure that restoration objectives are being met, document project benefits, and guide future management and restoration efforts within the Natural Area. This work is anticipated to cost between $50,000–$250,000 (over multiple years) and will be funded through a combination of future Section 319 grants and partner capacity funds.

7. Implement the Hawk Ridge Nature Reserve Facilities Improvements Mini-Master Plan

Implementation of the Hawk Ridge Nature Reserve Facilities Improvements Mini-Master Plan (City of Duluth, 2022) will guide the development and enhancement of visitor infrastructure for accessibility, safety, and education within the LAHR Natural Area. Planned improvements may include construction or upgrades to trails, overlooks, bird observation facilities, access points, and supporting amenities. All improvements will be designed and constructed to minimize environmental impacts, protect sensitive habitats, and integrate with the surrounding landscape. Coordination with ongoing natural resource management efforts will ensure that facility development supports both recreational use and long-term conservation goals.

8. Continue Long-term Bird Monitoring Through Bird Migration Count, Banding Research, and Post-Restoration Monitoring

Long-term bird monitoring at Hawk Ridge will continue through coordinated migration counts and banding research conducted by the Hawk Ridge Bird Observatory and partners. These efforts provide critical data on migratory bird populations, species trends, and habitat use, contributing to regional and continental conservation initiatives. Ongoing monitoring will also inform local management decisions by identifying changes in species composition, migration timing, and habitat conditions within the Natural Area. Supporting these efforts will ensure the continuation of Hawk Ridge's role as a nationally recognized site for raptor and songbird migration research and education. A post-restoration monitoring program will be developed to track impacts of forest management actions on birds within the natural area.

9. Develop and Implement Forest Stewardship Plan for Hawk Ridge Nature Reserve

HRBO, in consultation with partners, will develop and implement a Forest Stewardship Plan for management of invasive plant species and restoration of native vegetation within the Hawk Ridge Nature Reserve based on recommendations in the Lester-Amity Forest Management Plan and NPC management recommendations included in this LAHR Natural Area Management Plan. This plan will focus on high-priority areas within the reserve, including heavily disturbed sites, trail corridors, and ecologically significant habitats. Efforts will include mapping infestations, implementing targeted control treatments, and re-establishing native plant communities adapted to site conditions. Restoring native vegetation will improve habitat quality, increase biodiversity, enhance slope and soil stability, and reduce the likelihood of reinvasion. These actions will be coordinated with other management activities to maximize effectiveness and long-term ecological resilience.

Viewshed management at the Hawk Ridge Bird Observatory will ensure that key observation areas maintain clear sightlines necessary for bird monitoring and visitor experience while balancing ecological

considerations. Management actions may include selective vegetation management, coordination with facility improvements, and ongoing maintenance to prevent obstruction of critical viewing corridors. Efforts will be guided by a site-specific vegetation management approach that considers habitat value, aesthetic quality, and long-term sustainability of the landscape and will be guided by the native plant community data and the Forest Management Plan.

10. Complete Assessment of the Natural Area trails' Condition and Erosion Potential

A comprehensive assessment of the Natural Area trail system will be conducted to evaluate trail conditions, identify areas of erosion or drainage concern, and prioritize maintenance and improvement needs. The assessment will consider factors such as trail alignment, slope, soil conditions, user intensity, and proximity to sensitive natural features. Results will be used to develop a prioritized list of stabilization and erosion control actions, including drainage improvements, trail reroutes, and installation of erosion control features. This effort will provide the foundation for long-term trail management that protects natural resources while maintaining safe and sustainable recreational access. The assessment is expected to be completed collaboratively by natural resource partners and interest groups.

11. Install Interpretive Signage on Hawk Ridge Nature Reserve Trails

Interpretive signage will be installed along trails within the LAHR natural area to enhance visitor understanding of the area's natural features, ecological processes, and conservation efforts. Signage may highlight topics such as bird migration, forest ecosystems, stream restoration, invasive species management, and the cultural and natural history of the area. Materials and placement will be designed to be durable, visually consistent, and minimally intrusive to the natural setting. These efforts will support environmental education, promote stewardship, and improve the overall visitor experience.

12. Update the Natural Area Management Plan as New Assessment Data Become Available

The Natural Area Management Plan will be periodically updated to reflect new data, monitoring results, and evolving management priorities. Updates may incorporate findings from ecological assessments, trail condition surveys, water quality monitoring, and ongoing research efforts within the Natural Area. This adaptive management approach will ensure that the plan remains current, scientifically informed, and responsive to changing conditions, while continuing to guide coordinated management actions among project partners.

13. Establish a Stewardship Team of Natural Resource Partners and Interest Groups

South St. Louis SWCD, HRBO, MNTU, and MLT will establish a coordinated stewardship team with interest groups focused on stewardship of the LAHR natural area with the intent of establishing clear communication pathways on work in the natural area. The team will meet quarterly or bi-annually (as determined during team formation) to discuss projects and share information about stewardship needs and identify opportunities for collaboration.

RESPONSIBILITIES

Implementation of the Lester–Amity–Hawk Ridge Natural Area Management Plan will be a collaborative effort among local, state, and partner organizations. Responsibilities are defined to reflect each entity's statutory authority, technical expertise, and long-term stewardship role. While individual projects may involve additional partners or funding sources, the responsibilities outlined below provide the framework for implementing the prioritized management actions identified in this plan.

City of Duluth

The City of Duluth is the long-term owner and steward of lands within the Lester–Amity–Hawk Ridge Natural Area. The City is responsible for providing long-term protection of natural resources, integrating management actions into broader park and infrastructure planning efforts, and coordinating maintenance activities that affect natural water features. Specific responsibilities include supporting access for restoration and monitoring activities, maintaining trails, roads, and drainage features in a manner that minimizes sediment delivery to streams, and participating in invasive species management and riparian vegetation maintenance where restoration projects occur. The City will also support future updates to this management plan and ensure consistency with adopted City plans and policies.

Hawk Ridge Bird Observatory

Hawk Ridge Bird Observatory is the 501(c)3 nonprofit organization responsible for the management of Hawk Ridge Nature Reserve through a land trust agreement with the City of Duluth (owners of the property). Hawk Ridge Bird Observatory will work closely with the partners and in conjunction with the City of Duluth for implementation of management actions related to Hawk Ridge Nature Reserve. Technical expertise related to birds and the Lester-Amity-Hawk Ridge Natural Area will also be provided. Hawk Ridge Bird Observatory will continue their long-term bird monitoring research and education efforts to promote conservation of raptors and other birds in the Western Lake Superior region for research, education, and stewardship.

Minnesota Land Trust

The Minnesota Land Trust is a 501(c)3 nonprofit organization whose mission is to protect and restore Minnesota's land, water, and wildlife resources**.** MLT has been working with the City of Duluth on the Duluth Natural Areas Program since 2018. MLT will work with the City of Duluth and other partners to implement the forthcoming Forest Management Plan in the Lester-Amity-Hawk Ridge Natural Area over time.

South St. Louis SWCD

The South St. Louis Soil and Water Conservation District serves as the lead implementation partner for stream and floodplain restoration activities within the Natural Area. The District is responsible for grant administration, contracting, financial management, reporting, and overall project coordination for stream, floodplain, and riparian restoration efforts. The District will lead the design and implementation of priority restoration projects identified in the Amity Creek Nine Key Elements Watershed Plan, coordinate post-project monitoring and evaluation, and work with partners to secure funding for phased implementation. The District will also provide technical assistance related to erosion control, stormwater management, and sediment reduction strategies.

Minnesota Trout Unlimited

Minnesota Trout Unlimited (MNTU) serves as a funding partner and technical collaborator focused on protecting and restoring coldwater fisheries and associated habitats within the Natural Area. MNTU contributes state habitat funding and supports implementation of stream and floodplain restoration projects that improve Brook Trout habitat, water quality, and system resilience. MNTU may also provide technical input during project development and assist with outreach, education, and coordination among conservation partners.

Minnesota Pollution Control Agency

The Minnesota Pollution Control Agency provides financial support and technical guidance for water quality improvement efforts within the watershed. The Agency supports implementation through grant funding, including the Clean Water Act Section 319 program, and assists with water quality monitoring and biological assessments. The Agency's involvement ensures that restoration and management actions are aligned with statewide water quality goals and contribute to measurable reductions in sediment and nutrient loading.

Minnesota Department of Natural Resources

The Minnesota Department of Natural Resources provides technical expertise and regulatory oversight related to fisheries, stream restoration, and habitat management. The Department will assist with project review, design guidance, and monitoring related to coldwater fisheries and aquatic habitat. The Department may also support water temperature monitoring, fish population assessments, and evaluation of aquatic organism passage improvements. These efforts will help ensure that restoration actions support long-term ecological function and align with state fisheries management objectives.

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Appendix A

Lester-Amity-Hawk Ridge Natural Area Nomination Report

NOMINATION OF LESTER - AMITY - HAWK RIDGE NATURAL AREA TO THE

Duluth Natural Areas Program

DATE: APRIL 2025

Nominated by:

Hawk Ridge Bird Observatory

Minnesota Land Trust

South St. Louis Soil and Water Conservation District

Minnesota Trout Unlimited

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Preface

The Duluth Natural Areas Program (DNAP) has recognized and protected high functioning natural ecosystems within the City of Duluth since 2002. Four conservation organizations active within the City of Duluth have committed to supporting the long-term protection and restoration of the Lester – Amity – Hawk Ridge Natural Area. They have teamed up to provide the justification for inclusion of over 1,183 acres of wild space into the DNAP and consider how they will collectively assist the City of Duluth to delist Amity Creek and East Amity Creek from the impaired waters list, improve fish habitat and riparian forests, and remove invasive species that threaten the integrity of the plant communities, maintaining these high-quality resources for generations to come.

Hawk Ridge Bird Observatory (HRBO) is the management entity of the 365-acre Hawk Ridge Nature Reserve (HRNR). The mission of HRBO is to promote conservation of raptors and other birds in the Western Lake Superior Region through research, education, and stewardship. Since 1972 when the city of Duluth purchased the highest part of the ridge as the “core area”, HRBO has fulfilled that mission and is internationally known as one of the best places to view the fall bird migration for the vast diversity and numbers of birds and over 50 years of raptor research and education. Tens of thousands of visitors from all 50 states and over 40 foreign countries come to HRNR during the fall bird migration.

Minnesota Land Trust (MLT) has been working with landowners and communities since 1991 to protect threatened lands and waters. The mission of the MLT is to protect and restore Minnesota’s vital lands to provide wildlife habitat, clean water, outdoor experiences, and scenic beauty for generations to come. MLT has worked with the City of Duluth on protection and restoration of its open space for over 10 years. Accomplishments in partnership with the city include designation of two natural areas within the DNAP, acquisition of thousands of acres of task forfeit lands for open space protection, completion of the city’s first ever Natural Resources Management Program Plan, and restoration of over 200 acres of important avian habitat.

The South St. Louis Soil and Water Conservation District (SWCD), pursues dedicated funding to restore and enhance sensitive and ecologically significant public waters. The mission of the SWCD is to provide technical, educational, and financial resources to land occupiers in order to implement practices and projects that preserve, protect, and enhance water quality and other natural resources. For over 50 years, the SWCD has been a public resource for land conservation and stewardship and has partnered with the city to restore over one hundred acres of city land and improve the habitat along four miles of stream channels.

Minnesota Trout Unlimited (MNTU) has a history of restoration and enhancement projects focusing on state registered public trout waters. The mission of MNTU is to conserve, protect, and sustain Minnesota’s coldwater fisheries and their watersheds. MNTU has a history of restoring habitat across the state, including over 100 miles of trout streams in Minnesota. MNTU aims to support high quality stream trout fishing that is accessible to residents of all socio-economic strata to support local economics through sustainable tourism and outdoor recreation.

HRBO, MLT, SWCD, and MNTU, in cooperation with the City of Duluth, are committed to developing a management plan for the Lester - Amity - Hawk Ridge Natural Area. Additional supporting entities include, but are not limited to:

- Arrowhead Fly Fishers Association
- Arrowhead Native Plant Explorers
- 1854 Treaty Authority
- Minnesota Department of Natural Resources
- Minnesota Pollution Control Agency
- University of Minnesota Duluth Natural Resources Research Institute
- Izaak Walton League – W. J. McCabe Chapter

Letters of support are provided in Appendix A.

Executive Summary

The following collaborating partners, Hawk Ridge Bird Observatory (HRBO), South St. Louis Soil and Water Conservation District (SWCD), Minnesota Land Trust (MLT), and Minnesota Trout Unlimited (MNTU), developed this nomination for 1,183 acres of land to be included as the Lester – Amity – Hawk Ridge Natural Area and requests submission to the Planning Commission and City Council for review under Duluth City Code, Chapter 2, Article XXIX, Sect 2-152 known as the Duluth Natural Area Program (DNAP).

These nominated lands are renowned globally as a prominent bird migration observation area along with its significant geologic landforms and native plant communities that all contribute to the health of the Amity Creek and Lester River Watersheds. These lands are tied to important open spaces bound by Lake Superior and associated with the habitat diversity needed for migratory raptors and passerines as well as birds that live here seasonally or year-round along with unique bedrock plant communities that support sensitive plant species. Amity Creek is a registered cold-water trout stream and remains one of the most well-preserved areas from urban impact within the City of Duluth, ranking number five in terms of brook trout abundance among all trout streams along Minnesota's North Shore of Lake Superior. These lands are also important for protecting the wetlands in the watershed which provide significant groundwater contributions that help maintain the cold temperatures necessary for coldwater fish assemblages in Amity Creek and its tributaries. The uninterrupted forested woodlands between Lester River and Amity Creek provide vital groundwater recharge and nesting habitat. The river ravines for both Amity and Lester support known populations of the state listed buffaloberry (*Shepherdia canadensis*). In all, these lands are among the best remaining examples of viable natural areas representative of the Duluth area in the five categories defined in the eligibility requirements for a Duluth Natural Area.

In 2002, the City of Duluth created the Duluth Natural Area Program (DNAP) to protect and preserve Duluth's highest quality ecological features utilizing qualification criteria. Significant habitats and features that meet these criteria thresholds are eligible for a DNAP nomination in an effort to protect them from future development and exploitation. This nomination submits the following justification of significant features, pursuant to the city ordinance (Chapter 2, Article XXIX) and its complementary guidelines:

- Important bird congregation area – Over 200 bird species are documented annually in the natural area for nesting, foraging, and migratory habitat including raptors and passerines. Hawk Ridge Nature Reserve was the first Important Bird Area designated in the state of Minnesota.
- Special species area – The state listed special concern species, Canada buffaloberry (*Shepherdia canadensis*) has been documented in approximately six unique locations throughout the proposed natural area. Furthermore, 60% of the MN Bird Species in Greatest

Conservation Need have been recorded at Hawk Ridge during count and banding research efforts.

- Significant native plant community areas – Nine noted native plant communities accepted into the natural areas program criteria are documented within the proposed natural area.
- Natural water feature area – Amity Creek, East Amity Creek, and Lester River are designated trout streams with significant coldwater groundwater contributions.
- Geologic landform area – The geologic formation of Duluth is represented by landforms in the nominated natural area from two dramatic events in geologic history entailing the Mid-Continent Rift and the Great Ice Age Glaciation.

Introduction

The lands that nourish Amity Creek, Lester River, and the Hawk Ridge Nature Reserve provide vital habitat for the charismatic Brook Trout that spawn in the cold waters of Amity and Lester and the transient raptors that hunt along Hawk Ridge during their spring and fall migrations. With tens of thousands of visitors from all 50 states and over 40 countries, Hawk Ridge is a global destination with more accessible terrain and educational programming. With so many visitors, HRBO would benefit from the management plan that accompanies a DNAP designation and is committed to fulfilling items pertaining to the 365 acres under current trust agreement. Newly acquired forest lands nestled between Lester and Amity provide vital groundwater recharge for the creeks and with so many local trail users, would also benefit from the guidance a management plan offers. With limited trail access and inhospitable ravines, Amity Creek maintains its reputation as a rugged but fruitful gem within the city by local anglers and environmental stewards. Amity Creek and East Amity Creek have been listed as impaired waters but still maintain their brook trout population despite high turbidity. The Minnesota Pollution Control Agency (MPCA) has identified them as high priorities for restoration to eliminate their turbidity impairments, and as the landowner of much of the watershed, the City of Duluth is responsible for initiating conservation and restoration activities to delist them as impaired waters. The South St. Louis SWCD has partnered with MNTU to ultimately bring in over $2 million in grant funding to address these impairments and improve brook trout habitat. The Duluth Natural Area designation would demonstrate good faith in this project and ensure that public funding isn't spent on unprotected lands.

Eligibility

Eligibility of a tract for nomination under the DNAP requires both land ownership and scientific criteria to be satisfied. This section of the nomination provides detailed documentation for the Lester-Amity - Hawk Ridge Natural Area that satisfies both types of criteria.

LAND OWNERSHIP

The Lester – Amity – Hawk Ridge Natural Area nomination includes 82 parcels totaling approximately 1,183 acres in the northeast portion of the City of Duluth. Figure 1 shows the parcels proposed for the natural area. Table 1 provides the parcel numbers, areas, and ownership.

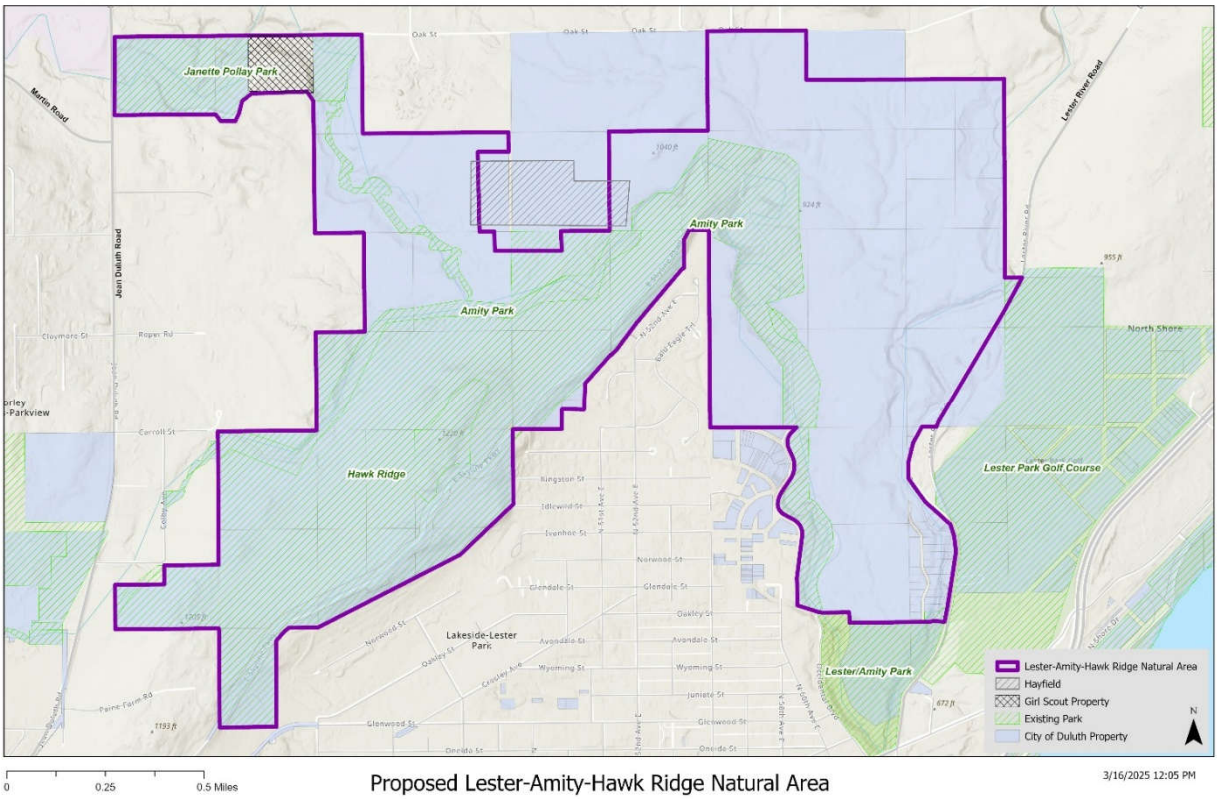

Figure 1. Proposed Lester-Amity-Hawk Ridge Natural Area in relation to city land ownership.

Table 1. Parcels for inclusion in the proposed Lester-Amity - Hawk Ridge Natural Area.

PARCEL	Title Holder	Acres
010-0090-00010	CITY OF DULUTH	1.5
010-0090-00040	CITY OF DULUTH	0.9
010-0090-00050	CITY OF DULUTH	0.8
010-1390-02130	CITY OF DULUTH	18.9
010-1410-00040	CITY OF DULUTH	37.8
010-1410-00050	CITY OF DULUTH	33.2
010-2119-00690	CITY OF DULUTH	5.6
010-2680-00080	CITY OF DULUTH	19.8
010-2680-00085	CITY OF DULUTH	19.8
010-2680-00090	CITY OF DULUTH	19.2
010-2680-00100	CITY OF DULUTH	8.6
010-2680-00105	CITY OF DULUTH	14.4
010-2680-00110	CITY OF DULUTH	7.3
010-2680-00120	CITY OF DULUTH	27.3
010-2680-00130	CITY OF DULUTH	40.0
010-2680-00280	CITY OF DULUTH	23.3
010-2680-00310	CITY OF DULUTH	37.5
010-2680-00320	CITY OF DULUTH	8.7
010-2680-00340	CITY OF DULUTH	17.3
010-2690-00720	CITY OF DULUTH	0.4
010-2690-00730	CITY OF DULUTH	9.6
010-2690-00740	CITY OF DULUTH	69.3
010-2690-00990	CITY OF DULUTH	38.7
010-2690-00997	CITY OF DULUTH	20.0
010-2690-01000	CITY OF DULUTH	79.8
010-2690-01020	CITY OF DULUTH	10.0
010-2690-01040	CITY OF DULUTH	10.7
010-2690-01050	CITY OF DULUTH	32.4
010-2690-01060	CITY OF DULUTH	60.7
010-2690-01070	CITY OF DULUTH	50.4
010-2690-01090	CITY OF DULUTH	40.4
010-2690-01100	CITY OF DULUTH	2.7
010-2690-01110	CITY OF DULUTH	16.2
010-2690-01130	CITY OF DULUTH	36.4
010-2690-01140	CITY OF DULUTH	28.6
010-2690-01150	CITY OF DULUTH	40.2
010-2690-01155	CITY OF DULUTH	5.7
010-2690-01160	CITY OF DULUTH	37.6
010-2690-01165	CITY OF DULUTH	0.9
010-2690-01180	CITY OF DULUTH	106.6
010-2690-01310	CITY OF DULUTH	10.1
010-2690-01320	CITY OF DULUTH	10.1
010-2690-01330	CITY OF DULUTH	10.1
010-2690-01340	CITY OF DULUTH	10.1
010-2690-01350	CITY OF DULUTH	10.1
010-2690-01360	CITY OF DULUTH	10.1
010-2690-01410	CITY OF DULUTH	39.9
010-2690-01420	CITY OF DULUTH	23.9
010-3790-00010	CITY OF DULUTH	0.3
010-3790-00020	CITY OF DULUTH	0.3
010-3790-00030	CITY OF DULUTH	0.4
010-3790-00040	CITY OF DULUTH	0.4
010-3790-00050	CITY OF DULUTH	0.5
010-3790-00060	CITY OF DULUTH	0.5
010-3790-00070	CITY OF DULUTH	0.4
010-3790-00080	CITY OF DULUTH	1.4
010-3790-00120	CITY OF DULUTH	0.4
010-3790-00130	CITY OF DULUTH	0.5
010-3790-00140	CITY OF DULUTH	0.5
010-3790-00150	CITY OF DULUTH	0.6
010-3790-00160	CITY OF DULUTH	0.6

010-3790-00170	CITY OF DULUTH	0.9
010-3790-00190	CITY OF DULUTH	0.5
010-3790-00200	CITY OF DULUTH	0.7
010-3790-00210	CITY OF DULUTH	0.8
010-3790-00220	CITY OF DULUTH	0.8
010-3790-00230	CITY OF DULUTH	0.8
010-3790-00240	CITY OF DULUTH	0.8
010-3790-00250	CITY OF DULUTH	0.5
010-3790-00260	CITY OF DULUTH	2.0
010-3790-00290	CITY OF DULUTH	0.6
010-3790-00300	CITY OF DULUTH	0.5
010-3790-00310	CITY OF DULUTH	0.4
010-3790-00320	CITY OF DULUTH	0.3
010-3790-00330	CITY OF DULUTH	0.5
010-3790-00340	CITY OF DULUTH	0.6
010-3790-00345	CITY OF DULUTH	0.1
010-3790-00350	CITY OF DULUTH	0.4
010-3790-00370	CITY OF DULUTH	0.4
010-3790-00380	CITY OF DULUTH	0.5
010-3790-00390	CITY OF DULUTH	0.5
010-3790-00400	CITY OF DULUTH	0.5

*Note: The City GIS layer was used to calculate parcel acreage. There may be discrepancies between the GIS area calculations and the deeded acreage (i.e., roads and right of ways included).

SCIENTIFIC CRITERIA

The DNAP Guidelines (City of Duluth, 2002) require natural area nominations to support one or more of the following scientific criteria:

- Important bird congregation area
- Special species area
- Significant native plant communities
- Natural water feature area
- Geological landform area

The Lester – Amity – Hawk Ridge Natural Area is being nominated under all five scientific criteria.

Important Bird Congregation Area

One of nature's remarkable spectacles can be witnessed each fall at Hawk Ridge Nature Reserve (HRNR) when migrating raptors and other birds concentrate in impressive numbers at the western tip of Lake Superior. Migrating birds originate from summer breeding areas as far north as the Arctic and have winter destinations as far south as South America. Reluctant to cross a large body of water, birds funnel down the North Shore of Lake Superior. Raptors ride updrafts formed above the rocky outcrops parallel to the lakeshore and efficiently soar for miles, as they migrate past HRNR.

Before 1950, local gunners used passing raptors for target practice. The killing stopped through the efforts of the Duluth Bird Club (now the Duluth Audubon Society). The Club publicized the illegal shooting and had the prohibition against shooting in the city limits enforced. Raptors were counted sporadically from the 1950s until 1971; as the magnitude of the migration became apparent, monitoring increased from a few days in mid-September to daily observation from August through November.

Since 1972, a systematic count of migrating raptors has been conducted annually from August to November, totaling approximately 1,000 hours of coverage per year. More than 60,000 raptors and over 200,000 other birds are counted at HRNR annually (one of the longest running and highest counts in the continent). The highest single species count for a single day at HRNR was tallied on September 1, 2003, with 101,698 Broad-winged Hawks recorded! Raptor species regularly recorded during the fall bird migration include: Bald Eagle, Northern Harrier, Sharp-shinned Hawk, Cooper's Hawk, American Goshawk, Short-eared Owl, Red-Shouldered Hawk, Broad-winged Hawk, Swainson's Hawk, Red-tailed Hawk, Turkey Vulture, Rough-legged Hawk, Osprey, Golden Eagle, American Kestrel, Merlin, Peregrine Falcon, and Mississippi Kite. The record season total stands at 201,826 raptors counted in 2003!

HRNR bird counts are contributed to collective published research datasets, such as the Raptor Population Index, Hawk Migration Association of Association's HawkCount, and Cornell Lab of Ornithology's eBird. These long-term datasets are an important research tool in bird conservation efforts and environmental management decisions, such as health of bird populations and habitat.

According to the DNAP criteria for Important Bird Congregation Areas, the concentrations of raptors more than exceeds the recommended 5,000 to 10,000 seasonal totals. Figure 2 shows the annual total raptor counts since 1972.

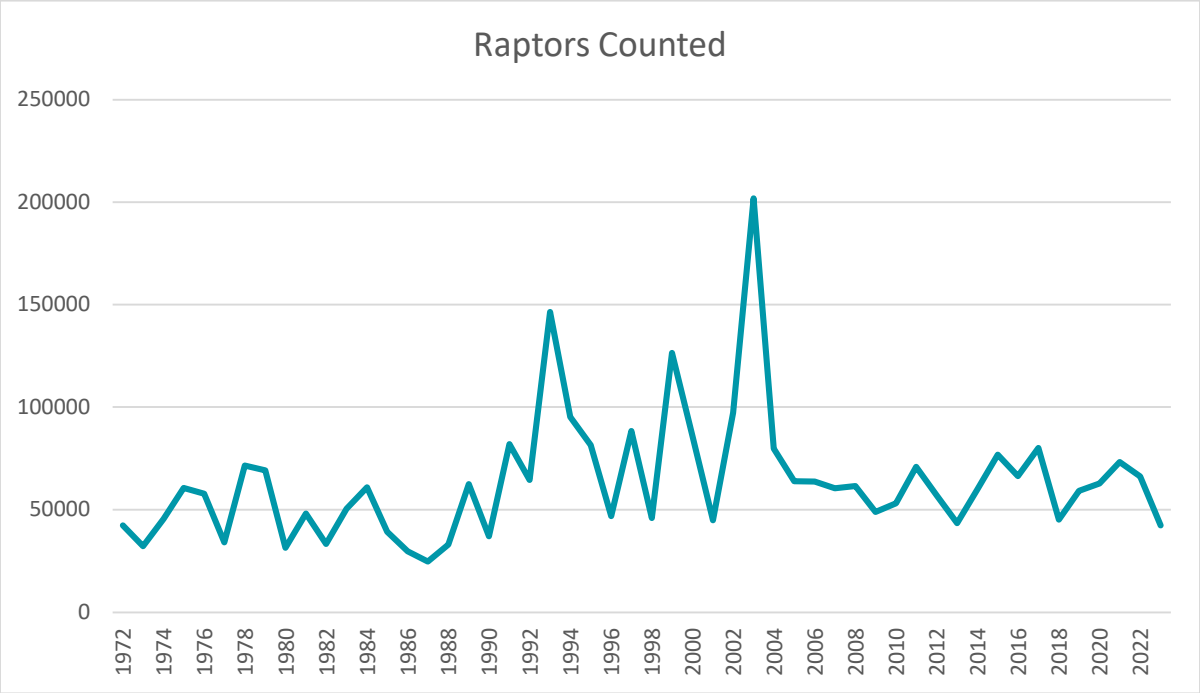

Figure 2. Raptor migration counts at HRNR, 1972-2023.

Bird banding research is also conducted at HRNR during the fall bird migration for diurnal raptors and passerines (e.g., songbirds, perching birds) and nocturnal owls. The fall raptor banding research station has been in operation since 1972 and the passerine banding program since 1996. The research station is one of the few on top in terms of the total numbers of banded raptors and largest station for numbers of owls on the continent. An average of 3,000 raptors (including owls) and 1,200 passerines are banded each season. Regular owl species banded are Northern Saw-whet Owls, Long-eared Owls, Barred Owls, and Great-Horned Owls. Other owls that have been banded at HRNR include Boreal Owl, Snowy Owl, Great Gray Owl, and Eastern Screech Owl. HRNR and the banding research station has also been important as a training ground for field assistants whose careers have taken them into various educational and wildlife management fields. Focusing on conserving diverse bird communities when developing habitat management plans helps ensure resilient and stable ecosystems. A list of the birds of greatest conservation need that have been counted and/or banded at HRNR is provided in Appendix B.

Monitoring bird populations is important because changes in bird populations can signal ecosystem health and degradation. To document breeding bird communities, habitat-use, and trends at HRNR, a standardized breeding bird monitoring program was established by Dr. Jerry Niemi (University of Minnesota, Duluth) and Dr. Matt Etterson (Environmental Protection Agency) in 2010. This monitoring effort consists of 13-point count locations that were systematically located across the reserve. Ten-minute point counts are conducted annually during the peak of the breeding season (June) by trained observers. In addition to the point count surveys, HRBO became an established Monitoring Avian Productivity and Survivorship Program (MAPS) banding station in 2015. The MAPS Program utilizes

standardized, constant-effort mist netting and banding during the breeding season to collect data that can be used to estimate key demographic parameters such as productivity, recruitment, and survival of individual bird species. More than 25 species have been documented as breeding birds through the MAPS project, including the 12 species listed below that have been confirmed as regular resident breeding birds each year of MAPS 2015-2023. Together, these breeding bird monitoring programs provide important information that allow us to track changes in population and determine potential underlying causes of observed trends. The information can be used in various impactful ways including documenting changes in diversity and informing habitat management plans. Overall, these data can help inform the creation of a coordinated, holistic, and landscape-scale approach to long-term conservation and management of the proposed Lester – Amity – Hawk Ridge Natural Area.

Confirmed regular resident breeding songbirds at Hawk Ridge (MAPS 2015-2023)

American Goldfinch
American Redstart
Black and White Warbler
Black-capped Chickadee
Common Yellowthroat
Chestnut-sided Warbler
Mourning Warbler
Nashville Warbler
Ovenbird
Song Sparrow
Red-eyed Vireo
Veery
White-throated Sparrow

Special Species Area

Within the proposed natural area, the state listed special concern species, Canada buffaloberry (*Shepherdia canadensis*) has been documented historically since the 1940s (Figure 3). Listed as special concern in 2013, the Minnesota Department of Natural Resources searched suitable habitats across the state and found many fewer populations than expected. Recent populations have been documented between 2018 – 2024, confirming an established and viable population that has maintained its presence since at least the 1940s. This species is likely to be found in greater abundance throughout this area, preferring the rocky outcrops in full to part sun in many difficult to access eroding cliffs or scrubby upland habitats. The proposed natural area contains many of these conditions that have not been fully explored and documented due to limited access, particularly along the Amity Creek and Lester River gorges. This species has a very narrow range, occurring within only seven counties in the northern third of the state, close to the Canadian border, within a handful of locations in the Boundary Waters Canoe Area Wilderness, and along the bedrock outcrops of Lake Superior. The occurrences in the proposed natural area (Figure 4) represent a higher density of this special concern species than has been found elsewhere in the state. This nomination would place a higher level of protection on one of the very few documented stated listed species within the City of Duluth.

Figure 3. Special concern species Canada buffaloberry (*Shepherdia canadensis)* along Amity Creek within the nomination area.

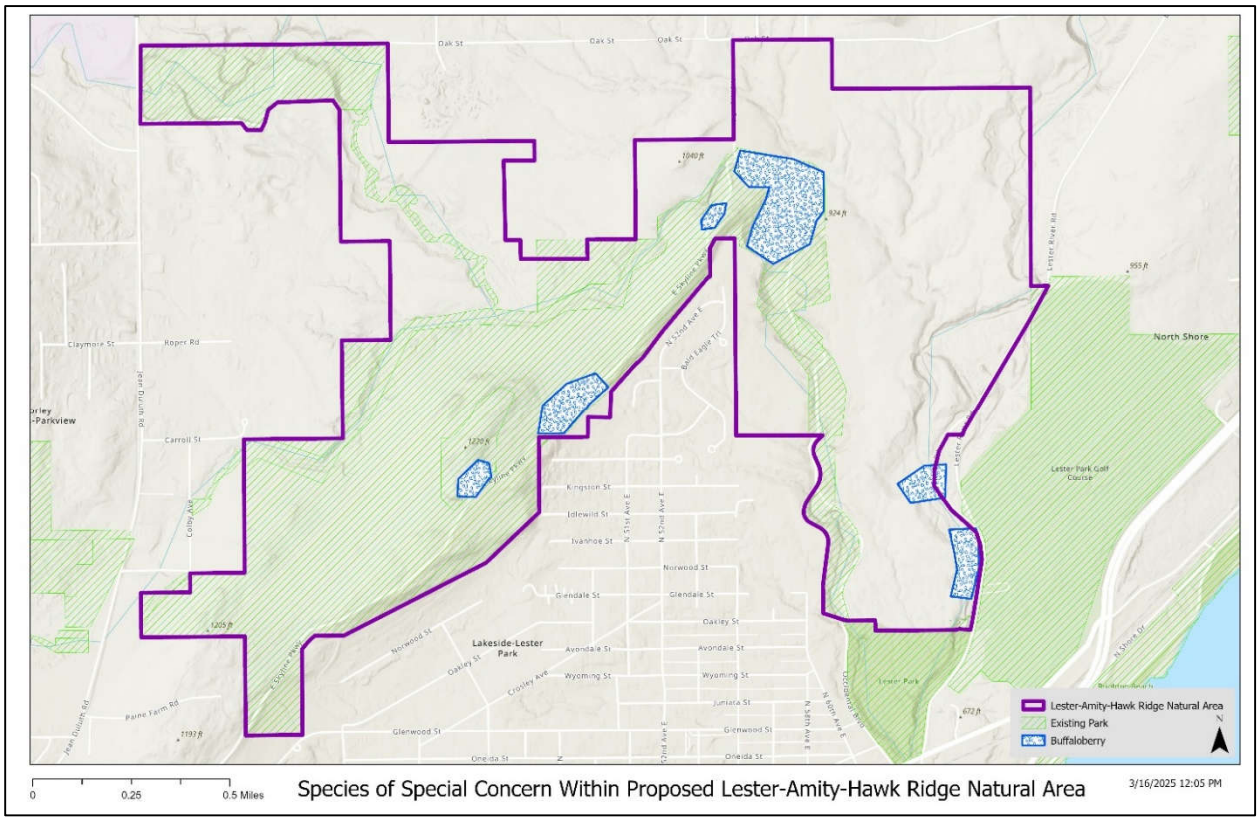

Figure 4. Generalized locational polygons denoting species of special concern.

Furthermore, the vegetation within the HRNR was sampled in 2014 and found to contain the following nine viable native plant communities in accordance with the DNAP Guidelines (Table 2 and Figure 5): Northern Alder Swamp, Northern Floodplain Forest, Northern Rich Maple-Basswood Forest, Northern Rock Outcrop, Northern Sedge Meadow, Poor Dry-mesic Bedrock Aspen-Birch-Fir Woodland, Poor Dry-mesic Great Lakes Pine Woodland, Wet Black Ash Swamp, and Wet-mesic Black Ash - Sugar Maple Forest (Delany, B., 2014). Of these plant communities, the Northern Rich Maple – Basswood Forest is in the northern edge of its range, making these occurrences at the proposed Amity-Hawk Ridge Natural Area, Hartley Natural Area, and Magney-Snively Natural Area rare outliers within the state of Minnesota. Furthermore, a relatively high abundance of oak has been observed within the Northern Rich Maple – Basswood Forest and are colloquially noted as increasing in density. Oaks are considered to have greater genetic adaptability, increasing the resiliency of the documented high quality Northern Rich Maple – Basswood Forest when faced with the impacts of climate change.

The Northern Rock Outcrop community is in high to moderate quality condition and comprises much of the habitat for the special concern species, Canada buffaloberry (*Shepherdia canadensis*) along with other lesser common species such as three toed cinquefoil (*Potentilla tridentata*), pale corydalis (*Corydalis sempervirens*), poverty grass (*Danthonia spicata*), bearberry (*Arctostaphylos uva-ursi),* and

rusty woodsia (*Woodsia ilvensis*). This habitat is found primarily within the HRNR but is also fairly common along the canyon walls and near adjacent stream corridors of the lower reaches of both Amity Creek and Lester River. Although Northern Rock Outcrops are not an uncommon community within Duluth, Canada buffaloberry is not found much beyond the HRNR and Amity Creek and Lester River gorges.

Table 2. Plant communities present in Hawk Ridge Nature Reserve that meet Significant Plant Community criteria based on 2014 vegetation surveys (Delany, B. 2014).

Hawk Ridge Plant Community Survey 2014			
DNRCODE	**DNAP Code**	**Plant Community Name in DNAP**	**Acres**
FPn73a	CPn79a	Northern Alder Swamp	32.56
FFn57a	FFn67	Northern Floodplain Forst	15.38
MHn35b	MHn5b	Northern Rich Maple-Basswood Forest	23.9
ROn23a	ROn1a	Northern Rock Outcrop	63.38
WMn82b	WMn1a	Northern Sedge Meadow	0.06
FDn33b	FDn2d	Poor Dry-mesic Bedrock Aspen-Birch-Fir Woodland	107.72
FDn33a	FDn2f	Poor Dry-mesic Great Lakes Pine Woodland	10.43
WFn55a	WFn71c	Wet Black Ash Swamp	52.9
MHn46b	MHn62b	Wet-mesic Black Ash - Sugar Maple Forest	43.21

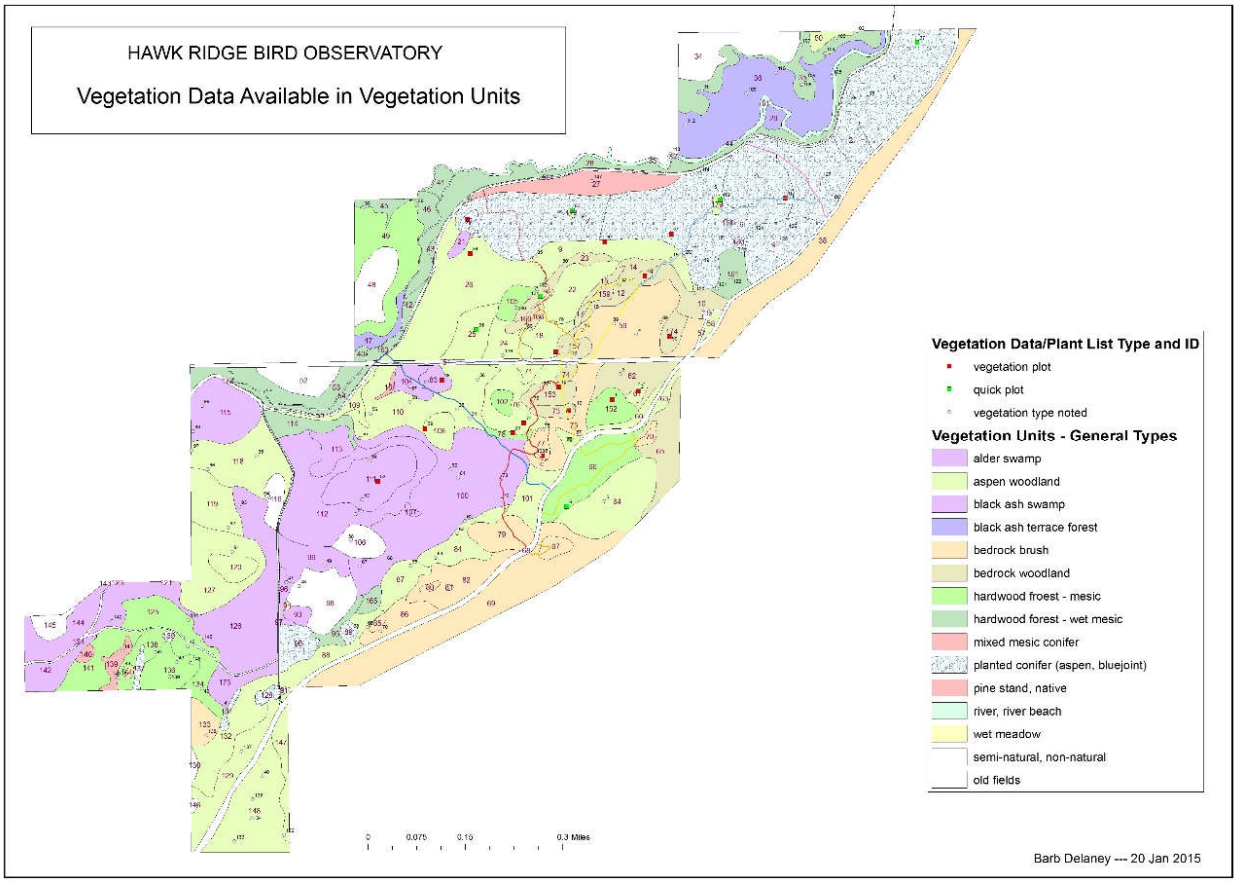

Figure 5. Mapped plant communities (HRNR, 2014). Plant communities were later classified into MNDNR Native Plant Communities and cross-referenced with the Duluth Natural Areas Significant Plant Communities Criteria.

The wetland plant communities found in the proposed natural area, Northern Alder Swamp, Northern Sedge Meadow, Wet Black Ash Swamp, and Northern Floodplain Forest all contribute to groundwater recharge and water quality, preserving the native Brook Trout population and aquatic macroinvertebrates in Amity Creek. Some of the Black Ash Swamps are fairly large and noted to be of high to moderate quality with noted floodplain species in the understory, such as ostrich fern (*Matteuchia strutheropteris*) and mesic species such as bluebead lily (*Clintonia borealis*), bunchberry (*Cornus* canadensis), and nodding trillium (*Trillium cernuum*). Both the wetland communities and the upland communities, including Northern Rich Maple – Basswood Forest, Northern Rock Outcrop, Poor Dry – Mesic Bedrock Aspen – Birch – Fir Woodland, and Poor Dry – Mesic Great Lakes Pine Woodland all offer vital foraging and hunting habitat for the migrating and nesting bird species as well as other fauna such as squirrels and bear, especially in such a large, undeveloped area. This continuous canopy of mixed upland and wetland habitats provides a crucial wildlife corridor that links to the Lester River and Lakewood Township on the east side and connects the forests adjacent to Amity Creek and Tischer Creek as they flow through wooded neighborhoods and City of Duluth property on the west side.

The plant community survey conducted in 2014 did not sample the plant communities adjacent to Amity Creek nor were the plant communities within the newly acquired Lester River forest surveyed. These areas are suspected or known to harbor more of those communities found in the HRNR along with some possible cliff communities in the Amity Creek and Lester River gorges, mesic hardwoods and mixed conifer forests in between the Amity Creek and Lester River gorges, and forested wetlands along the upper reaches of Amity Creek.

Another suspected intact and valuable native plant community that is likely to be contributing to the cold groundwater is the northern mesic hardwood forest (MHn35) which is indicative of well-drained, loamy soils that contain small depressions that create ideal spring ephemeral ponds or vernal pools. Vernal pools are biodiversity hotspots and provide important habitat for sensitive species such as wood frogs, fairy shrimp, and blue spotted salamanders, which need seasonally wet and dry periods to complete their reproductive cycles.

Natural Water Feature Area

Amity Creek is one of the least urbanized streams within the city, due in part to the large parcels of undeveloped land within the watershed with only 3% of the Amity Creek watershed land use categorized as developed, rural, or urban. The lower reaches of this designated cold-water trout stream was included in the proposed natural area which includes approximately 1.23 square miles (7.4%) of the watershed of the east and main stem branches of the creek. A stretch of the creek also flows through a rhyolite canyon.

The Amity Creek Watershed is widely recognized as one of the highest quality trout fisheries in the City of Duluth. Both the main stem and the East Branch of Amity Creek are listed as impaired by state of Minnesota for turbidity. The “Amity Creek Stressor Identification Report” produced by Jennings and Geenen (2016) documented sources of sediment loading along with recommended stream restoration projects in these areas. Several reaches of East Branch and main stem of Amity Creek within the proposed natural area were identified as major sediment sources, and areas of degraded physical habitat were observed due to channel and bluff instability. The U.S. Environmental Protection Agency, Minnesota Pollution Control Agency, and SWCD recently completed the “Amity Creek Watershed Nine Key Element Plan” which addresses the sediment impairments. Now that the plan is complete, the SWCD is eligible to receive federal grants over the next fifteen years to implement sediment reduction projects in the watershed.

The East Branch offers the coldest water temperatures and provides much of the baseflow to the system due to significant groundwater upwelling and wetland storage (Jasperson, 2015). The following is an excerpt from the Lake Superior South Stressor Identification Report (MPCA, 2017):

“The East Branch of Amity Creek Watershed is a productive coldwater stream with a robust population of naturally reproducing native brook trout. Water temperatures and brook trout numbers in this stream are comparable or superior to many of the highest quality streams in less developed areas of the North Shore and surrounding area (Figure 6. Results of Amity Creek/East Amity Creek brook trout

spawning assessment completed in fall of 2014. Source: Lake Superior South Stressor Identification Report (Jasperson et al, 2017).

Table 3). A brook trout spawning assessment was completed in the fall of 2014 along approximately three miles of the East Branch, where 186 areas of spawning activity (clusters of “redds” i.e. nests) were observed, a density of 62 per mile, compared to nine per mile on the main stem of Amity Creek (Figure 6). Several of the spawning areas observed on the main stem of Amity Creek were located at its confluence with the East Branch, likely due to the coldwater inputs from this tributary. The results of the spawning assessment clearly illustrate the importance of the East Branch as a spawning and rearing area for wild brook trout.”

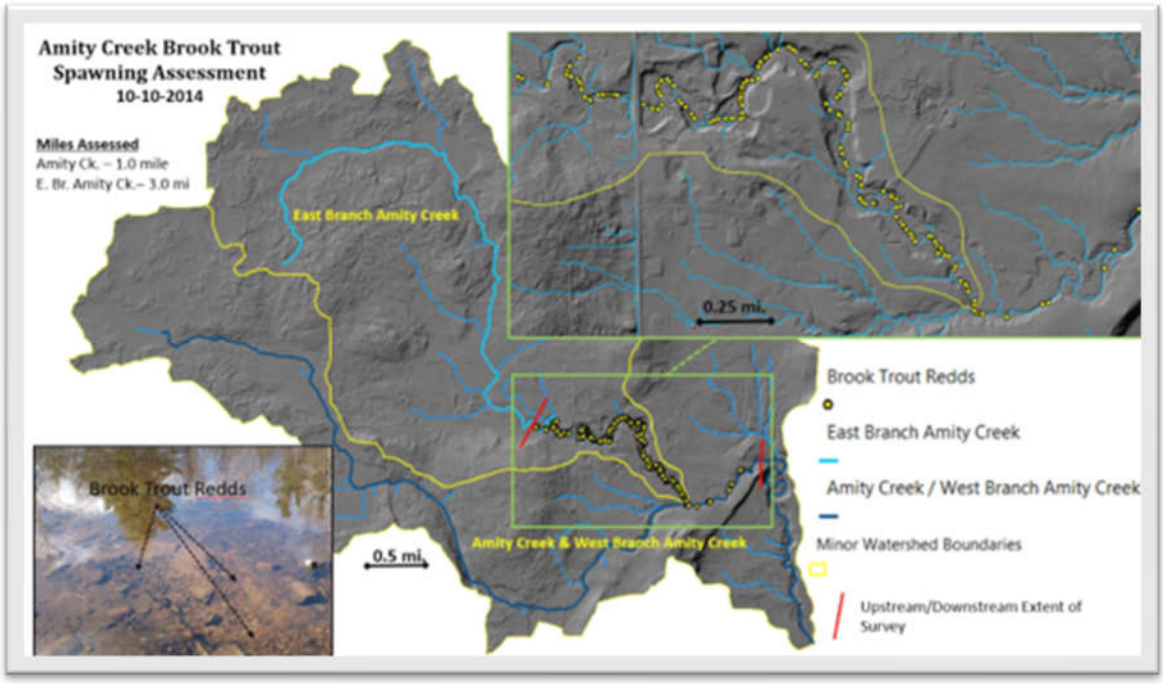

Figure 6. Results of Amity Creek/East Amity Creek brook trout spawning assessment completed in fall of 2014. Source: Lake Superior South Stressor Identification Report (Jasperson et al, 2017).

Table 3. Ranking of East Branch Amity Creek among north shore streams based on number of Brook Trout sampled. Source: Lake Superior South Stressor Identification Report (Jasperson et al, 2017)

Rank (n=95)	Stream name	Station	Visit date	Distance sampled (m)	# Brook Trout sampled	BKT/meter	Batch weight (g)
1	Kadunce River	13LS050	8/27/2013	221	214	0.968	4006
2	McCarthy Creek	11LS007	8/9/2011	150	112	0.747	3222
3	Cascade River	13LS013	9/4/2013	350	175	0.500	6279
4	Devil Track River	13LS046	9/4/2013	280	116	0.414	5247
5	**Amity Creek, East Branch**	**97LS038**	**6/20/2011**	**158**	**55**	**0.348**	**3124**
6	Little Devil Track River	97LS073	9/17/2013	150	50	0.333	1765
7	Big Sucker Creek	97LS089	8/31/2011	262	86	0.328	3038
8	Junco Creek	13LS006	8/22/2013	175	47	0.269	2059
9	Kimball Creek	13LS011	8/13/2013	134	33	0.246	471
10	Heartbreak Creek	97LS075	8/15/2013	220	52	0.236	1551
11	Elbow Creek	05LS005	8/7/2013	175	41	0.234	1824
12	Captain Jacobson Creek	11LS017	7/28/2011	150	31	0.207	902
13	Brophy Creek	10EM141	6/22/2010	157	30	0.191	763
14	Manitou River	98LS030	9/19/2013	420	79	0.188	2797
15	Cascade River	95LS013	9/5/2013	420	76	0.181	3200

The 2017 Lake Superior South Stressor Identification Report stresses the importance of protecting the Amity Creek Watershed:

"Protection planning for Duluth's twelve trout streams should be a priority under the [DNAP]. Many of the trout streams that course through city lands are negatively impacted by urban runoff, fragmented by road crossings, and offer marginal physical habitat and temperate regimes for coldwater fish. East Branch Amity Creek is an exception to this in many regards:

- Large corridors of undeveloped public land
- Priority protection area is already in public ownership, and located upstream of densely developed urbanized areas
- Significant groundwater sources and wetlands maintain cold temperatures and suitable stream flows (Jasperson, 2015)

Based on available data, East Branch Amity Creek represents one of the best remaining habitats for wild brook trout within Duluth. This stream segment warrants protection under the DNAP based on these attributes and the abundance of public land and recreational interests in the watershed. A partnership of state and local agencies could provide the monitoring and management support required under the DNAP guidelines."

The easiest and least expensive option to protect the cold-water habitat of this designated trout stream is to preserve the stream and its vegetated corridor where it will continue to provide water storage, reduce storm flow, streambank erosion, and downstream flooding. Preserving significant portions of the Amity Creek Watershed also contributes to the protection of the nearshore waters of Lake Superior, where Amity Creek discharges shortly after its confluence with Lester River just outside of the proposed natural area. The nominated natural area provides "green infrastructure" that helps minimize the loading of excess phosphorus, nitrogen, and even road salt into these streams and eventually the oligotrophic Lake Superior. Maintaining large, forested tracts of land that provide crucial water storage within this watershed contributes to the future resilience of this cold-water stream as it faces increasing temperatures, greater intensity storms and higher associated rainfalls.

Finally, with more extreme weather events contributing to higher rainfall and downstream flooding, it is crucial to protect the existing habitat that currently mitigates some of the highest impacts to the fragile stream bluffs (Figure 7), water quality, and fauna of this cold-water trout stream.

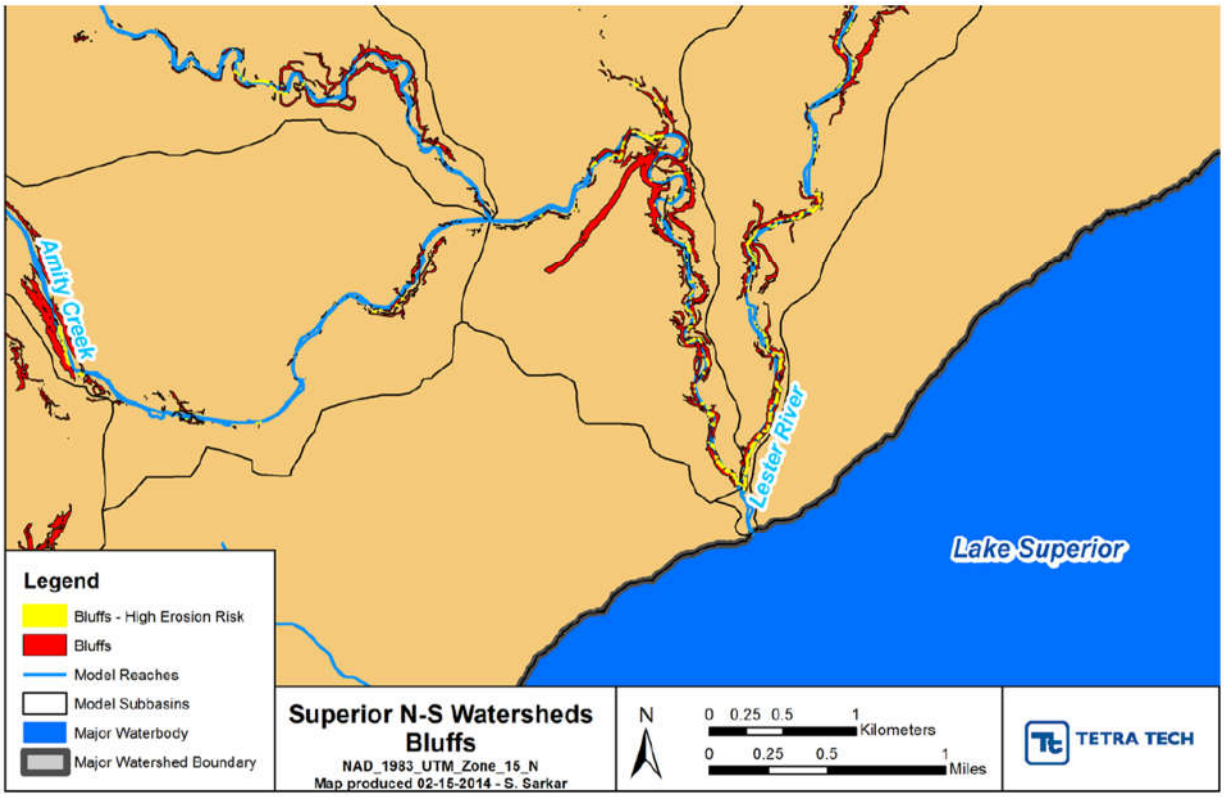

Figure 7. Areas at high risk of bluff collapse in Amity Creek and Lester River Watersheds. Source: Duluth Urban WRAPS HSPF Model Report (Revised, MPCA, 2019)

Geologic Landform Area

The prominent, northeast-trending ridge on which the HRNR sits is higher than the surrounding landscape because it is made of a rock called diabase that is more resistant to weathering and erosion than the rocks to the northwest or southeast (Figure 8). This feature traces its origin to two dramatic events in its geologic history entailing the Mid-Continent Rift (about 1.1 billion years ago) and the Great Ice Age Glaciation (over the last 2.5 million years ago). Both of these events produced evidence of geologic formations included in the DNAP Geological Landform Area criteria.

Figure 8. Photo of Hawk Ridge, courtesy Dr. John Green.

All of the rocks in the Duluth area were formed approximately 1.1 billion years ago (late Precambrian times, or more specifically the mid-Proterozoic). At this time, the earlier crust of the Earth started to stretch apart and split up along a great, arcuate trend centered beneath present Lake Superior and reaching to about Detroit to the southeast and to northeastern Kansas to the southwest. This rifting (Midcontinent Rift System or MRS) was apparently caused by a huge upwelling of hot rock from deep in the Earth's mantle (thick layer beneath the crust). As this "plume" of buoyant, hot rock approached the surface, it began to melt and produce immense volumes of magma (molten rock material) of basaltic composition. This basaltic magma passed upward toward the surface along fissures caused by the stretching and rifting. Most of this magma erupted as hundreds of great lava flows, which now make up most of the North Shore. Some of the magma never reached the surface, however, but instead squeezed into and between the already-erupted lavas. These "intrusions" then cooled more slowly than the volcanic rocks and formed coarser-grained rock of similar composition called diabase or gabbro. These diabase layers or sills developed fewer fractures as they cooled and proved to be more resistant to weathering and erosion, once they were exposed at the surface, than the nearby volcanic rocks. This is why Duluth's main high areas are made of diabase and gabbro, in contrast to the lava flows that underlie the lower areas downtown and in the Lakeside neighborhood.

As the rifting, stretching, and lava eruption continued, the central part of the MRS subsided, leaving the rock layers on its flanks tilted toward the rift axis. The lower reaches of Amity Creek and Lester River cut into rhyolite (light) and basalt (dark) lava flows to form gorges as they cascade down the Duluth hillside and join just before entering Lake Superior at the bridge. This exposed volcanic rock are further evidence of the Mid-Continent Rift.

Thus, in Duluth, the layers trend north to northeast and are tilted from about 10 to 20 degrees to the east. Slow uplift and erosion over the billion years or so since the rifting and volcanism ceased have "etched out" these harder layers. This has resulted in our landscape's prominent high areas: Duluth Heights to Spirit Mountain and Bardon's Peak, "held up" by the Duluth (gabbro) Complex; Mount Royal, held up by the Endion sill; Hawk Ridge, held up by the Northland sill; and Moose Mountain, held up by the Lester River sill. All these sills are made of diabase.

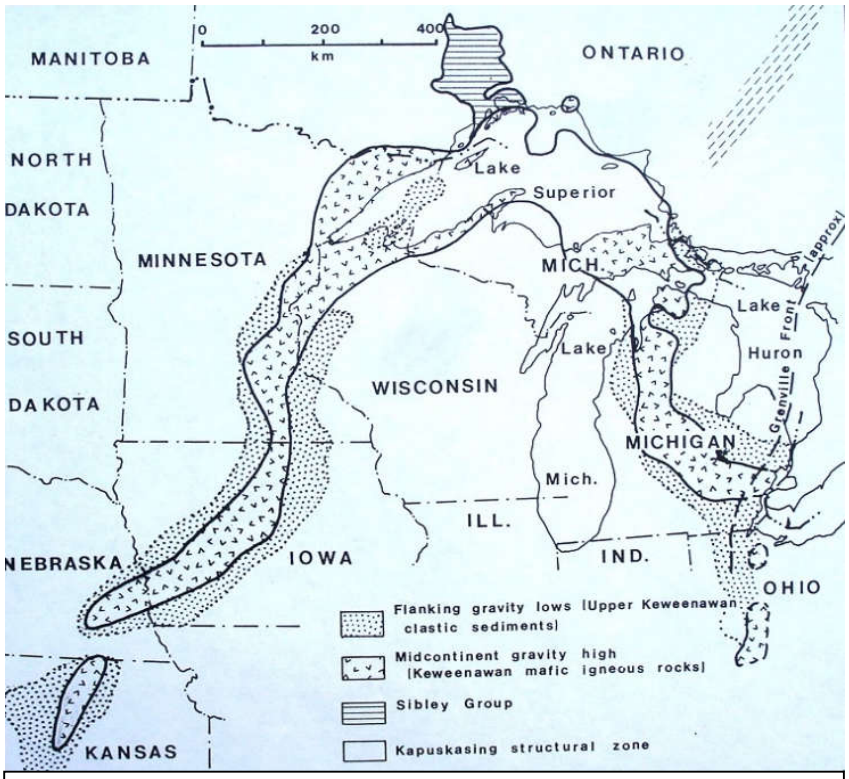

Figure 9. Map of Mid-Continental Rift.

The last major geologic event that has helped give Hawk Ridge its present character was the great Pleistocene Ice Age. Starting about 2.5 million years ago, several huge, mile-thick ice sheets spread out from east-central Canada and covered this area, again eroding the softer rocks more readily than the harder ones. The easiest to erode were the thick sandstones that had been deposited on top of the lava flows after volcanism waned at the close of the Midcontinent rifting. The glaciers preferentially gouged out these sandstones and formed the basin that Lake Superior has since occupied. The ice sheet eroded off most of the deeply-weathered igneous rocks too, leaving scratches or striations on the surface of the remaining fresh bedrock. These can be seen at several places along the Hawk Ridge trails. The last glacier also deposited till, a mix of very fine, medium, and coarse particles of varying thickness, on top of the bedrock. On the high points, including Hawk Ridge, there was little if any glacial sediment deposited. The minimal soil on this resistant, rocky ridge has inhibited human development over the years, allowing it to remain in public ownership, and the rocky character provides habitat for special rock-adapted plants. In a nutshell, the special topography here in Duluth, with prominent ridges next to the Lake Superior basin, is what concentrates the huge bird migration through this area. This topographic relief is the product of dramatic geologic processes and events over the last 1.1 billion years.

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Appendix A - Letters of Support

Hawk Ridge Bird Observatory Resolution in Support of Nomination of the Amity/Hawk Ridge Natural Area to the Duluth Natural Areas Program

November 21, 2024

WHEREAS, the Duluth Natural Areas Program (DNAP) was established under Duluth City Code Chapter 2, Article XXIX, Section 2-152 to protect and preserve natural areas of special ecological significance within the City of Duluth; and

WHEREAS, the mission of the Hawk Ridge Bird Observatory is to promote conservation of raptors and other birds in the Western Lake Superior Region through research, education, and stewardship of the 365-acre Hawk Ridge Nature Reserve; and

WHEREAS, the Amity/Hawk Ridge Natural Area has been identified as an ecologically significant area due to its unique geological formations, native plant communities, and its role in protecting critical habitats for bird species, particularly in the Amity Creek watershed; and

WHEREAS, the 365-acre Hawk Ridge Nature Reserve managed by the Hawk Ridge Bird Observatory is a critically important international bird migration corridor. It is also a national & international attraction for birdwatching with a unique designation as an Audubon Important Bird Area, one of only four such designated sites in the United States; and

WHEREAS, the nomination of the Amity/Hawk Ridge Natural Area under DNAP aligns with the mission of the HRBO to promote conservation of raptors and other birds in the Western Lake Superior Region; and

WHEREAS, the protection of the Amity/Hawk Ridge Natural Area will provide long-term ecological, education, and recreational benefits to the community, as well as maintain the integrity of critical habitats within the 365-acrea Hawk Ridge Nature Reserve;

NOW THEREFORE, BE IT RESOLVED, by the Hawk Ridge Bird Observatory Board of Directors that:

1. The HRBO fully supports the nomination of the Amity/Hawk Ridge Natural Area to the Duluth Natural Areas Program.
2. The HRBO shall serve as a nominating partner in the application to include Amity/Hawk Ridge Natural Area Program.
3. The HRBO commits to collaborating with other partners and stakeholders, including the City of Duluth and other conservational organizations, to ensure the long-term preservation and management of the Amity/Hawk Ridge Natural Area.
4. The HRBO Board of Directors authorizes Janelle Long, Executive Director, to act on its behalf in all matters related to this nomination, including the submission of formal letters of support.

BE IT FURTHER RESOLVED, that this resolution shall take effect immediately upon adoption.

Adopted by the HRBO Board of Directors on November 21, 2024.

James W Sellers

Board Chairperson

South St. Louis Soil and Water Conservation District Resolution to Support Nomination of the Lester-Amity-Hawk Ridge Natural Area to the Duluth Natural Areas Program

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Date: 4/16/2025

WHEREAS, the Duluth Natural Areas Program (DNAP) was established under Duluth City Code Chapter 2, Article XXIX, Section 2-152 to protect and preserve natural areas of special ecological significance within the City of Duluth; and

WHEREAS, the Lester-Amity-Hawk Ridge Natural Area has been identified as an ecologically significant area due to its unique geological formations, native plant communities, and its role in protecting critical habitats for bird species, particularly in the Amity Creek watershed; and

WHEREAS, Amity Creek, a designated trout stream, is one of the best-preserved natural water features within the City, supporting a population of brook trout and providing essential coldwater habitat due to its groundwater contributions; and

WHEREAS, the South St. Louis Soil and Water Conservation District (SWCD) has been a key partner in conservation efforts within the region, including the implementation of sediment reduction projects in the Amity Creek watershed as part of the "Amity Creek Watershed Nine Key Element Plan" and other conservation initiatives; and

WHEREAS, the nomination of the Lester-Amity-Hawk Ridge Natural Area under DNAP aligns with the mission of the SWCD to promote sustainable land use and protect natural resources in the region; and

WHEREAS, the protection of the Lester-Amity-Hawk Ridge Natural Area will provide long-term ecological, educational, and recreational benefits to the community, as well as maintain the integrity of critical habitats within the watershed;

NOW, THEREFORE, BE IT RESOLVED by the Board of Supervisors of the South St. Louis Soil and Water Conservation District that:

1. The South St. Louis Soil and Water Conservation District fully supports the nomination of the 1,202-acre Lester-Amity-Hawk Ridge Natural Area to the Duluth Natural Areas Program.
2. The South St. Louis Soil and Water Conservation District shall serve as a nominating partner in the application to include Lester-Amity-Hawk Ridge Natural Area in the Duluth Natural Areas Program.
3. The South St. Louis Soil and Water Conservation District commits to collaborating with other partners and stakeholders, including the City of Duluth and other conservation

organizations, to ensure the long-term preservation and management of the Lester-Amity-Hawk Ridge Natural Area.

4. The District authorizes Tim Beaster, Conservation Specialist, to act on its behalf in all matters related to this nomination, including the submission of formal letters of support.

BE IT FURTHER RESOLVED, that this resolution shall take effect immediately upon adoption.

Adopted by the Board of Supervisors of the South St. Louis Soil and Water Conservation District on April 16, 2025.

Board Chairperson

4/8/2025

Jim Filby Williams
Director, Department of Property, Parks and Libraries

City of Duluth
411 West First Street
Duluth, MN 55802

South St. Louis
SOIL & WATER CONSERVATION DISTRICT

Dear Mr. Williams,

I am writing on behalf of the South St. Louis Soil and Water Conservation District (SWCD) to express our enthusiastic support for the nomination of the Lester-Amity-Hawk Ridge Natural Area into the Duluth Natural Areas Program (DNAP)). The designation of the Hawk Ridge Natural Area, encompassing almost 1,200 acres of land, including a portion of the Amity Creek watershed, aligns with our mission to conserve and restore natural resources in our region.

The Amity Creek watershed holds significant ecological value and the East Branch of Amity Creek in particular is renowned as one of the premier trout fisheries within the City of Duluth. Despite its esteemed status, both the main stem Amity Creek and the East Branch face challenges, particularly regarding sediment impairments. Multiple watershed assessments in recent years have all recommended restoration and protection activities within the area being nominated for DNAP inclusion. The completion of the "Amity Creek Watershed Nine Key Element Plan" by the Environmental Protection Agency (EPA), Minnesota Pollution Control Agency (MPCA), and our organization positions the SWCD to secure federal EPA grants for implementing vital habitat restoration and sediment reduction projects over the next decade.

The SWCD has already secured the first of four $291,000 EPA grants (totaling $1.2 million) that will be phased over the next 15 years. We are partnering with MN Trout Unlimited to leverage these federal resources and obtain an additional $800,000 in State funding, with the goal to fully restore the portions of East Amity Creek that are on City of Duluth-owned property. The inclusion of these portions of the Amity Creek watershed into the DNAP would represent a crucial step towards safeguarding our significant taxpayer-funded investment in this invaluable natural resource and preserving it for future generations.

The SWCD is a nominating partner in this endeavor and is committed to collaborating with other partners and stakeholders to ensure the long-term preservation and management of this natural area, including in the development and implementation of the Lester-Amity-Hawk Ridge Natural Area management plan. The collaborative endeavors of the City of Duluth, Hawk Ridge Bird Observatory, MN Trout Unlimited, SWCD, and various stakeholders exemplify the spirit of conservation and stewardship that defines our community. By formally recognizing the ecological significance of the Lester-Amity-Hawk Ridge Natural Area, we demonstrate our collective commitment to preserving the integrity of our local ecosystems and ensuring the long-term sustainability of our watersheds. Thank you for considering this nomination.

Sincerely,

Tim Beaster
Conservation Specialist
South St. Louis Soil and Water Conservation District
4215 Enterprise Circle, Duluth MN 55811

4215 Enterprise Circle • Duluth, MN 55811 • P: 218.723.4867 • www.southstlouisswcd.org

MINNESOTA LAND TRUST

April 15, 2025

Jim Filby Williams
Director of Parks, Properties, and Libraries
City of Duluth - Department of Public Administration
411 West First Street
Duluth, MN 55802

Dear Jim:

The Minnesota Land Trust (MLT) supports the proposed nomination of the approximately 1200-acre Lester-Amity-Hawk Ridge Natural Area to the Duluth Natural Areas Program. We are pleased to be among the nominating partners for this important effort to protect and subsequently restore the lands and waters in the Amity Creek watershed for our community.

As you are aware, MLT has been a strong partner to the City of Duluth regarding preservation of the city's open space for over ten years. Our work has supported acquisition of important tax forfeit lands, designation of two natural areas to the DNAP, restoration of important habitat at numerous sites within the city and the St. Louis River estuary, and development of the City's first Natural Resources Management Program Plan. These efforts not only support the preservation of important ecological habitats but secures these spaces for the recreational and well-being benefits of our residents and visitors.

The nominating partners are excited to focus resources within the natural area to support restoration and preservation of the ecological integrity of Amity Creek, a premier trout fishery within the city, and the surrounding forested lands, including the Hawk Ridge Nature Reserve, a location of global importance for raptor migration designated as an Important Bird Area by Audubon. MLT will collaborate with the City, our nominating partners, and other interested parties to develop and implement the natural area's management plan. MLT has secured grant funding to complete native plant community classifications within the proposed natural area. This data is foundational to development of the management plan and identification of management actions. With the resources already secured for this watershed and those that will come because of the natural area nomination, we are poised to make a significant difference in the long-term viability of these resources for our community.

Thank you for your thoughtful consideration of this nomination.

Sincerely,

Kris Larson
Chief Executive Officer

Minnesota Trout Unlimited
PO Box 845
Chanhassen, MN 55317
612.670.1629

April 8, 2025

Jim Filby Williams
Director, Department of Property, Parks and Libraries
City of Duluth
411 West First Street
Duluth, MN 55802

Re: Nomination of Lester-Amity-Hawk Ridge Natural Area

Dear Mr. Williams:

Minnesota Trout Unlimited (MNTU) is writing in support of the nomination of the Lester-Amity-Hawk Ridge Natural Area into the Duluth Natural Areas Program (DNAP). DNAP's mission of preserving natural places to protect natural resources and provide human sanctuary aligns with the mission of MNTU and its Gitche Gumee Chapter to conserve, protect, and restore coldwater resources. Furthermore, the inclusion of the Lester-Amity-Hawk Ridge Natural Area within DNAP provides a timely and significant value-added boost to the forthcoming Amity Creek restoration project. MNTU has partnered with the South Saint Louis Soil and Water Conservation District (SSLSWCD), the Minnesota Department of Natural Resources (MNDNR), and the Minnesota Pollution Control Agency (MPCA), to design and implement restoration of 9,400 feet of Amity Creek by 2029. We seek the City's partnership as well.

Amity Creek is Duluth's top wild brook trout fishery. However, the watershed has been impacted by decades of urbanization and trout habitat was severely damaged by the June 2012 flood. The stream has become incised and disconnected from its floodplain. As a result, during floods the streambanks crumble, filling in critical pool habitats, smothering the gravel where trout spawn, and clouding the water. All these factors diminish the health and productivity of the brook trout fishery.

Extensive assessments conducted by the SSLSWCD, MNDNR, and MPCA documented these ecological impairments and produced a detailed restoration roadmap to guide improvements on five key components of watershed health: hydrology, geomorphology, connectivity, biology, and water quality. Following completion of the watershed plan in January 2023, SSLSWCD secured a renewable Federal Section 319 grant for design work and construction over the next 15 years. To meet the required match for this federal grant, MNTU will secure approximately $800,000 from the Lessard Sams Outdoor Heritage Fund to support restoration of Amity Creek.

The Amity Creek stream restoration project and protection of this land in perpetuity will ensure social, recreational, ecological, and economic benefits to the Duluth community for generations. This project will create opportunities for high quality trout fishing that is easily accessible to residents of all socio-economic strata in the City of Duluth. It will also draw anglers from around the region and state who visit the area for its outdoor recreational opportunities.

The inclusion of these nominated lands into the Duluth Natural Areas Program will ensure the health and productivity of the Amity Creek watershed and its biodiversity, support the diversification of Duluth's economy, promote the social wellbeing of the local community, and boost resilience of this watershed to the impacts of climate change. Minnesota Trout Unlimited is a committed and steadfast supporter of this effort.

Thank you for your consideration of this nomination.

Sincerely,

John P. Lenczewski, Executive Director

Jennifer L. C. Biederman, Habitat Program Director

DEPARTMENT OF NATURAL RESOURCES

December 3rd, 2024

Jim Filby Williams
Director, Department of Property, Parks and Libraries
City of Duluth
411 West First Street
Duluth, MN 55802

Dear Director Filby Williams,

I am the Regional Clean Water Legacy Specialist for the Minnesota Department of Natural Resources (DNR), Division of Ecological and Water Resources, and am writing to express strong support for the inclusion of the Amity - Hawk Ridge Natural Area into the Duluth Natural Areas Program (DNAP), as nominated by the Hawk Ridge Bird Observatory, South St. Louis Soil and Water Conservation District, MN Trout Unlimited, and MN Land Trust. The proposed Amity - Hawk Ridge Natural Area, encompassing over 800 acres of ecologically significant land, including portions of the Amity Creek watershed, is a critical step towards preserving the natural heritage and ecological integrity of this region.

The Amity Creek watershed is recognized as one of Duluth's highest quality trout fisheries, supporting a robust population of naturally reproducing native Brook Trout. Despite this, both the main stem and the East Branch of Amity Creek are currently listed as impaired due to turbidity. The 2016 "Amity Creek Stressor Identification Report" by Jennings and Geenen identified major sediment sources and outlined potential stream restoration projects crucial for mitigating sedimentation and restoring habitat quality. The recent completion of the "Amity Creek Watershed Nine Key Element Plan" by the Environmental Protection Agency (EPA), Minnesota Pollution Control Agency (MPCA), and the South St. Louis Soil and Water Conservation District (SWCD) represents a comprehensive approach to addressing sediment impairments. This plan positions the SWCD to receive federal grants to implement essential sediment reduction projects, further enhancing the ecological health of the watershed.

Particularly noteworthy is the East Branch of Amity Creek, which provides the coldest water temperatures in the watershed and is a vital spawning and rearing habitat for Brook Trout. The Lake Superior South Stressor Identification Report published by the MN Pollution Control Agency in 2017 highlights the importance of this tributary, with Brook Trout spawning densities significantly higher in the East Branch compared to the main stem of Amity Creek. This underscores the critical role of the East Branch in sustaining healthy Brook Trout populations, making its preservation through DNAP designation essential.

The designation of the Amity - Hawk Ridge Natural Area within the DNAP will provide robust protection for these vital ecological assets, preventing development and exploitation, and ensuring that the Amity Creek watershed remains a thriving habitat for native species. This aligns with the DNR's mission to conserve and manage the state's natural resources for the benefit of all.

Thank you for considering our endorsement. We look forward to supporting this nomination and collaborating on future conservation efforts.

Sincerely,

Karl Koller

Karl Koller
Regional Clean Water Legacy Specialist
Division of Ecological and Water Resources
Minnesota Department of Natural Resources
DNR Grand Rapids Headquarters
1201 E HWY 2
Grand Rapids, MN 55744
Phone: (218)328-8816
Email: karl.koller@state.mn.us

MINNESOTA POLLUTION CONTROL AGENCY

Duluth Office | 525 Lake Avenue South | Suite 400 | Duluth, MN 55802 | 218-723-4660
800-657-3864 | Use your preferred relay service | info.pca@state.mn.us | Equal Opportunity Employer

December 19, 2024

VIA EMAIL

Jim Filby Williams
Director, Department of Property, Parks and Libraries
City of Duluth
411 West First Street
Duluth, MN 55802

Dear Jim Filby Williams:

RE: Letter of Support for Amity – Hawk Ridge Natural Area nomination

The Minnesota Pollution Control Agency (MPCA) is pleased to support the Amity – Hawk Ridge Natural Area nomination to the Duluth Natural Areas Program (DNAP). The proposed area includes a significant portion of Amity Creek Watershed (Amity Creek and East Branch Amity Creek), a coldwater ecosystem. The nomination proposal by Hawk Ridge Bird Observatory, South St. Louis Soil and Water Conservation District (SWCD), Minnesota Trout Unlimited, and Minnesota Land Trust is an important step to maintaining the long-term ecological integrity of this vulnerable habitat in Duluth.

Amity Creek Watershed has long been a keystone watershed in developing a better understanding of those factors that contribute to good water quality. Numerous studies have been conducted to better understand land uses and land covers that may be influencing water quality. Studies have focused on water chemistry, habitat, hydrology (including groundwater inputs), and geomorphology. This information has then been used to inform restoration projects within the watershed. Amity Creek and East Branch Amity Creek, both designated trout streams, have existing water quality impairments due to excess sediment in the stream. Formal studies were completed in 2020 and approved by U.S. Environmental Protection Agency. This milestone provides access to state funds to implement protection and restoration projects and activities. Amity Creek Watershed was recently selected for long term funding (16 years) through MPCA to address non-point source pollution within the watershed.

This proposal complements work that MPCA is doing to restore impaired waters and protect unimpaired waters, including high quality and sensitive waters such as trout streams. The MPCA uses a watershed approach to restoring and protecting Minnesota's rivers, lakes, and wetlands through the development of Watershed Restoration and Protection Strategies (WRAPS). We accomplish this important work through partnerships, collaboration, and building local capacity. While MPCA's Watershed Division focuses on water quality, we recognize the value and importance of an intact ecosystem, providing riparian and terrestrial connectivity that can benefit a broad spectrum of species throughout their life cycle needs.

In addition to achieving local environmental goals, such as those of the City of Duluth Comprehensive Land Use Plan, Imagine Duluth 2035, and water quality goals of the St. Louis River One Watershed, One Plan (comprehensive watershed management plan) and statewide water quality goals, the project also

achieves broader objectives, including priorities of the Lake Superior Lakewide Action and Management Plan (LAMP) and Great Lakes Restoration Initiative Action Plan III. Amity Creek is a vital coldwater tributary to Lester River that then flows to Lake Superior. Establishing the Amity – Hawk Ridge Natural Area will create the necessary, long term land controls to ensure the longevity and success of projects and actions taken in the watershed, which in turn contributes to the overall success of the DNAP program.

Thank you for your consideration on this proposal. If we can be of further assistance to further explain our support for this project, please let us know. You can reach Tom Estabrooks of my staff by phone at 218-302-6608, or by email at tom.estabrooks@state.mn.us.

Sincerely,

Amy Adrihan

This document has been electronically signed.

Amy Adrihan
Supervisor
Northeast Unit
Watershed Division

GS/AA/TE:nld

W.J. McCabe (Duluth) Chapter
Izaak Walton League of America
P. O. Box 3063 • Duluth, MN 55803

April 17, 2025

Jim Filby Williams
Director, Department of Property, Parks and Libraries
City of Duluth
411 West First Street
Duluth, MN 55802

Dear Director Filby-Williams,

The W.J. McCabe Chapter of the Izaak Walton League of America, located in Duluth, is pleased to support the nomination of 1,183 acres of the Lester-Amity-Hawk Ridge Natural Area to be added to the Duluth Natural Areas Program (DNAP). The League is a "big picture" organization, working to protect whole watersheds, including the air and water quality, the fish and wildlife habitat, and to provide the opportunity for nature centered outdoor activities, especially for youth. The McCabe Chapter has been a strong supporter of projects to protect and restore natural areas in the City of Duluth and provide recreational opportunities on public land. The Hawk Ridge Bird Observatory and surrounding lands, including the Amity Creek watershed, is an ecologically and recreationally significant area and we strongly support its protection as part of the DNAP.

Amity Creek is a cold-water trout stream, but is impaired for sediments due to development pressures and the resulting erosion in the watershed. In spite of this, Amity remains one of the highest quality trout streams in the City, retaining natural forests along its banks and significant native plant species in the watershed. Some restoration activities have taken place in the watershed in the past (through the Weber Stream Initiative and state and federally funded projects) and the McCabe Chapter has supported these and spoken out about our concerns with proposed activities that would increase sedimentation, erosion, and warming in the stream. The DNAP designation provides an opportunity to build on the early restoration work and ensure this resource and the habitat it includes are protected for the long term.

The Hawk Ridge migration corridor holds global significance well beyond the Duluth area and northeastern Minnesota. Adding it to the DNAP recognizes its' importance and the obligation we have to protect this unique and irreplaceable resource - not only for use by Duluth residents and visitors, but for the greater birding community, future generations, and for the sake of the birds themselves. The McCabe Chapter enthusiastically supports this nomination.

Sincerely,

Julie O'Leary

Julie O'Leary
President
W.J. McCabe Chapter IWLA

December 20, 2024

TO: Jim Filby Williams
Director, Department of property, Parks and Libraries

City of Duluth
411 W 1st Street
Duluth, MN 55802

RE: Proposal for Hawk Ridge

The Arrowhead Fly Fishers (AFF), an affiliate chapter of Fly Fishers International (FFI), is writing to express support for a proposal to include the Hawk Ridge Nature Reserve (HRNR) in the Duluth Natural Area Program (DNAP). The area consists of 822 acres of contiguous land that is highly prized for its natural state as a recreational attraction, contained within the city limits of Duluth. The primary reason for the inclusion of HRNR in the DNAP is the strong commitment of Duluth over the past 50 years to preserve the bird migration habitat and promote observation and conservation of migratory birds the HRNR provides. The area strongly supports other habitats, one of which is a large segment of Amity Creek, a high-quality trout stream currently accessible to residents of Duluth. Large portions of the Amity Creek watershed are undeveloped and this DNAP designation would secure a significant area of the watershed and riparian areas to protect this cold-water ecosystem for future generations as an additional bonus.

The AFF see this opportunity as a win for many diverse outdoor interests. We in AFF participate in numerous activities along this corridor; bird watching, hiking, exploring, fishing, etc. These activities and opportunities are reasons we love living in Duluth.

The mission of FFI through its various chapters such as AFF is to support diverse interests to protect and care for rivers and streams so our children can experience the joy of all fishes wild and native. We have an opportunity here to support multiple interests in protecting our natural environment, not only for migratory birds but also challenges our native brook trout face in Duluth's trout streams and for the interconnected environment that provides the opportunity to enjoy all elements of our ecological landscape. We support efforts to protect habitat for many species and the opportunities to enjoy wildlife in their native environment within our city. The quality of life is greatly enhanced with local opportunities.

Sincerely,

Laurie Arndt

Laurie Arndt (Acting President AFF)
Larndt423@charter.net

Peder M Yurista

Peder Yurista (Conservation & Education AFF)
woollybugger@charter.net

Arrowhead Native Plant EXPLORERS

April 7, 2025

Jim Filby Williams
Director, Department of property, Parks and Libraries

City of Duluth
411 W 1st Street
Duluth, MN 55802

Dear Director Filby Williams,

I am writing to express our enthusiastic support for the nomination of Lester – Amity - Hawk Ridge into the City of Duluth's Natural Areas Program (DNAP) on behalf of Arrowhead Native Plant Explorers (ANPE). As an organization dedicated to the conservation and promotion of native plant communities in the Arrowhead Region of Minnesota, we recognize the paramount importance of preserving these invaluable ecosystems for future generations.

Hawk Ridge Nature Reserve, the Amity Creek and Lester River corridors, and the woodlands between encompass 1,183.6 acres of land renowned for their globally significant bird migration observation sites and remarkable geological formations. However, it is the diverse native plant communities thriving within these landscapes that are of particular interest to ANPE. These communities, shaped by the unique geologic history of the area, provide vital habitats for migrating bird species and other wildlife and water recharging opportunities for native brook trout and macroinvertebrates.

At ANPE, our mission is to support and advocate for the conservation of native plant species in the Arrowhead Region. We firmly believe that the protection of these native plant communities is essential for maintaining the ecological integrity and biodiversity of the region. The presence of state-listed special concern species such as the Canada buffaloberry (*Shepherdia canadensis*) within the proposed natural area underscores the importance of safeguarding these habitats.

Moreover, the designation of Lester – Amity – Hawk Ridge as a natural area aligns seamlessly with our commitment to environmental education and community engagement. By preserving these landscapes, we not only protect their inherent natural beauty but also provide opportunities to continue scientific research and public outreach initiatives.

We commend the efforts of all involved in championing the conservation of these invaluable landscapes and look forward to the positive impact of their inclusion in the City of Duluth's Natural Areas Program.

Sincerely,

KO Beaster

Kelly Beaster, President, Arrowhead Native Plant Explorers
218-590-4933, president@arrowheadnativeplants.org

Appendix B

Birds of Greatest Conservation Need - Counted and/or Banded at Hawk Ridge Nature Reserve
List adapted from Minnesota Ornithologists' Union list of Species at Risk
https://moumn.org/concern.html

Common Name	Scientific Name	State Status	Federal Status	Rationale for listing
Trumpeter Swan	*Cygnus buccinator*	Threatened		MN Threatened
American Black Duck	*Anas rubripes*			Continental population declining, MN population low (<1,000) based on 1991-93 Black Duck Survey.
Northern Pintail	*Anas acuta*			Continental population stable since 1985, but significant long-term decline dating to the 1950s; MN population low and declining since 1986.
Lesser Scaup	*Aythya affinis*			Continental population declining since 1985 and long-term (Lesser and Greater combined), MN population stable but survey poorly timed for breeding scaup.
Common Loon	*Gavia immer*			High priority in several Bird Conservation Regions of Waterbird plans
Horned Grebe	*Podiceps auritus*	Threatened		MN Threatened, Moderate concern in several Bird Conservation Regions (BCRs) of Waterbird Plans

Red-necked Grebe	*Podiceps grisegena*			High and medium priority in Waterbird Plans, uncommon, wetland habitat declining. Threatened in WI.
American White Pelican	*Pelecanus erythrorhynchos*	Special Concern		MN Special Concern
Bald Eagle	*Haliaeetus leucocephalus*	Special Concern	Threatened	Federally Threatened, MN Special Concern
Northern Harrier	*Circus cyaneus*			High Partners in Flight Priority (PIF 2) in several Bird Conservation Regions (BCRs)
American Goshawk	*Accipiter gentilis*			On USFS sensitive species list - vulnerable habitat (large patches of mature forest), may be regionally declining, tracked by MN DNR Heritage.
Red-shouldered Hawk	*Buteo lineatus*	Special Concern		MN Special Concern
Swainson's Hawk	*Buteo swainsoni*			Partners in Flight Continental Watchlist
Peregrine Falcon	*Falco peregrinus*	Threatened		MN Threatened
American Golden-Plover	*Pluvialis dominica*			High Priority (4) in the Prairie Pothole (BCR11) Shorebird Plan
Greater Yellowlegs	*Tringa melanoleuca*			High Priority (4) in several Bird Conservation Regions of Shorebird Plans

Upland Sandpiper	*Bartramia longicauda*			High Priority (4) in all Bird Conservation Regions of Shorebird Plans
Ruddy Turnstone	*Arenaria interpres*			High Priority (4) in the Prairie Pothole (BCR11) Shorebird Plan
Semipalmated Sandpiper	*Calidris pusilla*			High Priority (4) in the Prairie Pothole (BCR11) Shorebird Plan
White-rumped Sandpiper	*Calidris fuscicollis*			High Priority (4) in the Prairie Pothole (BCR11) Shorebird Plan
Dunlin	*Calidris alpina*			High Priority (4) in the Prairie Pothole (BCR11) Shorebird Plan
Buff-breasted Sandpiper	*Tryngites subruficollis*			High priority (4) in all Bird Conservation Regions of Shorebird Plans
Short-billed Dowitcher	*Limnodromus griseus*			High Priority (4) in several Bird Conservation Regions of Shorebird Plans
American Woodcock	*Scolopax minor*			High Priority (4) in all Bird Conservation Regions of Shorebird Plans
Franklin's Gull	*Larus pipixcan*	Special Concern		MN Special Concern
Common Name	**Scientific Name**	**State Status**	**Federal Status**	**Rationale for listing**
Common Tern	*Sterna hirundo*	Threatened		MN Threatened, High priority in all Bird Conservation Regions (BCRs) of Waterbird plans

Black-billed Cuckoo	*Coccyzus erythropthalmus*			Highest Partners in Flight Priority (PIF 1) in several Bird Conservation Regions (BCRs)
Short-eared Owl	*Asio flammeus*	Special Concern		MN Special Concern
Boreal Owl	*Aegolius funereus*			Meets several criteria - declining habitat, rare and declining in MN, not adequately surveyed by breeding bird survey, tracked by MN DNR heritage.
Common Nighthawk	*Chordeiles minor*			Not well monitored by breeding bird surveys. Declining populations, insectivore and aerial feeder - special resource needs.
Whip-poor-will	*Caprimulgus vociferus*			Not well monitored by breeding bird surveys. Declining populations, insectivore and aerial feeder - special resource needs. Id'd on USFWS reg. 3 concern list.
Red-headed Woodpecker	*Melanerpes erythrocephalus*			Partners in Flight Continental Watchlist
Yellow-bellied Sapsucker	*Sphyrapicus varius*			High Partners in Flight Priority (PIF 2A) in the Boreal Hardwood Transition plan (BCR12). Also significant regional declines in NRRI Forest Brid Monitoring.
Black-backed Woodpecker	*Picoides arcticus*			High Partners in Flight Priority (PIF 2C) in the Boreal Hardwood Transition plan (BCR12). Range more extensive in MN than N 3-toed woodpecker and also has high regional threats (habitat needs of large burned areas).

Olive-sided Flycatcher	*Contopus cooperi*			Partners in Flight Continental Watchlist
Eastern Wood-Pewee	*Contopus virens*			High Partners in Flight Priority (PIF 2A) in the Boreal Hardwood Transition plan (BCR12). Also shows one of the most significant declines in the NRRI forest bird monitoring.
Least Flycatcher	*Empidonax minimus*			High Partners in Flight Priority (PIF 2A) in the Boreal Hardwood Transition plan (BCR12)
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*			High Partners in Flight Priority (PIF 2) in several Bird Conservation Regions (BCRs)
Boreal Chickadee	*Poecile hudsonica*			Suggested addition by feedback team. Sharp continental population decline (PIF=5), threatened habitat.
Winter Wren	*Troglodytes troglodytes*			Highly significant population declines in NRRI Forest Bird Monitoring.
Sedge Wren	*Cistothorus platensis*			Highest Partners in Flight Priority (PIF 1) in several Bird Conservation Regions (BCRs)
Veery	*Catharus fuscescens*			Highest Partners in Flight Priority (PIF 1) in the Boreal Hardwood Transition plan (BCR12)
Wood Thrush	*Hylocichla mustelina*			Partners in Flight Continental Watchlist
Brown Thrasher	*Toxostoma rufum*			Highest Partners in Flight Priority (PIF 2A) in several Bird Conservation Regions (BCRs)

Golden-winged Warbler	*Vermivora chrysoptera*			Partners in Flight Continental Watchlist
Cape May Warbler	*Dendroica tigrina*			Highest Partners in Flight Priority (PIF 1) in the Boreal Hardwood Transition plan (BCR12)
Black-throated Blue Warbler	*Dendroica caerulescens*			Highest Partners in Flight Priority (PIF 1) in the Boreal Hardwood Transition plan (BCR12)
Bay-breasted Warbler	*Dendroica castanea*			Partners in Flight Continental Watchlist
Ovenbird	*Seiurus aurocapillus*			While does not meet PIF priority (2B), the NRRI Forest Bird monitoring shows highly significant regional declines. Also vulnerable habitat (forest interior).
Connecticut Warbler	*Oporornis agilis*			Highest Partners in Flight Priority (PIF 1) in the Boreal Hardwood Transition plan (BCR12)
Canada Warbler	*Wilsonia canadensis*			Partners in Flight Continental Watchlist
Le Conte's Sparrow	*Ammodramus leconteii*			Highest Partners in Flight Priority (PIF 1) in the Boreal Hardwood Transition plan (BCR12).
Swamp Sparrow	*Melospiza georgiana*			High Partners in Flight Priority (PIF 2A) in the Prairie Hardwood Transition plan (BCR 23). Partners in Flight shows rangewide declines and also a continental stewardship species.

White-throated Sparrow	*Zonotrichia albicollis*			Suggested addition. Highly significant regional population declines in NRRI Forest Bird Monitoring.
Rose-breasted Grosbeak	*Pheucticus ludovicianus*			High Partners in Flight Priority (PIF 2A) in the Boreal Hardwood Transition plan (BCR12) and also significant regional declines indicated in NRRI Forest Bird monitoring.
Dickcissel	*Spiza americana*			Partners in Flight Continental Watchlist
Bobolink	*Dolichonyx oryzivorus*			Highest Partners in Flight Priority (PIF 1) in several Bird Conservation Regions (BCRs)
Eastern Meadowlark	*Sturnella magna*			On USFWS Region 3 concern list. Suggested addition. Precipitous continental population decline, habitat inperiled.
Rusty Blackbird	*Euphagus carolinus*			Partners in Flight Continental Watchlist

Criteria for adding species to the set of Minnesota Species in Greatest Conservation Need:

a. Species identified on formal lists:

- species listed under the **Federal Endangered Species Act.**
- **Minnesota's List of Endangered, Threatened, or Special Concern** species
- **Partners in Flight (PIF) Continental Watch List** bird species that breed in Minnesota.
- **Partners in Flight (PIF) Landbird Regional Plans:** Tier 1, 2A, and 2C species in at least one of Physiographic areas 16, 20, 32, and 40 and breed in Minnesota. (PA32 covers only a small portion of Minnesota and species were individually reviewed to determine if they meet the SGCN definition for Minnesota).

• **Regional Shorebird Conservation Plans:** Species identified as Highly Imperiled (5) or High Concern (4) in at least one of bird conservation regions (BCR) 11, 12, 22, 23, and either breed or are significant migrants in Minnesota.

• **Minnesota Waterbird Conservation Plan:** species identified as high or moderate concern in at least one of bird conservation regions (BCR) 11, 12, 22, 23 and breed in Minnesota.

• **NRRI Breeding Bird Monitoring:** Bird species showing significant ($P \leq 0.05$) declines in all 4 sample areas (Superior, Chippewa, Chequamegon/Nicolet National Forests and the St. Croix Region of E. Central MN) as well as overall regionally, and are supported by corroborative information from other regional surveys (e.g. PIF regional or continental plans).

b. Species, other than those on the above lists, identified through an expert review process to meet the CWCS Species in Greatest Conservation Need definition.

For more information on the lists, please see the following websites:

-Federal Endangered Species Act: http://endangered.fws.gov/

-Minnesota Endangered, Threatened & Special Concern Species: http://www.dnr.state.mn.us/ets/index.html

-Partners in Flight Regional Landbird Plans: http://www.blm.gov/wildlife/pifplans.htm

-Waterbird Conservation Plan: http://www.waterbirdconservation.org/

-US Fish and Wildlife Service Region 3 Resource Conservation Priorities: http://midwest.fws.gov/Endangered/lists/concern.html

-U.S. Shorebird Conservation Plan: http://shorebirdplan.fws.gov/

-NRRI Breeding Bird Monitoring: HYPERLINK "http://www.nrri.umn.edu/mnbirds/default.htm" http://www.nrri.umn.edu/mnbirds/default.htm

Material adapted from: Minnesota Department of Natural Resources. 2006.


DULUTH NATURAL AREAS PROGRAM