

UNIVERSITY OF MINNESOTA DULUTH

Western Waterfront Trail Extension Proposal

Riverside to Morgan Park

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Executive Summary

The extension that is proposed to run through the Morgan Park community beginning in Riverside shows a great amount of economic, business, and recreational development potential. With a grassroots approach led by community involvement the Morgan Park community can develop this project by means of a low cost budget due to volunteer commitment.

Environmentally this project can be low impact taking into consideration the immense amount of natural habitat that exists in the lower St. Louis River estuary. This compiled report outlines the history and development of the St. Louis River estuary, the recreational opportunities it holds, economic and property issues that may arise, and the volunteer, construction, and maintenance component of this project. Additionally, the University of Minnesota Duluth's spring semester Geographic Information Sciences (G.I.S) Urban Analysis course created a compilation of map based scenarios relating to the proposed extension area. These maps range from neighborhood access points to various plant communities surrounding the trail area. The final map for the proposed trail was also completed through the University of Minnesota Duluth's G.I.S program.

History of Development and Industry on the Lower St. Louis River

The first settlers of the Lower St. Louis River were the Fond du Lac Band of Lake Superior Chippewa, meaning Head of the Lake or where the water stops. Prior to the 1600s they had alone shared and inhabited the shores of the St. Louis River; using its lands for the harvest of game, fish, wild rice, and other wild plants to sustain their populations. Due to their nomadic way of life and their intimate understanding of their environment they left minimal signs of impact on the Lower St. Louis River.

Beginning in the 1600s the first European explorers set foot on the shores of the St. Louis River. They brought hopes of exploration, trade, and introducing a new way of life to the native Chippewa's. It was not until the early 1800's when the Europeans became aware of the valuable transportation route along the St. Louis River they had come across. In 1834 The American Fur Company established its first commercial fisheries harvesting Lake Superior trout and whitefish. Their headquarters were located at the Fond du Lac trading post until the late 1840s. During this time travelers described the area as, “a wide shallow river with extensive emergent wetland vegetation, including floating bogs and beds of wild rice. The vegetation was so thick that it was often difficult to follow the main channel,” (Fritzen 1978).

As more and more explorers, traders, and trappers came to the waters of Lake Superior an increased need for a faster route of trade occurred. In 1861 a railway that followed the waterfront of the St. Louis River was established and in 1870 completed. The railway followed the north bank of the St. Louis River to Fond du Lac and then to Third Avenue East in Duluth. Due to the implementation of a railway, beginning in 1863, the area saw a rapid change in population with a rise from fourteen families to 3,000 people. In 1892 the population rose to over 50,000, (Lisignan 1983).

In 1872 Minnesota Harbor Improvement Company cut through the baymouth sand bar to develop and reconfigure the shoreline to construct a ship canal for Duluth; this created a second outlet for the St. Louis River. In 1873, the River and Harbor Act was passed by the federal government to include the first appropriations to dredge the harbor channels to a depth of 13 feet. In 1881, the amendments were changed to the Act, which allowed the channels to be dredged to an increased depth of 16 feet. In 1896, an Act of Congress joined the Duluth and Superior

harbors under one administration and authorized \$3 million dollars to be used to enlarge the harbor and rebuild the Duluth Ship Canal. In a time span of just 30 years the harbor had increased its shipping canals to 17 miles and to a standard depth of 20 feet. The Duluth-Superior Harbor and the St. Louis River were an obvious location for commerce and as the industry grew and various business were established along the waters edge a major impact to habitat was occurring, (Lusignan 1983).

Prior to 1854, the native Chippewa Indians had had sole control of their lands and it was within that year the U.S. government and the Fond du Lac Chippewa tribes signed the LaPointe Treaty which began the opening of land for settlement. This would begin the early settlements of Superior and Duluth. In 1885, to bypass the rapids of the St. Mary's River, the only outlet of Lake Superior into Lake Huron, a construction of locks was created at Sault Ste. Marie. This began the mark of inhibited travel between Lake Superior and Lake Huron, making it possible for larger ships to sail to the Duluth-Superior Harbor. This would allow industries to expedite the area's natural resources of iron ore, lumber, and grain. During WWII the Duluth-Superior Harbor saw a spike in usage of the shipping industry. In 1959, the Duluth-Superior Harbor opened its waters to international trade through the St. Lawrence Seaway, (Lusignan 1983).

The abundance of bedrock being removed along the river for dredging and development purposes led to the establishment of several rock quarries. The St. Louis River Slate and Brick Company in Thomson manufactured brick from the ground slate. This led to the development of three sandstone quarries established near Fond du Lac, Mission Creek on the south side of the river about a mile above Fond du Lac, and the third on the north side of the river. Additional

dredging occurred all the way to Fond du Lac during these times to transport rock from site to site.

The largest industry to take place during the late 1800s and early 1900s was that of logging the white and red pine forest of Wisconsin and Minnesota. Facilities were quickly establishing for shipping and sawmills in Carlton and Thomson. The operations were carried over in what is now Jay Cooke State Park and in 1870 the clearing on the south side of the river, known as the “high landing” was the site for early logging operations. The logs were floated down the river to Fond du Lac, then boomed and rafted to sawmills in Duluth and Superior. In 1894 at least 15 sawmills were located along both sides of the St. Louis River. In 1895, the white and red pine forest of Minnesota and Wisconsin were estimated to have produced an exhaustible number of 40 billion feet of lumber, all of which would have forever disappeared, (Fritzen 1978).

The Duluth-Superior harbor is the number one grain importer in the Great Lakes area and it began in 1885 with a series of eleven grain elevators located on Rice's Point, an area now known as elevator row. In 1886, the Duluth-Superior Harbor began its reign as the largest wheat shipping port on the Great Lakes. In 1918, the number of grain elevators had increased to 25. Today, grain shipments are the port's third leading commodity, (Kellner et al. 1999).

As the logging industry came to an end the wholesale trade of coal, pig iron, and coking operations began. In 1902, Zenith Furnace Company opened businesses dealing with the listed three units. Heavy oils were then sold to Duluth Tar and Chemical where manufactured coal gas was sold to the City of Duluth. In 1911 the Universal Portland Cement Plant was built on land adjacent to the steel plant and four years later the U.S. Steel completed their construction of a fully integrated steel mill on 1,500 acres of land on the Minnesota shore of the St. Louis River.

Adjacently located to this site was the community of Morgan Park, established to house the steel and cement plant workers, (Kellner et al. 1999).

In conclusion to the development of Duluth-Superior Harbors' success the shipping industry remains one of the key segments of the economy for the "Twin Ports" area. 1,100 ships enter the Duluth-Superior Harbor each year, transporting 45 million metric tons of material. The principle cargoes being iron ore (40%), coal (40%), and grain (10%). The Duluth-Superior Harbor based on volume alone, ranks as the number one Great Lakes port, (Duluth Seaway Port Authority 2009). With an environmental concern over the past 100 years 69,500,000 cubic yards of clay and mud mixed with sand have been dredged from the river bottom and used as fill to create docks, replenish eroded areas on Minnesota and Wisconsin Points, and to form new islands. The amount of time it took to dredge the sands out was in comparison a relatively short amount of time in the years of 1870 to 1920. By 1902 17 miles of shipping channels had been excavated to a depth of 20 feet. By 1960, most channels had been dredge to a depth of 27 feet, a very significant change to this once-shallow freshwater estuary, (St. Louis River Habitat Plan 2002).

Historic habitat of the Lower St. Louis River

The first documentation of the river was charted by William Hearding in 1861. He described the land as a relatively shallow area, bordered by a variety of wetlands and riparian forest communities. The wetland vegetation that covered the area was filled with emergent marshes and floating peat islands; this making it very difficult to navigate through the lush vegetation. The surrounding forest was dominated by coniferous and mixed deciduous and coniferous trees. These specific forest types played a crucial role in the reduction and absorption of the spring snow-melt, resulting in less erosion of the shores. Also present was a thick layer of organic duff

on the forest floor. This aided in the slowed movement of water from land to the river, (DeVore 1978).

The effects of human interference

Due to the high level of human interferences in the Lower St. Louis River area much of the environment has changed from its original state. Dams, constructed up river in the now Jay Cooke State Park area, were built to generate electricity have affected the water flow, water level, and the amount of sediment transported by the river. These dams act as sediment traps and have been known to greatly decrease the rate at which the upper part of the estuary is replenished by sediment. The immense amount of dredging that has occurred over the past 100 years in the shipping channel, in addition to the natural phenomenon of isostatic rebound in the area, has resulted in an overall deepening of the harbor. As more shallow water habitats are transformed to open water, fetch increases, wave strength increases, and erosion of shallow water areas and shorelines increases. Commercial shipping and recreation boating have also been found to increase shoreline erosion as a result of wave action caused by bow wake and propeller wash. The main affects that can be seen in the Lower St. Louis River estuary are that of accelerated movement of water from the land into the river. Impervious surfaces have increased in the area in both residential and commercial development. The traditional method of storm water management has increased the volume and speed of the runoff to the tributary streams, ditches, and the river itself. Also, the attempts to farm and develop the clay soils within the watershed have led to extensive drainage of the surrounding wetlands. Today's early successional forests and deciduous forest do less to slow snowmelt and rain runoff than did the more diverse coniferous forests that were seen in the Early 1800s. This results in greater peak flows in streams

and greater erosion rates on the stream banks, thereby increasing the amount of sediment deposited in the estuary.

The current habitat of the Lower St. Louis River estuary

The Lower St. Louis River is the largest U.S. tributary to Lake Superior, traveling 179 miles from Sand Lake/Seven Beavers landscape before it meets Lake Superior above the twin ports of Duluth and Superior to form a 12,000 acre freshwater estuary. Since 1861, 3,000 acres of wetlands have been lost, this due to result of intentional filling. 4,000 acres of the estuary area have dredged or deepened for navigation purposes. The remaining 5,000 acres remain upstream and undeveloped. Developers on the other hand have taken notice to this area of land and have hopes of purchasing and developing the upper St. Louis River, (Myers, 2005).

The forest vegetation has changed dramatically from its original state; having been harvested at least twice and intensively burned at least once, the forest surrounding the Lower St. Louis River is now largely maintained in an early successional stage of aspen and birch forests. If it were not for widespread human instances (particularly the unnaturally intense, post-logging slash fires) spruce, fir, pine, maple, and other species would have re-grown after disturbances to form an irregular and varied patchwork of plant communities. The current forest can be seen lacking the natural variation of species composition, age, structure, and pattern that it once had, (St. Louis River Habitat Plan 2002). Despite the dramatic changes the Lower St. Louis River has been subjected to it can still be seen as a vital habitat for many of the aquatic plants that can be found in the wetlands and the riverine systems of the estuary. According to the Harding's chart of the estuary in 1861, the average depth of the estuary was between 10-15 feet, (St. Louis River Habitat Plan 2002). Air photo interpretations indicate that approximately 2,000 acres of

vegetated wetlands remain in the estuary; this includes wetlands either created or heavily influenced by human activity (St. Louis River Habitat Plan 2002). Because of the dramatic changes the wetlands have experienced the plants have over time become generally adapted to the fluctuations of the ever changing water levels caused by the seiche (back and forth “sloshing”) of Lake Superior, (St Louis River Habitat Plan 2002). Other vegetated areas surrounding the Lower St. Louis River estuary are the upland forests at Magney-Snively Park, these plants include the northern hardwood forest with spring ephemeral plants and old growth forest, and aspen-spruce-fir forests in the Superior Municipal Forest. The baymouth bars of Wisconsin and Minnesota (Park) points include sensitive beach dune plant communities as well as old growth upland red pine forests, (St. Louis River Estuary).

As for wildlife in the area black bear, wolves, mink, otters, white-tailed deer, and red fox can be seen, (National Conservation Association 2009). The estuary has become a primary nursery for the fish found in western Lake Superior, and is home to over 45 native fish species including walleye, lake sturgeon, muskellunge, northern pike, and smallmouth bass. There are also several species of native freshwater mussels found in the estuary, (National Conservation Association 2009). The habitat is also a critical migratory stopover and breeding area for songbirds, raptors, shorebirds, water birds, gulls, and terns as they migrate each spring and fall (National Conservation Association 2009). Many of the migrant birds will not fly over large bodies of water and thus are funneled to the Estuary at the far western end of Lake Superior. The Estuary contains large expanses of wetlands that provide important food sources and nesting habitats. The Estuary is also a rarity in that it includes open, sandy beaches for shorebirds. The diversity of habitats make the St. Louis Estuary is ideal for breeding birds as well (National Conservation

Association 2009). All of these factors taken into account are proof of the importance of the lower St. Louis River Estuary to the natural environment of the area.

Significance of the Lower St. Louis River to the surrounding habitat

Although in need of some restoration, the ecosystems of the Lower St. Louis River are regionally, nationally, and globally significant being the largest complex of estuarine wetland habitats in the Lake Superior Basin. The freshwater estuary and baymouth bar system are virtually absent elsewhere in the interior of North America. The specific plant communities, as rare and declining as they are, are supported by these baymouth bars and rely on the environment as a significant source of productivity for the entire Lake Superior ecosystem. The result is the estuary being endemic to the Great Lakes ecosystem. Also found no where else in the world are the Great Lakes white and red pine forests and should be viewed as an element of significance and worth of conservation. Of equal importance is the unusual habitat the lower St. Louis River creates for breeding and migratory birds traveling through the Lake Superior, Upper Midwest, and Great Lakes area on their pan-America journey, (National Conservation Association, 2009).

St. Louis River Citizen Action Committee vision and concerns for the lower St. Louis River

“The vision for the Lower St. Louis River is a thriving human community connected to the aquatic and terrestrial ecosystems of the river. The river ecosystems are diverse, productive, and healthy, with natural processes (such as hydrologic regimes, illogical productivity, and nutrient cycling) operating within the natural range of variation. The diversity of plants and animals and the composition of natural communities present at the time of European settlement is reflected in the sustainable ecosystem today,” (St. Louis River Habitat Plan 2002).

The St. Louis River Citizen Action Committee has stated specific ideologies and actions that must be taken by the residents of the surrounding environment. They ask that we recognize that what is to be managed is not the environment but the actions of humans operating within the environment, that we promote stewardship of the resource by local residents, users of the resource, and those concerned with it, as well as to protect, enhance, and restore ecological functions and maximize biodiversity without seeking to restore the estuary to its pre-settlement condition, (St. Louis River Habitat Plan 2002). Their vision for the St. Louis River is to continue as, “A thriving human community connected to the aquatic and terrestrial ecosystems of the river. The river ecosystems are diverse, productive, and healthy, with natural processes (such as hydrologic regimes, illogical productivity, and nutrient cycling) operating within the natural range of variation. The diversity of plants and animals and the composition of natural communities present at the time of European settlement is reflected in the sustainable ecosystem today,” (St. Louis River Habitat Plan 2002).

Outlined in the 2002 Habitat Plan for the Lower St. Louis River is a list of concerns and roles that we as residents and users will play in the restoration of the estuary. With the implementation of the extension of the Western Waterfront Trail there are specific threats and concerns that will arise and will need to be addressed. The Habitat Plan describes a threat in two parts: as a stress and a source of stress. “Stresses are the processes or events that directly impact the conservation targets. The sources are the entities that cause the stresses. Stresses need to be eliminated or minimized to protect the conservation targets, but this can only be done by acting on the sources of the stress. The main concerns of the SLRCAC are loss of habitat due to development, commercial shipping, and other sources and increased sedimentation due to development, forest management practices, and other sources,” (St Louis River Habitat Plan 2002). Our goal for the

implementation of this trail is to preserve this critical habitat as a designated greenway that will be preserved as a space to observe the given environment in a way as to not disturb the ecosystem and the functions that go on within. With this being stated every precaution outlined will be addressed. The varying stages and methods of construction that will be taking place will take into account the critical and valuable habitat that surrounds the Western Waterfront Trail extension. The goal is to establish a linkage to the one-of-a-kind environment that the Lower St. Louis River Estuary has become and it is our goal to allow people to see the value of this area through a practice of conservation appreciation.

Current preservation efforts

For nearly the past forty years conservation, preservation, and restoration efforts have been going on in the St. Louis River area. More than \$1.75 million in state and federal conservation dollars is available to buy Clough Island, also called Whiteside Island, to preserve the key habitat for birds, fish, and animals. The habitat plan calls for the island to become a wildlife sanctuary, or a possible refuge under the U.S. Fish and Wildlife Service. The island, more than 30 percent of which is wetland, is considered critical for the shoreline habitat. Other money may be available from private grounds. So far, however, developers, who plan a major recreation and housing complex for the island, have been unwilling to sell the land, (Myers, 2005). Fortunately, the Nature Conservancy has purchased 87 acres of the Wisconsin waterfront downstream from Oliver. This hilly section of land tends to erode, adding to the siltation in the river. This would have intensified if the land had been open for development. The parcel of land is now protected in state hands, also included in the purchased 87 acres of land is 35 acres of highly valuable wetlands (Myers 2005). The Conservancy currently owns two properties, as of 2003, on both

sides of the state line in the estuary, (National Conservation Association 2009). The Nature Conservancy and city of Duluth, as of 2005, were nearing the final stages of protecting the 2,000-acre Magney Snively forest in western Duluth under the city's Natural Acres Program. The forest will be the first big area permanently protected by conservation easements under the city program. An area along the river, called North Bay, also has been nominated for natural-area protection (Myers, 2005). The SLRCAC Remedial Action Plan, a “blue-print for recovery,” states Lynelle Hanson, the then director of SLRCAC, was developed in 1989 with input from 54 different state, local, and federal groups and agencies, (Myers, 2005). In 2002, SLRCAC published the Lower St. Louis River Habitat Plan, with support from the Conservancy and many others. This Plan outlines specific steps to preserve and restore the critical habitats of the Estuary. In Stryker Bay, located west of the Morgan Park community, Lynelle Hanson says the ongoing Superfund clean-up and cover-up will help restore a pollution hotspot and restore wildlife habitat, including that of wetland birds, (Myers, 2005). “There is some good work going on. But we have so much more to do,” Hanson said. “We've been blessed in a city and area that have so much great green space... but the pressures to develop those are increasing. Keeping those acres around as habitat is important for wildlife and birds and butterflies. It's important for us, for people as well,” (Myers 2005).

Currently there are many partners working together to preserve the habitat. They are, St. Louis River Citizens Action Committee, Minnesota Department of Natural Resources, Wisconsin Department of Natural Resources, Minnesota Sea Grant, Fond Du Lac Band of Lake Superior Ojibwa, U.S Environmental Protection Agency, City of Duluth, City of Superior, Minnesota Power, Minnesota Ornithologists' Union, U.S. Coast Guard, U.S. Fish and Wildlife Service, Natural Resources Research Institute – UMD, Minnesota Pollution Control Agency, Carlton

County Soil and Water District, 1854 Port Authority, Douglas and St. Louis County, and numerous private citizens and companies, (National Conservation Association 2009).

Recreation opportunities

The St. Louis River Estuary holds an abundance of diversity within its vast and complex habitats. The varying habitats range from baymouth bar complex to bedrock outcroppings to maple-basswood northern hardwoods to aspen-spruce forest types. As well an assortment of habitats there is also an array of wildlife communities and occurrences such as sturgeon spawning and common tern nesting.

The St. Louis River Estuary has a rich natural history beginning in the early 1800s when early native settlers harvested the estuary for its plentiful supply of wild rice. Following this period French and European settlers arrived to exploit the abundance of natural resources for export and profit. For years the forestry industry thrived as the areas old growth white pine forests were stripped across northern Minnesota and shipped through the St. Louis River. As the forestry era ended the industrial era began. During this period the estuary changed its habitat dramatically with immense amounts of soil being taken from the estuary through dredging. This opened up the estuary from a nearly un-passable bog to an open water area large enough for an export shipping industry to flourish. Unfortunately, the environment was not taken into account during these years and the estuary suffered in health. Resulting from environmental neglect the U.S. Steel site located in southeast end of Morgan Park fell into disarray and has since been deemed an un-useable superfund site. Even though the St. Louis River Estuary has been through some

difficult times the area still flourishes with its diverse habitat, wildlife, and recreation opportunities.

Through the University of Minnesota Duluth's Urban Analysis GIS course, students specifically investigated the best route scenario regarding recreation and connectivity between neighborhoods and communities. In particular, the students found that the St. Louis River Estuary recreational identifier could notably be portrayed as unique site for bird watching. Much of Duluth focuses on the Hawk Ridge and Park point areas when it comes to bird watching but the Estuary can be seen as a site just as valuable, unique, and interesting. A 2001 U.S. Fish and Wildlife Service report detailed that while the average U.S. birding participation rate for adults was 22%, Minnesota's rate was 36%. These national figures place Minnesota 5th overall behind Wisconsin, which boasts a rate of 41%. This gives northeast Duluth a local and regional significance when the recreational focus is that of bird watching. The Western Waterfront Trail extension would offer access to excellent year-round birding, allowing recreational users close proximity to the varied habitat types. An example can be seen in northeast Duluth where the seasonal funneling of raptors occurs, creating an area with outstanding bird-watching potential.

Nature Conservancy of Minnesota states, "The St. Louis Estuary is home to over 230 bird species and is a critical migratory stopover and breeding area. In addition to a multitude of songbird species, large numbers of raptors, shorebirds, water birds, gulls, and terns migrate through the area each spring and fall. Several factors make the Estuary an important stopover site. Many migrants will not fly over large bodies of water and thus are funneled to the Estuary at the far western end of Lake Superior. The Estuary contains large expanses of wetlands that provide important food sources and nesting habitat. The Estuary also is a rarity in that it includes

open, sandy beaches for shorebirds. The diversity of habitats make the St. Louis Estuary ideal for breeding birds as well,” (2009).

Spatially, the bird-watching potential could pass through seven different land cover classes including:

1. Open water
2. Emergent Herbaceous Wetlands
3. Evergreen forest
4. Deciduous forest
5. Pasture
6. Developed open space
7. Developed, low intensity

Also noteworthy, the trail could also pass through Stewart Creek and Morgan Park Creek (2 branches) which provide riparian zones of potential bird-watching interest. The mapping done specifically looking at recreation proposed an area of 44.1 percent that would allow access to river/estuary frontage. The routing will maximize spring waterfowl migration viewing and spring and early summer waterfowl nesting observation. Autumn observation of raptors may also be assisted by the large stretches of open areas through which the proposed trail passes.

Other recreational features that are worth taking a look into is the availability to connect with other trails located in the west end of Duluth. There are a total of four adjoining opportunities to connect with other trail systems. These trails being the Willard Munger Trail, Magney Snively Trail system, the Superior Hiking Trail, and the Western Waterfront Trail. Also, the ability to

connect with existing park space will extend the possibilities of use and multiple uses and will allow residents to take advantage of various recreational elements.

Specific examples include:

1. The public landing in Smithville provides alignment between the possibilities of multiple use-trail and water based recreation
2. A spur trail could link the Western Waterfront Trail to the parks green space in the northeast corner of the Morgan Park neighborhood (the spur could follow an existing trail cut over the WLSSD Sanitary pipelines); this will create a recreation connection for one of the communities along the route
3. The southeast corner of Morgan Park trailhead (end/start) makes a connection at the community club with hopes of utilizing the direct connection

Establishing the trail as a site for potential bird watching is the main focus in identifying a recreational purpose. Other recreational features have also been identified such as connectivity with other established trails, communities, and park space. The proximity of these recreational spaces will extend the possibilities of use and multiple uses existing along the proposed extension of the Western Waterfront Trail.

Adjoining recreation opportunities

1. Adjoining wildlife areas: Jay Cooke State Park, Magney-Snively Park and Spirit Mountain, North Bay, Superior Municipal Forest (4,000 acres), Park Point, and Wisconsin Point. The conservancy's "Worthington" property is located on the river in Oliver, WI, and its Magney Forest property is located adjacent to City of Duluth land on Stewart Creek in Magney-Snively Park.

2. In Duluth, following Grand Avenue going west there are many additional recreation opportunities one can use, they are: The Munger State Trail, Western Waterfront Trail (W 73rd to Riverside), Smithville/Munger Landing, Boy Scout Landing, North Bay overlook, Perch Lake Fishing Pier, Chambers Grove Park, Jay Cooke State Park., Cross the Oliver Bridge to the Village of Oliver boat launch and Worthington property and Superior Municipal Forest (also accessible from Superior).
3. Coming from Skyline Parkway, going west, recreational users will have access to, Jay Cooke State Park, Magney-Snively Park., cross the Route 2 Bridge to access Billings Park boat launch and Superior Municipal Forest south of Superior, cross the Aerial Lift Bridge in Duluth and drive to the end of Park Point to access the trails and beaches of this remarkable Baymouth bar and its unique plant habitats, cross the Route 53 Blatnik Bridge to Superior, left on Moccasin Mike Road, left on Wisconsin Point Road, (National Conservation Association 2009).

Economic Issues and Community Impacts

During the development phase of a new trail, local residents will often have a wide range of concerns about the trail's impact on their community. Landowners, for instance, may be uncertain if the trail will have a positive or negative effect on their property values. Residents could be apprehensive about the new flows of people that the trail will bring through their neighborhood. Homeowners along the trail may wonder what responsibilities, if any, they have to the trail's safety and maintenance. This section will cover these issues and more and will

demonstrate how the implementation of a new trail should be seen as a great opportunity for the Morgan Park neighborhood and the City of Duluth.

Economics

This section will start by covering the anticipated economic impact that expanding the Western Waterfront Trail will have on both homeowners and businesses in the community. In a study of the Luce Line State Trail west of Minneapolis, Minnesota, about 90 percent of landowners adjacent to the trail felt that it increased or had no affect on their property values. Like in Morgan Park, the trail was an unused railroad line before its implementation, (Mazour, 1988). In another study, properties adjacent to the Mountain Bay Trail in Brown County, Wisconsin sold faster and for an average of 9 percent more than similar properties not adjacent to the trail, (Brown, 1998).

However, it is important to note that trails along narrow corridors don't have as much of an impact on land values as open park space does. Because of this, any increase in a property's value is likely to accrue from its accessibility to the linear trail, rather than from views of nature and the trail. The first study on a trail's impact on property values was undertaken for two trails in the San Francisco Bay area in 1978. Two trails studied were the LaFayette-Moraga Trail which was developed from an abandoned rail line, and the Alameda Creek Trail which was a part of a flood control project. Residents along these trails were asked if their property values have changed since the trails' development. 53% of residents near the LaFayette-Moraga Trail that responded said the trail had no affect on their property value, while 77% of residents near the Alameda Creek Trail that responded said the same thing. In brief, it is likely that the trail alone will only cause a slight increase in property values near and adjacent to the trail. However, there could potentially be some instances where land values rise up to 25 percent. It is very unlikely that the trail will reduce anybody's land value, though, (Crompton, 1999).

Aside from the economic benefits of property values, waterfront trails also play an important role in mitigating flood damage and improving water quality. A city can save more money in the long run by not redeveloping shoreline property. For example, the estimated value of the water filtration credited to wetlands along a three-mile stretch along Georgia's Alchoy River is \$3 million every year, (Lerner, William, 1999). Seeing the importance of the wetlands' water filtration capabilities is crucial to properly managing the water quality of the St. Louis River estuary.

Expanding the Western Waterfront Trail into Morgan Park could also make it the neighborhood's most important commercial asset. Similar communities in the United States have experienced increased tourist and recreational spending after the implementation of new trails. In Leadville, Colorado, a declining mining town of only 2,700 people, the opening of the Mineral Belt Trail resulted in a 19 percent increase in the city's sales tax revenues – much of that coming from tourists visiting the town specifically to ride the trail, (NTEC, 2002).

Trails are not only a boom for tourism; they can also promote new businesses to areas near them. Many companies seeking a site for their corporate headquarters have cited that access and availability of trails is an important factor in choosing one location over another. For example, Ruby Tuesday Inc. moved its Support Center to Maryville, Tennessee, a city of about 23,000, because as chairman and CEO Samuel E. Beall III stated, "I was very impressed with the beauty of the park, which helps provide a sense of community to this area, as well as the many benefits it provides to our more than 300 employees," (NTEC, 2002). Another example of a trail inspiring commercial investment is in Milford, Delaware, a small city of about 6,700 residents, where the Mispillion River Greenway inspired downtown reinvestment, with more than 250 people working in a district that was nearly vacant a decade earlier.

The extension of the Western Waterfront Trail, coupled with the addition of the new disc golf course, would make Morgan Park a central hub for outdoor recreation in West Duluth. In addition, with its proximity to the Willard Munger Trail and the Indian Point Campground, the new trail would improve the neighborhood's connectivity to other recreational assets in the area. The benefits of extending the Western Waterfront Trail would go beyond attracting new people to the area – it is a key element in rebuilding the economy of Morgan Park as well as the City of Duluth as a whole.

Landowner Liability

Some landowners might wonder if they have any responsibilities to the trail or if they are liable for injuries that trail-goers incur on their property. The short answer to both matters is: no. First of all, garbage bins would be placed throughout the trail and could be marked on trail maps. City maintenance would be responsible for general upkeep of the trail and emptying the trash containers. Landowners adjacent to the trail are not required to clean trash or forest debris that exists on their section of the trail. However, volunteering efforts could also be organized to enhance the quality of the trail beyond the general maintenance that the city would be responsible for.

As for injury liability, landowners adjacent to the trail are not responsible for injuries that occur on their property. The State of Minnesota has a recreational use statute, §604A.20 to §604A.27, which protects private land owners that allow for free use of their land for public use.

Recreational use statutes are generally intended to promote public recreational use of privately owned land. This means that even if a landowner makes it permissible for trail-goers to use part of their land along the trail, such as a bench or a dock on their property, that landowner does not extend any assurance that the land is safe and is not responsible for injuries. It should be noted

that this statute applies specifically to recreational use, and any other use (e.g. commercial) is not applicable.

Crime

Some residents may be concerned that the construction of the Western Waterfront Trail into Morgan Park could facilitate the movement of economically disadvantaged individuals, thereby increasing crime in their neighborhoods. While it is true that the construction of the trail will encourage flows of people that are not from local neighborhoods, converting an unused rail corridor to a trail actually tends to decrease crime rates by cleaning up the land and attracting individuals who would use the trail for transportation and recreation, (Tracy, Morris, 1998).

Four separate studies, from several different U.S. states, conclude that rail-trails do not increase crime, and most residents never experience any crime-related problems after a nearby trail opens. In the Minnesota study, residents adjacent to the Douglas Trail near Rochester and the Heartland Trail near Leech Lake experienced much less crime than was anticipated prior to construction of the trails, (Seattle Engineering Department, 1987). In the Washington study of the Burke-Gilman Trail in Seattle, local police said that the separation of a criminal from his or her escape vehicle is a primary deterrent in crime. Therefore, they do not expect crime to be a problem as long as the trail remains inaccessible to motor vehicles. Furthermore, the rate of vandalism and break-ins to the property adjacent to the trail was well below the neighborhood average, (Moore, 1992).

The National Park Service studied neighborhoods near the Heritage Trail in Iowa, the St. Marks Trail in Florida, and the LaFayette-Moraga Trail in California. The majority of property owners interviewed reported that residing near a trail was better than they originally had expected and

was also better than living next to abandoned rail corridors. Most adjacent property owners reported that trespassing, burglary, and vandalism rates had decreased or remained the same since the trail's opening, (Moore, 1992). In the fourth study, residents near the Mohawk-Hudson Bike-Hike trail in New York were given surveys regarding the problems the trail had caused. The greatest problem the study identified was litter, in which 14% of respondents claimed it was a "major problem". However, this contrasts sharply with 41% of the respondents who claimed that litter was, "not a problem at all."

Geographic Information Sciences and classroom components

The students in GEOG5995 - GIS in Urban Analysis were introduced to the Western Waterfront Trail Extension Project as a 3 week exercise in GIS project planning. Nine students were divided into 3 groups to address seven objectives of a proposed trail:

- Minimize impact on the environment
- Access to river, natural areas
- Recreational opportunities, commuter possibilities
- Make Logical Connections to neighborhood
- Optimize Cost
- Address ADA access and portion of route if possible
- Identify areas of notable views

Bill Majewski, former City of Duluth planner, presented a 45 minute history and introduction to the Western Waterfront Trail project to the class. He represented the viewpoints of the stakeholders of the Morgan Park community. Following Majewski's presentation, the student

groups were assigned objectives to address. The in-class GIS exercise involved problem and project definition. Bill Majewski and Stacey Stark interacted with the students in their discussion groups as they addressed the following questions.

Define the problem. What is the question? What are your hypotheses, if any? In what format do you want the answer? What are the products of this analysis (i.e. maps, numerical results, etc) What are the individual spatial questions you will ask? What data are needed for your analysis.

Each student group was asked to prepare maps and a report with planning maps addressing their assigned objectives and suggesting a trail route. They then presented this information to the class and to Samantha Follis. The 3 week assignment follows.

1. Define data sets you will use (complete table)
2. Describe data you think would be useful to your study, but cannot include and why.
3. Outline your methods (be as detailed as possible!). Include **at least 3 different** GIS Analysis methods (overlay, query, buffer, intersect, etc) to answer **at least 5** spatial questions. If there are more than 5, describe the remainder briefly.
4. Define your results (or metrics) and what you intend to demonstrate.
5. Create *draft* maps and tables (if applicable) demonstrating output.
6. Present the report to the class on March 9, 2009.

The student reports and maps are attached as Appendix A. The names have been removed from the reports.

The class was unable to incorporate ownership information. When the proposal was written, it was understood that the City of Duluth had completed the parcel delineations for the trail expansion area. This was not the case. A list of tracts in the area was compiled, but because the proposed extension primary falls on the railroad bed and existing easements, a detailed analysis of ownership in the area was not completed.

Following the student presentation, one student employee working for GISL was made available to work with Samantha to create updated maps as needed. Maps were made to simplify the students' suggestions and a poster size "planning map" was given to the Morgan Park Community Club for their use.

This project was valuable in the classroom and the experience received good feedback from the students. In summary, this project benefited students with a situation that can be applied to a real life scenario and resulted in a trail route proposal trail route for the continuation of the Western Waterfront Trail from Riverside to Morgan Park. The baseline analysis and planning maps will support Morgan Park Community in developing their own plan for the trail.

Western Waterfront Trail Options

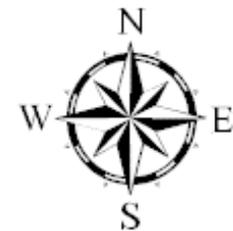
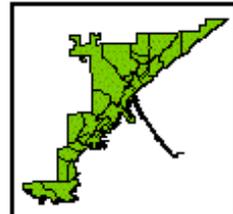


View Along the Trail

- Bridge
- Creek
- Grade of Trail
- Munger Landing
- Old Train
- Small Creek
- View of Bong Bridge
- View of Delta
- View of St. Louis River
- Wooded Natural Area

Attractions

- Type
- Community Center
 - Marina
 - Park/Baseball Fields
 - Public Access



Data Created: April 11, 2009
 Data Sources: DNR Data Desk and the GSI.

Group 1. Addressing ADA accessibility and scenic view points

Western Waterfront Trail Extension (unedited)

The original plan in the 1978 Western Waterfront trail report was for a 9 mile track along the coast of the St. Louis river that would eventually link up to Jay Cooke Park in Carlton county. Currently the track only extends four kilometers from 63rd avenue. west until it ends abruptly at Spring Street. The goal of this project was to figure out the best option for extending the trail alongside the St. Louis River until Morgan Park. Our specific focus was to assess the best ADA accessible route and mark the best views along the way.

In order for our trail to be completely ADA compliant the path must meet standards. The slope must not extend over 50 feet at a 6-8 degree slope, 30 feet at a 9-10 degree slope, and 5 feet at over 11-14 degrees. Fortunately the proposed path along the St. Louis River has low lying and generally flat terrain. More specifically there is an old railroad that is not being used anymore that follows from Spring Street down to Morgan Park. The railroad grade is wide enough to fit the ADA standards of 36 inches width and a max run of trail slope that is fully compliant with ADA standards.

The old railroad crosses over a wetland area where the path narrows and old bridges may have to be reconstructed to create a safe new path. There are two options, either follow the railway across the wetlands, or go inland around the wetlands. During our field work we examined the two options, if you go around the wetlands there is going to be slope gradients above fourteen degrees, resulting in non-compliant ADA standards. The alternate trail connects to sanitary lines that serve as an existing pathway until it reconnects back to the existing railway line.

The proposed Western Waterfront trail extension traverses many invaluable resources that will be encountered en route. There are views of historic trains, the St. Louis River, and the Morgan Park mudflats. The alternate route around the wetlands is a great option for an alternative scenic route. The alternate trail around the wetlands encounters a view of the aerial lift bridge, a dense stand of birch trees, and views of the hillside in West Duluth. Over a hundred species of birds can be encountered along the banks of the St. Louis River and there is a view of an Eagles Nest on the proposed western waterfront trail extension.

Methodology:

The first step was to create a geodatabase with all of the necessary layer files. In order to perform slope analysis for the ADA standards we downloaded a ten meter digital elevation model from the USGS. Another key component was the Aerial photography needed to show visual reference, this was collected from the National Agricultural Imagery program. Layers needed to set trail parameters included data from the city of Duluth; public parcels and wetlands. The waterfront extension was digitized from a line feature class that we created in our geodatabase. The second part of our methodology was field work. After performing slope analysis and digitizing a proposed trail, we entered the spatial point data of our proposed trail into a GPS unit and went into the field to examine the surroundings. We found conclusive evidence that the alternate route around the wetlands will not be ADA compliant. The original slope range reached values as high as ten percent which would be acceptable in the case that it does not extend greater than 30 feet. The scale at which we did our analyses was 30 ft. Each pixel represented 30 feet so there was no way to tell the difference in values within one 30 ft. pixel. According to the map this alternate

route would be a close call for ADA compliance. There was no way to know the details without going into the field.

The Field work cleared up the issue as we encountered very steep terrain within these 30 X 30 areas. The alternate slope around the wetlands encounters slopes greater than fourteen percent; this exceeds the threshold of ADA compliance. In order to fit ADA compliance the trail must follow the existing railway that extends through the wetland area. The field work was also necessary to assess the different views encountered in crossing the Western Waterfront train. We used a digital camera for photo documentation of our different views and a Garmin GPS to record the spatial coordinates of the view site.

Analysis:

ArcGIS software was used to perform trail analyses. We created a polygon feature class to clip all of the layers to our designated area. Next we performed slope analyses on the digital elevation model to find the different slope gradients along the proposed trail extension. Contour lines were created in order to plan the most stable routes. Raster calculator was utilized to find out whether or not the length and slope of trails were ADA compliant.

There are three options to consider when creating this trail. The first option is to follow the old railway and fit with ADA compliance. The second option is to create an alternate route around the wetland area. The second option follows alongside Clyde road, through steep terrain, and down the existing sanitary line path. The third option is to create both trails. The third option

would allow the extension to be fully ADA compliant as well as provide an alternate route with a great view of Birch trees, hills of West Duluth, and Bong Bridge.

Group 2. Addressing Recreational opportunities, connection to neighborhood, and optimizing costs

Recreation Plan for the Western Waterfront Trail Expansion (unedited)

This report will describe a proposed trail route plan for the expansion of the Western Waterfront Trail in West Duluth. In addition to highlighting recreational opportunity, this overview will provide a plan for neighborhood connectivity and an awareness of cost; a full cost-benefit analysis will not be presented, however, cost features will be identified for further consideration.

The St. Louis River Estuary has rich natural and cultural history. The use of the term “Estuary” is usually reserved for salt and fresh water intersections, thus its’ use underscores the biological richness of the area. The meeting of Lake Superior and the St. Louis River provide a rich diversity of habitat types, from a baymouth bar complex to bedrock outcroppings, from maple-basswood northern hardwoods to stretches of aspen-spruce forest types. The wildlife communities are historically rich as well, from Sturgeon spawning to Common Tern nesting, the biological diversity is significant. The discovery of wild rice in the Estuary, “*The food that grows on water*” by the Ojibwe people (Benton-Benai, 1988) is the first documentation of the cultural and natural history intersect of the modern era; incidentally, the site of this historic discovery is the shoreline adjacent to this proposed trail route. A more recent part of this natural and cultural history is the heavy industrial period along the estuary shores in the mid twentieth century; the US Steel factory and this period of industrialization had a large impact on the

estuary. This impact is identified in the more recent 1983 U.S. EPA Superfund site designation of a large portion of the Minnesota shoreline of the Estuary. And despite the negative impact, a more recent chapter in this complex history is the important effort to link people and nature.

West Duluth is rich with trails that help meet this goal, including, but not limited to: the Willard Munger Trail, Magney Snively Trail system, the Superior Hiking Trail, and the Western Waterfront Trail.

An expansion of the Western Waterfront Trail (WWT) will increase the possibilities for people to interact with the Estuary in a meaningful way. The purpose of this paper is to document a proposed addition to the Western Waterfront Trail that considers three specific design elements: Recreation opportunities, logical neighborhood connections, and cost consideration. Appendix A outlines the route we have chosen for the trail extension. The trail segment we propose is 2.77 km (1.7 miles).

Given the abundance of trails in the area an effort was made to identify a potential recreation niche for this proposed stretch of trail; while fitness and social interaction have been identified as possible recreation elements of focus, and activities such as skiing and biking highlighted as possible “best uses” for the trail, the unique recreational identifier used in this analysis is bird-watching. Duluth is known for its’ good birding, but much of the attention is focused upon Hawk Ridge and Park Point. A 2001 U.S Fish and Wildlife Service report detailed that while the average U.S. birding participation rate for adults was 22%, Minnesota’s rate was 36%. These national figures place Minnesota 5th overall behind Wisconsin, which boasts a rate of 41%. Given the noted quality of birding in the Twin Ports and the noted regional significance of the

recreational endeavor, bird-watching was deemed to be an excellent recreational focus. The WWT offers access to an excellent site for year round birding. The close proximity of varied habitat types, the open-water migratory flyway, and the seasonal funneling of raptors, most notable in NE Duluth, creates an area with outstanding bird-watching potential. The Nature Conservancy of Minnesota sums up the bird watching potential in the following passage:

The St. Louis Estuary is home to over 230 bird species and is a critical migratory stopover and breeding area. In addition to a multitude of songbird species, large numbers of raptors, shorebirds, water birds, gulls, and terns migrate through the area each spring and fall. Several factors make the Estuary an important stopover site. Many migrants will not fly over large bodies of water and thus are funneled to the Estuary at the far western end of Lake Superior. The Estuary contains large expanses of wetlands that provide important food sources and nesting habitat. The Estuary also is a rarity in that it includes open, sandy beaches for shorebirds. The diversity of habitats make [sic] the St. Louis Estuary ideal for breeding birds as well. (Nature Conservancy, 2009)

We have addressed this bird-watching potential spatially in the following ways:

- The trail extension passes through as many cover types as possible to correspond with as many avian habitat types; for example, you will note the trail winds its' way through/and adjacent to seven different land cover classes including:
 - Open water
 - Emergent Herbaceous Wetlands
 - Evergreen forest

- Deciduous forest
 - Pasture
 - Developed open space
 - Developed, low intensity
- In addition to land cover classes, Stewart Creek and Morgan Park Creek (2 branches) are crossed in the proposed trail providing additional riparian zones of potential bird-watching interest.
 - Approximately 44.1 percent of the proposed trail provides river/estuary frontage. This routing will maximize spring waterfowl migration viewing and spring and early summer waterfowl nesting observation.
 - Autumn observation of raptors may also be assisted by the large stretches of open areas through which the proposed trail passes.

Beyond the bird watching potential of this trail plan, other recreation features have been identified and can be noted on the accompanying maps. A deliberate effort was made to identify and connect with existing park space; the proximity of various recreational elements will extend the possibilities of use and multiple uses. Three examples of this include: one, the public landing in Smithville provides alignment between the possibilities of multiple use—trail and water based recreation. Two, a spur trail will link the WWT to the park green space in the NE corner of the Morgan Park neighborhood (the spur will follow an existing trail cut over the WLSSD Sanitary pipelines); this will create a recreation connection for one of communities along the route (see “connectivity” below for additional information on this effort). And finally at the other end of the Morgan Park connection (SE corner of the neighborhood) is the proposed

trailhead (end/start site); this site was chosen for a deliberate connection to the community club. It is our hope that community club recreation programming will utilize this direct connection.

Neighborhood connectivity was another important consideration for the proposed trail. The trail is designed to make access easy for both local residents and visitors. Four key sites were identified for connection with the trail. Firstly, the proposed trail intersects Spring Street; this street provides access to the Spirit Lake Marina from the Riverside neighborhood. Street parking is available at this site. Secondly, the boat landing at the end of Clyde Ave. connects with the Smithville neighborhood. This connection point would provide an access point to the trail as well as free public off-road parking. Third, the noted footpath between the proposed trail and the park space within Morgan Park provides a neighborhood connection as well as the already noted recreational connection. And lastly, the 88th Ave. West trailhead immediately adjacent to the Morgan Park Community Club was identified as a connection point with available public off-road parking.

Overall cost was the last of the objectives considered in this trail extension project. While no figures were computed directly, efforts were made to reduce potential costs. For instance, the topography of the area was considered for its effect on construction costs. Areas that were deemed too steep were avoided to reduce costs by avoiding switchbacks and other erosion control methods. Exposed Bedrock was not identified in the area, which avoids other potential trail construction costs. The trail itself passes through or is adjacent to seven different land cover classes as listed previously, including Emergent Herbaceous Wetlands; proximity to these wetlands was deliberate for maximizing bird watching potential, and avoidance of direct crossing

areas that contain wetlands. To avoid possible environmental damage and associated costs, a multi ring buffer was created with 10 m. intervals. This 50 m buffer shows the trails' overall proximity to adjacent features. This allowed identification of potential concerns and the trail was then designed to avoid these areas. As noted previously, three creeks intersect the proposed trail route; each of these sites will require a bridge; this additional cost is deemed acceptable because the crossings may enhance the recreational appeal of the trail.

In conclusion, the proposed WWT extension plan outlines how bird-watching is an appropriate focus for this trail given the uniqueness of the St. Louis River Estuary. In addition, this trail will create a significant recreational resource in conjunction with the other trail resources of the area. In terms of access, this plan shows how recreation opportunity and neighborhood connectivity can be mutually satisfied by one trail route. Finally, while not itemized for cost, this plan has highlighted both cost avoidance and non-avoidable costs (costs that will serve the recreational outcomes for the trail).

Group 3. Addressing minimal environmental impact and accessing natural areas.

Western Waterfront Trail Extension (unedited)

The Western Waterfront Trail Extension has been proposed since the 1970's and was never implemented due to a number of factors. These factors include, but are not limited to: minimizing environmental impact, allowing access to the river and natural areas, connecting the surrounding neighborhoods, optimizing cost, addressing accessibility concerns for the handicapped, and giving trail-users notable views of the surrounding landscapes. Not until recently was a technology available that could be used to address all of these concerns. This

technology is called GIS, which is short for Geographic Information Systems. With this technology our group, along with two others were able to tackle these six problems. Our group focused on the first two factors listed above. After having listened to guest speaker, Bill Majewski we began our project with some knowledge regarding zoning and railroad restrictions in the proposed area.

The data that we used in our analysis is as accurate as possible. All of the data layers are projected under the same coordinate system and projection. The projection that we choose was Transverse Mercator and the coordinate system that we used is NAD 1983 UTM Zone 15N, which defines the majority of Minnesota's area. All layers are seamless and overlay with no visible errors. Although error is inevitable in all maps, we worked on eliminating as much error as possible. All of our raster data analysis is based off the 10 Meter Digital Elevation Model, which is one of the most accurate DEM's available from the USGS Seamless Server Website. Error for each cell is 10 meters, which is considerably better than the commonly used 30 Meter DEM. When our group created the optional extension paths we digitized at a scale of 1: 5,000 and a scale of 1: 15,000.

Our group chose to undertake several methods to input, analyze, edit, and output our data. We are very confident that all of our methods produced correct results except for our weighted overlay, which became skewed due to re-sampling inaccuracies and cell-size differentiation. The other methods produced results that we expected after looking at other layers. Our group has only a year's worth of GIS experience, so we stayed within our knowledge level in our analysis

and choose methods that we have done in previous GIS classes at the University of Minnesota Duluth.

The data that we used came from a variety of sources, with the majority coming from our schools server. From the data that came from UMD's X Drive, the main source was from the GISL_data folder. Other folders used from the X Drive were Classes and drs. Our 10 Meter DEM was collected from the USGS Seamless Server website and focused on the trail extension area. We collected the data by adding it into ArcMap and then viewing the data's spatial extent and attribute table. If we found no applicable information in the attribute table we chose not to use the layer in our analysis. Two exceptions to this were with our Plant Communities and Soils layers which we had to find associated tables to join with the data. This allowed us to better understand the symbology and attribute information. The Plant Communities table was found under X\Classes and is an Excel Spreadsheet (xls). The Soils table was created by using a program called Soil Data Viewer. This program allowed us to select the 13 soil types in our study area and then gave us an erosion rating to put in our table.

In addition to collecting data and creating the final map, the analytical part of our project involved several kinds of procedures. We created a slope map from our 10 Meter DEM by using the Spatial Analyst Toolbar. This layer was used in other procedures to derive the erosion susceptibility and our weighted overlay to designate the best place for the trail based on several land conditions. We created an 8 meter buffer around wetland areas so that the trail would not be too close and therefore produce a negative environmental impact. We were originally going to create a buffer around residential neighborhoods and railroad tracks (in-use), but we chose not

to because we had no values to use as a buffer. Our weighted overlay did not come out as planned as we encountered errors based on our data's differing cell sizes and skewing from our resampled data. The weighted overlay, if done correctly, would have shown the best possible area to construct the trail based on several layers regarding the areas topography. The more and more layers you use, the more accurate your results will be. Although if you use too many, then the chances of putting the trail anywhere will most likely vanish due to the increased number of factors being analyzed. Our overlay, which does not represent the data accurately, was done by using the Duluth_Landuse, Slope, Soils, and Wetlands layers. Erosion Susceptibility was completed by reclassifying our Slope, Land Use, and Geomorphology attributes based on values that we knew from another GIS class. After the three layers were reclassified based on their attributes susceptibility to erosion we weighted all three of them so that the most susceptible layer to erosion would have the most weight. The output of this procedure shows 50x50 meters cells that have erosion susceptibility ranging from low to very high.

Our final procedure was to display possible trail extension paths. We did this by digitizing a line feature class based on layers that we calculated previously. We choose to output three trail extension lines, instead of showcasing only one of the many possibilities. The trail closest to the river runs along the path of the railroad tracks which are no longer in use. The trail ends by looping into an open space in order to avoid erodible soils and wetland. The second possible trail extension goes westbound on Clyde Avenue for a short distance and then cuts through the forest. The trail minimizes the amount of trees that would have to be cut down for construction by traveling through areas that already have existing paths or brief open spaces. The downside to this trail path is that it does go through strips of moderate to severe erodible soils and areas

with intermediate erosion susceptibility. The third possible extension path detours westbound on Clyde Avenue and then goes southwest on Grand Avenue until Hulett Avenue where it goes due south running through an already constructed path. The trail then goes through the northern part of the Morgan Park community before connecting with a park adjacent to the river and surrounding wetlands. The trail then continues the same path as the first option. The three paths are tailored to different users, depending on whether the user enjoys an urban setting, a forested area, or a river/wetland view.

Although GIS is a considerably helpful tool in helping us analyze dozens of data layers, the program cannot address everything. Our analyses were subjective to what we found important in minimizing environmental impact and allowing access to natural areas. Our group defined natural areas as places that are notable points of interest along the trail which trail users may use to engage in other activities on/off the trail (such as canoeing, kayaking, fishing, bird watching, legal flower picking, etc.) Your definition of natural area may differ from ours which makes our analyses subjective to those in our group. Also in plotting access points, it would have been nice to have qualitative information from locals and people that regularly hike around these areas. Individuals that have been to the location and seen it with their own eyes can supplement information that the GIS cannot interpret with data layers. Although our group has high confidence that our analyses were run correctly, we cannot be entirely sure that the data we retrieved from UMD's server is up-to-date or errorless in their computations. We hope that these maps can act as a reference when constructing the trail extension. Although the maps are static in their print form, our GIS program can perform additional analyses and add more layers if you consider it necessary to do so.

Volunteer, Construction, and Maintenance

The contribution of volunteers for the construction of the extension of the Western Waterfront supports the strategic goals and missions of the support contributors such as LISC and the Community and Regional Research board. With the aid of volunteers we will be able to create an informed group of individuals that can communicate and organize to accomplish the goal, mission, and tasks at hand. Volunteers can help build visibility for the participating organizations in the Morgan Park community. Volunteers will also leverage the capacity in terms of accomplishing the goal of trail completion. They will also produce financial savings to the greater community and city of Duluth. As a result of involvement volunteers are also more likely to play an active role in the project and become potential donors.

Volunteer Coordinator

The tasks associated with performing and accomplishing the project will require the project coordinator to hire a volunteer coordinator. Judy Gibbs, whose credentials include work on the Superior Hiking Trail and Hartley Nature Center has verbally committed to apply for hiring and has outlined her duties and a six month pay request of an estimated \$6,000.

Gibb's duties would include designing and giving presentations to civic, religious, educational, adult, youth, business, groups to educate about the project and to create support (defined as community buy-in, volunteers to work on the project, or for financial contributions/materials, networking).

Make timely/weekly progress reports to all entities involved such as project coordinators (LISC), city staff, interested groups and individuals, local and state media, and all volunteers who have participated.

Utilize a website or blog and maintain e-mail/database to announce upcoming projects and dates, track volunteer hours for recognition and grant reporting, publicly thank people directly involved in the project, and educate the community.

The volunteer coordinator will be required to allot for flexible scheduling options and work dates for when volunteers are available. Gibbs has seen a trend in volunteer participation throughout the summer months. During the work week summer youth and school groups as well as retired citizens are best suited for these times. For evenings and weekends when work is not being done all other volunteers can usually be available for these times. During the months of May and June a high turn-out rate can be seen. July and August is the lowest turn-out rate as the summer months get warmer and people tend to spend more vacation time during these times. Following these months September and November can be seen as the highest-turn out rate as residents return to the community as work and school begins again.

The volunteer coordinator is to be knowledgeable in the science and/ or craft of trail building. They must have the ability to understand the tools used and safe usage procedures to educate volunteers. The goal must be to create a trail with the ideology for long term sustainability with awareness to sensitive habitats in the natural environment, specifically wetland areas. They will always be required to work with adjacent homeowners to build and maintain supportive environment. Lastly, they are to be flexible and work with the job skills of the people on hand.

When working on projects like trail construction with volunteers it is mostly about people management and a little about trail building. Finding people, who want to help, make sure there is a tool in everybody's hand, thanking them profusely, keeping track of who did what and when and maintaining communication with superiors. Trail building is in there some place but many times the people that want to help on projects already have a little (or a lot of) knowledge, so one can learn from the volunteers. "When I started, I was fortunate enough to have really great people who came out to help and taught me the craft. And so I learned to approach it all by waiting to see who showed up that day, and working with the strengths of those who were there," says Judy Gibbs. "Of course, you also get many folks who come out once, and sometimes in large numbers, and that is when the time for unskilled free labor for moving large amounts of gravel or moving rocks, cutting brush, etc."

Volunteer recruitment and benefits from becoming a volunteer

Volunteers who will be recruited will be those who believe in the mission of the organizations and communities that may benefit as well as those who play an active role in the community and have an affiliation with areas such as business development or recreation opportunities. These places include areas such as Morgan Park, Riverside, Gary New Duluth community members and trail users. There are also specific user groups who will benefit and they are residents of Morgan Park and Duluth as well as seasonal tourists. Local Duluth businesses and outfitters as well as the Duluth tourist economy will benefit from this opportunity. Not only will specific groups benefit but the volunteer will take an experience away that may help build their own personal resume. This proposal being a community led project will allow volunteers to connect with their surrounding environment instilling stewardship for the land and the diverse ecosystem habitat.

The volunteer will commit to a time that falls in the duration of May 2010 to November 2010, weather permitting. The necessary skills needed from the volunteers will be physically fit as heavy lifting and areas of steep and unstable ground may occur. Volunteers may be required to lift heavy objects and must be able to conduct manual labor tasks.

Volunteers may be found by promoting the opportunity to the surrounding area by:

Press releases: this is the most direct and efficient way to reach a large number of potential volunteers, and it will increase the profile of the organization. The press release will be conducted through a concise overview of the project and the want and need for the specific volunteer projects.

Organizations newsletters and websites: the same message conveyed in the press release will be similar to what is expressed through the newsletters and website messages. If a website is to be constructed it should be easy to navigate through, containing a volunteer FAQ page and a link to the appropriate forms and information regarding volunteering.

Community (Volunteer) Centers: opportunities can be registered with existing volunteer referral services, like those found at university centers. Volunteer postings may also be posted on the community library and city web pages.

Community Groups and Leaders: meeting and networking with local community and service leaders may lead to the development of a volunteer support system

Word of mouth: inexpensive and low-tech, volunteers telling other about volunteering can be a particularly successful recruitment tool.

Informal networks of friends, family members, list serves, and distribution lists.

Newsletters and websites of businesses, civic groups, partners, statewide organizations, conservation groups, public agencies, etc

Equipment and supplies needed

Hand tools:

- Shovel-flat and round
- Rake- garden and lead
- Hoe
- Cultivator
- Broom
- Digging bar
- Tamper
- Axe
- Hand saw
- Pruners and lopers
- Buckets and trash bags
- Rope and/or chain
- Carpentry tools (hammer, saw, screw driver, etc.)

Power tools:

- Walk-behind mover
- String hammer
- Chain saw
- DR Trimmer of sickle-bar mower

Power equipment:

- Lawn tractor (mower)
- Garden tractor with attachments (mower, blade, loader, sickle-bar)

Large power equipment:

- Bobcat
- Chipper
- Loader/backhoe
- Dump truck
- Grader
- Bulldozer
- Paving machine
- Roller

Preliminary project budget

Staff salary and benefits: Judy Gibbs hired as an independent contractor will receive an estimated net salary of \$6,000 (\$1,000/month on a 6 month timeframe). The independent contractor will be required to provide their own insurance which is on average \$300 per year.

Cost per foot estimate: further information needed to determine

Total trail cost estimate: further information needed to determine

Equipment/Tools: will be provided by the city of Duluth free of charge

Safety equipment: will be provided by the city of Duluth free of charge

Materials for work: gravel will need to be purchased from the city of Duluth at a rate not yet determined

Travel expenses: none

Office supplies, other materials, Printing/copying, Postage, Phone/email/internet, advertising/marketing: none

Training expenses (safety training, volunteer orientation- materials, and food/drink): none

Recognition activities/events (awards, food/drink/location rental): donated

Funding opportunities

The budget required for the construction of the extension of the Western Waterfront Trail is not yet determined but what is known is due to the grassroots level of this project the end cost has potential to be a low-cost venture. The main cost in the budget is the hiring of a volunteer

coordinator, which is listed above. Staff will be brought in through volunteer efforts, which requires no cost. Materials can be donated and acquired for a minimum not yet determined, as well as miscellaneous expenses not yet determined. The funding source of this project will need to be acquired through the grant writing process. Many of the grant opportunities that could be utilized, can be found through the Department of Natural Resources, National Oceanic and Atmospheric Association, U.S. Fish and Wildlife Services, National Audubon Society, as well as opportunities through the University of Minnesota Duluth, as well as surrounding universities, fundraising, and donation. Making the most of these accessible source grant funders the budget needed can be acquired with ample money to complete the project. The deadline dates for many of the grant opportunities is typically in the Fall and Winter months with awards being granted in the Spring of the following year. This would coincide with the time-frame of the project with construction beginning in late April (depending on the frost and thaw of the season).

Potential trail support organizations

1. St. Louis River, Great Lakes, Lake Superior advocacy groups
2. Hiking, biking, skiing groups
3. Land Trust organizations
4. AmeriCorps, Minnesota Conservation Corp Volunteer groups
5. Board members of various participating organizations
6. Business and professional organizations
7. Churches and religious groups
8. Community service restitution programs (court service requires)
9. Corporations and small businesses
10. Friends groups of local, state, and national parks

11. National sororities and fraternities
12. Public agencies and retired personnel
13. Schools- service learning programs, honors programs, parent groups
14. Girl and boy scouts troops or other youth groups
15. Senior citizen groups, Senior Corps Programs
16. Kiwanis, Rotary clubs, Junior leagues
17. University/college/community college organizations
18. Volunteer centers: United Way, True North

Timeframe of project- length of duration, daily work hours

The project is tentatively projected to begin construction in the late spring of 2010. Construction will continue until the beginning of November 2010. Work hours will be set by the volunteer coordinator during this time. With the varying schedules of the volunteers, work hours will be flexible and scheduled at the coordinator and volunteer's convenience.

Long-term maintenance

Ownership of the Western Waterfront Trail running from Riverside to Morgan Park will be claimed as public land and owned by the municipal government of the city of Duluth.

The trail will be maintained by the city of Duluth and volunteers. Since ownership is held within the municipal government the role in liability is much stronger than if the trail were to be privately owned. Therefore the city takes on the task of maintenance and ownership in exchange for low-cost maintenance. Also to be noted is the city's ability to provide assistance in disaster situations such as flooding or erosion.

Funds will be raised and allocated as needed for long term maintenance projects. People will take on the task of maintaining the trail with a goal of long term sustainability because of personal will and a love for the trail rather than being assigned a task and forced to complete it. Other funding options for long term maintenance could/will be to establish a long-term maintenance endowment; raise funds locally and get support from tourism and recreation taxes and fees. When constructing a trail for minimal maintenance it is important to have minimal human, material and financial resources in construction because in the long run the less maintenance needed the better.

Methodology for the Resident, Business, and User Survey

The goal of the survey was to collect qualitative data in the Morgan Park community to gather opinions, views, concerns and ideas on the proposed Western Waterfront Trail extension that will be running through the Morgan Park community if constructed. This data will give valuable insight on specific issues that are rather important or un-important to community members. Conducting this survey will allow the Morgan Park community members to have an opinion in the proposal process of this project.

The survey consisted of a series of 20 questions pertaining to residents, business owners, and trail users. The specific questions were multiple choice and short opinion answers. Questions pertained to private and business property values, privacy, type of usage, how often trail will be used, benefits, concerns, amenities for trail, option for commuting, and willingness to volunteer.

The Morgan Park community club meets once a month and discuss issues that directly affect Morgan Park. The people who are in attendance for these meetings play an active role in the

community and are comprised of parents, teachers, coaches, business owners, advocacy groups, retired city planners and among many others. Recruitment was accomplished through attendance at monthly Morgan Park community club meetings. Meeting attendees had an option to fill out the resident, business, and user survey after the presentation was completed.

The rationale behind the survey was to make community members aware of the benefits of improving the physical image of Morgan Park and how it will increase resident's participation in promoting pride. Additional benefits can be seen through cleaning up the neighborhood and the continuing action with the beautification process. By creating connections with other neighboring communities, residents in Morgan Park will be able to gain walking or water access along Grand Avenue, the St. Louis River, and along the existing railroad corridor. With increased access to these areas new spots for various neighborhood activities and public uses will be made available. This will allow Morgan Park to continue with the mission of creating a sustainable close-knit community. With access points and the possibility of creating an economic and tourism corridor there is potential for business and economic development. The existing railway corridor can play a vital role in re-establishing connections to neighboring communities by linking pedestrians and bicyclists. By creating more physical linkages this creates a better way to bring communities together. The increased usage of land in this area has the potential to increase neighborhood services and programming for youth, family, and seniors for Morgan Park residents and surrounding communities, such as improved outdoor recreation opportunities. Lastly, Morgan Park residents will have an instilled quality of ownership for their community and thus will become more aware of their role in the environmental stewardship for the St. Louis River estuary and watershed.

Survey Results: Morgan Park Residents, Business Owners, and Trail Users Survey

Questions 1 asked; “Do you live in or own a business in Morgan Park.” The responses are as follows:

2 responded as renters

8 responded as homeowners

1 responded as a business owner

2 responded as other; City employee, homeowner in west Duluth; trail user

Question 2 asked; “What are some concerns you have regarding the extension of the trail?” The responders were asked to circle all that apply. The responses are as follows:

2 responded property values

1 responded privacy

4 responded crimes

2 responded safety (sharp turns, gravel, and bridges)

2 responded low points potentially flooding the trail

7 responded cleaning and maintaining the trail with specific concern to whom will be responsible

8 responded to access points in Morgan Park

3 had no response

Question 3 asked, “How often do you currently use the Western Waterfront Trail?” The responses are as follows:

1 responded daily

0 responded more than once a week

3 responded between 1 to 4 times a week

4 responded less than once a month

5 responded never

Question 4 asked, “How often do you think you would use the Western Waterfront Trail if it extended into Morgan Park?” The responses are as follows:

1 responded daily

4 responded more than once a week

4 responded between 1 to 4 times a week

3 responded less than once a month

2 responded never

Question 5 asked, “What activities do/would you use the Western Waterfront Trail for?” The responders were asked to circle all that applied. The responses are as follows:

12 responded walking

2 responded jogging

8 responded biking

1 responded horseback riding

5 responded cross country skiing

3 responded snowshoeing

1 responded birding

Question 6 asked, “What benefits do you see with extending the trail? The responders were asked to circle all that applied. Their responses are as follows:

12 responded a new place to walk

8 responded bird-watching

6 responded fishing

9 responded flowers

6 responded a place to escape the hustle and bustle of the city

7 responded a safe place for the children/grandchildren to play

9 responded a way to unite the community

10 responded making connections with nearby neighborhoods

7 responded another way to spend time outdoors

Question 7 asked, “In addition to the trail itself, what else would you like to see added along the waterfront? The responders were asked to circle all that apply. The responses are as follows:

7 responded public docks

6 responded a watercraft business (to sell/rent kayaks, canoes, paddle boats, and etc.)

7 responded more parks

9 responded benches and picnic tables

8 responded signage and maps

10 responded garbage cans

10 responded restrooms

4 responded water fountains

4 responded leave it as is: natural. Don’t commercialize it

Question 8 asked, “Would you use the trail for commuting to the adjacent neighborhoods (Riverside, Norton Park, and etc.)? The responses are as follows:

6 responded yes, I could use it to walk to my work, relatives, friends, or etc's home

1 responded maybe, but only if it is faster than driving

5 responded no, I would only use the trail for recreation

Question 9 asked, "How would you like to see the trail develop in the future? The responses are as follows:

7 responded keep it a simple nature-oriented trail

8 responded pave the pathway and maybe add a bench, but keep it simple

5 responded add several amenities to the trail, but don't make it as extravagant as the Lakewalk

1 responded transform it completely into a tourist attraction, like the Lakewalk

Question 10 asked, "Would you be willing to volunteer your time to help keep the trail clean?"

The responses are as follows:

9 responded yes, I could make a commitment to do so

1 responded maybe, as long as the work isn't too unpleasant or strenuous

2 responded undecided

Question 11 asked, "Would you be willing to volunteer your time to help maintain the trail?"

The responses are as follows:

6 responded yes, I could make a commitment to do so

3 responded yes, I may help out with a project or two, but I'm not willing to make a commitment

2 responded maybe, as long as the work isn't too unpleasant or strenuous

1 responded undecided

Question 12 asked, “Describe your overall feelings about extending the Western Waterfront Trail into Morgan Park, (comments, questions, concerns, etc). The responses are as follows:

- “Great”
- “The community really needs this; not just the Morgan Park community; this is a valuable city-wide resource”
- “Excellent idea”
- “It needs to be extended to Fon du Lac as originally designed as a way to connect neighborhoods and alternate transportation routes that separates traffic from vehicles”
- “Great project! I definitely would love to see this project move forward”
- “Very exciting project and fits perfectly with our revitalization plan”
- “The trail should be accessible from 93rd,”
- “Great, awesome, we have to do it! Involve the schools!”
- “Great idea”
- “Develop, pave, washroom, water fountain, trash bins,” in regards to amenities that should be addressed
- 4 had no responses

Survey Analysis: Morgan Park Residents, Business Owners, and Trail Users Survey

The meeting that was held on Tuesday; May 5, 2009 at the Morgan Park Community Club was conducted to hold a presentation of the current update on the proposal for the Western Waterfront Extension from Riverside to Morgan Park. There were 13 members in attendance that took part in the Morgan Park residents, business owners, and trail user survey. The survey was handed out at the end of the meeting and was conducted in an anonymous manner. No

names, ages, or address were taken down. The only information that the respondents were asked to write down in regards to demographics was whether they were a renter, homeowner, business owner, or other. Majority of the respondents were homeowners in Morgan Park, with addition to two renters in the area.

The respondents were asked about specific concerns regarding the extension of the trail. The main concerns were access points within Morgan Park, the cleaning and maintenance of the trail with regards to whom will be responsible for the cleaning and maintenance, and crimes occurring in the areas. Issues that were discussed with crime dealt with issues of safe lighting along the trail and parking areas. The noted issues above have been addressed in the creation of the trail route proposal. The map has been created with logical points of interest and accessible assess routes that will make the trail more easily and readily available to the public. The upkeep of the trail will be maintained through volunteer efforts led through the community and surrounding Duluth area. Duluth city employees will be responsible for the larger tasks at hand that cannot be accomplished through volunteer efforts.

When asked how often respondents used the trails the answers varied. Majority responded they use the trail once or more a month, while 1 responded daily, and five responded to never using the trail. The majority of respondents answered that they do in fact use the trail. The next question pertained to how the respondents would use the trail if the Western Waterfront were extended into Morgan Park. Their answers changed dramatically from negative to positive. In two categories four people responded they would use the trail more than once a week or one to four times a week, and three responding that they would the trail less than once a month. In the never category it went from five to two, which shows a positive change if the trail were to go through the Morgan Park community.

The respondents were asked what type of activities they would utilize through the trail being implemented. The main answers chosen were walking, biking, and cross country skiing; followed by snowshoeing, jogging, and birding.

The benefits that were seen by the respondents were positive. The responses chosen in dominant order were: a new place to walk (12), making connections with nearby neighborhoods (10), a way to unite the community (9), and answers responding to nature (30). This information is valuable because the main focus being analyzed through this proposal is that of which option will benefit the community most and majority of their answers revolve around community cohesion and improvement while still trying to maintain a balance with nature in ways that they can make the proposed trail accessible and easily enjoyable.

The respondents were asked in addition to the trail what amenities are desired along the proposed trail route. The most important amenities desired by the public are places to put garbage, restrooms, places to sit and eat and view wildlife, as well as, public access to the waterfront and business development to utilize the waterfront through kayak, canoe, or via boat, and accessible and readable signage before and along the routes. Many of these wants have been addressed through the G.I.S. component of this proposal in regards to sites where accessible waterfront locations could be located and locations determined where wildlife viewing will be optimal. With regards to amenities such as restrooms, garbage's, and water fountains; these will increase the cost of budget immensely and will be strongly analyzed where best case locations are and which areas will be utilized the most with these additional amenities.

The respondents were asked how they would use the trail and only one respondent said they would maybe use the trail, only if it were faster than driving. Otherwise the results showed that the trail will be used as a connector between homes and for recreational purposes only.

In regards to the future of the trail development the respondents were asked how they would like to see the area develop. Majority of the responses wanted the trail to be kept nature oriented and simple with the possibility to create areas where paved pathways were implemented as well as benches. Only one respondent wanted to create a recreational area similar to the Lakewalk, which was categorized as a developed tourist attraction.

There were two questions regarding volunteering to keep the trail clean as well as maintaining the up-keep of the trail. Majority of the responses were positive with respondents willing to commit to the development and maintenance of the trail. Only three responded that they were undecided and six responding they would maybe help only if the work required was not unpleasant or strenuous.

The last question asked was an open ended question with regards to their feelings about extending the trail. To note, only four respondents did not write anything for the last question.

The various responses are quoted below:

“Great”

“The community really needs this; not just the Morgan Park community; this is a valuable city-wide resource”

“Excellent idea”

“It needs to be extended to Fon du Lac as originally designed as a way to connect neighborhoods and alternate transportation routes that separates traffic from vehicles”

“Great project! I definitely would love to see this project move forward”

“Very exciting project and fits perfectly with our revitalization plan”

“The trail should be accessible from 93rd”

“Great, awesome, we have to do it! Involve the schools!”

“Great idea”

“Develop, pave, washroom, water fountain, trash bins,” in regards to amenities that should be addressed

Questions for Morgan Park Residents, Business Owners, and Trail Users

- 1.) Do you live or own a business in Morgan Park?
 - a. I'm a renter
 - b. I'm a homeowner
 - c. I'm a business owner
 - d. I'm a homeowner and business owner

- 2.) What are some concerns you have regarding the extension of the trail (circle all that apply)
 - a. Property values
 - b. Privacy
 - c. Crime
 - d. Safety (sharp turns, gravel, bridges)
 - e. Low points potentially "flooding" the trail
 - f. Cleaning and maintaining the trail
 - g. Access points in Morgan Park

- 3.) How often do you currently use the Western Waterfront Trail?
 - a. Daily
 - b. More than once a week
 - c. Between 1-4 times a month
 - d. Less than once a month
 - e. Never

- 4.) How often do you think you would use the Western Waterfront Trail if it extended into Morgan Park?
 - a. Daily
 - b. More than once a week
 - c. Between 1-4 times a week
 - d. Less than once a month
 - e. Never

- 5.) What activities do/would you use the Western Waterfront Trail for? (circle all that apply)
 - a. Walking
 - b. Jogging
 - c. Biking
 - d. Horseback riding
 - e. Cross-country skiing
 - f. Snowshoeing

- 6.) What benefits do you see with extending the trail? (circle all that apply)
 - a. A new place to walk

- b. Bird watching
 - c. Fishing
 - d. Flowers
 - e. A place to escape the hustle and bustle of the city
 - f. A safe place for the children/grandchildren to play
 - g. A way to unite the community
 - h. Making connections with nearby neighborhoods
 - i. Another way to spend time outdoors
 - j. Other, please specify: _____
- 7.) In addition to the trail itself, what else would you like to see added along the waterfront?
(circle all that apply)
- a. Public docks
 - b. A watercraft business (to sell/rent kayaks, canoes, pedal boats, etc)
 - c. More parks
 - d. Benches or picnic tables
 - e. Signage/Maps
 - f. Garbage cans
 - g. Restrooms
 - h. Water fountains
 - i. Leave it as is: natural. Don't commercialize it
 - j. Other, please specify: _____
- 8.) Would you use the trail for commuting to the adjacent neighborhoods? (Riverside, Norton Park, etc.)
- a. Yes, I could use it to walk to my work, relative's house, friend's house, etc.
 - b. Maybe, but only if it's faster than driving
 - c. No, I would use only the trail for recreation
- 9.) How would you like to see the trail develop in the future?
- a. Keep it simple nature-oriented trail
 - b. Pave the pathway and maybe add a bench, but keep it simple
 - c. Add several amenities to the trail, but don't make it as extravagant as the Lakewalk
 - d. Transform it completely into a tourist attraction, like the Lakewalk
- 10.) Would you be willing to volunteer your time to help keep the trail clean?
- a. Yes, I could make a commitment to do so
 - b. Yes, but only at my own leisure
 - c. Maybe, as long as the work isn't too unpleasant or strenuous
 - d. Maybe, but only if I was paid
 - e. No, because of a disability
 - f. No, but I would hope somebody else would
 - g. No, I don't support the trail extension at all
 - h. Undecided

11.) Would you be willing to volunteer your time to help maintain the trail? (repainting or repairing docks, bridges, medians, etc.)

- a. Yes, I could make a commitment to do so
- b. Yes, I may help out with a project of two, but I'm not willing to make a commitment
- c. Maybe, as long as the work isn't too unpleasant or strenuous
- d. Maybe, but only if I was paid
- e. No, because of a disability
- f. No, but I would hope somebody else would
- g. No, I don't support the trail extension
- h. Undecided

12.) Describe your overall feelings about extending the Western Waterfront Trail in Morgan Park, (comments, questions, concerns, etc.)

Project Title:

*Trail plan proposal for the continuation of the Western Waterfront Trail from
Riverside to Morgan Park*

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Project abstract

In the late 1970's, a proposal was made to develop the Western Waterfront Trail (WWFT) from the Duluth Zoo to Fond du Lac in a corridor roughly parallel to the old Lake Superior and Mississippi Railroad tracks. These tracks are owned by the City of Duluth and are leased to the Lake Superior and Mississippi excursion train for tourism purposes. These two segments of the WWFT trail were constructed. The first was between the Duluth Zoo and Riverside and the second portion of the trail was constructed between the Duluth and 63rd Avenue West in 1988.

Along the corridor moving to the south, the next logical extension is between Riverside and Morgan Park. What is needed now is to study exact alternative routes within the corridor location to determine the best trail option in terms of meeting ADA standards, views, impacts on the environment, access to the river and water front, as well as other natural areas and logical connections with adjacent neighborhoods.

Statement of the problem

Morgan Park has an abundance of natural resources, green space amenities, and wildlife observation opportunities that are not being fully utilized in regards to the available recreational space. The available land that could be used for the proposed trail route is located along the Lake Superior and Mississippi railroad corridor. For years, this community has lived along the banks of the St. Louis River estuary, now accredited by the National Oceanic and Atmospheric Administration (NOAA) as a National Estuarine Research Reserve (NERR). Unfortunately, the Morgan Park community has had limited interaction with the waterfront due to lack of accessibility. There is an opportunity here to establish public access to the river so that all can enjoy their natural environment. Developing the WWFT trail that links the residential areas to the waterfront is a strong desire made by the community. With a trail established and an increase in water access availability, community members and all will be able to enjoy various recreational activities such as hiking, wildlife viewing of migrating birds, and enjoying the multiple scenic overlooks viewing the St. Louis River estuary.

Community Improvement Rationale

Improving the physical image of Morgan Park will increase resident's participation in promoting pride. Additional benefits can be seen through cleaning up the neighborhood and the continuing action with the beautification process. By creating connections with other neighboring communities, residents in Morgan Park will be able to gain walking or water access along Grand Avenue, the St. Louis River, and along the existing railroad corridor. With increased access to these areas new spots for various neighborhood activities and public uses will be made available. This will allow Morgan Park to continue with the mission of creating a sustainable close-knit

community. With access points and the possibility of creating an economic and tourism corridor there is potential for business and economic development. The existing railway corridor can play a vital role in re-establishing connections to neighboring communities by linking pedestrians and bicyclists. By creating more physical linkages this creates a better way to bring communities together. The increased usage of land in this area has the potential to increase neighborhood services and programming for youth, family, and seniors for Morgan Park residents and surrounding communities, such as improved outdoor recreation opportunities. Lastly, Morgan Park residents will have an instilled quality of ownership for their community and thus will become more aware of their role in the environmental stewardship for the St. Louis River estuary and watershed.

Methodology for data collection and analysis

The city of Duluth holds the specific GIS spatial data layers needed for trail planning. The specific data needed is the parcel property polygons that will be joined to the assessor's data tables and zoning data. The assessor's office can provide a table of data after we have discovered which parcel the trail and easements intersect within the GIS data. The proposed analysis for trail layout in the GEOG 5995; GIS Urban Analysis, course taught by Stacey Stark, would be for students to use topography and property ownership data to view and determine access to the river, slopes, ownership to find different trail scenarios for the most scenic route, most accessible for various ability users, and least "cost" based on types of landscape traversed, slope, and ownership issues. This will be done as a two week lab project using GIS analyses that will determine access to the river, slopes, aspects, and viewsheds along the trail. Two to four scenarios will be presented to me, Samantha Follis, upon completion of the project.

With the proposed trail routes determined, I Samantha Follis, LISC intern and UMD student, will be able to conduct research and write a comprehensive summary of the proposed trail. The various issues that may arise with trail implementation may be environmental concern, land use, history of ownership and policy issues.

Comparative Case Study

An important endeavor, the Cayuga Waterfront Trail, located in Ithaca, New York, shows similarities that can be helpful in the Western Waterfront Trail development. An active project, it is just moving beyond the planning phase into implementation, and has similar goals, citizen participation, and research that can be helpful as a case study for Duluth.

The Cayuga Waterfront Trail is on the inlet canal adjoining Lake Erie, and is a similar case study when compared to the Western Waterfront Trail. The usage of this area began as an Iroquois settlement area. As white settlement occurred in this area, the shipping industry prospered. As the industrial era came to a close, environmental concern arose because of the degradation that occurred due to dredging and a century long shipping industry. The Cayuga Waterfront Project, similar in context to the Western Waterfront Trail site, had an interest in increasing the access to the waterfront, as well as promoting an active living initiative and improving the public health. They saw opportunities for a potential tourist destination and ways the waterfront could support economic development.

This designated area of land would allow residents, community members, and tourists to travel along a corridor that allowed them the opportunity to walk, run, bike, or rollerblade along the Cayuga Waterfront. The Cayuga Waterfront Trail is broken down into three phases, much like

the anticipated outcome for the Western Waterfront Trail. The first phase has been completed and is a 2-mile loop, which allows residents to walk, run, bike, the first section of the trail. The second phase is a 1.5 mile corridor that connects with the first section of the trail. This section runs through an area of great economic possibility. Along this corridor a farmers market and multiple restaurants have been established.

The third and final phase, of the Cayuga Waterfront Trail is planned to be constructed May 2009 or 2010. This section of the trail will deal with similarities shared with the Western Waterfront Trail in regards that there will be a period of anticipated negotiations with the local railroad company, The Norfolk Southern Railroad. Similar to the Western Waterfront Trail located from Riverside to Morgan Park, we will be facing land ownership issues with the Lake Superior and Mississippi Railroad.

Anticipated outcomes/product

This project will serve as an opportunity for the participating students to work on a project that has multiple level aspects of a specific real life situation. This will be beneficial to the students, staff, institution, and the Duluth community of Morgan Park. This project will initiate the forward movement toward the common goal of the Morgan Park community in economic, community, and land use development and sustainability. Once the proposed trail map has been established, I, Samantha Follis, will be able to write a comprehensive summary of what the proposed trail will consist of in regards to costs, best case route scenarios, water access location sites, land ownership issues, and etc. During the writing of the comprehensive summary I will be able to complete a comparative study of the Western Waterfront Trail to the Cayuga Waterfront Project. This will allow me to take the issue at hand and compare it to what has been done in

Ithaca. It will also enable me to look at the barriers the Cayuga Waterfront Project experienced and what they learned. As questions arise from the Morgan Park community I will be able to inform the residents of the similar situation Ithaca faced and the ways in which they dealt with the problems, solutions and outcome that were created.

With the creation of a proposed trail plan and comprehensive summary, myself or community members such as Bill Majewski or Debbie Isabell-Nelson will have the necessary materials to present the WWFT plan to the Morgan Park Community Club as well as the City of Duluth.

With proper funding from local and official organizations me, Samantha Follis, or other Morgan Park community members will be able to implement this trail design within the designated trail area between Riverside and Morgan Park along the St. Louis estuary and waterfront.

Participant and project role

Samantha Follis: Project coordinator, research, marketing, time management, acquiring needed data, connecting resource groups, and presenting trail proposal to the City of Duluth.

Stacey Stark: Parcel and data collection of site specific area, collaborate with UMD students in creating a proposed trail plan. Hiring and supervising student GIS support worker.

Adam Pine: Assistance in conducting urban policy planning and public and private land ownership issues research.

Bill Majewski: Marketing trail proposal to the community and to Stacey Stark's GIS class participants re: Morgan Park's community interests, connecting resource groups.

Debbie Isabell-Nelson: Lead person at Morgan Park Community Club meetings (coordinator and club president), bring together various focus groups.

Nan Stubenvoll: Supervise student intern and facilitate meetings as needed.

Unnamed student: GIS and digital data support

Time table for tasks

January 20- February 20:

In-class opportunity; trail map production

Stacey Stark incorporates the Western Waterfront Plan/Trail as a planning scenario in her spring 2009 semester Advanced Urban GIS class. She will prepare material for a 2 week lesson for the students. The students will have an opportunity to participate in a real life situation and project. If the students choose to do so, they have the opportunity to participate and continue to plan for the expansion of the Western Waterfront Trail through Morgan Park. Bill Majewski, former city planner, will be able to come into the classroom for a 10-15 minute introduction on what the project entails and what the students should be considering when approaching this specific project. The students will be required to research particular options for a preliminary trail plan, including wheelchair accessibility, most scenic and lowest cost projection. With the information the students have collected, they will be able to create a map projection of their choice for a possible trail option in Morgan Park.

- This project will benefit students with a situation that can be applied to a real life scenario

- Students will be able to create a proposed trail route for the continuation of the Western Waterfront Trail from Riverside to Morgan Park.
- Implementation planning
- Students will be able to continue with this project outside of the classroom and continue to prepare their proposed trail route to the community of Morgan Park.
- Students participating will be able to play an active role in trail and implementation planning, community involvement, urban planning and land ownership issues.

After the in-class work has been completed a student of Stacey Stark's choice or a student volunteer will have a paid opportunity to continue working on the proposed trail mapping. They will be working on the trail adjustments that may need to be made with regards to Morgan Park's community interests and concerns. The student will work conjunctively with me, Samantha Follis, and the other participating members. They will also attend community and organizational meetings where they will be able to present the completed data done by the student.

Jan 20-March 20:

Comprehensive summary

After the trail route has been established a comprehensive summary will be written. This will include what the proposed trail route will consist of including the design elements of the specific trail, costs of trail construction, and the environmental and public land ownership implications that may follow due to trail construction along the St. Louis River estuary.

March 20-April 30:

Trail proposal presentation

Following the writing of the comprehensive summary the material will be presented to the Morgan Park Community Club for support in the next step which is presenting the proposal to the City of Duluth for additional funding that will be needed for trail construction. Also to be included in the proposal presentations are the Duluth LISC staff and advisory committee, FITCity Active Living Committee, NHS staff, St. Louis River Citizen Action Committee (SLRCAC).

Requested Budget

Parcel and zoning boundaries data from the City of Duluth	\$625.00
Processing fee for assessors database query	\$25.00
GISL use fee (per student GIS use hour)	80 hours at \$4.00 per hour = \$320.00
Stacey Stark; GIS Specialist (hire and oversee GIS support position)	8 hours at \$45.00 per hour = \$360.00
Samantha Follis; project coordinator, research	120 hours at \$10.50 per hour = \$1,260
Student position GIS support	80 hours at \$10.00 per hour = \$800.00
Miscellaneous supplies (e.g. printing, public hand-outs, office supplies)	\$250.00
Travel	0.58 cents per mile = \$65.00
Adam Pine; Assistant Professor of Geography Director, Urban and Regional Studies	Time donated
Stacey Stark; GIS Specialist	Time donated
Nan Stubenvoll; LISC Program Director	Time donated
Bill Majewski; volunteer	Time donated
Debbie Isabell-Nelson; volunteer	Time donated
Student volunteers	Time donated
	Final amount requested: \$3,705.00

Detail Budget

Parcel and zoning boundaries data from the City of Duluth at a fee of \$625.00 has been requested by Stacey Stark. This data is necessary as input for the trail maps that will be completed. In order to obtain the data a \$25.00 fee is required from the City of Duluth.

In conjunction to the two week lesson held through Stacey Stark's GEOG 5995; GIS Urban Analysis course, an additional 80 hours of lab time will be needed to complete the necessary trail mapping. These 80 hours of work will be completed by a student participant not yet determined.

Outside of the two weeks Stacey Stark will spend in the classroom on this project she will need an additional 8 hours in the GIS lab to oversee and assist student work.

I, Samantha Follis, will spend over the 2009 spring semester an estimated 120 hours of time coordinating the Western Waterfront Trail proposal plan. Within the given time I will be conducting research and a comparative study on the various urban planning and policy issues that may arise as well as completing a comprehensive summary of the WWFT plan. I will also be leading the several meetings held with the participating interest and focus groups.

There will be an estimated five meetings with various organizations such as the Morgan Park Community Club, the Duluth LISC advisory board, FITCity Active Living Committee, St. Louis River Citizen Action Committee, and NHS staff. Hand-out materials will need to be printed and presented to attendees. As 0.32 cents per page an estimated \$35.00 will be needed for these miscellaneous materials. In addition Stacey Stark and students will need approximately \$215.00 to print the necessary maps. Each map printed will be \$43.00 and we are estimating we will need 5 maps printed. The final total for printed material is \$250.00.

The mileage round-trip from the University of Minnesota Duluth's campus to Morgan Park is 22 miles. I am estimating that we be making five trips out to the Morgan Park community. At a cost of \$0.58 per mile the estimated budget needed is \$65.00.

During Stacey Starks GEOG 5995; GIS Urban Analysis class, the students will spend two weeks; 6 hours of lecture and lab time, participating in a prepared lesson plan on the various trail planning scenarios presented.

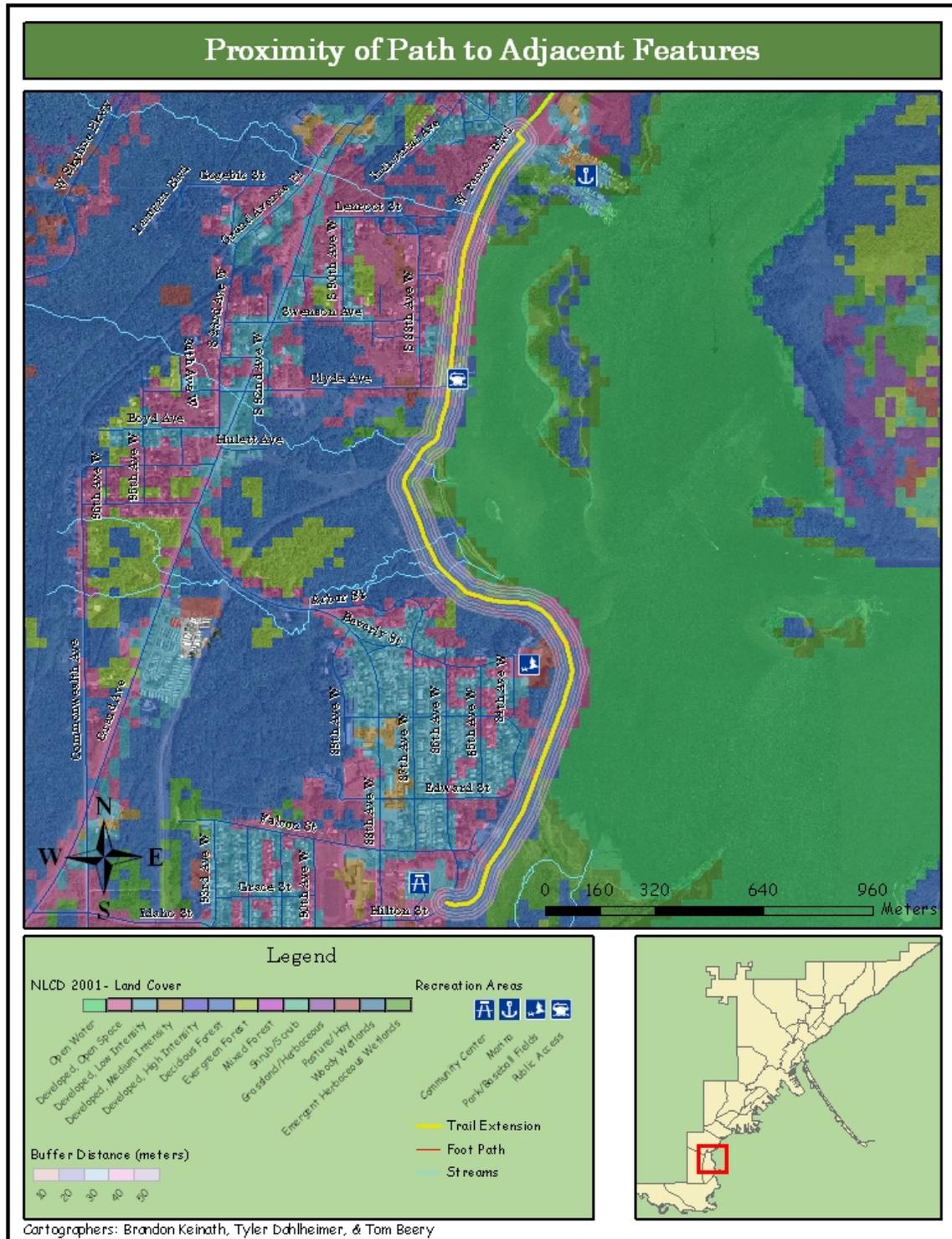
Adam Pine will be donating the necessary hours to oversee the writing of the comprehensive summary of the Western Waterfront Trail proposal plan.

Nan Stubenvoll will be donating time to supervise and facilitate the meetings that may occur throughout the given time.

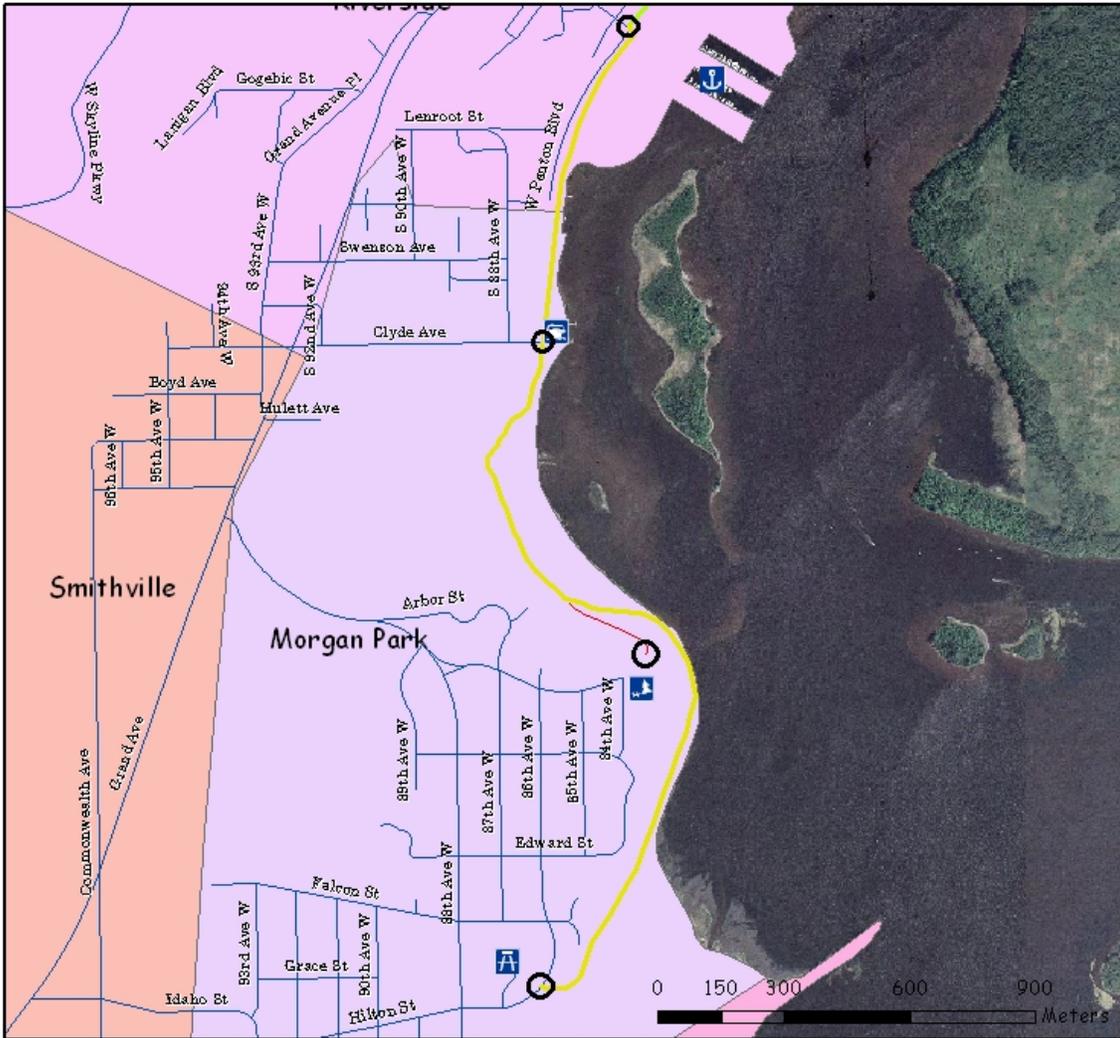
Bill Majewski will be donating his time through a presentation in Stacey Stark's GEOG 5995 GIS Urban Analysis course. He will be marketing the trail proposal to the class as a retired city planner and a Morgan Park community member. He will be representing the community's interest and concerns as well as connecting various resource groups. He will also be participating in many of the meetings held throughout the community and participating organizations.

Debbie Isabell-Nelson will be donating her time as the lead representative for the Morgan Park community through the organization Neighborhood Housing Services (NHS). Her role will be bringing together the various interest and focus groups that will play a participatory role within this project.

Appendix III. Additional trail maps created by UMD students



Neighborhood Access Points



Legend

Recreation Areas

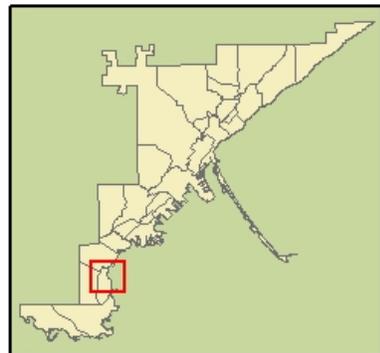
Description

-  Community Center
-  Marina
-  Park/Baseball Fields
-  Public Access
-  Access Points

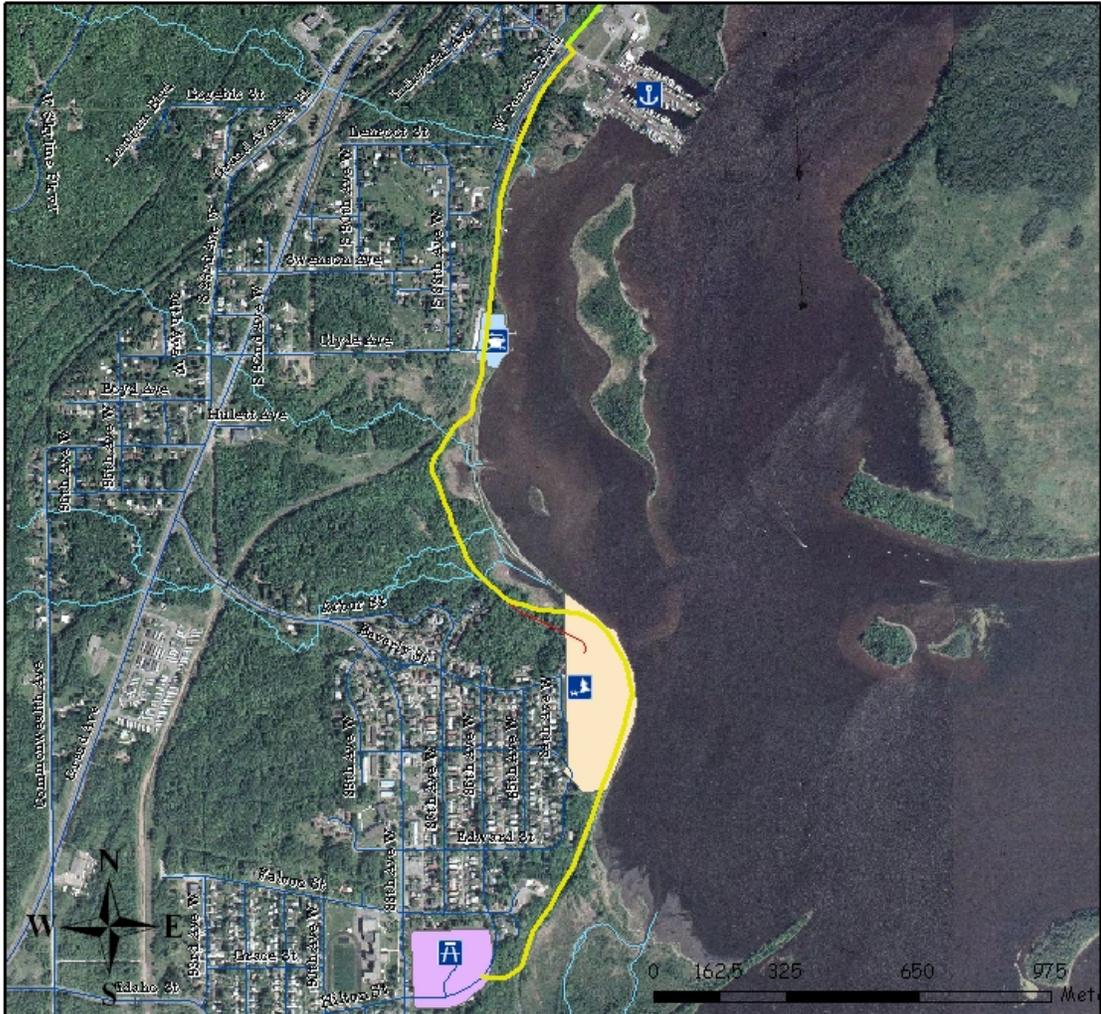


Cartographers:

Brandon Keinath, Tyler Dahlheimer, & Tam Beery



Parks and Other Recreation Connectivity



Legend

Parks

- Munger Landing
- Blackmer Park
- Morgan Park Community Recreation Center
- Original Trail
- Trail Extension
- Foot Path
- Streams

Recreation Area

- Description**
- Community Center
 - Marina
 - Park/Baseball Fields
 - Public Access



Cartographers: Brandon Keinath, Tyler Dahheimer, & Tom Beery

The Western Waterfront Trail Extension



Legend

Attractions	Description
	Extension
	Active Railroad
	Streams
	Foot Path
	Community Center
	Marina
	Park/Baseball Fields
	Public Access
	Munger
	Original Trail



Cartographers:

Brandon Keinath, Tyler Dahlheimer, & Tom Beery



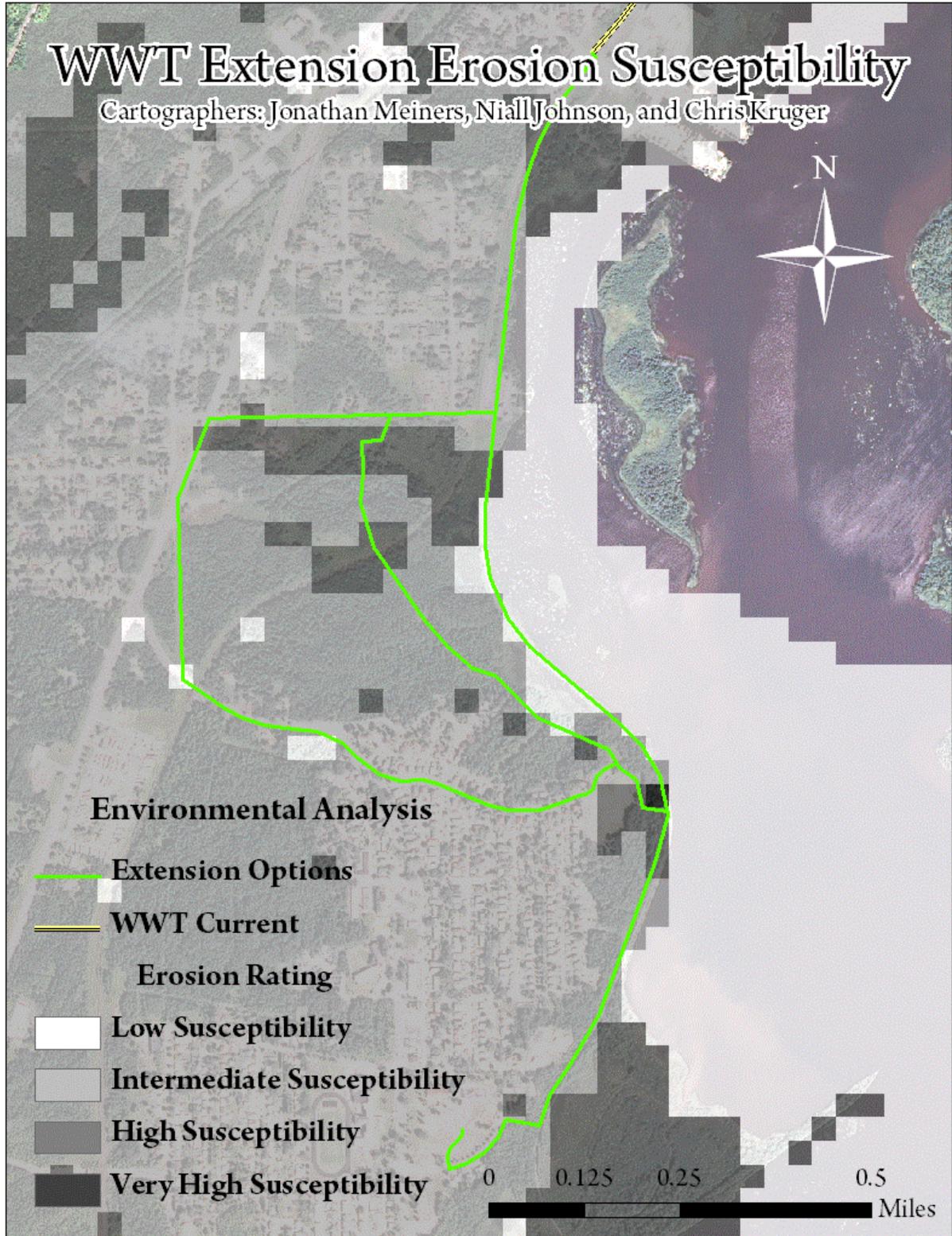
WWT Extension Plant Communities

Cartographers: Jonathan Meiners, Niall Johnson, and Chris Kruger



WWT Extension Erosion Susceptibility

Cartographers: Jonathan Meiners, Niall Johnson, and Chris Kruger

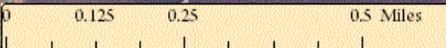
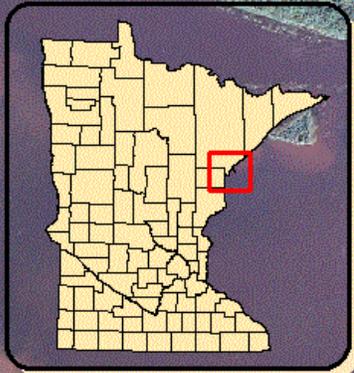


Morgan Park Community: WWTE Environmental Analysis



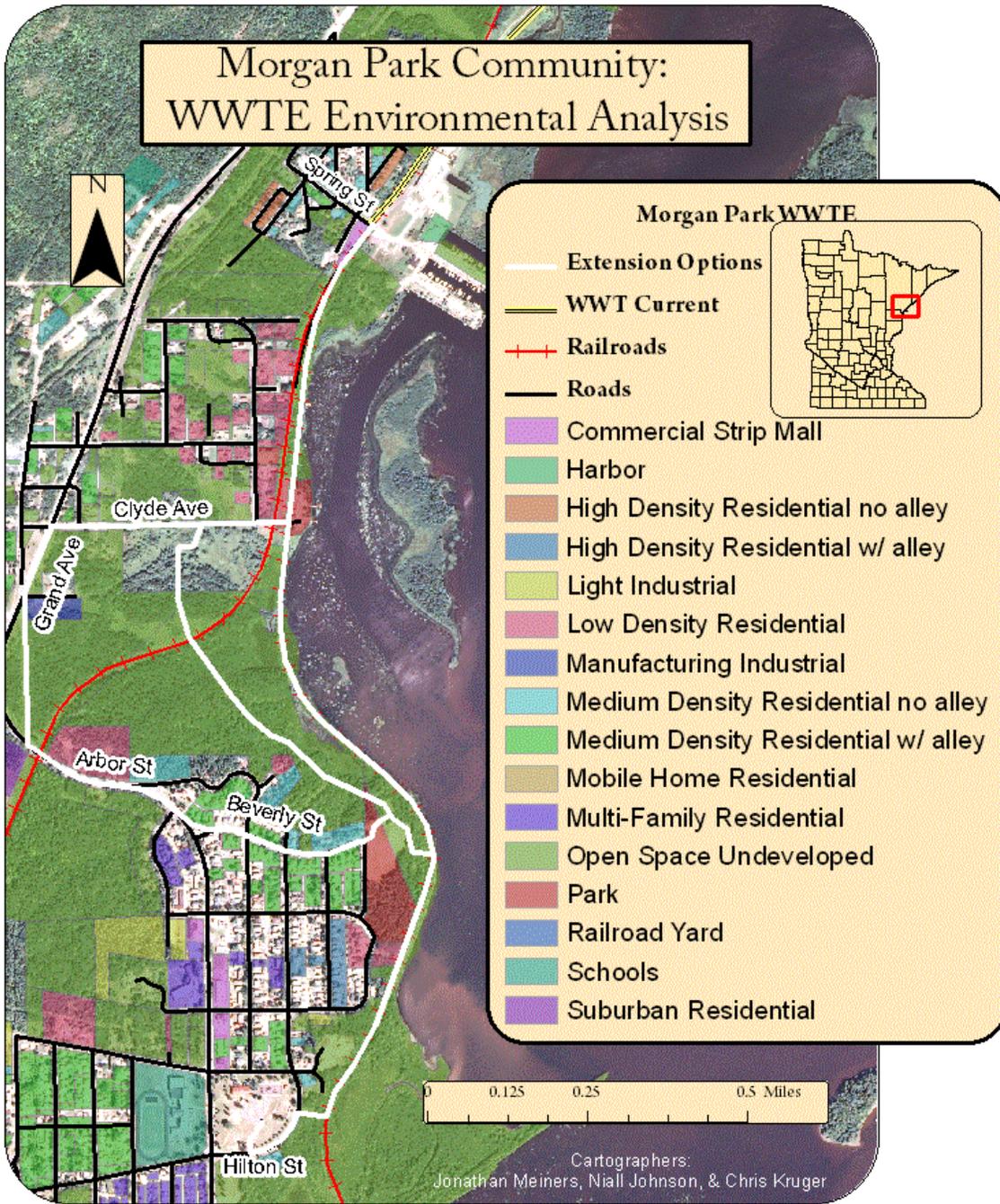
Morgan Park WWTE

- Extension Options
- WWT Current
- Natural Areas
- +— Railroads
- Roads



Cartographers:
Jonathan Meiners, Niall Johnson, & Chris Kruger

Morgan Park Community: WWTE Environmental Analysis



Western Waterfront Trail Extension Parameters



- Wetlands
- Public Land
- Proposed Trail

Sources:
MN DNR
City of Duluth
USGS
MN Department
of Admin
ADA

0 0.36 Miles

Cartographers:
Matt, Aaron, Alex

Western Waterfront Trail Extension Parameters



- Wetlands
- Public Land
- Proposed Trail

0 0.36 Miles

Sources:
MN DNR
City of Duluth
USGS
MN Department
of Admin
ADA

Cartographers:
Matt, Aaron, Alex

References for History of development and industry of the lower St. Louis River

DeVore, Philip W. 1978. *Fishery resources of the Superior-Duluth estuary*. Center for Lake Superior Environmental Studies, University of Wisconsin, Superior.

Duluth Seaway Port Authority. 2009. Port Facts. Accessed 5, February 2009.
<<http://www.duluthport.com/seawayfactsus.html>>

Finley, Robert W. 1976. *Original vegetation cover of Wisconsin*. Cartographic Laboratory, University of Wisconsin, Madison, WI.

Fritzen, John. 1978. *The history of Fond du Lac and Jay Cooke State Park*. St. Louis County Historical Society, Duluth, MN.

St Louis River Citizen Action Committee. 2002. *Interactive Lower St. Louis River Habitat Plan*. St Louis River Alliance. Date accessed February 3, 2009
<<http://www.stlouisriver.org/IAhabitatplan/habitatplan.html>>.

Kellner D K., T. Kroska, and K. Plass. 1999. Historic reconstruction of property ownership and land uses along the Lower St. Louis River. *St. Louis River Citizens Action Committee*, Duluth, MN.

Lusignan, Paul R. 1983. Superior intensive survey report. *City of Superior Community Development Office, Superior, WI*.

Myers, John. "Imperiled Estuary." Duluth News Tribune 17 May 2005 3 Feb 2009
<http://www.greatlakesdirectory.org/mn/051705_great_lakes.htm>.

Ojakangas, R. W., and C.L. Matsch. 1982. *Minnesota's geology*. Minneapolis, MN: University of Minnesota Press.

"St. Louis River Estuary." The Nature Conservancy. 2009. The Nature Conservancy. 3 Feb 2009<<http://www.nature.org/wherewework/northamerica/states/minnesota/preserves/art9465.html>>.

Walker, D.A., and S.P. Hall. 1976. Duluth-Superior Harbor cultural resources study. *Archeology Department, Minnesota Historical Society, St. Paul, MN*.

Resources for Group 3: Addressing minimal environmental impact and accessing natural areas

Benton-Benai, E. (1988). *The mishomis book*. St. Paul: Red School House.

La Rouche, G. P. (2001). Birding in the United States: A demographic and economic analysis. *United States Fish and Wildlife Service, Report 2001-1*.

Nature Conservancy (2009). St. Louis River Estuary. Retrieved 3/6/09 from <http://www.nature.org/wherewework/northamerica/states/minnesota/preserves/art9465.html>.

References for Economic Issues and Community Impacts

Brown County Planning Commission, Green Bay. (1998). Recreation trails, crime, and property values: *Brown County's Mountain-Bay Trail and the proposed Fox River Trail*.

Crompton, John L. *The impact of parks and open space on property values*, p. 109-121.

Lerner, Steve, Poole, William. (1999). The economic benefits of parks and open space. *The Trust for Public Land*, p. 41.

Mazour, Leonard P. (1988). *Converted railroad trails: The impact on adjacent property*. A Masters Thesis. Manhattan, KS: Kansas State University, Department of Landscape Architecture.

Minnesota Department of Natural Resources. (1980). *Living along trails: What people expect and find*. Saint Paul, MN.

Moore, Roger L., et al. (1992). *The impact of rail-trails: A study of users and nearby property owners from three trails*. Washington, DC: National Park Service.

National Transportation Enhancements Clearinghouse. (2002). *Enhancing America's communities: A guide to transportation enhancements*, p. 11.

Schenectady County Department of Planning. (1997). *The Mohawk-Hudson Bike-Hike Trail: Its impact on adjoining residential properties*. Schenectady, NY.

Seattle Engineering Department and Office for Planning. (1987). *Evaluation of the Burke-Gilman Trail's effects on property values and crime*. Seattle, WA.

Tracy, Tammy & Morris, Hugh. (1998). *Rail-trails and safe communities*. Rails-to-Trails Conservancy.