Environmental Assessment Worksheet (EAW)

"Duluth Traverse" Mountain Bike Trail System

Prepared for
City of Duluth

January, 2013

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BARR

332 West Superior Street
Duluth, MN 55802
Phone: (218) 529-8200
Fax: (218) 529-8202

EAW for "Duluth Traverse" – Mountain Bike Trail System

January, 2013

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1.0 Environmental Assessment Worksheet

1.1 Executive Summary (Purpose and Need)

The Duluth Traverse is a planned sustainable multi-use natural-surface single-track trail system that will be constructed across the City of Duluth from Jay Cooke State Park to Lester Park. The Duluth Traverse will interconnect several existing trail systems and span the 25-mile length of Duluth with approximately 100 miles of trail in the system. The purpose of the Duluth Traverse trail, although designed and purpose built for mountain biking, will be multi-use and suitable for a variety of other human-powered trail uses such as trail running, hiking, snowshoeing, dog-walking, and bird watching. The Duluth traverse is being built as a partnership between the City of Duluth, Minnesota, and COGGS (Cyclists of the Gitchee Gumee Shores). The Duluth Traverse meets the recreation need to inter-connect trails and provide a multi-use network of trails as outlined in the City of Duluth's Comprehensive Land Use Plan.

1.2 Project Information

1.2.1 Project title

"Duluth Traverse - Phase 1" – Sustainable Multi-Use Natural Surface Mountain Bike Trail System, Duluth, Minnesota

1.2.2 Proposer

City of Duluth, Minnesota

Contact person:	Kathleen Bergen
Title:	Manager Parks and Recreation
Address:	411 West 1st Street – Ground Floor
City, state, ZIP:	Duluth, Minnesota 55802-1191
Phone:	(218) 730 - 4309
Fax:	none
E-mail :	kbergen@duluthmn.gov

1.2.3 RGU

City of Duluth, Minnesota

Contact person:	Keith Hamre
Title:	Director of Planning and Construction Services
Address:	411 West 1st Street – Room 208
City, state, ZIP:	Duluth, Minnesota 55802-1191
Phone:	(218) 730 - 5297
Fax:	(218) 723 - 3559
E-mail:	khamre@duluthmn.gov

1.2.4 Reason for EAW preparation

___EIS scoping _X_ Mandatory EAW ___Citizen petition ___ RGU discretion ___Proposer volunteered

If EAW or EIS is mandatory give EQB rule category subpart number and subpart name: Minn. Rules 4410.4300 Subp37A. Recreation Trails; EAW required per terms of Legacy Grant awarded to the City of Duluth to build the Duluth Traverse Phase 1.

1.2.5 Project location

County: St. Louis County City/Township: City of Duluth and Midway Twp.
Parcels crossed by the proposed Duluth Traverse Trail are shown in Table 1.

Table 1: 40 Acre Parcels Crossed by Proposed Trail

TWP	RGE	SEC	Parcels											
48	15	4	NENW											
48	15	5	SWSE	SWSW	NESE	NWSE	NESW	NWSW	SENW	SWNE	NENW	NWNE		
48	15	6	SESE											
48	15	6	NWSE											
48	15	6	NESE	SWNW	SENW	SWNE	SENE	NWNW	NENW	NWNE				
48	15	7	NENE											
49	14	6	NWNW	NWSW	NESW	SENW	SWNW							
49	15	1	SENE	NENE	NESE	SESW	NESW	NWSE	SENW	SWNE	NWNE			
49	15	12	SWNE	SESW	NWSW	NESW	SESE	SWNW	SWSE	SENW	NENW	NWSE	NESE	
49	15	13	SENW	NENW	SWNW	NWSW	NWNE							
49	15	14	SESE	SWSE	NESE									
49	15	23	SWSW	NWSW	NESW	SWNE	NWNE	SENW	NENW					
49	15	27	SWSW											
49	15	27	NESW											
49	15	27	NWSE											
49	15	27	SWNE											
49	15	27	NENE											
49	15	27	NWNW											
49	15	27	SESW											
49	15	27	SWSE											
49	15	27	SENE											
49	15	29	SESW											
49	15	31	SESW	NESW	NWSE	SWNE	SWSE	SESE	SENE	NESE	NENE			
49	15	31	SWSW											
49	15	31	NWSW											
49	15	32	SWSW	NWSW	NESW	SWNE	SESW	SWSE	NESE	SENW	NWNE	SWNW	SENE	NENW

TWP	RGE	SEC	Parcels (continued)											
49	15	33	SESW	SWSW	NWSW	NESW	NWSE	NESE	SWNW					
49	15	34	NWNW	NWSW	NESW	SWNW	SENW	NENW	NWNE					
50	13	5	NESE	NWNW	SENE	NENE								
50	13	6	NESW	GLOT 5	NENE	SWNE	SENE	SENW						
50	14	1	NWSW	SWNW	SENW	SWNE	SENE	SWSW						
50	14	2	SESW	SWSE										
50	14	10	SESE											
50	14	11	NWSW	NESW	SWSW	NWNE	NENE							
50	14	12	NWNW											
50	14	15	SWSW	NWSE	NESW	NWSW	SWNE	SENE	NENE					
50	14	16	NESE	SESE	SWSE									
50	14	21	SENE	NESE	SESE	NENE								
50	14	28	SESW	NE SW	SWNE									
50	14	31	SESE											
50	14	32	SWSW	SWNE	SENW	NWNE	NWSW	NESW	SENE	NENE				
51	13	32	NESE	NWNE	SESE	SWNE	NESW	SENW	SWSW	SESW	SENE	NENE		
51	13	33	NWSW	NESW	SWNW	NWNW								
50	14	28	NENE	SENE	NWSE									
50	14	27	NWNW	SWNW										
50	14	33	NENW	SENW	SWNW	NWNE	SWNE							
50	13	4	SWNW	NWSW										

1.2.6 Description

a. Provide a project summary of 50 words or less to be published in the *EQB Monitor.*

The City of Duluth in partnership with COGGS (Cyclists of the Gitchee Gumee Shores) is proposing to construct Phase 1 of the Duluth Traverse, a sustainable multi-use natural-surface single-track trail system purpose built for mountain biking but suitable for many human powered recreational users which will stretch across Duluth along the ridgeline.

b. Give a complete description of the proposed project and related new construction. Attach additional sheets as necessary. Emphasize construction, operation methods and features that will cause physical manipulation of the environment or will produce wastes. Include modifications to existing equipment or industrial processes and significant demolition, removal or remodeling of existing structures. Indicate the timing and duration of construction activities.

The Duluth Traverse is a planned sustainable multi-use natural surface single-track trail system that will eventually run from Jay Cooke State Park to Lester Park along the Duluth ridgeline (Figure 1). The Duluth Traverse will interconnect several existing trail systems and span the 25-mile length of Duluth with approximately 100 miles of trail in the system. The trail, although designed and purpose built for mountain biking, will be multi-use and suitable for a variety of other human-powered trail uses such as trail running, hiking, snowshoeing, dog-walking, and bird watching. Phase 1 construction will involve adding 3.64 miles of single track in Lester Park on the East side of the city (Figure 2), and approximately 13 miles of single track in the Mission Creek area, on the West side of the city

The Duluth traverse is being built through a partnership between the City of Duluth, Minnesota, and COGGS (Cyclists of the Gitchee Gumee Shores). COGGS is a 501(c)3 volunteer organization of bicycling enthusiasts founded in 1994 with the goal of improving and maintaining bicycling opportunities in and around Duluth, Minnesota. COGGS recently became a chapter of the International Mountain Bike Association (IMBA) and has over 350 members. Over the years, COGGS has partnered with the City of Duluth on several other smaller isolated trail projects at Piedmont trails, Hartley Park and Lester Park. These isolated trail centers will eventually be integrated into the Duluth Traverse trail system.

The proposed trail will be designed and built to International Mountain Bike Association (IMBA) sustainable trail guidelines to minimize maintenance and erosion problems. COGGS and the City of Duluth will hire consultants and contractors that build trail to the IMBA sustainable trail guidelines. Trails built to IMBA guidelines have been built at hundreds of locations throughout the United States as well as internationally. The trails built to these guidelines have proven themselves to be sustainable.

Examples of IMBA Sustainable Trailbuilding Guidelines to be implemented in the design and construction of this project:

- Avoid the Fall Line – Fall-line trails usually follow the shortest route down a hill – the same path that water flows. The problem with fall-line trails is that they focus water down their length. The speeding water strips the trail of soil; exposing roots, creating gullies and scarring the environment.
- Avoid Flat Areas – Trails that are not located on a slope have the potential for the trail to become a collection basin for water leading to chronically muddy conditions. The trail tread must always be slightly higher than the ground on at least one side of it so that water can drain properly.
- Slope the trail tread - Outslope encourages water to sheet across and off the trail, instead of funneling down the center. Reference Figures 1 and 2. Insloping the trail's tread to sump areas also keeps water from funneling down the center of the trail.
- Follow the Half Rule - The trail grade should not exceed half the grade of the hillside or sideslope that the trail traverses to prevent it from becoming a fall line trail.
- Maintain an average trail grade of 10% or less for the majority of the trails – An average grade of 10% or less is most sustainable to prevent erosion.
- Establish and don't exceed the Maximum Sustainable Trail Grades except for very short distance and

other special sustainable conditions (typically 15-25%).

- Implement Rolling Contour Trails with Grade Reversals – Grade reversals force water to exit the trail at the low point before it can gain more volume and momentum and erosive power. See Figure 3.

The Duluth Traverse trail system will be built for a variety of skill levels. The width of the Duluth Traverse trails will vary depending on the trail difficulty rating of a particular section of the trail and will also be influenced by the terrain that the trail is traversing. See Table 2- Duluth Traverse Trail Specifications. The backbone of the trail, called the Duluth Traverse Connector Trail, which connects all of the sections together and runs the length of Duluth, will be built as a flow trail and as close to beginner (Type 1) levels as the terrain allows. The Duluth Traverse Connector trail will be geared toward beginner/intermediate riders and the tread way typically will be constructed to 24-48" in width. More challenging trails will be available on other routes that branch off of the Duluth Traverse Connector Trail. Many other sections of the Duluth Traverse will typically have a tread way width of 18-36" wide (Type 2), depending on the sideslope of the surrounding terrain.

The trail corridor will be approximately 2 feet wider than the tread way on either side. The trail ceiling will be generally 7-9 feet high. A typical Duluth Traverse Connector Trail will have a 24" (2 foot) wide tread way with a 6-foot wide and 8-foot high trail corridor after construction. Over time the trail corridor will narrow as revegetation occurs. Trail maintenance may sometimes include trimming back foliage that encroaches too much into the trail corridor. See the illustrated trail corridor in Figure 3.

Table 2: Duluth Traverse Trail Specifications

	Type I	Type II	Type III
Active tread width	48"	36"	24"
Corridor width (4' above tread)	48"-72"	36"-72"	36"-48"
Corridor height	8'-12'	8'-12'	8'-12'
Unavoidable natural obstacles	≤ 2" tall	≤ 8" tall	≤ 18" tall
Avoidable natural obstacles	≤ 6" tall over less than 50% of tread	≤ 24" tall over less than 50% of tread	≤ 48" tall over less than 50% of tread
Trail features	Firm trail surface. May include rock surfaced section.	Majority of trail is a firm surface. May also include steps, stairs, rock gardens and exposed sections.	Unavoidable trail obstacles are expected.
Avg. trail grade	5% or less	10% or less	15% or less
Max. trail grade	10%	15%	25%
Min. trail grade	3%	3%	3%
Min. turn radius	10'	8'	6'
Max. turn pad grade	10%	15%	25%
	Note: all values are approximate		

The tread way will be built on the native mineral soils after removing the organic topsoil layer. Bench cutting will be used to cut the trail into a side-slope for sustainability purposes. For sustainability and skills development purposes, certain sections will have short runs of boardwalk, bridges and other features made of wood, as well as berms and other features made from native soils and native rocks. The trail will be

predominately built on forested slopes but there will be occasional stretches of trail built on exposed rock and open areas.

The trail will be designed by professional trail builders trained in sustainable trail building guidelines and built with a mixture of professional and volunteer labor using sustainable trail building techniques. The trail will be built using both mechanized and hand labor. Mechanized trail work will be done with small equipment such as mini-excavators, mini-skid steers, powered wheelbarrows and brush mowers. Such equipment is intended for landscaping work and typically does not exceed 48" in width. Aside from the lighter weight machines such as a brush mower, only tracked machines will be preferred because of the lower PSI exerted on the ground. Handwork will be done with powered and unpowered hand tools such as chainsaws, brush cutters, Pulaskis, McLeods, Mattocks, shovels, and picks.

The Duluth Traverse is a multi-year project and estimated to take 5-7 years to complete. Trail construction season generally runs from around May 1st, after the frost comes out of the ground and the ground dries up, until mid-November when the ground freezes up. Phase 1, planned to take place during the 2013 trail construction season, is anticipated to add approximately 17 miles of new trail. Phase 1 will involve adding 3.64 miles of single track in Lester Park on the East side of the city (Figure 4), and approximately 13 miles of single track in the Mission Creek area on the West side of the city (Figure 5) that was planned by IMBA consultants during the summer of 2012.

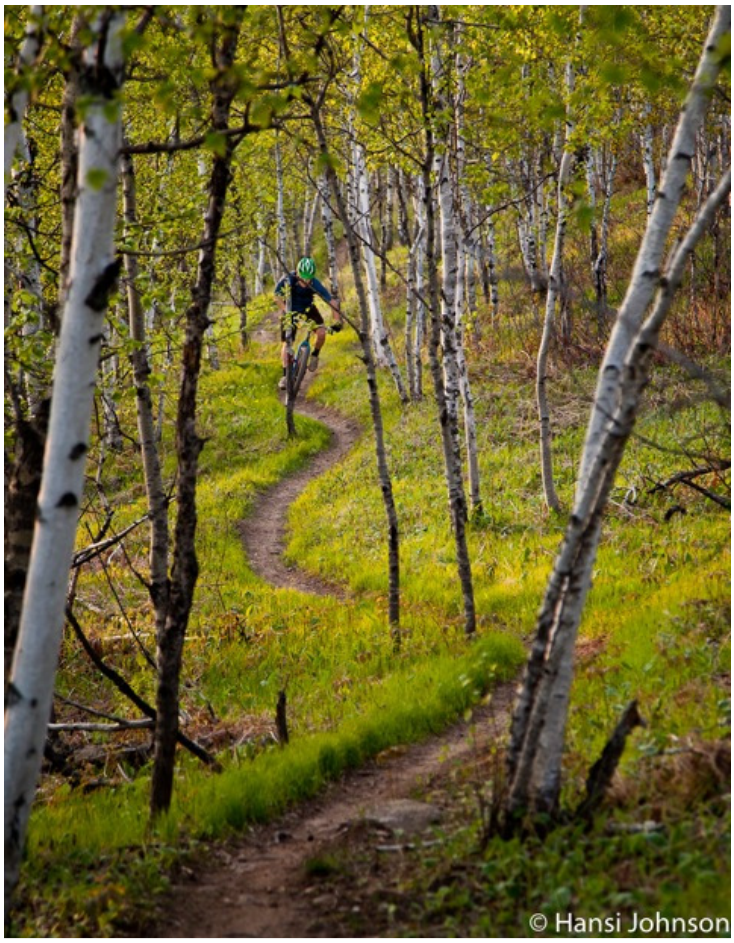
The trail will typically be built on side slopes and will avoid wetlands and low-lying areas. No wetlands will be drained or filled as a result of the proposed trail construction. Wetlands will be crossed by small treated lumber or other rot resistant natural wood boardwalks (Figure 6). The Duluth Traverse will cross nearly all of the Duluth streams and rivers as it crosses the city. The Duluth Traverse will normally cross these streams on small treated lumber or other rot resistant natural wood boardwalks or bridges (Figure 7). Large stream and river crossing will be made using already established bridges. Phase 1 of the proposed trail will use existing bridge crossings except for one intermittent stream crossing. Trail design and construction will follow IMBA trail building guidelines for sustainability. Erosion and sediment control will be a high priority through this entire build.

Excavation will consist of full bench cutting into side-slopes for sustainability. The removed topsoil will temporarily stockpiled for reuse on the backside of berms. Sometimes these soils may be collected and moved short distances along the trail to prevent soil eroding into waterways or wetlands, to make berms for turns and other trail features following IMBA guidelines for sustainable trail construction. Some boulders may also be moved and rearranged to improve the trail experience or to armor in sections where concentrated flows may occur along the trail treadway. No boulders will be moved or placed in wetlands or waterways. There is no anticipated need to have additional fill materials brought into the trail construction site from other locations.

Small trees and brush may either need to be cut down or be trimmed back. Large trees may need to have some branches pruned but normally won't be cut down except in special circumstances. The proposed trail will be routed around larger trees and only brush and trees of a sapling size or smaller will need to be cut down. Woody debris will be lopped into short pieces and scattered in upland locations. There should be no appreciable effect on the forest canopy due to the amount and size of vegetation removed for the narrow trail.

After construction, the physical disturbance of the natural environment will generally be confined to the tread way that will typically be 18-36" wide and wind through the forested lands that the trail will be built on. See pictures on the next page. After construction, the disturbance to wildlife will be the passing of trail user along the trail. The trail traffic will normally be during daylight hours but there will be some nighttime trail usage, especially in the fall and winter evenings trail users will generally utilize headlamps to traverse the trail in the darkness.

The trail or sections of the trail will be temporarily closed when trail conditions are too wet to avoid damage to the treadway and avoid future erosion or migration of soil material.



Typical Final Stabilized Trail Surface

Example of a Typical Trail Treadway Splitting into Two Segments

c. Explain the project purpose; if the project will be carried out by a governmental unit, explain the need for the project and identify its beneficiaries.

The purpose of the Duluth Traverse is to provide recreational opportunities for Duluth citizens and visitors to Duluth from throughout the region. A secondary purpose of the Duluth Traverse is to connect existing trails systems, parks and green space into one nearly continuous greenway, which will make it significantly more attractive to tourists looking for multi-day recreational experiences on high quality trails, and provide for public access though the public lands.

The Duluth Traverse trail system, though purpose built for mountain biking, will be suitable for many human powered recreational users such as trail running, hiking, dog-walking, nature watching and snowshoeing. All of these are lifetime sports, so people of all ages will be able to enjoy using the Duluth Traverse contributing to a healthy and life-long active lifestyle.

The proposed trail system will make it easy for users to enjoy Duluth's beautiful park system and natural environment. The trail system will be a regional draw, and when completed, will be the longest urban mountain bike trail system in the country.

d. Are future stages of this development including development on any other property planned or likely to happen? _X_Yes __No
If yes, briefly describe future stages, relationship to present project, timeline and plans for environmental review.

The proposed project is expected to take 5-7 years to complete and different phases will be built during each trail construction season, depending on available funding. Each successive phase will be generally very similar to previous phases at least in regards to the EAW, since the trail character, design, and construction will remain largely unchanged. Additional environmental reviews and permits will be completed as necessary per federal, state, and local requirements and per the terms of the Legacy grants that are a significant source of the funding for this project. Current plans are to use existing parking facilities and trailheads to accommodate trail users. It may be determined at a future data that additional parking or infrastructure will be necessary to accommodate higher than expected usage, but no plans or facility locations have been identified. If any future development will occur in association with the Duluth Traverse, the need for environmental review will be determined at such a time as those plans are developed.

e. Is this project a subsequent stage of an earlier project? ___Yes _X_No
If yes, briefly describe the past development, timeline and any past environmental review.

1.2.7 Project magnitude data

Total project acreage: The total project acreage of 35.33 acres is based on 58.3 miles of new trail to be built with an average 60" wide cleared trail corridor. Average bike trail tread will built to 18-36" wide.

Phase 1: is 10.3 linear acres based on a 60" wide cleared trail corridor that is approximately 17 miles long, based on available funding
Number of residential units: unattached: 0 attached: 0 maximum units per building
Commercial, industrial or institutional building area (gross floor space): total square feet

Indicate areas of specific uses (in square feet): Not Applicable

Office	Manufacturing
Retail	Other industrial
Warehouse	Institutional
Light industrial	Agricultural
Other commercial (specify)	

Building height if over 2 stories, compare to heights of nearby buildings

1.2.8 Permits and approvals required

List all known local, state and federal permits, approvals and financial assistance for the project. Include

modifications of any existing permits, governmental review of plans and all direct and indirect forms of public financial assistance including bond guarantees, Tax Increment Financing and infrastructure. *All of these final decisions are prohibited until all appropriate environmental review has been completed. See Minnesota Rules, Chapter 4410.3100.*

Unit of government	Type of application	Status
MN Pollution Control Agency	Stormwater Permit	to be submitted
MN Department of Transportation	Right of Way Permit	to be submitted
Minnesota DNR Legacy Grant	Awarded DT Phase 1 $250K	Awarded 2012
City of Duluth – City Council Resolution	accepting Legacy Grant	Passed 1/30/12
City of Duluth Public Land Administrator	Permit	In-Process
St. Louis County Public Land Administrator	Permit	In-Process
City of Duluth – Parks Department	Budgeted $100K for Phase 1	Approved
City of Duluth Planning	EAW	In-Process
City of Duluth Planning	Special Use Permit	In-Process
City of Duluth Planning	MS4 Permit	In-Process
Midway Township Special Use Permit	Special Use Permit	Applied
MN Natural Heritage Review	Application	In-Process
MN State Historical Preservation Office (SHPO)	Application	In-Process
State of Minnesota DNR	Water	Phase 1 to be submitted
State of Minnesota DNR	EAS Application	In-Process
City of Duluth – COGGS Partnership Agreement	Memorandum of Understanding	In-Process

1.2.9 Land use

Describe current and recent past land use and development on the site and on adjacent lands. Discuss project compatibility with adjacent and nearby land uses. Indicate whether any potential conflicts involve environmental matters. Identify any potential environmental hazards due to past site uses, such as soil contamination or abandoned storage tanks, or proximity to nearby hazardous liquid or gas pipelines.

The Duluth Traverse is being constructed on undeveloped park land or forest where the primary use has been for recreational purposes and green space. In some portions of the project, the Duluth Traverse will pass close to or intersect other recreational trail systems such as cross-country ski trails, snowmobile trails, and the Superior Hiking Trail. No environmental hazards due to past site uses or proximity to gas pipelines have been identified. No significant issues are anticipated with the Duluth Traverse project and adjacent and nearby land uses and other recreational trail systems.

1.2.10 Cover types

Estimate the acreage of the site with each of the following cover types before and after development:

	Before	**After**		**Before**	**After**
Types 1-8 wetlands			Lawn/landscaping		
Wooded/forest			Impervious surfaces		
Brush/Grassland	35.33	0	Stormwater Pond		
Cropland			Other (Trails)	0	35.33
TOTAL					

If **Before** and **After** totals are not equal, explain why:

Approximately 35.33 acres of area will be temporarily disturbed for construction of a mountain bike/multi-use trails as part of this project. The trails would be constructed according to the IMBA trail building guidelines. The 35.33 acres of permanent brush cover type conversion represent primarily the clearing of understory

vegetation to an approximately 60" wide trail corridor with an 8 foot ceiling. Specimen overstory trees will be maintained. The actual trail treadway would be typically 18-36" wide but an approximately 60" wide trail corridor with an 8 foot high ceiling would be cleared of brush and small saplings for trail construction.

1.2.11 Fish, wildlife, and ecologically-sensitive resources

a. Identify fish and wildlife resources and habitats on or near the site and describe how they would be affected by the project. Describe any measures to be taken to minimize or avoid impacts.

The proposed trail is being constructed to minimize the overall disturbance and avoid impacts to ecologically sensitive areas. The lands surrounding the Duluth Traverse are primarily wooded forestland and provide habitat for a variety of wildlife composed of mammals, reptiles and birds. Typical mammals found in the area are black bear, deer, porcupine, rabbits, skunks, raccoons, mice, bats, an occasional wolf and transient mountain lions and moose. Reptiles and amphibians, such as the common garter snake and toads, can be found in the forests in and surrounding Duluth. Varieties of birds both live and nest in the area and transiently move through the area.

The Duluth Traverse's narrow footprint and the fact that it is spread out over a large area is not expected to have a significant adverse effect on wildlife. The Duluth Traverse is being built with sustainability in mind to the IMBA trail building guidelines. Normally, only brush and small trees of sapling size will be cut down to open the trail corridor. Since larger trees aren't being cut down there is no anticipated effect to the forest canopy. Additional effects to ecologically sensitive resources have been avoided by referencing Minnesota County Biological Survey (MCBS) ecological subsection maps and sensitive plant community locations and geologic features when planning the corridor for the Duluth Traverse. The trail is routed to avoid and minimize impacts to sensitive resources, such as at Mission Creek. Construction effects to nesting and migrating birds will be reduced by adjusting the construction schedule to avoid potentially negative effects, such as construction noise on nest site selection or resting/foraging during migration, and to avoid known critical habitat areas during these important time windows. This will be particularly important crossing Hawk Ridge.

b. Are any state-listed (endangered, threatened or special concern) species, rare plant communities or other sensitive ecological resources on or near the site? __Yes _ X _No
If yes, describe the resource and how it would be affected by the project. Describe any measures that will be taken to minimize or avoid adverse impacts. Provide the license agreement number (LA-585) and/or Division of Ecological Resources contact number (ERDB _____) from which the data were obtained and attach the response letter from the DNR Division of Ecological Resources. Indicate if any additional survey work has been conducted within the site and describe the results.

A review of the MNDNR Natural Heritage Information System database identified only two species Botrychium lanceolatum (triangle moonwort), threatened and Listera auriculata (auricled twayblade), endangered) which are located within the threshold range of one of the proposed future phases of the Duluth Traverse trail segments (Figure 8). A follow up field survey was conducted on June 2, 2012 and neither target species was found in the search along the proposed trail segment. A report of the search, field methods and results is attached to this document in Appendix A. No endangered or threatened species were identified in the proposed Phase 1 construction segments.

Other species of concern were identified in the vicinity of the proposed trail segments during the review of the database. One of these is eastern hemlock, which is currently listed as a species of concern (SC) but is proposed to be listed as endangered (E) in 2013. The presence of eastern hemlock (Tsuga canadensis) was identified in the DNR database near a couple trail segments of the proposed trail. However, Phase 1 construction of the proposed trail will not affect the identified location of this species. Future trail construction is dependent upon available funding. The City of Duluth will coordinate with the DNR prior to working on the segments where eastern hemlock has been identified in order to ensure adequate protection of this species.

1.2.12 Physical impacts on water resources

Will the project involve the physical or hydrologic alteration — dredging, filling, stream diversion, outfall structure, diking, and impoundment — of any surface waters such as a lake, pond, wetland, stream or drainage

ditch? __Yes _X_No
If yes, identify water resource affected and give the DNR Public Waters Inventory number(s) if the water resources affected are on the PWI: Describe alternatives considered and proposed mitigation measures to minimize impacts.

The proposed project will cross streams using existing bridges where available. New proposed stream crossings will use narrow timber bridges approximately 2' wide and will provide 3' of freeboard over any navigable streams. Wetlands will be crossed by elevated boardwalks approximately 2' wide to span the wetland on piers. No excavation or fill is proposed to construct these structures over streams or wetlands. Cleared brush will be lopped and scattered in upland locations. The proposed crossings will not involve the hydrologic alteration of streams or wetlands, nor will it adversely affect the wetland functions.

1.2.13 Water use

Will the project involve installation or abandonment of any water wells, connection to or changes in any public water supply or appropriation of any ground or surface water (including dewatering)? __Yes _X_No
If yes, as applicable, give location and purpose of any new wells; public supply affected, changes to be made, and water quantities to be used; the source, duration, quantity and purpose of any appropriations; and unique well numbers and DNR appropriation permit numbers, if known. Identify any existing and new wells on the site map. If there are no wells known on site, explain methodology used to determine.

1.2.14 Water-related land use management district

Does any part of the project involve a shoreland zoning district, a delineated 100-year flood plain, or a state or federally designated wild or scenic river land use district? _ X _Yes __No If yes, identify the district and discuss project compatibility with district land use restrictions.

The proposed trail will cross many streams across the City of Duluth and consequently the trail will be located within the respective shoreland areas of these streams. The City's shoreland ordinance provides the establishment of trails less than 10' wide as a permitted use. The proposed 18-36" trail tread is not expected to present significant adverse impacts to the shoreland zone. In order to construct the trail, cutting of vegetation will be minimized to the extent practicable. Where possible, existing bridges will be used to cross streams and minimize shoreland and floodplain impacts. At the same time, the proposed trail will require the need to construct new structures to cross streams. Figures 9 and 10 show the locations of proposed trail in relation to shoreland and floodplain areas for Phase 1 construction.

1.2.15 Water surface use

Will the project change the number or type of watercraft on any water body? __Yes _X_No
If yes, indicate the current and projected watercraft usage and discuss any potential overcrowding or conflicts with other uses.

1.2.16 Erosion and sedimentation

Give the acreage to be graded or excavated and the cubic yards of soil to be moved: acres 21.2 (Phase 1: 6.2); cubic yards 15,392 (Phase 1: 4,479). Describe any steep slopes or highly erodible soils and identify them on the site map. Describe any erosion and sedimentation control measures to be used during and after project construction.

Note: acreage to be graded and excavated and cubic yards of soil to be moved are estimates based on assumptions like the average width of the treadway is 36" and the average grade will be 30%.

The trail will be designed and constructed to sustainable trail guidelines published by the IMBA Trail Solutions. Steep slope and highly erodible soils will be avoided, routed around, or built at such a shallow pitch that erosion would not be an appreciable issue. The purpose of the sustainable trail design and construction is to minimize any erosion issues and minimize the maintenance requirements of the trail. In the event that an erosion problem develops, corrective action will be taken to eliminate the problem and then maintenance will be performed to restore the condition of the trail. Trail segment closure and rerouting of the trail may be considered as a

solution, should a chronic erosion problem arise. Erosion and sediment control best management practices (BMP's), such as grass berms vegetation buffers, mulch or erosion blanket, silt fence, or biologs will be considered and used as appropriate during construction.

1.2.17 Water quality: surface water runoff

a. Compare the quantity and quality of site runoff before and after the project. Describe permanent controls to manage or treat runoff. Describe any stormwater pollution prevention plans.

The trail surface will be a porous surface, not totally impervious, allowing some water to penetrate. The tread way will be packed down from usage and won't accept water as readily as the downslope. In most cases, the trail tread way will have a slight outslope to shed water off the trail and grade reversals will be built into the trail periodically to shed any water that runs down the tread way off into a vegetated buffer before it generates enough volume and velocity to erode the trail. These gentle grade undulations called grade reversals and the outward slope of the tread way will minimize tread erosion by allowing water to gently drain off in a non-erosive manner called sheet flow. There should be no significant increase in surface water runoff due to the trail because runoff from the trail will be filtered by adjacent undisturbed vegetation between the trail and water bodies. This will result in on site infiltration and filtration before the water reaches any nearby water bodies. A Stormwater Pollution Prevention Plan (SWPPP) will be developed for the trail and will be followed during its construction.

b. Identify routes and receiving water bodies for runoff from the site; include major downstream water bodies as well as the immediate receiving waters. Estimate impact runoff on the quality of receiving waters.

Water shed by the trail will continue onto the same drainage it would have before the trail existed. The majority of the water will run off the downslope edge of the trail to an existing vegetated buffer. In some cases the water may follow the trail down grade for a very short distance but then will be dumped off the downslope edge of the trail at the next grade reversal. There should be no significant displacement of surface water runoff and no impact on the quality of receiving waters. No significant adverse effect is expected on downstream water quality.

1.2.18 Water quality: wastewaters

a. Describe sources, composition and quantities of all sanitary, municipal and industrial wastewater produced or treated at the site.

No wastewaters are expected to be produced by the proposed trail use on a long term basis. No waste will be treated on site. Portable toilets would be utilized during construction as appropriate and the resulting wastewater would be brought to Western Lakes Sanitary Sewer District (WLSSD) for processing by the provider. Any resulting wastewater is not expected to cause a significant increase to the daily WLSSD operations.

b. Describe waste treatment methods or pollution prevention efforts and give estimates of composition after treatment. Identify receiving waters, including major downstream water bodies (identifying any impaired waters), and estimate the discharge impact on the quality of receiving waters. If the project involves on-site sewage systems, discuss the suitability of site conditions for such systems.

Not Applicable – No treatment facilities are proposed for the Duluth Traverse.

c. If wastes will be discharged into a publicly owned treatment facility, identify the facility, describe any pretreatment provisions and discuss the facility's ability to handle the volume and composition of wastes, identifying any improvements necessary.

See item "a" above.

d. If the project requires disposal of liquid animal manure, describe disposal technique and location and discuss capacity to handle the volume and composition of manure. Identify any improvements necessary. Describe any required setbacks for land disposal systems.

Not Applicable – No land disposal will occur as a result of the Duluth Traverse.

1.2.19 Geologic hazards and soil conditions

a. Approximate depth (in feet) to ground water: 0 feet minimum / Varies average;
to bedrock: 0 feet minimum Varies average / Varies maximum
Describe any of the following geologic site hazards to ground water and also identify them on the site map: sinkholes, shallow limestone formations or karst conditions. Describe measures to avoid or minimize environmental problems due to any of these hazards.

No geologic hazards, such as those found in a region with karst topography in southern Minnesota have been identified in this area. The depth of ground water and bedrock varies throughout the length of the trail due to the nature and depth of glacial till. Bedrock is exposed on parts of the proposed trail surface in many sections and in other areas it may be buried deep under the soil. In some areas, ground water may be present near the surface, and in other areas it may be deep underground. Seeps and wet soils were identified in laying out the proposed Phase 1 trail segments and will be avoided where possible or will be crossed with boardwalks.

b. Describe the soils on the site, giving NRCS (SCS) classifications, if known. Discuss soil texture and potential for groundwater contamination from wastes or chemicals spread or spilled onto the soils. Discuss any mitigation measures to prevent such contamination.

Soils encountered will be predominantly clay soils and bedrock with an organic topsoil layer. Groundwater contamination potential will be low due to the low volumes of chemicals (gas, oil, etc.) to be used during construction and operation of the Trail.

1.2.20 Solid wastes, hazardous wastes, storage tanks

a. Describe types, amounts and compositions of solid or hazardous wastes, including solid animal manure, sludge and ash, produced during construction and operation. Identify method and location of disposal. For projects generating municipal solid waste, indicate if there is a source separation plan; describe how the project will be modified for recycling. If hazardous waste is generated, indicate if there is a hazardous waste minimization plan and routine hazardous waste reduction assessments.

All solid waste generated during construction and maintenance will be carried out and will be properly disposed by the trail construction crews. The proposed construction is not anticipated to generate any hazardous waste. The project will not require any new storage tanks.

b. Identify any toxic or hazardous materials to be used or present at the site and identify measures to be used to prevent them from contaminating groundwater. If the use of toxic or hazardous materials will lead to a regulated waste, discharge or emission, discuss any alternatives considered to minimize or eliminate the waste, discharge or emission.

The only potential for groundwater contamination from this project would be accidental spills of fuel used for motorized tools used for construction and maintenance. Only very small capacity fuel containers (<10 gallons) would be carried to construction and maintenance sites. Refueling will be performed at least 100 feet from streams or wetland areas to minimize the impact of any fuel spill during refueling. Equipment operators will be required to perform daily checks on all equipment that holds fluids to verify that fluids aren't being lost to leaks. All spills will be immediately cleaned up and any resulting waste will be properly disposed.

c. Indicate the number, location, size and use of any above or belowground tanks to store petroleum products or other materials, except water. Describe any emergency response containment plans.

Not Applicable - No aboveground or belowground tanks are proposed by this project.

1.2.21 Traffic

Parking spaces added: None.

Existing spaces (if project involves expansion): Not applicable
Estimated total average daily traffic generated: Estimated at 50 visits/day per trailhead.
Estimated maximum peak hour traffic generated and time of occurrence: Estimated at 10 visits/hour per trailhead on a Saturday afternoon.
Indicate source of trip generation rates used in the estimates.
If the peak hour traffic generated exceeds 250 vehicles or the total daily trips exceeds 2,500, a traffic impact study must be prepared as part of the EAW. Using the format and procedures described in the Minnesota Department of Transportation's Traffic Impact Study Guidance *(available at: http://www.oim.dot.state.mn.us/access/pdfs/Chapter%205.pdf)* or a similar local guidance, provide an estimate of the impact on traffic congestion on affected roads and describe any traffic improvements necessary. The analysis must discuss the project's impact on the regional transportation system.

The proposed trail system will not have a significant impact on the regional transportation system. At this time the Duluth Traverse will utilize existing parking and trail head facilities. A very small increase in automobile traffic is anticipated over current levels in order for people to access the trails. Many users will commute to and from the trail by bicycle. This will be especially true for the Lester trails portion in Phase 1. The Mission Creek trails will be more likely to be accessed via automobile, although trail users from the western part of the City may ride to the trailheads.

1.2.22 Vehicle-related air emissions

Estimate the effect of the project's traffic generation on air quality, including carbon monoxide levels. Discuss the effect of traffic improvements or other mitigation measures on air quality impacts.

The proposed Duluth Traverse is not expected to cause traffic congestion, which would otherwise artificially increase air emissions. A very small increase in vehicle-related air emissions may be expected as a result of increased visitation by trail users of the trails. Therefore, the Duluth Traverse is not expected to cause any significant decrease in air quality.

1.2.23 Stationary source air emissions

Describe the type, sources, quantities and compositions of any emissions from stationary sources of air emissions such as boilers, exhaust stacks or fugitive dust sources. Include any hazardous air pollutants (consult *EAW Guidelines* for a listing) and any greenhouse gases (such as carbon dioxide, methane, nitrous oxide) and ozone-depleting chemicals (chloro-fluorocarbons, hydrofluorocarbons, perfluorocarbons or sulfur hexafluoride). Also describe any proposed pollution prevention techniques and proposed air pollution control devices. Describe the impacts on air quality.

Not Applicable – No stationary sources of air emissions are part of this proposed project.

1.2.24 Odors, noise and dust

Will the project generate odors, noise or dust during construction or during operation? _X_Yes __No
If yes, describe sources, characteristics, duration, quantities or intensity and any proposed measures to mitigate adverse impacts. Also identify locations of nearby sensitive receptors and estimate impacts on them. Discuss potential impacts on human health or quality of life. (Note: fugitive dust generated by operations may be discussed at item 23 instead of here.)

In addition to hand tools, some of the trail construction will be performed using small diesel or gasoline powered mechanized equipment such as mini-excavators, mini-skid steers, powered wheelbarrows, chainsaws and brush-cutters. These tools will emit some exhaust fumes and noise when being operated. The proposed trail construction will cause minimal noise, odors and dust during daylight hours. The construction is not expected to generate significant noise levels or violate daytime and nighttime noise standards. There are no known sensitive receptors nearby the trail corridor.

Wind-blown dust will be controlled with watering. Due to the nature of the trail construction practices and maintenance, these impacts will be temporary and of limited intensity. Maintenance of the trail will be primarily performed with zero emission hand tools.

1.2.25 Nearby resources

Are any of the following resources on or in proximity to the site?

Archaeological, historical or architectural resources?	_X_Yes	__No
Prime or unique farmlands or land within an agricultural preserve?	__Yes	_X_No
Designated parks, recreation areas or trails?	_X_Yes	__No
Scenic views and vistas?	_X_Yes	__No
Other unique resources?	__Yes	_X_No

If yes, describe the resource and identify any project-related impacts on the resource. Describe any measures to minimize or avoid adverse impacts.

A Phase 1A review of the proposed Duluth Traverse by the Duluth Archaeology Center identified 21 areas of potential for archeological sites. Subsequently, a Phase 1 field survey was performed to evaluate these potential sites. The field survey identified five areas of concern and the proposed trail was rerouted to avoid impacting these sites. The Technical Report along with a request for a finding of no effect was forwarded to the State Historical Preservation Officer (SHPO). A copy of the SHPO letter is expected shortly.

The proposed trail will be built primarily in parks, recreational areas and greenspace. It will be a significant feature of each park and recreation area. The trail system will sometimes be in close proximity to or intersecting other recreational trail systems such as ski trails, the Superior Hiking Trail and snowmobile trails. In some instances, they may share the same tread way for short distances due to narrow corridors for trails or for sustainability purposes. Trail intersections will be minimized and signed appropriately to warn trail users about intersections to avoid potential conflicts between different users. The Duluth Traverse will take advantage of scenic views and vistas where possible so that trail users can enjoy the overlooks.

1.2.26 Visual impacts

Will the project create adverse visual impacts during construction or operation? Such as glare from intense lights, lights visible in wilderness areas and large visible plumes from cooling towers or exhaust stacks? __Yes _X_No

If yes, explain.

1.2.27 Compatibility with plans and land use regulations

Is the project subject to an adopted local comprehensive plan, land use plan or regulation, or other applicable land use, water, or resource management plan of a local, regional, state or federal agency? _X_Yes __No.

If yes, describe the plan, discuss its compatibility with the project and explain how any conflicts will be resolved. If no, explain.

There are three local plans that cover the lands that the Duluth Traverse will be built on. The three plans are the 2006 Duluth Comprehensive Land Use Plan, the 2010 Duluth Parks and Recreation Master Plan, and the 2011 Trails and Bikeways Master Plan. All three plans support the Duluth Traverse and include elements of the Duluth Traverse in each plan. All three plans were approved by the Duluth City Council.

The 2006 City of Duluth Comprehensive Land Use Plan discusses a conceptual multi-use trail network that stretches across the city from Jay Cooke State Park and past Lester Park along the ridgeline. This is the predecessor to the Duluth Traverse. On page 53 of the plan, it recognized the importance of green space and connectivity with the following statement: “Open space, natural areas, and recreational areas are more valuable if interconnected. The City will strive to connect its green space and recreational areas through natural corridors on public or private land, trail systems and creation of boulevard corridors on public right-of-ways.”

The 2010 City of Duluth Parks and Recreation Master Plan lists the Traverse trail, a multi-use mountain bike trail traversing the ridge top of the city from Lester Park to Mission Creek, as a priority action project the responsibility of Parks and Recreation, Park Maintenance, and COGGS. It specifies that it is to be included in the citywide trail and bikeway plan.

- Strategy 17a from the plan says to “Create an interconnected multi-use trail system with off road paved trails, an on-street bikeway network, and an interconnected hiking/walking trail network. Utilize the

trail and pedestrian policies and implementation items of the 2006 Comprehensive Plan. Have all trails be multi-use if the terrain supports it, except for the Superior Hiking Trail, which was purposefully built for hiking."

- Strategy 17m says to "Work with COGGS on plans for the Grant Traverse Trail and a potential mountain bike park at Arlington Park. The trail concept is also illustrated in the Trails and Connectivity – System Vision map (Page 71).

The Duluth Traverse route was included in Trail Vision Plan in the 2011 City of Duluth Trail and Bikeway plan (on page 40). The Duluth Traverse was listed as 1 of 6 across city trail systems and was described in detail on pages 38 and 39 of the plan. Implementation Priority G was to "Construct the first phases of the Duluth Traverse trail as land and funding are available."

1.2.28 Impact on infrastructure and public services

Will new or expanded utilities, roads, other infrastructure or public services be required to serve the project?
__Yes _X_No.
If yes, describe the new or additional infrastructure or services needed. (Note: any infrastructure that is a connected action with respect to the project must be assessed in the EAW; see *EAW Guidelines* for details.)

1.2.29 Cumulative potential effects

Minnesota Rule part 4410.1700, subpart 7, item B requires that the RGU consider the "cumulative potential effects of related or anticipated future projects" when determining the need for an environmental impact statement.
Identify any past, present or reasonably foreseeable future projects that may interact with the project described in this EAW in such a way as to cause cumulative potential effects. (Such future projects would be those that are actually planned or for which a basis of expectation has been laid.)
Describe the nature of the cumulative potential effects and summarize any other available information relevant to determining whether there is potential for significant environmental effects due to these cumulative effects *(or discuss each cumulative potential effect under appropriate item(s) elsewhere on this form).*

Some areas of the Duluth Traverse trail system will be in close proximity to other recreational trails such as the Superior Hiking Trail, cross-country ski trails and snowmobile trails. Another future proposed trail being considered is the Lowell to Lakewalk trail which will link the top of the hill in Duluth to the Lakewalk trail near the center of the City. In a few instances, the trails will share the same tread way for short distances in areas that have a narrow corridor for trails or for sustainability purposes. There are no known plans at this time to expand or significantly alter these trail systems. Given the narrow corridors and footprint, all of these trails are not expected to present significant cumulative adverse effects to the environment.

1.2.30 Other potential environmental impacts

If the project may cause any adverse environmental impacts not addressed by items 1 to 28, identify and discuss them here, along with any proposed mitigation.

No other additional environmental impacts were identified.

2.1. Summary of issues

List any impacts and issues identified above that may require further investigation before the project is begun. Discuss any alternatives or mitigative measures that have been or may be considered for these impacts and issues, including those that have been or may be ordered as permit conditions.

The proposed trail has been designed according to International Mountain Bicycle Association's (IMBA) published guidelines on sustainable trail construction to avoid and minimize impacts to environmental resources awhile minimizing the need for maintenance. Impacts are summarized in Table 2 below.

Table 3: Summary of Issues

Project Magnitude	Approximately 58.3 miles (35.33 acres) of new trail to be built 17 miles (10.3 acres) in Phase 1
Fish, Wildlife, Sensitive Resources	Minimal impact on fish and wildlife, impacts to threatened and endangered species avoided
Water Resources Physical Impacts	Minimized by avoiding wetlands where feasible, using elevated boardwalks for unavoidable crossings; using existing bridges to minimize number of new crossings of streams
Water Use	Limited use of water for dust control as needed
Shoreland Areas	Project will be constructed in shoreland areas with permits and as a permitted use
Watercraft Use	None
Erosion and Sedimentation	21.2 acres of disturbance (Approximately 6.2 acres in Phase 1)
Water Quality, Wastewaters	No treatment facilities, portable toilets used during construction
Geologic Hazards	Bedrock is a natural feature used in the trail, wet and soft soils are avoided to the extent practicable
Solid Waste, Hazardous Waste, Storage Tanks	Solid Waste to be properly managed; No hazardous waste generated; No storage tanks to be used
Traffic	No parking spaces added; little traffic congestion anticipated; no significant increase in vehicular traffic
Vehicle Related Air Emissions	No significant increase anticipated in air emissions
Stationary Source Air Emissions	None
Odors, Noise, Dust	Minimal dust, noise and odors generated during construction; temporary impacts during daylight hours
Archaeological / Historical Resources	No effect, trail was relocated to avoid impacts to these resources
Prime or Unique farmlands	None
Designated Parks	Project will link city parks
Scenic Views/ Vistas	Project will utilize scenic views where feasible
Visual Impacts	None
Compatibility with Land Use Regulations	Compatible with City of Duluth's Comprehensive Land Use Plan, Permitted use in shoreland areas
Impacts on Infrastructure and Public Services	None
Cumulative Impacts	No significant adverse impacts
Other Potential Environmental Impacts	None

Mitigation Measures and Special Conditions:

All permit conditions will be incorporated into the construction plans. Phase 1 construction will require only one new stream crossing of Minnesota DNR Protected Waters. The proposed bridge will span the stream without the need for piers or excavation below the ordinary high water mark (OHW). Due to the proximity of special waters (trout streams) in the vicinity of proposed Phase 1 construction, rapid stabilization of disturbed areas will occur within 7 days in accordance with Appendix A of the MPCA NPDES Construction Stormwater Permit.

3.1 RGU Certification

*(The Environmental Quality Board will only accept **SIGNED** Environmental Assessment Worksheets for public notice in the EQB Monitor.)*

I hereby certify that:

- The information contained in this document is accurate and complete to the best of my knowledge.
- The EAW describes the complete project; there are no other projects, stages or components other than those described in this document, which are related to the project as connected actions or phased actions, as defined at Minnesota Rules, parts 4410.0200, subparts 9b and 60, respectively.
- Copies of this EAW are being sent to the entire EQB distribution list.

Signature _____ Date _____

Title Interim Planning Manager – City of Duluth, Minnesota

Figures

Appendices

Appendix A

Appendix A: Duluth Traverse Threatened and Endangered Plant Search Report

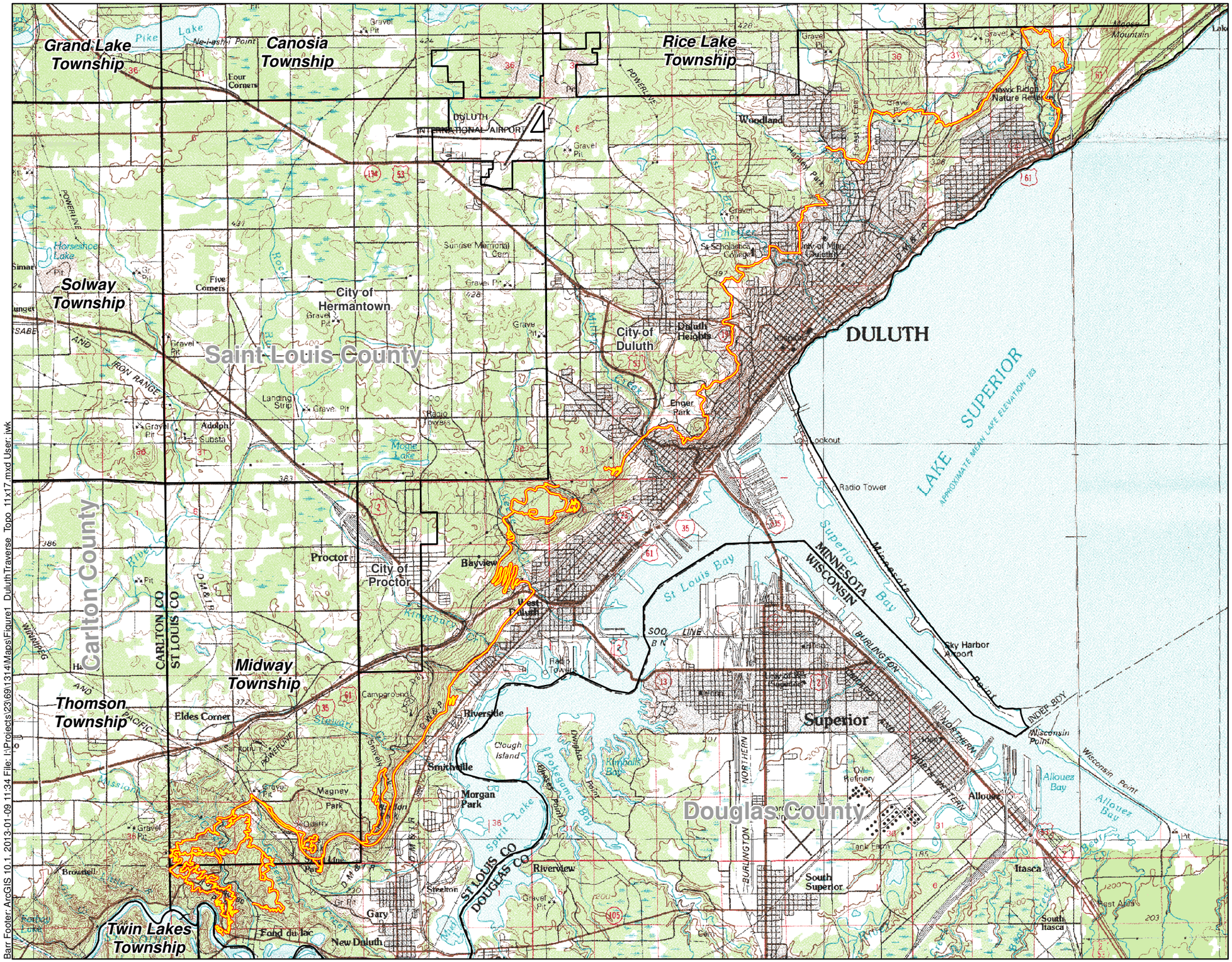


Figure 1

TRAIL LOCATION
Duluth Traverse
Duluth, Minnesota

BARR

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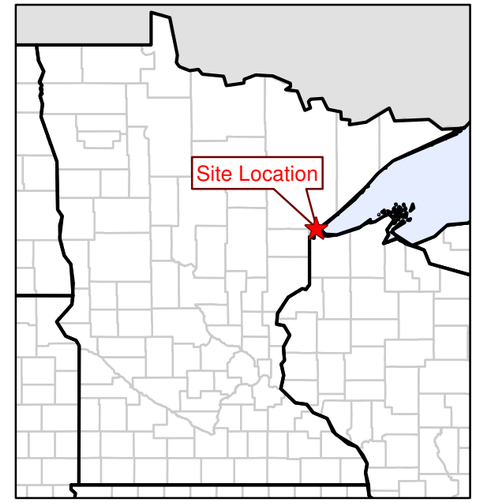

Proposed Lester River Trail - Phase 1

Proposed Mission Creek Trail - Phase 1

Other Duluth Traverse Trails

Minor Civil Divisions

0 1.5 3

Miles

1 Inch = 1.5 Miles

Figure 2

PHASE 1 TRAIL LOCATIONS
Duluth Traverse
Duluth, Minnesota

BARR

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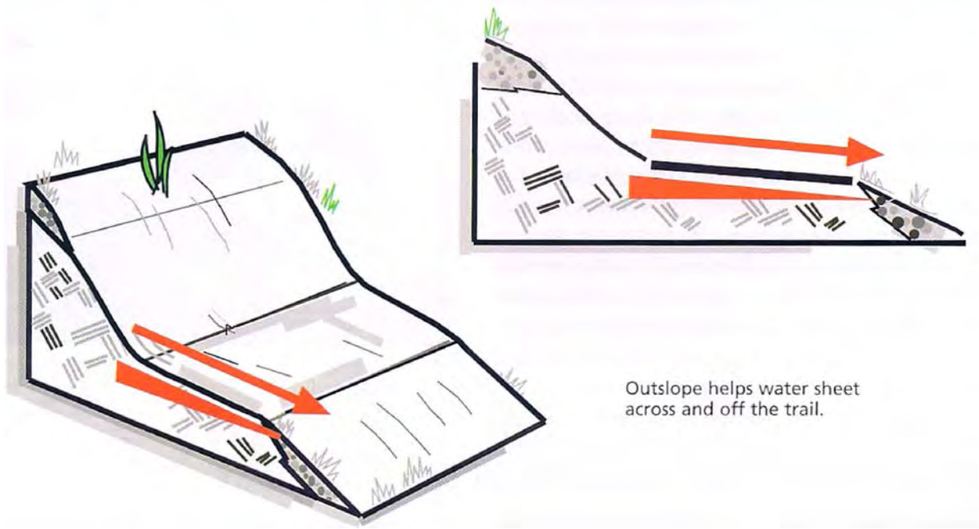
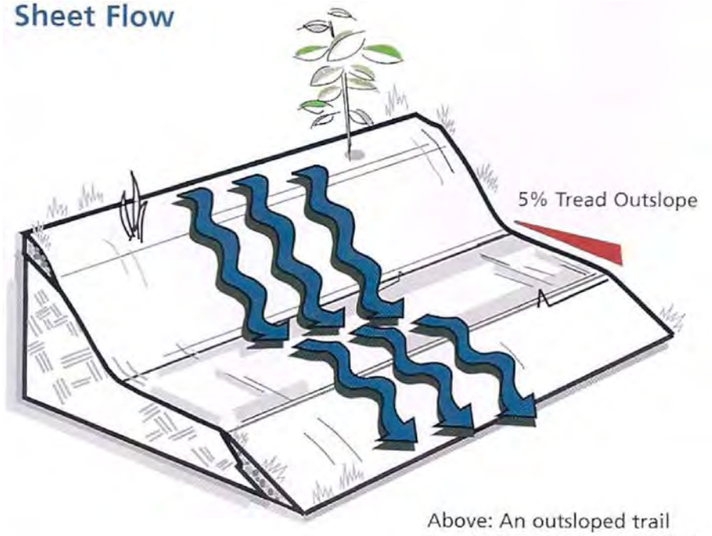
Outslope



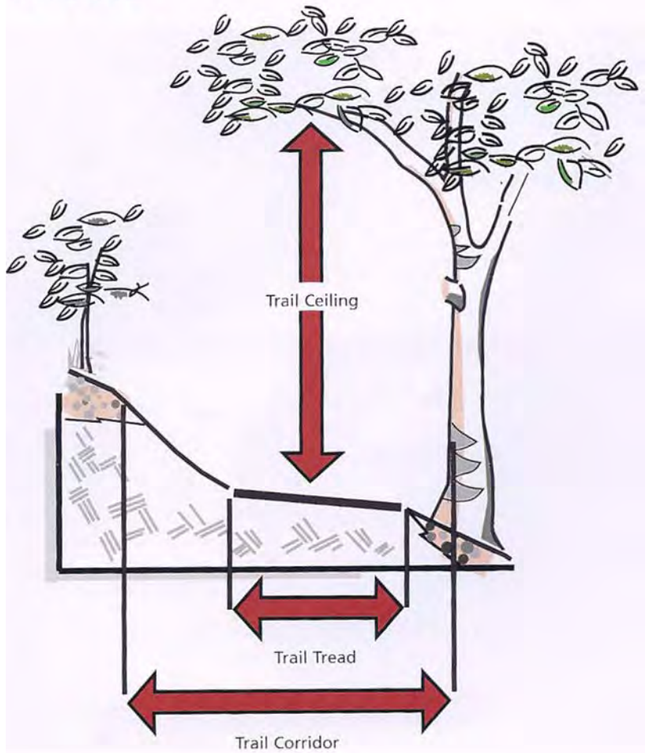
Outslope helps water sheet across and off the trail.

Sheet Flow

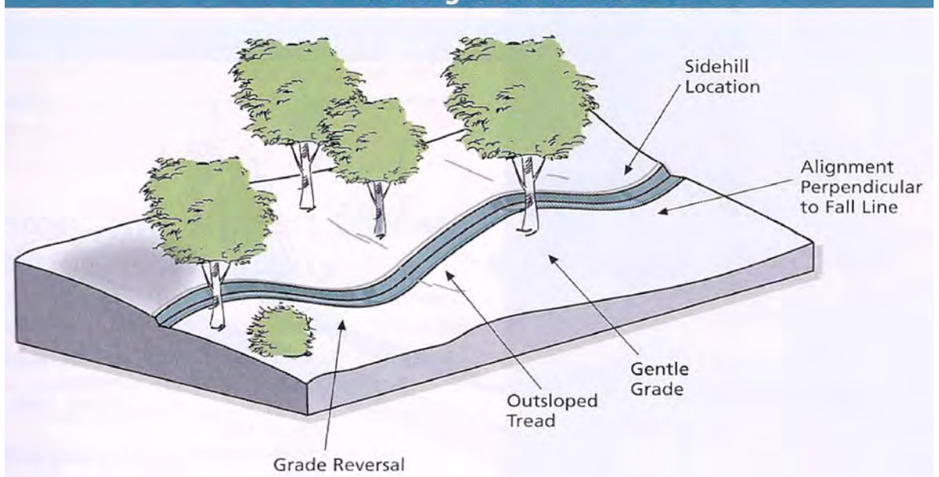


Above: An outsloped trail tread allows water to drain in a gentle, non-erosive manner called "sheet flow."

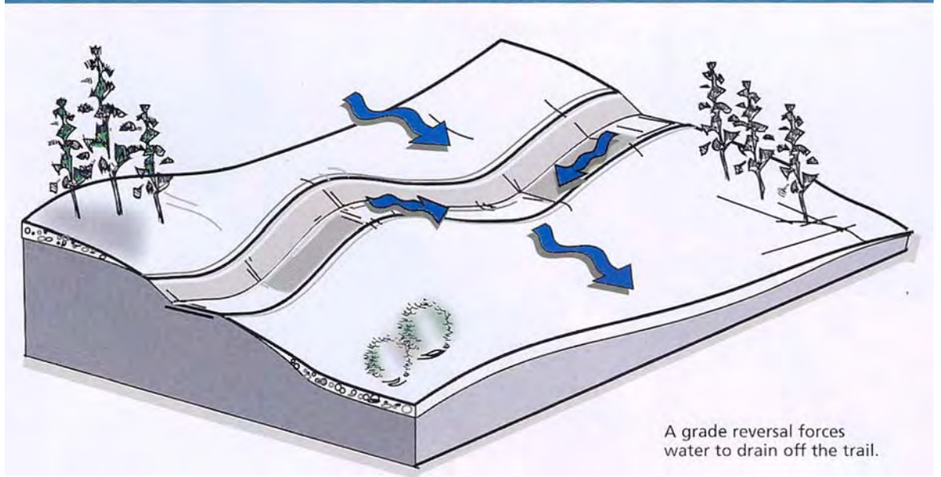
Trail Corridor



Rolling Contour Trail



Grade Reversal



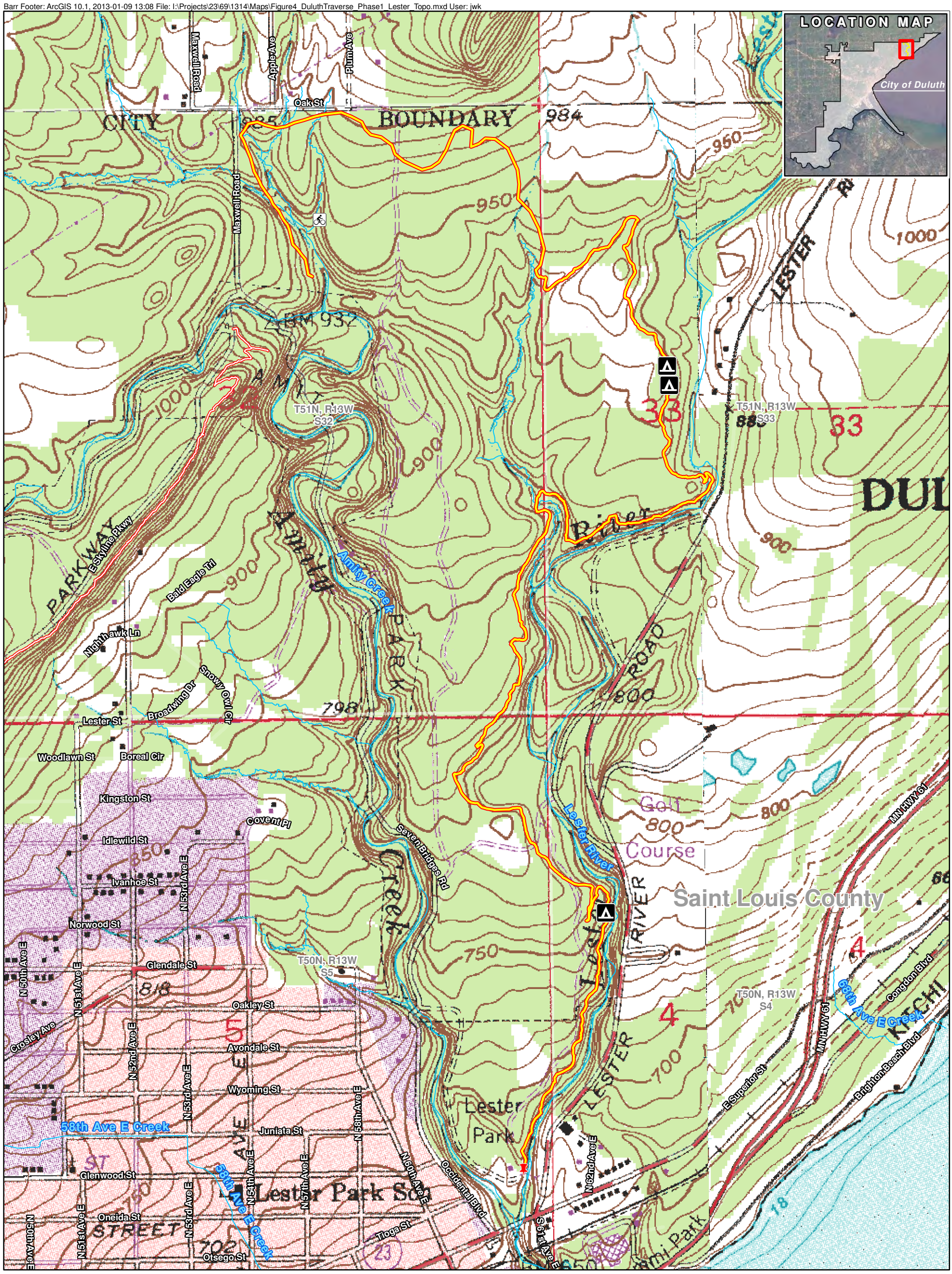
A grade reversal forces water to drain off the trail.

All images provided courtesy of
International Mountain Bike Association (IMBA)

Figure 3

TRAIL CONFIGURATIONS
Duluth Traverse
Duluth, Minnesota

BARR



Lester Proposed Trail
Duluth Traverse Proposed Trails
COGGS Loop Connector
Camp Site
Trail Start
Duluth Streams

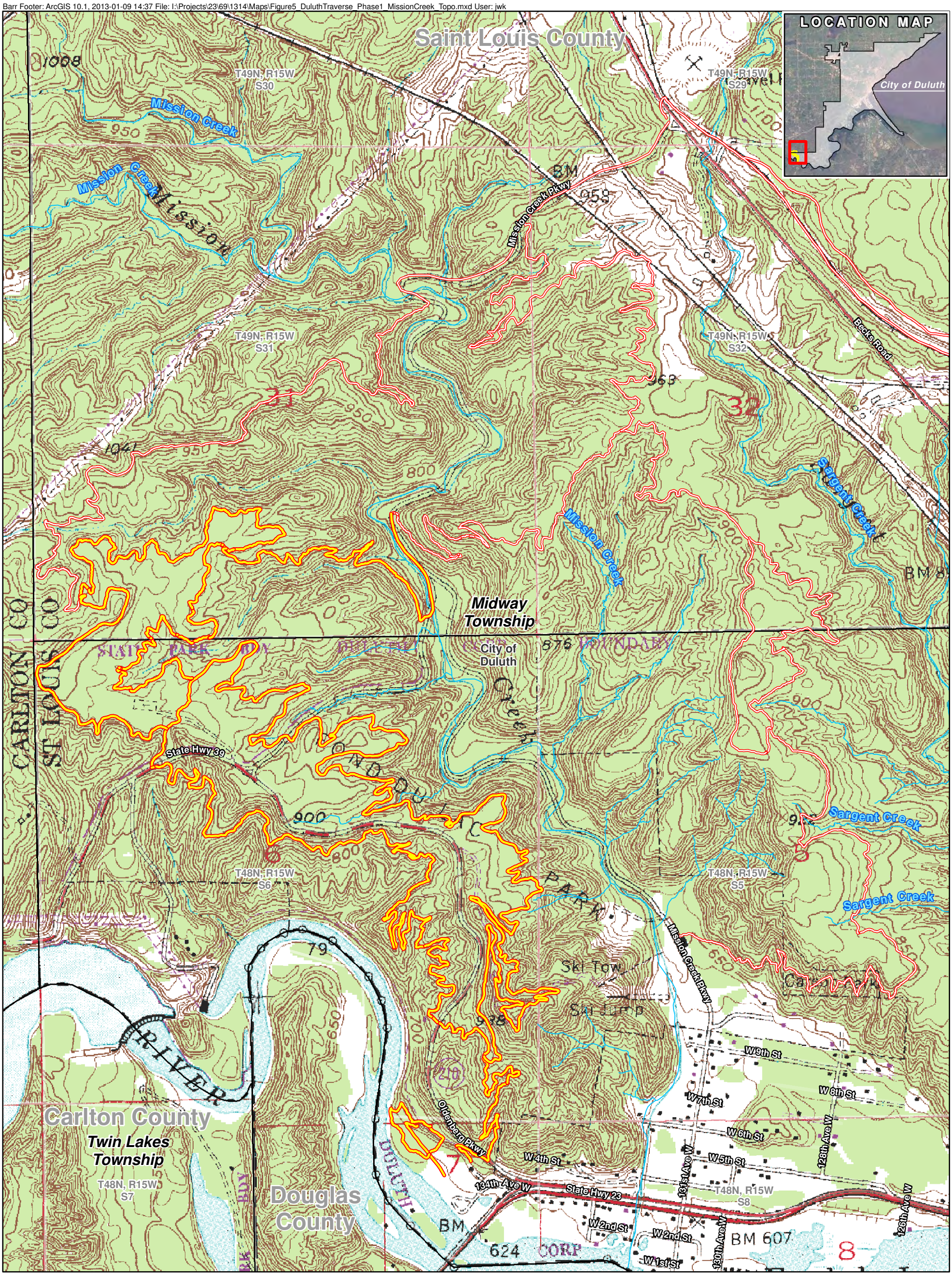
0 800 1,600
Feet

All data overlaid USGS 7.5' Topographic Map

BARR

Figure 4

LESTER RIVER PROPOSED TRAIL
PHASE 1
Duluth Traverse
Duluth, Minnesota



Mission Creek Proposed Trails

Duluth Traverse Proposed Trails

Duluth Streams

BARR

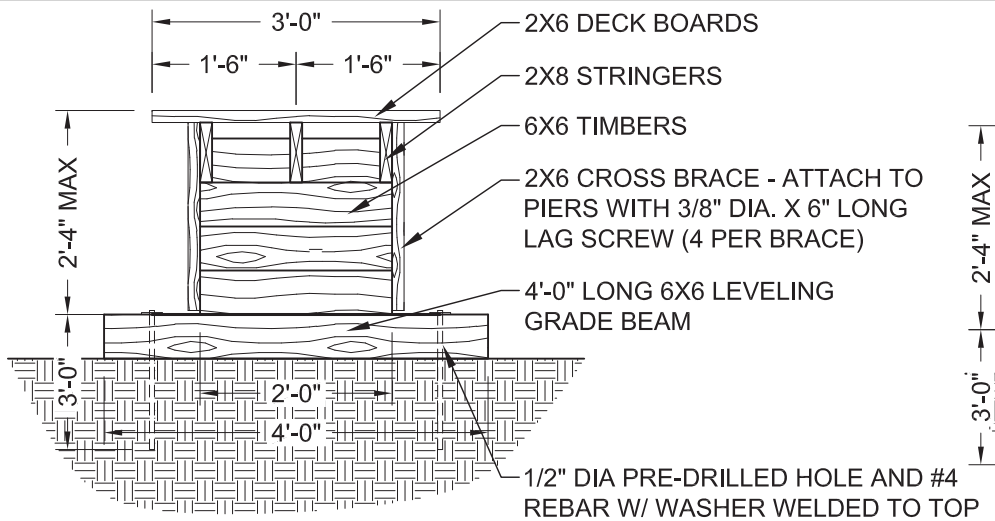
Figure 5

MISSION CREEK PROPOSED TRAIL
PHASE 1
Duluth Traverse
Duluth, Minnesota

0 1,000 2,000

Feet

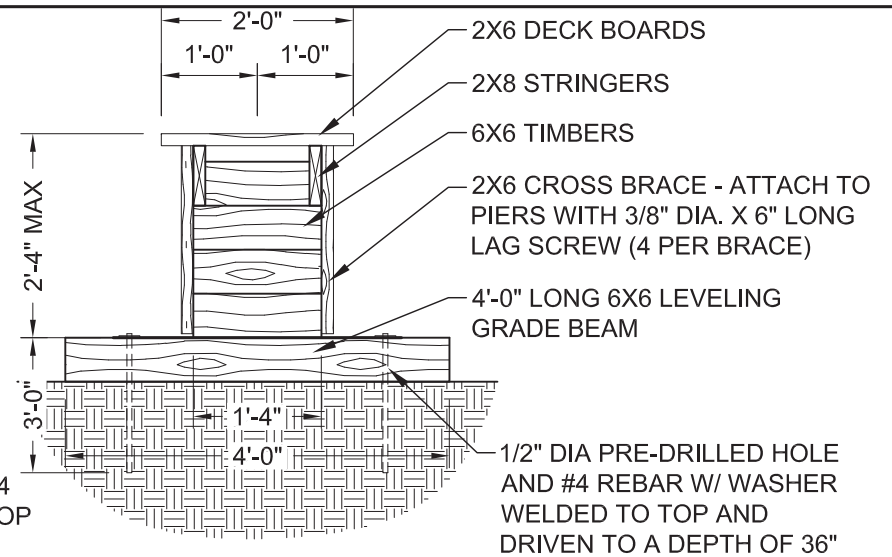
All data overlaid USGS 7.5' Topographic Map



36" WIDE BOARDWALK

NOT TO SCALE

1/8



24" WIDE BOARDWALK

NOT TO SCALE

2/8

MATERIAL NOTES:

A. LUMBER SHALL BE ROUGH SAWN RED PINE #2 OR BETIER, SIZED TO THE FULL DIMENSIONS SHOWN ON THE PLANS UNLESS NOTED OTHERWISE. ALL LUMBER SHALL BE TREATED ACCORDING TO THE OPTIONS INDICATED BELOW. TREATMENTS OTHER THAN THOSE LISTED MUST BE APPROVED BY THE ENGINEER PRIOR TO BIDDING.

A.1. PRESERVATIVE TREATMENT:

A.1.1. LUMBER SHALL BE TREATED IN ACCORDANCE WITH AWPA STANDARD C2/C9 .

A.1.1.1. PRESERVATIVES FOR MEMBERS NOT IN GROUND CONTACT SHALL BE ACQ (0.4 LBS/CF RET.)

A.1.1.2. PRESERVATIVES FOR 6x6's OR OTHER MEMBERS IN GROUND CONTACT SHALL BE ACQ (0.60 LBS/CF RET.)

A.1.2. FIELD TREATMENT: ALL FIELD CUTS AND DRILLED HOLES SHALL BE SATURATED WITH 2 COATS OF COPPER NAPTHENATE (2% SOLUTION). ALLOW TREATMENT TO ABSORB INTO WOOD PRIOR TO APPLYING SECOND COAT AS PER TREATMENT MANUFACTURERS RECOMMENDATIONS.

A.1.2.1. WHENEVER POSSIBLE APPLY THIS TREATMENT AWAY FROM WATER. USE EXTRA CARE IN THIS TREATMENT PROCESS NEAR OR OVER WATER. REFER TO MANUFACTURER'S RECOMMENDATIONS.

A.2. HARDWARE

A.2.1. HOT·DIP GALVANIZED (TRIPLE DIPPED): ALL HARDWARE SHALL MEET ASTM A307. HOT DIP GALVANIZE ALL HARDWARE IN ACCORDANCE WITH ASTM A153.

A.2.2. ATTACH DECKING TO STRINGERS WITH 4" X #10 SCREWS. TWO PER DECK BOARD TO EACH STRINGER CONNECTION.

A.2.3. ATTACH STRINGERS TO PIERS WITH 3/8 " DIA. LAG SCREWS WITH FLAT WASHER ON HEAD END. TWO LAG SCREWS PER STRINGER TO PIER CONNECTION.

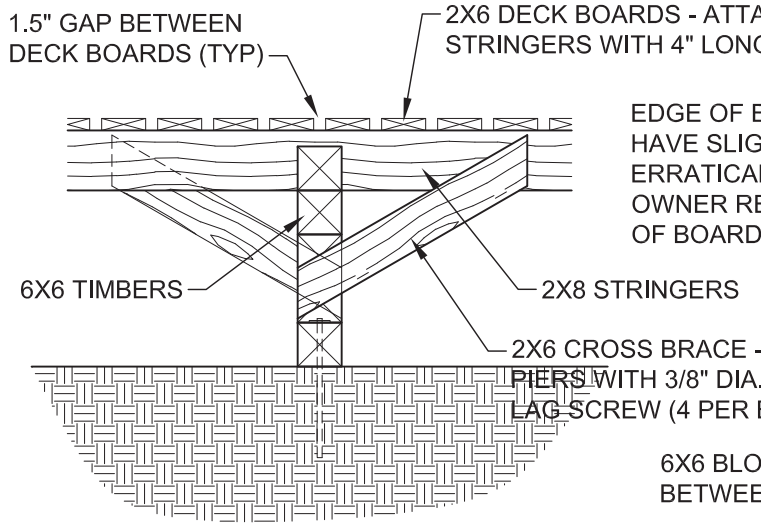
A.2.3. ATTACH 6X6's TOGETHER WITH 10" LONG RING·SHANK SPIKES. STAGGER SPIKES - MINIMUM OF 4 SPIKES FOR EACH 6X6 TO 6X6 CONNECTION.

A.2.4. ATTACH HEADERS TO STRINGERS WITH 4" LONG X #10 SCREWS. THREE PER HEADER TO STRINGER CONNECTION.

A.2.5. ATTACH HEADER AND STRINGER TO 6X6 BLOCKING WITH 4" LONG X #10 SCREWS. TWO PER HEADER TO LEVELING GRADE BEAM OR STRINGER TO LEVELING GRADE BEAM CONNECTION.

A.3. LEVELING GRADE BEAMS SHALL BE SHIMMED LEVEL WITH 2 X 6 ROUGH SAWN RED PINE #2 OR BETTER SIZED TO THE FULL DIMENSIONS SHOWN ON PLAN.

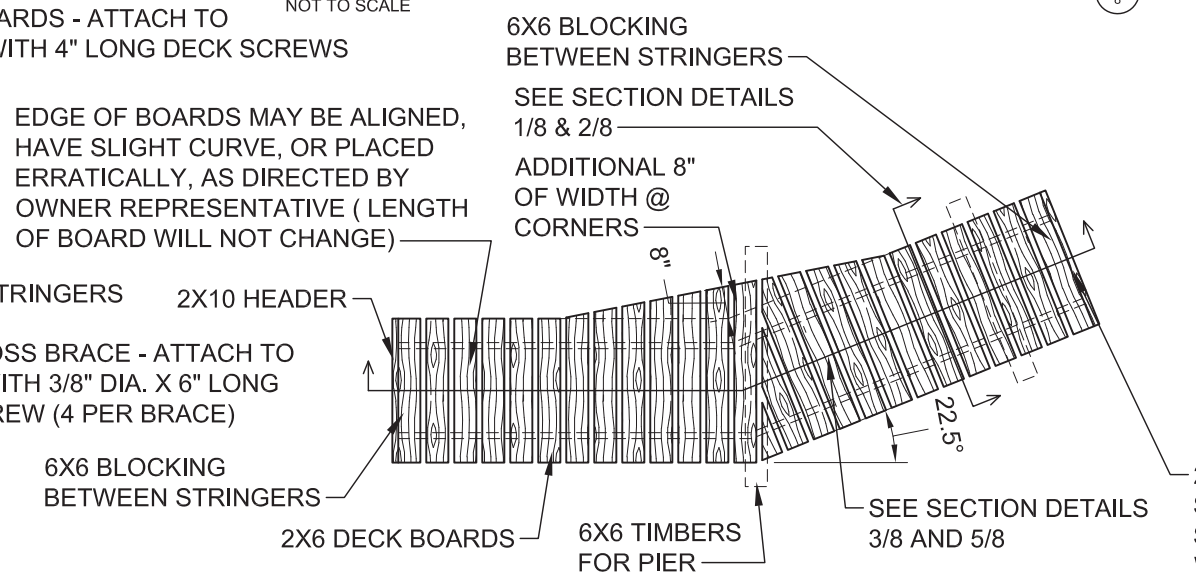
A.3.1. PRESERVE LUMBER IN ACCORDANCE TO ABOVE AWPA PRESERVATION TREATMENT.



TYPICAL ELEVATION @ PIER LOCATION

NOT TO SCALE

3/8

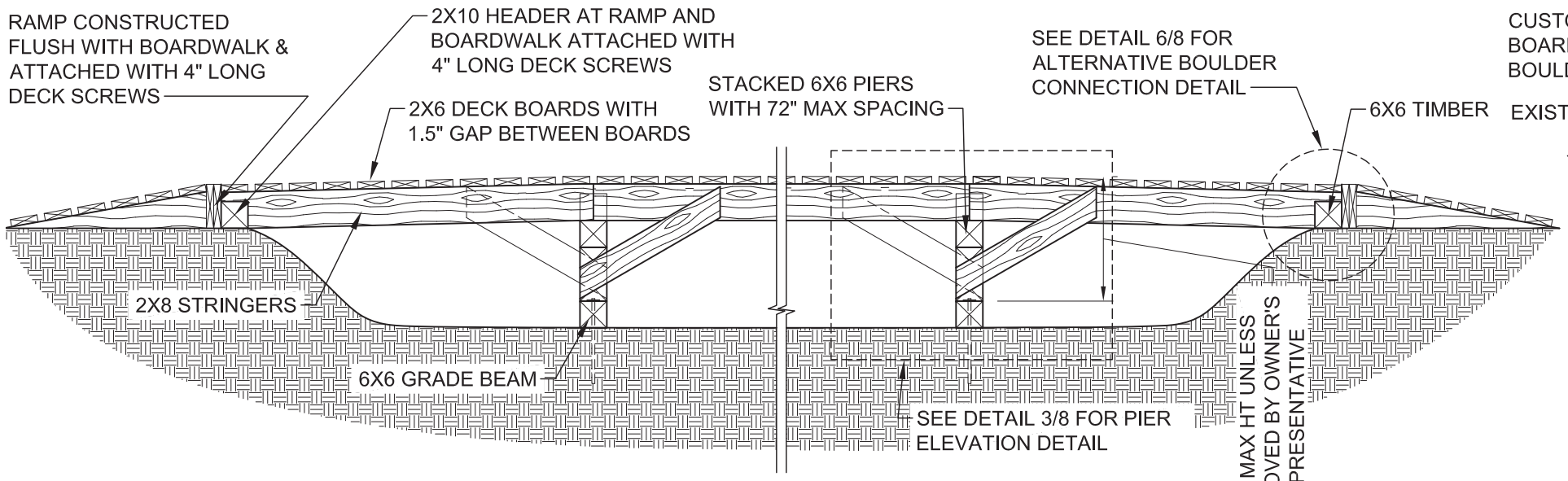


TYPICAL PLAN DETAIL OF BRIDGE (36" WIDE SHOWN)

NOT TO SCALE

4/8

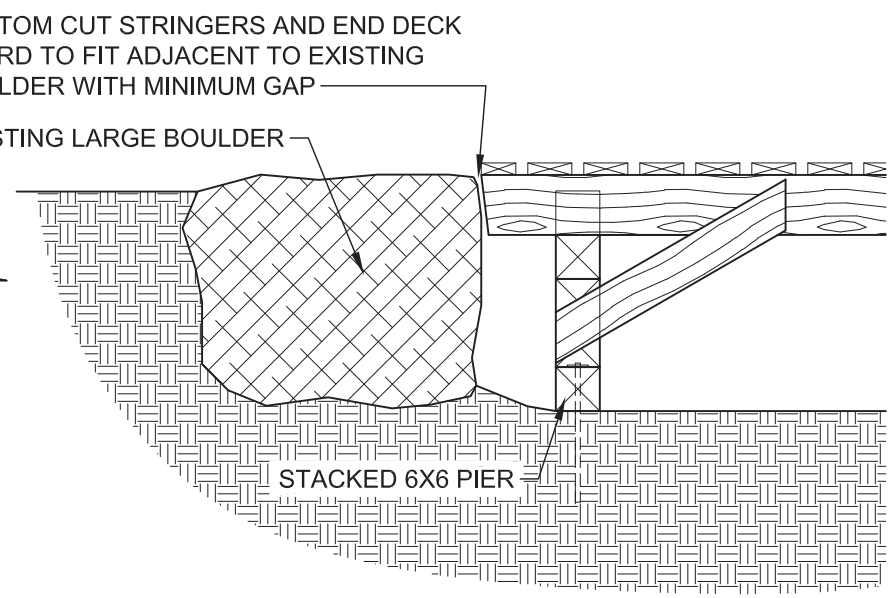
NO EXCAVATION OR FILL IS PERMITTED IN WETLANDS, CONSULT WITH OWNER'S REPRESENTATIVE



TYPICAL ELEVATION DETAIL FOR BOARDWALK (WET AREA CROSSINGS)

NOT TO SCALE

5/8



BOARDWALK CROSSING ABUTTING TO BOULDER

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6/8

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FAX 218-722-6803
EMAIL: archres@arimn.com

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DULUTH, MINNESOTA 55802
PHONE 218-727-8481
FAX 218-727-8483
EMAIL: archres@cpinternet.com

DULUTH TRAVERSE TRAIL LESTER PARK PHASE 1

DULUTH, MINNESOTA

PROJECT NO.: 12-039

DATE: JANUARY-2013

DRAWN BY: TTP

REVISIONS:

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION, AND THAT I AM A DULY LICENSED PROFESSIONAL LANDSCAPE ARCHITECT UNDER THE LAWS OF THE STATE OF MINNESOTA

PRELIMINARY
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JAMES M. STROBEL — JANUARY-2013 — 45577
SIGNATURE — DATE — REG. NO.

TRAIL DETAILS

Figure 6

CITY OF DULUTH PROJECT NO. XXXXX | DRAWN BY: TTP | SHEET NO. 9 OF X

MATERIAL NOTES:

A. LUMBER SHALL BE ROUGH SAWN RED PINE #2 OR BETIER, SIZED TO THE FULL DIMENSIONS SHOWN ON THE PLANS UNLESS NOTED OTHERWISE. ALL LUMBER SHALL BE TREATED ACCORDING TO THE OPTIONS INDICATED BELOW.
TREATMENTS OTHER THAN THOSE LISTED MUST BE APPROVED BY THE ENGINEER PRIOR TO BIDDING.

A.1. PRESERVATIVE TREATMENT:

A.1.1. LUMBER SHALL BE TREATED IN ACCORDANCE WITH AWPA STANDARD C2/C9.

A.1.1.1. PRESERVATIVES FOR MEMBERS NOT IN GROUND CONTACT SHALL BE ACQ (0.4 LBS/CF RET.)

A.1.1.2. PRESERVATIVES FOR 6x6's OR OTHER MEMBERS IN GROUND CONTACT SHALL BE ACQ (0.60 LBS/CF RET.)

A.1.2. FIELD TREATMENT: ALL FIELD CUTS AND DRILLED HOLES SHALL BE SATURATED WITH 2 COATS OF COPPER NAPTHENATE (2% SOLUTION). ALLOW TREATMENT TO ABSORB INTO WOOD PRIOR TO APPLYING SECOND COAT AS PER TREATMENT MANUFACTURERS RECOMMENDATIONS.

A.1.2.1. WHENEVER POSSIBLE APPLY THIS TREATMENT AWAY FROM WATER. USE EXTRA CARE IN THIS TREATMENT PROCESS NEAR OR OVER WATER. REFER TO MANUFACTURER'S RECOMMENDATIONS.

A.2. HARDWARE

A.2.1. HOT·DIP GALVANIZED (TRIPLE DIPPED): ALL HARDWARE SHALL MEET ASTM A307. HOT DIP GALVANIZE ALL HARDWARE IN ACCORDANCE WITH ASTM A153.

A.2.2. ATTACH DECKING TO STRINGERS WITH 4" X #10 SCREWS. TWO PER DECK BOARD TO EACH STRINGER CONNECTION.

A.2.3. ATTACH STRINGERS TO PIERS WITH 3/8 " DIA. LAG SCREWS WITH FLAT WASHER ON HEAD END. TWO LAG SCREWS PER STRINGER TO PIER CONNECTION.

A.2.3. ATTACH 6X6's TOGETHER WITH 10" LONG RING·SHANK SPIKES. STAGGER SPIKES - MINIMUM OF 4 SPIKES FOR EACH 6X6 TO 6X6 CONNECTION.

A.2.4. ATTACH HEADERS TO STRINGERS WITH 4" LONG X #10 SCREWS. THREE PER HEADER TO STRINGER CONNECTION.

A.2.5. ATTACH HEADER AND STRINGER TO 6X6 BLOCKING WITH 4" LONG X #10 SCREWS. TWO PER HEADER TO LEVELING GRADE BEAM OR STRINGER TO LEVELING GRADE BEAM CONNECTION.

A.3. LEVELING GRADE BEAMS SHALL BE SHIMMED LEVEL WITH 2 X 6 ROUGH SAWN RED PINE #2 OR BETTER SIZED TO THE FULL DIMENSIONS SHOWN ON PLAN.

A.3.1. PRESERVE LUMBER IN ACCORDANCE TO ABOVE AWPA PRESERVATION TREATMENT.

GENERAL NOTES:

1. SEE SPECIFICATIONS SECTION 3 FOR PROJECT DETAILS

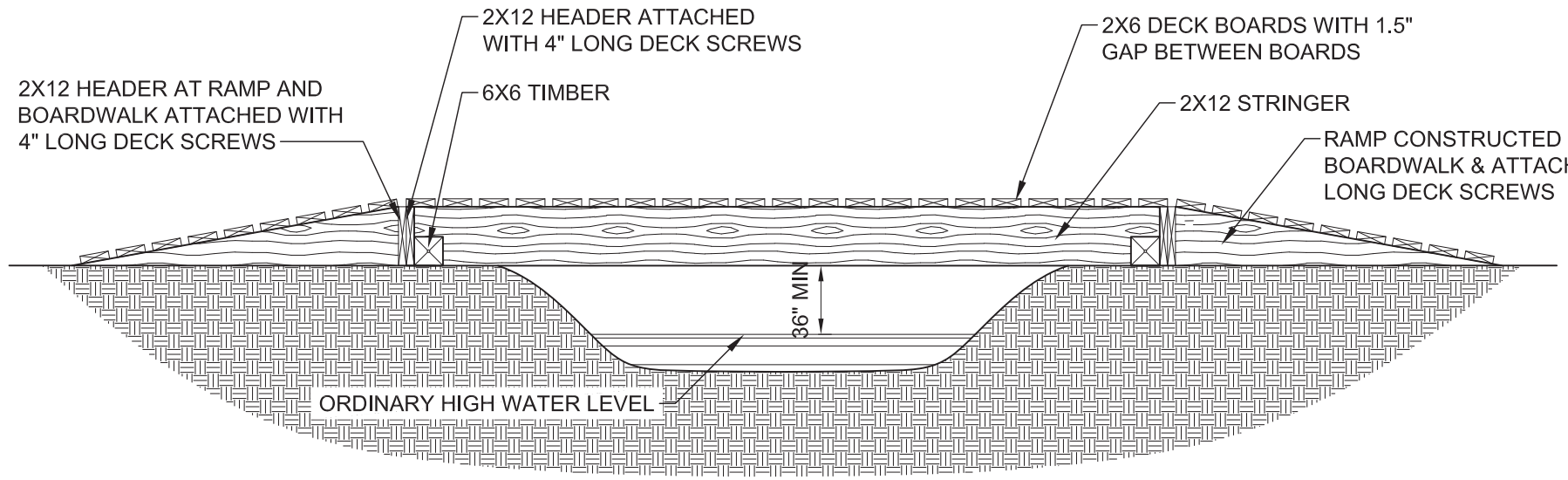
2. SEE SPECIFICATIONS SECTION 4 FOR FINISHED TRAIL CONSTRUCTION DETAILS.

3. SEE SPECIFICATIONS SECTION 5 FOR UNIT DEFINITIONS AND TREAD CONSTRUCTION DETAIL DRAWINGS.

4. ALL DISTURBED AREAS NOT PART OF ACTIVE TREAD TO BE SEEDED AND MULCHED WITHIN 7 DAYS OF NOT BEING WORKED. SEE (SWPPP) STORM WATER POLLUTION PREVENTION PLAN FOR DETAILS.

5. CUT BRUSH AND SLASH MUST BE DISPOSED IN AN UPLAND LOCATION AND MUST BE KEPT OUT OF STREAMS, GULLIES, SWALES, WETLANDS, AND LOW AREAS. SEE SPECIFICATIONS FOR DETAILS.

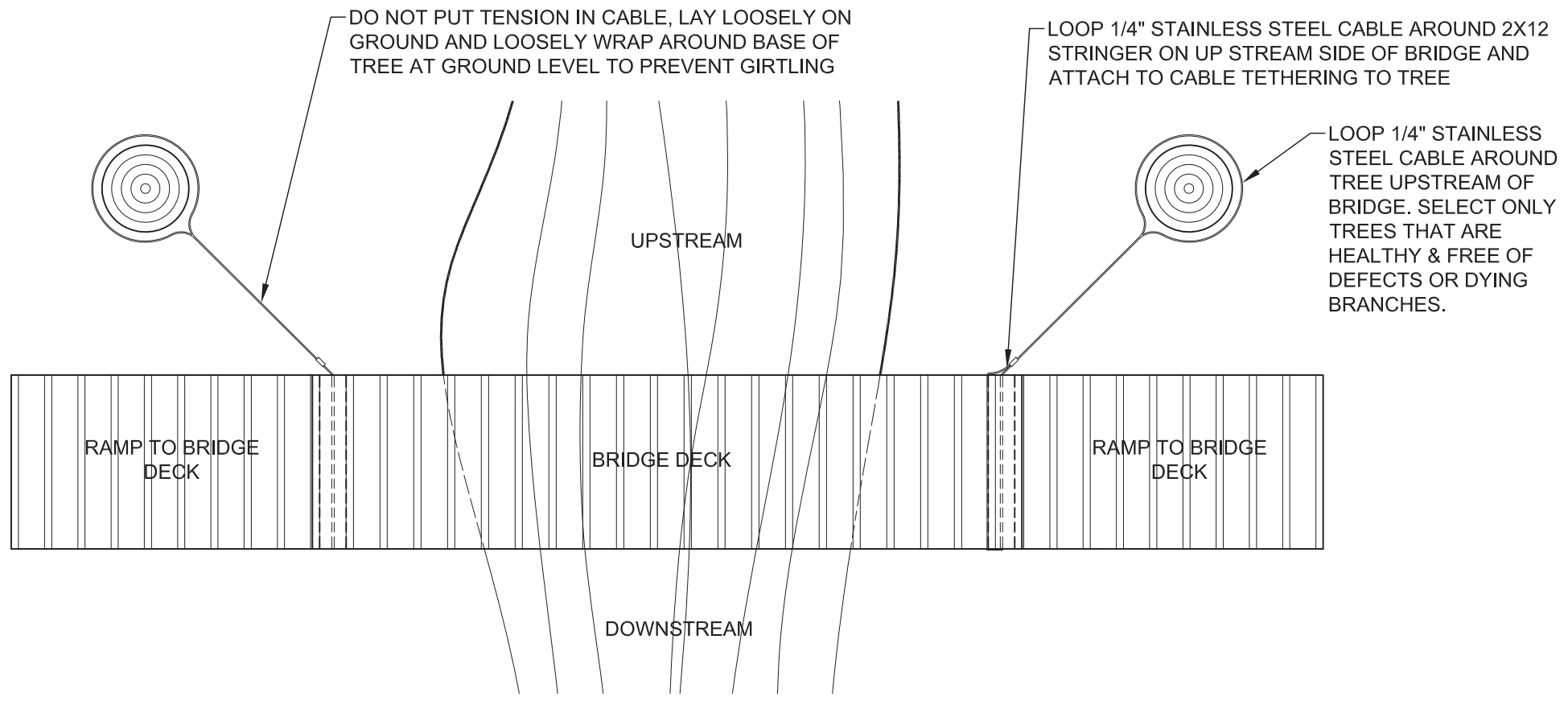
6. NO EXCAVATION OR FILL PERMITTED IN WETLANDS CONSULT WITH OWNERS REPRESENTATIVE PRIOR TO DOING ANY WORK WITHIN SUSPECTED WETLAND AREAS.



TYPICAL ELEVATION DETAIL FOR BRIDGE (CREEK CROSSINGS)

NOT TO SCALE

1/9



TYPICAL PLAN DETAIL FOR BRIDGE (CREEK CROSSINGS)

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2/9

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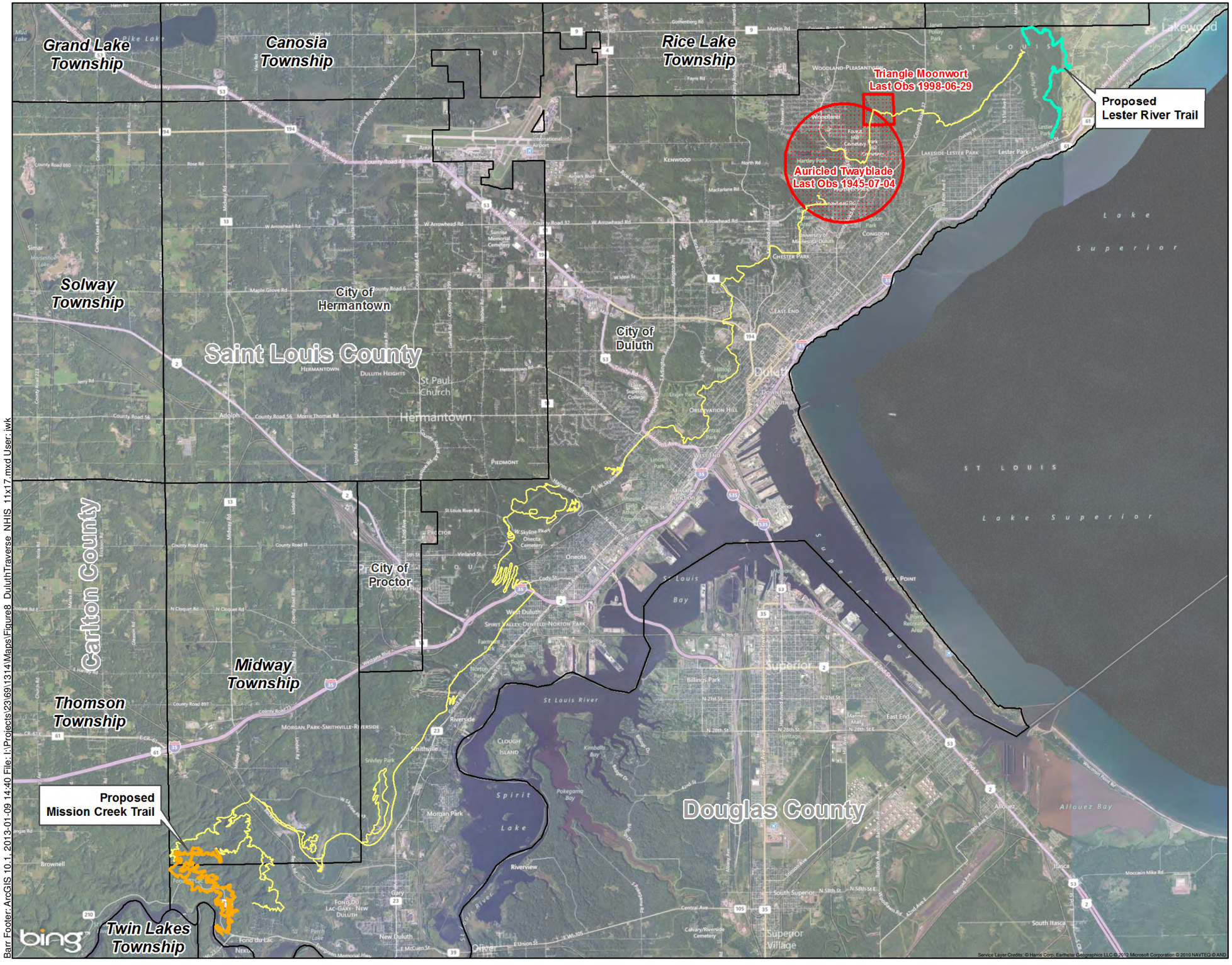
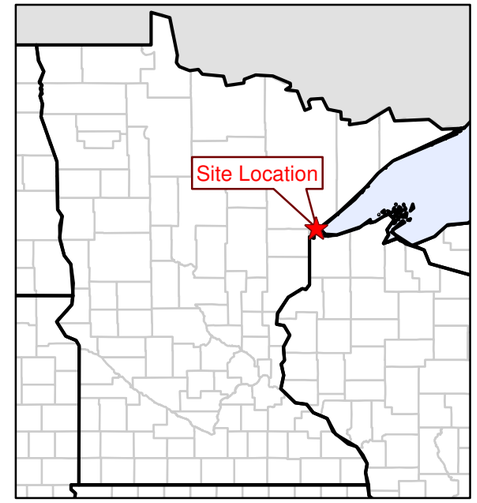
REG. NO.

TRAIL DETAILS

Figure 7





Proposed Lester River Trail - Phase 1

Proposed Mission Creek Trail - Phase 1

Other Duluth Traverse Trails

Minor Civil Divisions

NHIS Rare Natural Features

Vascular Plant
(Threatened & Endangered)

N

0 1.5 3

Miles

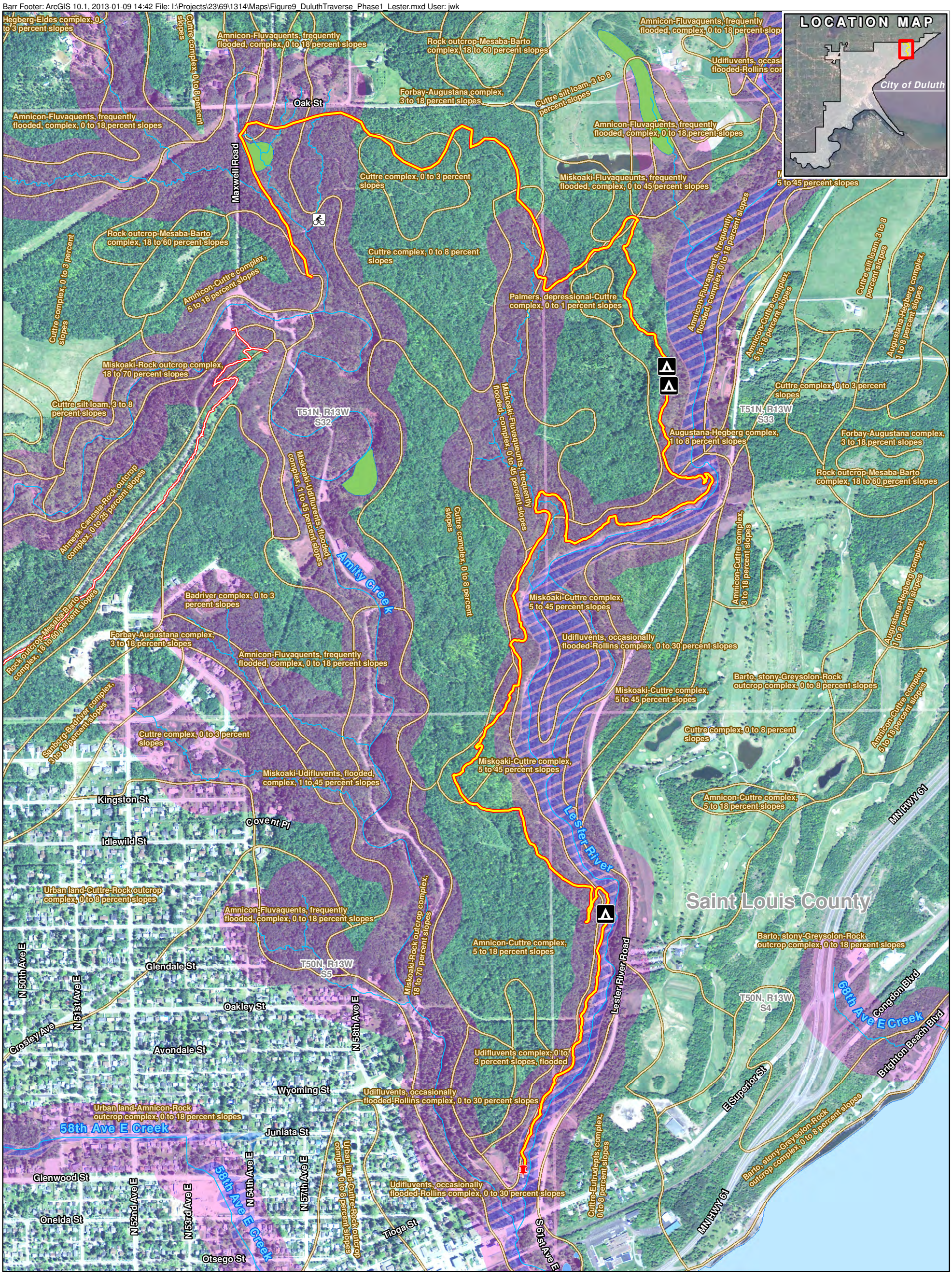
1 Inch = 1.5 Miles

Figure 8

THREATENED AND ENDANGERED SPECIES
Duluth Traverse
Duluth, Minnesota

BARR

Barr Footer: ArcGIS 10.1, 2013-01-09 14:40 File: I:\Projects\23\69\1314\Maps\Figure8_DuluthTraverse_NHIS_11x17.mxd User: jwk



- Lester Proposed Trail
- Duluth Traverse Proposed Trails
- COGGS Loop Connector
- Camp Site
- Trail Start
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine
- Duluth Streams
- Soils
- City of Duluth Shoreline Zoning Districts
- FEMA Floodplain

N

0 800 1,600

Feet

USDA FSA Imagery Circa August, 2010

BARR

Figure 9

LESTER RIVER PROPOSED TRAIL
PHASE 1
Duluth Traverse
Duluth, Minnesota

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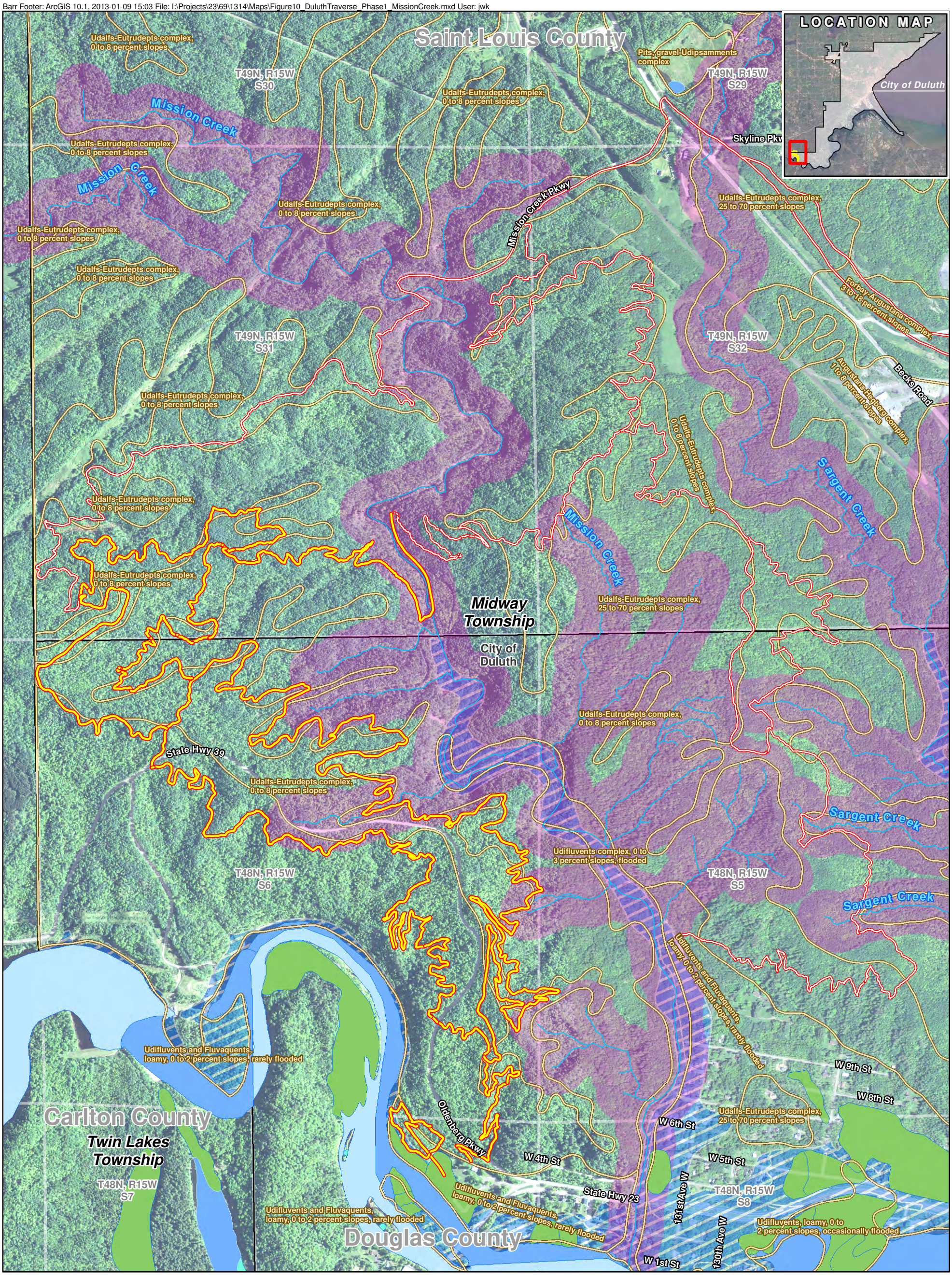

- Mission Creek Proposed Trails
- Duluth Traverse Proposed Trails
- Duluth Streams
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine
- Soils
- City of Duluth Shoreline Zoning Districts
- FEMA Floodplain

0 1,000 2,000

Feet

USDA FSA Imagery Circa August, 2010

BARR

Figure 10

MISSION CREEK PROPOSED TRAIL PHASE 1

Duluth Traverse
Duluth, Minnesota

Searches for *Listera auriculata* Wiegand and *Botrychium lanceolatum* (S.M. Gmel.) Angstr. along Proposed Sections of the Duluth Traverse Multi-use Trail

Suzanne Sanders[1]

Introduction

Listera auriculata Wiegand (auricled twayblade), endangered and *Botrychium lanceolatum* (S.G. Gmel.) Angstr. (triangle moonwort), threatened are Minnesota state listed species with multiple occurrences in St. Louis County, Minnesota. Due to the status, construction and development projects located within range of known locations of existing listed plant populations (or individuals) must include verification of the absence of these species in the construction area.

In St. Louis County, Minnesota, the City of Duluth is progressing with plans to build the Duluth Traverse multi-use trail. This trail will include approximately 100 miles of tread for human-powered recreation. Currently, approximately 650 meters of the proposed route cited for construction in 2012 are located within the threshold range of known populations of *L. auriculata* and *B. lanceolatum*. Based on a review of records that are currently in the MNDNR Natural Heritage Information System database, these are the only two species identified within the vicinity of any of the proposed Duluth Traverse trail sections. This report documents searches conducted by Suzanne Sanders, Terrestrial Ecologist, on June 2, 2012 for these two species along a portion of the proposed route.

Species

Listera auriculata (Orchidaceae) is an herbaceous perennial with two sessile cauline leaves and a flowering raceme with pale green petals. Plant height is 10-20 cm. Where present, *L. auriculata* is most often located in moist, low lying areas of hardwood and mixed hardwood forests, and in speckled alder (*Alnus incana* (L.) Moench ssp. *rugosa* (DuRoi) R.T. Clauson) swamps.

Botrychium lanceolatum (Ophioglossaceae) is an herbaceous perennial with a single sterile frond (trophophore) with 2-5 pinnatifid pinnae and a single fertile frond (sporophore). Plant height is typically 6-15 cm. Where located, the habitat is typically low lying areas in mature hardwood forests. Associated overstory species included *Acer saccharum* Marsh. (sugar maple), *Betula alleghaniensis* Britton (yellow birch), and *Fraxinus pennsylvanica* Marsh. (green ash). Nonetheless, *B. lanceolatum* is not typically observed, even in apparently suitable habitat.

Methods

Prior to initiating the searches, a document review was utilized to familiarize personnel conducting the search with the two species of interest using the habitat and species descriptions in Gleason and

[1] Contact information: National Park Service, Great Lakes Inventory and Monitoring Network, 2800 Lake Shore Dr. East, Ashland, WI 54805, Suzanne_sanders@nps.gov.

Cronquist (1991), as well as the line drawings in Holmgren et al. (1998). This included identifying characteristics and traits to distinguish the target species from similar species. Images and online descriptions where provided by the Minnesota DNR, Wisconsin DNR, and USDA Plants database.

Prior to the searches, the proposed route was flagged. The "Skyline Parkway" section parallels this road, approximately 20 meters downhill from it. This surveyed section is approximately 300 meters in length, immediately downhill from the Hawk Ridge Observatory deck, westward to where the proposed route crosses Skyline Parkway. The "Amity Road" section is between Skyline Parkway and Amity Road, a distance of approximately 350 meters although a small amount of this is on an existing snowmobile trail, and the Superior Hiking Trail.

Flagging along the proposed route was placed approximately every 10 meters. Searches were conducted by walking a straight path between each pair of flags, searching for the two species of interest within a 1.22 m wide swath. In areas where the understory was not dense, it was possible to walk and search without moving any existing vegetation. In other areas, leaves and stems were pushed aside to ensure a thorough search of the proposed route. Notes on the species encountered, as well as soils and geology, were recorded at periodic intervals.

Results

Neither target species was located in the search. The eastern half of the Skyline Parkway section contained large amounts of basalt outcroppings with the common overstory species being *Populus tremuloides* Michx. (trembling aspen), *Prunus virginiana* L. (choke cherry), and with scattered individuals of *Tilia Americana* L. (basswood). Common shrub taxa encountered were exotic *Lonicera* spp. (honeysuckle) and *Rhamnus cathartica* L. (buckthorn), as well as the native *Cornus rugosa* Lam. (roundleaf dogwood). Frequent understory taxa included *Hieracium* spp. (hawkweed), *Diervilla lonicera* Mill. (bush honeysuckle), *Eurybia macrophylla* (L.) Cass (big-leaf aster), and *Aralia nudicaulis* L. (sarsaparilla). The western half of the Skyline Parkway section was more shaded with slightly more developed soils. In addition to the species listed above, *Acer rubrum* L. (red maple) and *Rubus parviflorus* Nutt. (thimbleberry) were also common.

The Amity Creek section did not contain exposed bedrock, and had a substrate of soil throughout. Moist pockets and rivulets were common here. The species assemblage here more commonly exemplified the northern hardwood forest. Overstory species included *P. tremuloides* and *A. rubrum*, along with *Betula papyrifera* Marsh. (paper birch). Common shrub taxa included multiple species of *Ribes* L., *C. rugosa*, *Rosa* L. spp., *D. lonicera*, and *A. incana* ssp. r*ugosa*. Common understory species were *Rubus pubescens* Raf. (dwarf red blackberry), *A. nudicaulis*, *Cornus canadensis* L. (bunchberry), *Carex arctata* Boott ex. Hook., and *Maianthemum canadense* Desf. (Canada mayflower).

Discussion

The substrate and species assemblages of the Skyline Parkway section were not favorable for either target species and it was not surprising that these were not located in this section. The Amity Road section appeared to be somewhat more conducive to the target species, although the habitat was

certainly not ideal. In order to account for the increased likelihood of locating the target species in the Amity Road section, the pace at which ground was searched was slowed compared with that of the Skyline Parkway section. This slower pace also reflected the denser groundcover here.

Literature Cited

Gleason, H. A. and Cronquist, A. 1991. Manual of Vascular Plants of Northeastern United States and Adjacent Canada, 2nd edition. The New York Botanical Garden, Bronx, NY.

Holmgren, N. H., P. K. Gleason, A. Henry. 1998. Illustrated Companion to Gleason and Cronquist's Manual: Illustrations of the Vascular Plants of Northeastern United States and Adjacent Canada. New York Botanical Garden, Bronx, NY.

Suzanne Maria Sanders
117 Chester Parkway
Duluth, MN 55805
(715) 209-6795

Professional Experience

Terrestrial Ecologist 1/2008 – present, National Park Service Great Lakes Inventory & Monitoring Network

Program manager for long-term vegetation monitoring program. Lead author on vegetation monitoring protocol which included plot type selection and study design; hire, train, and supervise field crew and monitor plots; identify trees, shrubs, and herbaceous species from a range of habitats in Minnesota, Wisconsin, Michigan, and Indiana; perform statistical analysis of data; develop reports for park natural resource managers; played a key role in database development; maintain professional contact with park personnel at nine parks, other networks, universities around the region, and independent researchers; oversee all aspects of personnel, budget management, and contracting associated with the vegetation monitoring program.

Employer's address: National Park Service, Great Lakes Network, 2800 Lake Shore Dr. E., Ashland, WI

Inventory Specialist 6/2004 – 1/2008, National Park Service Great Lakes Inventory & Monitoring Network

Coordinate biological inventories for the Network. Select contractors and administer contracts; review reports; synthesize comments from peer reviewers; ensure that reports are entered into the National Park Service NatureBib database and that all accounts of species are entered into the NPSpecies database.

Network librarian. Maintain database of network library (journal articles, books, reports); catalog articles and books; maintain network subscriptions; edit, copy, bind, and distribute completed network reports to parks, collaborators, and other interested parties.

Other ongoing and completed duties supporting general Network operations. These include being co-author of a chapter of the Network's monitoring plan and serving as technical editor for the entire report; administering additional contracts and agreements in addition to the inventories above, and writing portions of the Network's Annual Administrative Report and Work Plan.

Graduate Research Assistant 5/1999-6/2004, Department of Biology, West Virginia University

Conducted research focused on understanding causes of rarity in understory herbs: goldenseal (*Hydrastis canadensis*), American ginseng (*Panax quinquefolius*) and black snakeroot (*Actaea racemosa*). Field surveys for the three rare species above; GIS study to relate locations of populations for all three species to physiographic parameters; greenhouse study of breeding system in goldenseal; field study examining the effects of goldenseal harvest; field based reciprocal transplant study to determine degree of adaptation vs. plasticity in goldenseal; field based study to examine the role of light, humidity, and temperature on goldenseal growth; field based study of restoration aspects of goldenseal.

Employer's address: Department of Biology, West Virginia University, Box 6057, Morgantown, WV

Education

1999-2004	West Virginia University, Morgantown, WV – PhD. in Biology (GPA 3.98)
1996-1999	University of Idaho, Moscow, ID – M.S. in Plant Science (GPA 3.54)
1992-1996	Miami University, Oxford, OH – B.A. in Botany (GPS 3.67)

Publications

Sanders, S. and J. Grochowski. 2010. Implementation of a long-term vegetation monitoring program at Sleeping Bear Dunes National Lakeshore. Natural Resource Technical Report NPS/GLKN/NRTR-2010/407. National Park Service, Fort Collins, Colorado.

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McGraw, J. B., **S. M. Sanders**, and M. Van der Voort. 2003. Distribution and abundance of *Hydrastis canadensis* L. (Ranunculaceae) and *Panax quinquefolius* L. (Araliaceae) in the central Appalachian region. Journal of the Torrey Botanical Society 130 (2):62-69.

Sanders, S. M. and J. B. McGraw. 2002. Distribution, abundance, and population dynamics of goldenseal (*Hydrastis canadensis* L.) in an Indiana Nature Preserve, USA. Natural Areas Journal 22:129-134.